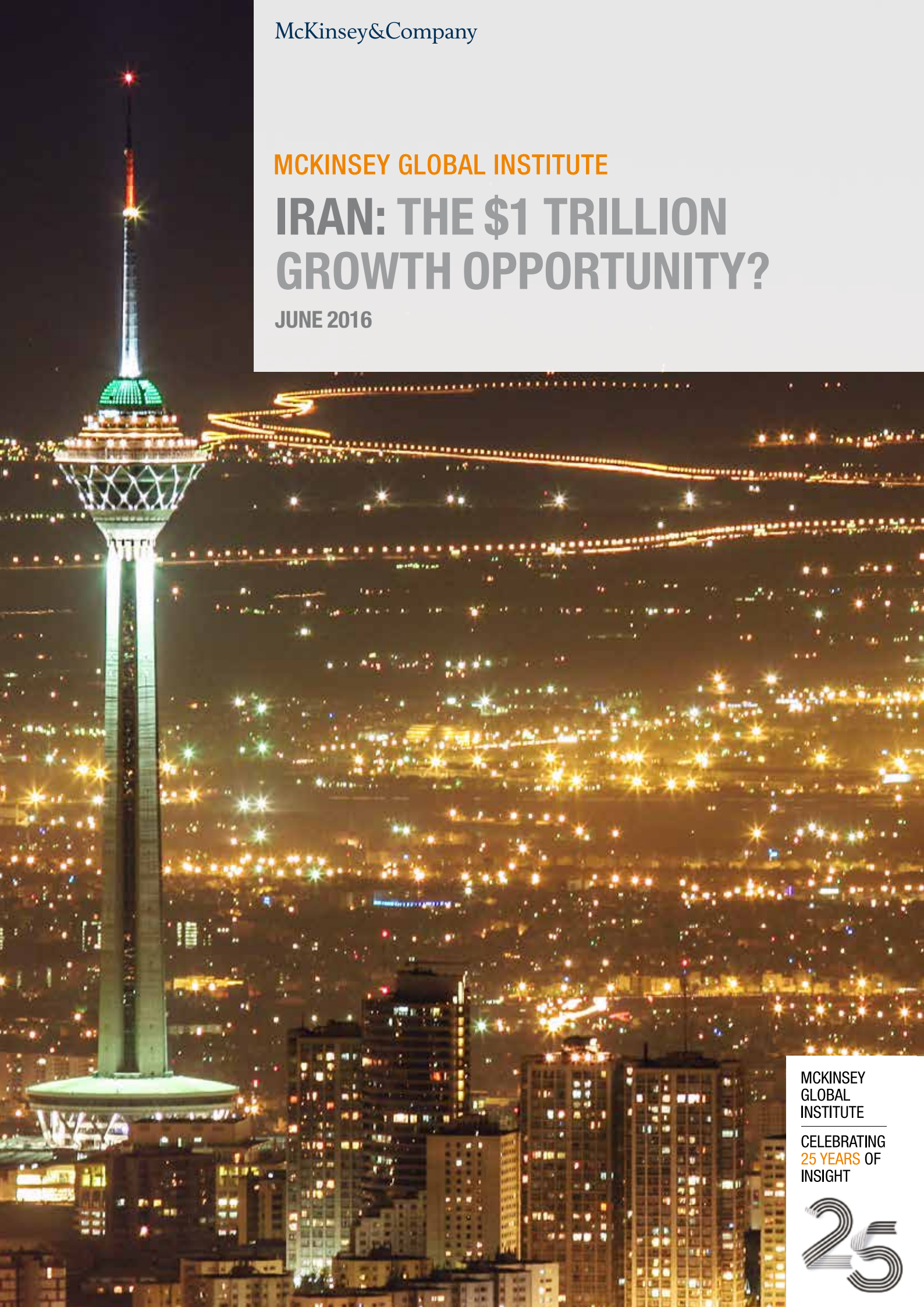


MCKINSEY GLOBAL INSTITUTE

IRAN: THE \$1 TRILLION GROWTH OPPORTUNITY?

JUNE 2016



MCKINSEY
GLOBAL
INSTITUTE

CELEBRATING
25 YEARS OF
INSIGHT



MCKINSEY GLOBAL INSTITUTE

In the 25 years since its founding, the McKinsey Global Institute (MGI) has sought to develop a deeper understanding of the evolving global economy. As the business and economics research arm of McKinsey & Company, MGI aims to provide leaders in the commercial, public, and social sectors with the facts and insights on which to base management and policy decisions. The Lauder Institute at the University of Pennsylvania ranked MGI the world's number-one private-sector think tank in its 2015 Global Think Tank Index.

MGI research combines the disciplines of economics and management, employing the analytical tools of economics with the insights of business leaders. Our “micro-to-macro” methodology examines microeconomic industry trends to better understand the broad macroeconomic forces affecting business strategy and public policy. MGI's in-depth reports have covered more than 20 countries and 30 industries. Current research focuses on six themes: productivity and growth, natural resources, labour markets, the evolution of global financial markets, the economic impact of technology and innovation, and urbanisation. Recent reports have assessed the economic benefits of tackling gender inequality, the global consumers to watch, a new era of global competition, Chinese innovation, and digital globalisation.

MGI is led by three McKinsey & Company directors: Jacques Bughin, James Manyika, and Jonathan Woetzel. Michael Chui, Susan Lund, Anu Madgavkar, and Jaana Remes serve as MGI partners. Project teams are led by the MGI partners and a group of senior fellows, and include consultants from McKinsey & Company's offices around the world. These teams draw on McKinsey & Company's global network of partners and industry and management experts. Input is also provided by members of the MGI Council: Eric Labaye (chairman of MGI), Andres Cadena, Richard Dobbs, Katy George, Rajat Gupta, Eric Hazan, Acha Leke, Scott Nyquist, Gary Pinkus, Shirish Sankhe, Oliver Tonby, and Eckart Windhagen. In addition, leading economists, including Nobel laureates, act as research advisers.

The partners of McKinsey & Company fund MGI's research; it is not commissioned by any business, government, or other institution. For further information about MGI and to download reports, please visit www.mckinsey.com/mgi.

MCKINSEY & COMPANY

McKinsey & Company is a global management consulting firm, deeply committed to helping institutions in the private, public, and social sectors achieve lasting success. For more than eight decades, our primary objective has been to serve as our clients' most trusted external adviser. With consultants in more than 100 offices in over 60 countries, across industries and functions, we bring unparalleled expertise to clients anywhere in the world. We work closely with teams at all levels of an organisation to shape winning strategies, mobilise for change, build capabilities, and drive successful execution.

IRAN: THE \$1 TRILLION GROWTH OPPORTUNITY?

JUNE 2016



Richard Dobbs | London
Homayoun Hatami | Paris
Tera Allas | London
Saba Arab | London
Arsalan Mahtafar | New Jersey

PREFACE

Prospects for Iran's economy are attracting widespread attention following implementation in January 2016 of a nuclear accord between Iran and the United States, the European Union, China, France, Germany, Russia, and the United Kingdom, and the subsequent easing of international sanctions. Numerous business and government delegations have been visiting Tehran and other cities to size up the potential opportunities and to sign deals and commercial agreements. Iran for years was largely cut off from the globalisation trends that have supported growth around the world. With some of the sanctions lifted, the country now has an opportunity to reconnect with the global economy, but many questions remain. How big is that opportunity, for Iran, and for the global economy? How could both Iranian and international companies capture it? And what measures would Iran need to adopt in order to help usher in a new era of prosperity?

This report discusses the strengths and challenges of Iran's economy and its potential over the next two decades to 2035. It is the fruit of several months of in-depth research, including an examination of key sectors of Iran's economy ranging from oil and gas to fast-moving consumer goods, agriculture, and information and communications technology. We find that Iran has the potential to add \$1 trillion to GDP and create nine million jobs by 2035. If it is to realise this potential, Iran will have to put in place key enablers of rapid growth, including measures to increase the attractiveness of the country to foreign investors, ensure macroeconomic stability, strengthen and deepen its financial system and its international connectivity, raise productivity, and upgrade its industrial infrastructure.

Whilst the political environment and stability are important to economic outcomes, we do not comment on politics in this report.

The analysis was led by Richard Dobbs, a McKinsey and MGI director based in London, and Homayoun Hatami, a McKinsey director based in Paris. Tera Allas, an MGI visiting fellow in London, headed the project team, which was directed by Saba Arab and Arsalan Mahtafar and comprised Julian Buckner, Samuel Byrne, Maggie Desmond, Alistair Fernie, Owen Gallogly, Sajjad Goli, Babak Hashemi, Amir Hosseini, Amir Ali Motahari, Juan de Francisco Rasheed, Kevin Russell, Ata Seifi, and Pegah Soltani. Peter Gumbel, senior MGI editor, and Matt Cooke, director of MGI external communications, also contributed to this report, for which Marisa Carder, Julie Philpot, Margo Shimasaki, and Patrick White provided editorial support.

We are grateful for the advice and input of many McKinsey colleagues around the world who provided industry expertise and analysis.

We are also grateful to a number of academics, experts, business executives, policy makers, and institutional stakeholders who offered their opinions and insights in private discussions.

The McKinsey Global Institute operates in full compliance with current laws and regulations, including US regulations. The McKinsey Global Institute is publishing this document for informational purposes only. It is not intended to facilitate, encourage, or support client activities.

This report contributes to MGI's mission to help business and policy leaders understand the forces transforming the global economy, identify strategic opportunities and challenges, and prepare for the next wave of growth.

While we are grateful for all the input we have received, the report is ours, including any errors. As with all MGI research, this work is independent and has not been commissioned or sponsored in any way by any business, government, or other institution.

Jacques Bughin

Director, McKinsey Global Institute
Brussels

James Manyika

Director, McKinsey Global Institute
San Francisco

Jonathan Woetzel

Director, McKinsey Global Institute
Shanghai

June 2016



The gardens of the Bagh-e Eram Palace in Shiraz are a UNESCO World Heritage Site.
© Latitudestock/Getty Images

CONTENTS

HIGHLIGHTS



Iran has a diversified economy



Building up knowledge sectors



Reconnecting with the global economy

In brief

Executive summary Page 1

1. Six core strengths Page 19

Iran can build future growth on fundamental strengths including a diversified economy, strong scientific education, a high degree of urbanisation, and an entrepreneurial tradition

2. The \$1 trillion growth opportunity Page 35

Our sector-by-sector analysis of Iran's potential suggests the country could add \$1 trillion to GDP and create nine million jobs within 20 years. We divide the sectors into four growth engines

Harnessing natural resource endowments Page 38

Nurturing internationally competitive industries Page 54

Transitioning to a knowledge-based economy Page 71

Expanding and modernising infrastructure Page 93

Special feature: Investing in Iran Page 104

3. Challenges, and an agenda for action Page 109

Iran's economy will need to undergo profound reforms if it is to realise its growth potential

Annex:

International corporate deals since the nuclear agreement Page 131

Technical appendix Page 133

Bibliography Page 149

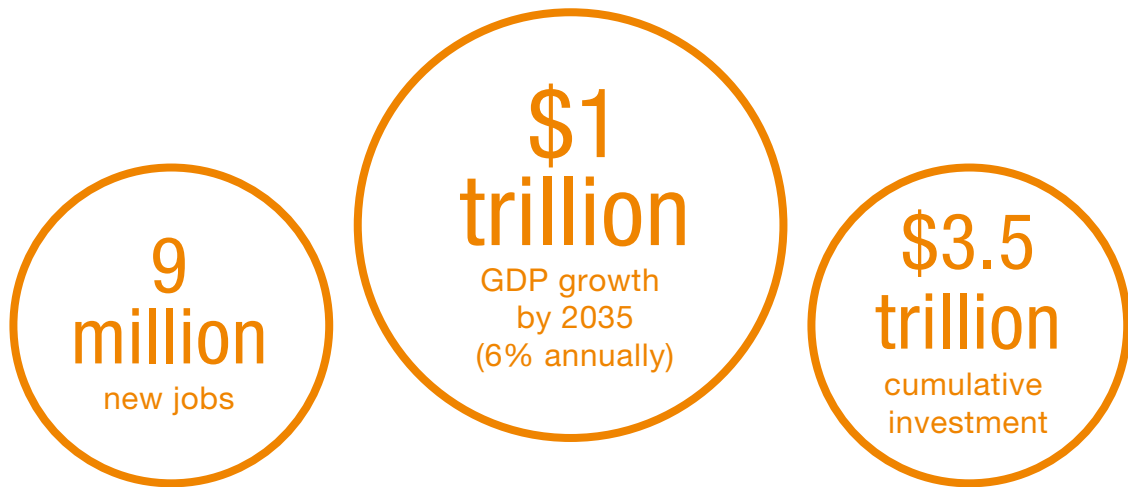
IN BRIEF

IRAN: THE \$1 TRILLION GROWTH OPPORTUNITY?

A new era has begun for Iran's economy. Isolated from the West, and operating in relative autarky, it has an opportunity to reconnect with the global economy following the January 2016 easing of international sanctions. Expectations of rapid growth are running high within the Iranian government, among ordinary Iranians, and in the domestic and international business community. In this report we gauge Iran's growth opportunity to 2035 through a sector-by-sector examination of the economy's potential and challenges.

- As Iran emerges from the sanctions era, it has six core strengths on which to build future growth. Its diversified economy, strong tradition of scientific education, and fast-growing consumer class, along with a high degree of urbanisation, a deeply rooted culture of entrepreneurship, and the country's geographic location between East and West, could all contribute to Iran's reconnection with the global economy and its future prosperity.
- Iran's very substantial oil and gas reserves will be essential drivers of economic growth, but the country also has many other sectors with the potential to contribute to GDP growth and employment. They include other resource-based industries such as petrochemicals and mining; sectors including automotive, fast-moving consumer goods, and tourism that could become internationally competitive; information and communications technology, banking, insurance, and professional services that will be essential if Iran is to become a knowledge-based economy; and infrastructure-related industries such as transport, utilities, and construction that would enable growth.
- Our "micro-to-macro" approach, building a comprehensive picture from sector-by-sector analysis, finds that Iran has the potential to grow GDP by \$1 trillion and create nine million jobs by 2035. This implies an economic growth rate of 6.3 percent per year in projected real exchange rates gradually increasing over the next two decades. Such growth would require investment of about \$3.5 trillion and would increase global GDP by more than 1 percent.
- To realise this opportunity, Iran will need to improve productivity and upgrade its industrial infrastructure with an economy better able to attract and absorb domestic and foreign investment, new technology, and modern management practices, a financial system that efficiently channels savings to productive investment and is well connected to international systems, a labour market with greater flexibility and workplace skills and higher labour participation, and a business environment that encourages more dynamic competition and innovation. Transparency, the rule of law, corporate governance, and pace of reforms will also need to be improved.
- Alongside Iranian firms, international companies could have a significant role to play in building a stronger and more globally competitive Iranian economy. Foreign direct investment dried up during sanctions but is already starting to flow again. Since the implementation in January 2016 of the international nuclear agreement with Iran, many representatives of foreign companies have travelled to Iran to begin talks and, in some cases, sign commercial agreements.
- Realising Iran's potential for growth and its full reconnection to the global economy will take time and considerable effort. Not all international sanctions have been lifted, and Iran's government, whilst expressing its intent to introduce widespread reforms, will need to accelerate its reform agenda. Stability at home and in its international relations will be essential if Iran is to meet the high aspirations of its people for a flourishing economy in the two decades to come.

RECONNECTING WITH THE GLOBAL ECONOMY



Strengths

- Diversified economy with only one-quarter of GDP from oil and gas
- Scientific education producing as many engineers as the US
- Consuming class double the proportion of China and Brazil
- Urban population twice the proportion of India
- Entrepreneurial tradition with vibrant startup community
- Strategic location at the crossroads of East and West

Challenges

- Macroeconomic stability to minimise inflation and currency risk
- Competitive business and regulatory environment reducing red tape
- Flexible labour market increasing participation and decreasing unemployment
- Well-functioning financial system recapitalising and reconnecting banks
- Attracting and deploying investment of \$3.5 trillion





A modern shopping mall in Isfahan.

© Simon Dawson/Bloomberg/Getty Images

EXECUTIVE SUMMARY

International sanctions against Iran were partially lifted on January 16, 2016, following implementation of a nuclear agreement between Iran and the United States, the European Union, China, France, Germany, Russia, and the United Kingdom. But international business and government delegations began arriving in Tehran even before Implementation Day. Germany's economy minister took a group of business executives to Iran in July 2015. Russian President Vladimir Putin visited four months later. About 100 French CEOs went in February 2016, and Italian Prime Minister Matteo Renzi headed a delegation of 60 business leaders in April 2016. Meanwhile, Iranian government representatives have been travelling the globe to discuss opportunities for international investment. In January 2016, President Hassan Rouhani led business delegations to France and Italy, where commercial agreements worth several billions of dollars were signed.

The nuclear agreement marked a turning point for Iran, with implications for the global economy as a whole. For the past two decades, Iran's trade and financial ties with much of the rest of the world have been subject to international sanctions that largely isolated its economy and contributed to uneven growth. In that period, it missed out on the productivity improvement and globalisation wave that has supported growth around the world. In 1989, Iran's economy was on a par with Turkey's in absolute terms; in 2014, it was about half the size, with a GDP of \$415 billion and GDP per capita of \$5,400 in nominal terms. Adjusting for purchasing power, Iran's economy in 1989 was 50 percent larger than Turkey's; in 2014, at \$1.4 trillion, it was slightly smaller.

Iran has an opportunity to increase GDP by \$1 trillion and create nine million jobs by 2035.

More than
\$130B
Value of
international deals
signed since
nuclear accord

The lifting of sanctions by the United Nations and European Union gives the country an opportunity to reconnect with the global economy and make up for the lost opportunity, although US primary sanctions remain in place. Expectations in Iran and in the international business community are high. In the ten months since the nuclear agreement was adopted in July 2015, preliminary business deals with global companies worth at least \$130 billion have been announced (for details see the annex at the end of this report). But many questions remain. How might domestic and international businesses capture the growth opportunities? Which sectors will likely be the engines of growth? And what steps will the government need to take for Iran to realise its potential?

In an attempt to answer these questions, we have conducted in-depth research on 18 sectors that will be sources of GDP growth and employment. They range from oil and gas and automotive to retail, information and communications technology, and infrastructure. We have also interviewed economic experts and business executives inside and outside Iran to analyse its underlying strengths and identify key challenges.

Based on this analysis, we find that, over the 20-year period to 2035, Iran has the potential to increase its GDP by \$1 trillion and create nine million jobs. Domestic companies will likely drive much of the future growth, but international companies could also have a significant role to play, bringing not just investment but also technology and management know-how that could enable significant productivity improvements. Iran will be able to build on some key strengths, including a high degree of economic diversification, as it seeks to achieve this growth. But it will also need to undertake significant improvements to put its economy on a stronger footing, able to support dynamic, sustainable long-term growth.

Realising this potential will require considerable effort. The government will need to accelerate the reforms that can deliver the most impact in the shortest amount of time and pursue with patience the longer-term structural changes required. Multinational firms will need to customise their business models and adapt to a unique business environment. Iranian firms will need to improve their productivity in the face of global competition. Financial institutions, in Iran and abroad, will have to reconnect to reopen financial flows. If such issues can be addressed, Iran could again play a role in the global economy that is commensurate with its long history and strategic geographic location between East and West.

IRAN HAS SIX CORE STRENGTHS ON WHICH TO BUILD FUTURE GROWTH

Iran's economy in 2014 was the 18th largest in the world measured on a purchasing power parity basis. In recent years, however, it has operated in a state of relative self-sufficiency, limited in its ability to interact with the rest of the global economy. The economy's performance has been fairly resilient to external shocks, including sanctions and slumping energy prices, but it has been clouded by low productivity, high unemployment, and tenacious inflation that has only recently been brought under control.

As Iran now seeks to reconnect with the global economy, accelerate its GDP and employment growth, and meet the aspirations of its young, urban, and upwardly mobile population, it will be able to draw on six core strengths. These are:

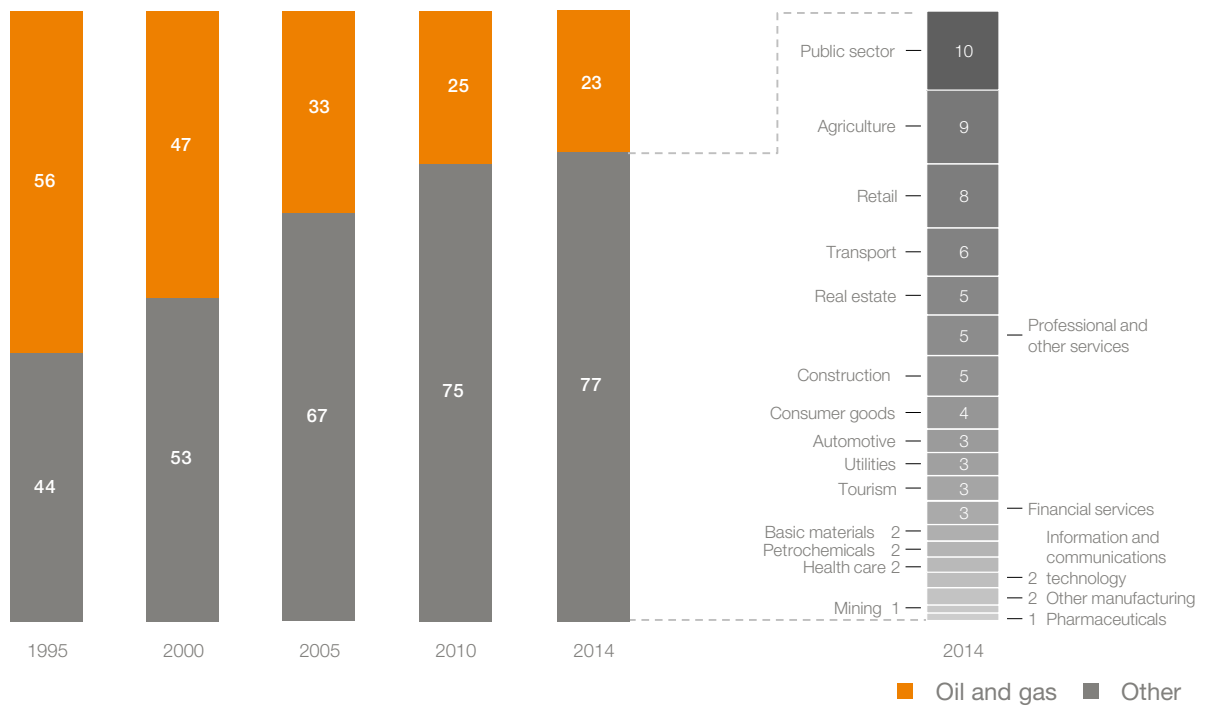
- **Economic diversification.** Iran has the largest proven gas reserves in the world and the fourth-largest proven oil reserves, and production costs for its oil and gas fields are among the lowest among its peers. These are key assets that will enable the economy to grow. At the same time, Iran's economy is highly diversified and not overly dependent on oil and gas, which in 2014 accounted for just 23 percent of gross value added, less than many other oil-producing countries in the region. For example, that compared with 30 percent in the United Arab Emirates (UAE) and 50 percent in Kuwait. Retail trade together with real estate, construction, and professional services make up a larger share of Iran's economy than oil and gas (Exhibit E1). Iran has significant reserves of copper and zinc. In 2014 it exported \$14 billion of petrochemical products, and the automotive sector produced more than one million vehicles. Indeed, one of the unusual characteristics for an economy of this size is its heavy reliance on domestic producers for a range of goods and services, from cosmetics to pharmaceuticals to electronic equipment.

18TH

largest economy in
the world in 2014

Iran has a diversified economy beyond oil and gas

Sectoral contribution to Iran's total gross value added¹
%



¹ Gross value added (GVA) plus taxes minus subsidies equals GDP; at the sector level, GVA is used in place of GDP.

SOURCE: IHS Global Insight; McKinsey Global Institute analysis

1/3
of Iranian graduates have engineering-related degrees

- Scientific education.** Iran has one of the highest levels of participation in tertiary education in the world, ahead of the United Kingdom, France, and Germany, and more than one-third of its graduates receive engineering-related degrees.¹ This puts Iran among the top five countries worldwide for the number of engineering-related students graduating each year, almost level with the United States and ahead of Japan and South Korea. Technical literacy is a powerful factor that can drive productivity and employment if the talents developed by Iran's education system are unleashed on the economy in rewarding jobs. In the past, some of the country's best and brightest have moved abroad to continue their studies or take employment or become entrepreneurs. They include Maryam Mirzakhani, the first woman to win the Fields Medal, the most prestigious global award for mathematics. Almost two-thirds of Iran's current cabinet members have doctorates, six of them from Western universities including three in the United States. By comparison, only two members of President Obama's cabinet have PhDs, whilst ten have law degrees (JDs).

¹ UNESCO Institute for Statistics. Engineering-related degrees consist of engineering, manufacturing, and construction studies.

8

cities with more than 1 million population

1/3

Iran's exports as a share of GDP

- **A growing consuming class.** MGI research has identified the size and dynamism of the consuming class as a predictor of rapid economic growth in emerging economies.² About 56 percent of Iranian households already have annual income exceeding \$20,000 adjusted for purchasing power parity, a level we define as “consuming households”. This proportion is more than double that of China and India, and of the BRIC economies of Brazil, Russia, India, and China, only Russia matches Iran. When adjusted for purchasing power, Iran’s retail sales per capita are higher than those in Turkey, Malaysia, or Mexico.
- **A highly urbanised population.** MGI research has shown the importance of vibrant cities for economic growth and projected that by 2025, more than 50 percent of global growth will come from cities in emerging economies.³ Iran’s degree of urbanisation outstrips its global ranking in terms of GDP per capita, which suggests that there is potential for future growth. The country has eight cities with more than one million inhabitants, the biggest of which—the capital, Tehran—has more than eight million residents and a GDP larger than that of Rio de Janeiro.⁴ With three-quarters of the population living in cities, Iran is more than twice as urbanised as India and also ahead of several European nations, including Italy, Portugal, Austria, and Ireland. Whilst the country has extensive urban and industrial infrastructure, this would need to be upgraded. Roads, ports, rail, and airports require heavy investment, and enhancements are needed in digital infrastructure, including high-speed broadband networks, both fixed and mobile.
- **An entrepreneurial culture.** Entrepreneurs in Iran enjoy higher status than in France and are on a par with those in the United States, according to the Global Entrepreneurship Monitor. Their inventiveness manifests itself in many ways. With many international companies long restricted from doing business in Iran, local Iranian entrepreneurs have stepped in to fill the gap. The top ten packaged food brands are all domestic, and Iran has home-grown versions of Amazon, YouTube, PayPal, and other Internet companies. Some of the three million or more Iranians who live outside Iran are notable entrepreneurs, including Arash Ferdowsi, co-founder of Dropbox, and Omid Kordestani, the former chief business officer at Google.
- **Strategic location for cross-border flows.** The legendary Silk Road between East and West once traversed the Persian Empire. Its size and position historically made it an important stop on east-west and north-south trade routes. The same features could again give Iran the potential to become a regional hub for commerce and a centre of diversified trade. Iran borders seven countries by land whose total population is 430 million, including nearly 40 million consuming households projected to grow at 5.2 percent per year by 2025. As of today, Iran has among the lowest stock and flows of foreign direct investment in the Middle East, partly as a result of sanctions. Its economy has nonetheless managed to remain in the global flow of trade, even as the pattern of its trade has changed markedly. Prior to the 1979 Revolution, the United States was Iran’s second-largest trading partner. Today the number-one partner is China, which accounts for almost 40 percent of all of Iran’s trade. India and Turkey also have boosted their commercial ties. Overall, Iran’s exports have fluctuated in recent years but still amount to about one-third of GDP, on a par with Japan and Australia. In absolute terms, Iran exports more than Egypt, Pakistan, and Morocco combined, albeit mostly in oil-related products.⁵

² *Urban world: Mapping the economic power of cities*, McKinsey Global Institute, March 2011. The income figures are on a purchasing power parity basis.

³ *Ibid.*

⁴ In 2015, measured in purchasing power parity, MGI Cityscope.

⁵ *World development indicators*, World Bank, 2015.

IRAN HAS THE POTENTIAL TO ADD \$1 TRILLION TO GDP AND CREATE NINE MILLION JOBS BY 2035

Iran has the opportunity to accelerate its economy by building on these strengths—but how fast could it do so, and what would it take? In addition to analysing macroeconomic indicators, we conducted an in-depth study of 18 industry sectors in Iran, using MGI's distinctive “micro-to-macro” approach to the economy. We found that the magnitude and speed of Iran's future economic success rests primarily on four engines of growth, along with macroeconomic reforms to improve the business environment.

Optimising the returns from Iran's natural resource endowments, especially oil and gas, is the first engine of growth. The second involves transforming what are today largely domestic manufacturing industries, such as automotive, basic materials, and fast-moving consumer goods, into internationally competitive sectors. The third requires Iran to accelerate its transition towards a knowledge-based economy, building on its strengths to grow and improve sectors such as information and communications technology (ICT) and financial services. Finally, physical and digital infrastructure will need to be modernised and expanded to underpin growth.

Achieving \$1 trillion in GDP growth would require cumulative investment to 2035 of about \$3.5 trillion.

Our analysis shows that, by boosting these four engines of growth, Iran has the potential to add \$1 trillion to its economy over the next 20 years, at projected real exchange rates.⁶ An increase of this magnitude would take Iran's GDP to the level of Spain's in 2014 or, on a per capita basis, above the 2014 level of Turkey, Russia, Malaysia, and Mexico. It would also increase global GDP by more than 1 percent. For Iran, this implies a 6.3 percent annual growth in the dollar value of its economy and the addition of nine million jobs, gradually ramping up over the next 20 years. As shown in Exhibit E2, this growth would be broadly distributed across a large number of sectors, further strengthening the Iranian economy's resilience to external shocks.

\$2.5T
Domestic
investment
required

This magnitude of increase in GDP would require wide-ranging improvements in Iran's labour productivity so that it rises by an average rate of 3.4 percent per year—similar to the experience of Turkey from 1980 to 2012. It would also require a larger labour force: Iran's population is already growing at a modest rate of 0.6 percent annually, but labour-force participation rates, especially for women, would need to increase. If Iran's participation rate rises in proportion with GDP, it would reach about 43 percent by 2035, up from 41 percent in 2014. These factors would add nine million jobs to the economy and reduce unemployment to just above 7 percent in 2035 from about 13 percent in 2014, even taking into account the population growth that is forecast.

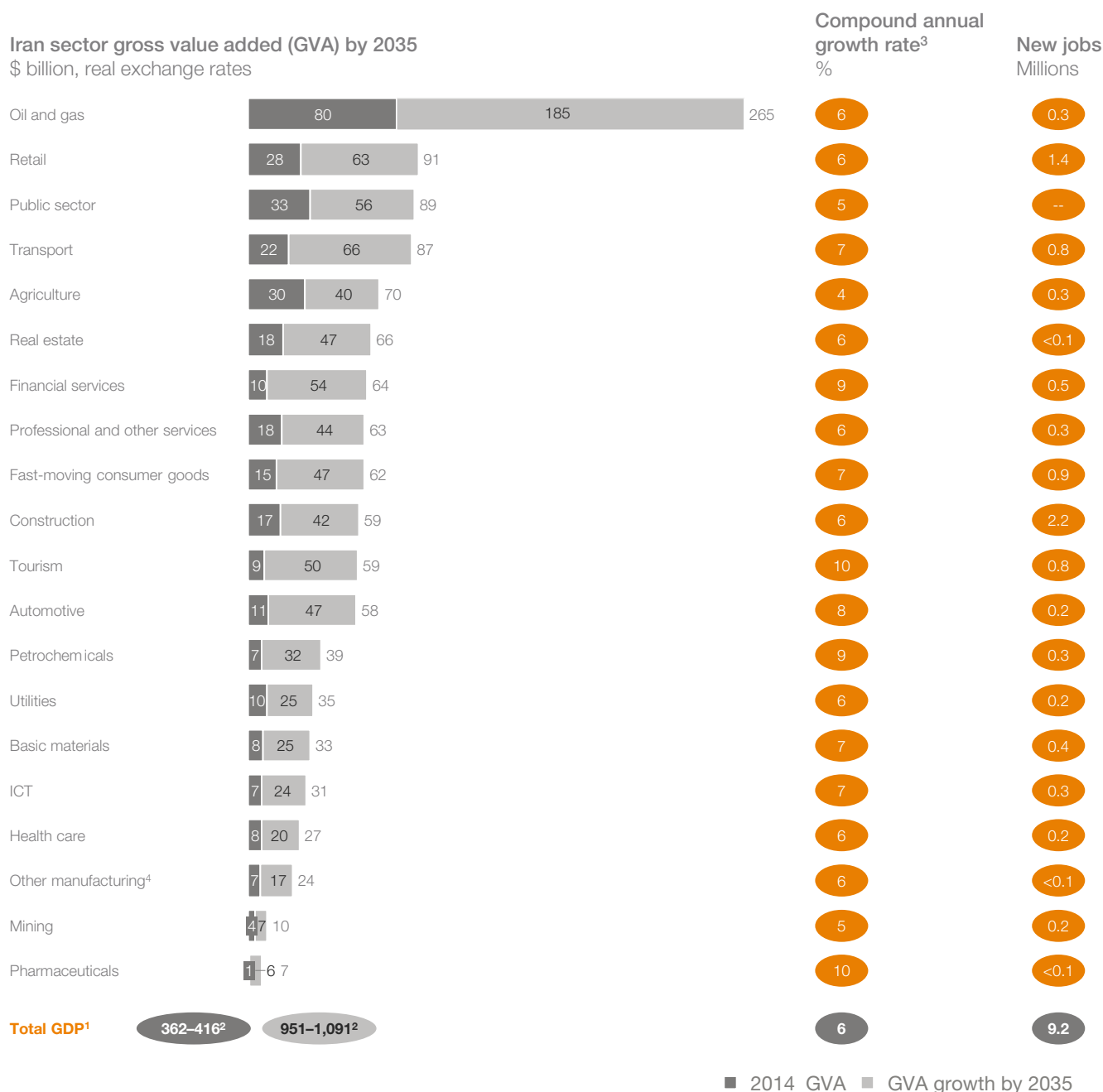
Achieving this growth would require substantial cumulative investment of about \$3.5 trillion between now and 2035. Leveraging its low debt ratio and high savings rate, Iran has the potential to source much of that investment domestically, although roughly \$1 trillion of this sum would likely have to come from foreign investment. Iran could benefit not just from the capital that international investors would bring, but also from the technology, know-how, and management practices of global companies. While oil and gas and Iran's other natural resources will use a large proportion of the required investment, we estimate that the three other engines of growth we identify will need at least as much and more. In particular,

⁶ All the sector gross value-added and investment projections in this report for 2035 are on the basis of projected real exchange rates. See Technical appendix for more detail.

expanding and modernising infrastructure will likely require in excess of \$1.5 trillion of the total cumulative investment by 2035, according to our analysis, compared with about \$550 billion for natural resources, about \$650 billion for nurturing competitive industries and almost \$800 billion for the transition to a knowledge-based economy.

EXHIBIT E 2

Iran could add \$1 trillion to its GDP and create nine million jobs by 2035



Note: Numbers may not sum due to rounding.

¹ Difference between the sum of the sector GVAs and GDP is explained by taxes and subsidies.

² Estimates for 2014 GDP vary from \$362 billion to \$416 billion, depending on source; the range in future GDP is driven by this baseline variance.

³ Includes 1.12 percentage points per sector from real exchange rate appreciation.

⁴ Other manufacturing includes textiles, paper and pulp, printing and publishing, machinery, equipment, appliances, and others.

SOURCE: McKinsey Global Institute analysis

In its Sixth Five-Year Development Plan (2016–21), the government is targeting an annual growth rate of 8 percent, up from 4 percent in 2014, and seeking to reduce to 8 percent both unemployment, which is around 13 percent, and inflation, which was 10 percent in 2015.⁷ To achieve this aspiration, sometimes referred to as 8-8-8, the government has outlined 31 economic priorities, which include improving the business environment, strengthening the financial system, and upgrading industry and infrastructure through the adoption of modern technology. The government plan also encourages investment by foreigners and Iranian expatriates.

Harnessing oil, gas, and Iran's other resource endowments

With the delivery of one million barrels of oil from the tanker Monte Toledo to Spain's Cepsa refinery on March 7, 2016, Iran restarted its crude exports to Europe. Oil and gas will play a critical role in boosting Iran's growth. A rebound in oil exports will likely provide the initial impetus to more rapid economic growth, whilst gas could sustain growth over the longer term. Exports of oil fell by more than 50 percent during the period of international sanctions and prices have dropped sharply since mid-2014, but Iran's natural gas production has grown strongly over the past two decades. This is due to development of the huge South Pars gas field, Iran's largest with 14 trillion cubic metres of recoverable reserves. Whilst gas for now is mainly used domestically and will play a key role in energising the domestic economy, significant net gas exports are likely to become a possibility in the next decade, delivered by pipeline or in the form of liquefied natural gas.

South Pars gas field has recoverable reserves of

14T

cubic metres

We estimate that oil and gas together could contribute \$125 billion to \$375 billion to Iran's GDP and add nearly 300,000 jobs by 2035. The wide range in our estimate is due primarily to considerable uncertainty about the future trajectory of oil and gas prices. It also depends on the level of investment the sector will attract to increase production over that period, and how it will overcome the technical challenges it faces, including infrastructure spread across hundreds of kilometres along the Persian Gulf and southern Iran. We estimate that oil and gas could absorb up to \$200 billion of investment in the next ten years.

The government's Five-Year Development Plan for 2016–21 calls for \$150 billion in oil and gas investment, with a priority on shared oil fields and enhanced oil recovery. The government's priority for gas is to rapidly increase production of the remaining phases of the South Pars field where the pullout of international oil companies during sanctions caused delays, higher costs, and gas lost to the Qatar side. Under current oil contracts, international companies are required to operate through locally controlled firms and earn revenue based on a buyback contract that is specific to the country. But Iran is looking to revise the commercial terms of its contracts and may move closer to a production-sharing model more in line with other oil-producing countries.⁸

Natural gas and natural gas liquids are low-cost feedstock for Iran's petrochemicals sector and give it a competitive edge. For example, its ethylene production costs at below \$200 per ton are about one-fifth the 2015 average global spot price. Iran is already the world's tenth-largest producer of petrochemicals in volume terms, accounting for about 2 percent of total global production. We estimate the country has the potential to increase the petrochemical sector's GDP contribution from about \$7 billion in 2014 to nearly \$40 billion in 2035 and create up to 300,000 new jobs over the same period. The government is seeking a total of \$80 billion in investment for planned projects that would bring an additional 120 million tons of capacity online by 2026.

⁷ "8% growth p.a. target for Sixth FYDP", *Financial Tribune*, July 2, 2015.

⁸ A government review committee established in 2013 has described general principles of a new contractual system, under which international firms would set up joint ventures with the National Iranian Oil Company and be paid with a share of the profit whilst complying with the principles of sovereign control of resources in Iran's constitution.

Mining could also become an important growth sector, although realising its potential could take time; with the downturn in commodity prices, global mining companies have slashed investment in new projects. Iran has a wealth of mineral deposits, including major reserves of zinc and copper; its Sarcheshmeh copper mine and Gol-e-gohar iron ore mines each produced more than \$1 billion in revenue in 2014. Iran is targeting \$29 billion of investment in the mining sector. Building it out would enhance economic activity in less developed areas of the country. However, the sector will require considerable investment. Iran's exploration budget, for example, was just \$40 million in 2012, or one-fifteenth the exploration budget of Chile, the world's largest copper producer.

Finally, agriculture is a sizable sector and a major employer accounting for about 18 percent of the total workforce. Best known for its pistachios, saffron, and caviar, Iran is also a large producer of many fruits, grains, and livestock products. Farm ownership is highly fragmented, with smallholders dominating the landscape. Adopting more modern techniques such as advanced irrigation technology and consolidating farms could bring about steady productivity growth. Although the country is likely to remain a net importer of agricultural goods, we estimate that Iran has an opportunity to grow its agricultural sector by 4 percent annually over the next 20 years, more than doubling the sector's gross value added and adding an estimated 250,000 jobs by 2035. Such growth would require about \$70 billion in investment. These efforts will need to be accompanied by careful management of water resources, which are scarce and at times used wastefully.

Nurturing internationally competitive industries with potential for exports

With a large domestic market, Iran has become self-sufficient in most industrial sectors, including automotive and fast-moving consumer goods, and some of these could become internationally competitive. To do so will require significant efforts to enhance productivity and efficiency, and gradually reduce barriers and tariffs that protect domestic producers but which also lessen the pressure on them to innovate and improve.

90%
of autos are
manufactured
domestically

Iran is both the largest automotive market in the Middle East-North Africa region and a significant auto manufacturer, with annual sales of 1.1 million vehicles in 2014, larger than Spain's market. For now, Iranian producers, including an extensive domestic network of parts manufacturers, meet 90 percent of domestic demand. But the auto models produced are relatively outdated, and consumer surveys show considerable dissatisfaction with quality.⁹ Factory utilisation in 2014 was just above 40 percent.

If Iran's automotive sector could become more competitive by raising productivity and quality levels to international standards, it would have the potential to become a regional automotive manufacturing hub. We estimate that the automotive sector could increase its gross value added from \$11 billion in 2014 to as much as \$58 billion in real exchange rate terms by 2035, or growth of just over 8 percent annually, and add almost 180,000 manufacturing jobs, even with substantial productivity improvements. To achieve this aspiration, automakers will need to attract significant investment. Parts manufacturers will need to upgrade their design and research and development capabilities. Greater availability of consumer credit and a higher standard of after-sales support could also spur demand. Policy makers have announced that they plan to increase privatisation and reduce protection of the industry.¹⁰ They will need to make careful choices about how—and how quickly—to open up the market to international competition.

In basic materials, Iran is one of the rare countries that exports cement at scale: it is the world's largest cement exporter. Both cement and steel are likely to benefit from an upsurge

⁹ A January 2016 report by the Ministry of Industry, Mine and Trade that rated autos by quality on a scale of one to five stars (five being the best) gave only a single star to two-thirds of domestically produced cars.

¹⁰ Remarks by President Hassan Rouhani at the Third Iran Automotive Industry International Conference in Tehran, February 29, 2016.

19

UNESCO World Heritage sites

in domestic infrastructure spending. The government is seeking to triple steel production by 2025, moving from being a net importer to self-sufficiency.¹¹ Iranian steel producers benefit from an abundance of quality iron ore and cheap energy necessary to produce direct reduced iron, which they use instead of scrap. But the steel sector is protected by import tariffs and will need to overcome several challenges to produce higher value-added products, including labour productivity that is less than one-quarter that in Turkey.

Fast-moving consumer goods and retail trade are dominated by domestic producers. All of the top ten packaged food brands are local, processed by Iranian companies, although foreign companies including Germany's Beiersdorf and Henkel have made inroads in home care, beauty, and personal care. Iran is the largest beauty cosmetics market in the Middle East. High tariffs constrain imports, but they also encourage local manufacturing. Domestic players will need to become more competitive as international brands seek to expand in the market. Foreign companies may also find opportunities to manufacture consumer goods in Iran, including for export to neighbouring countries. By 2035, we project Iran's fast-moving consumer goods sector could increase its GVA to \$62 billion, or annual growth of 7 percent, and add 850,000 jobs. The retail sector is fragmented and ripe for modernisation. Moving to new formats and adopting new technologies and advanced supply-chain management could significantly improve productivity. We project that the retail sector could grow at an annualised rate of around 6 percent through 2035, reaching up to \$91 billion in GVA and adding as many as 1.4 million jobs.

Finally, Iran's tourism sector has potential that resides in its abundant attractions, which range from ski slopes within a short car ride of Tehran and the 2,500-year-old ruins of the Achaemenid Empire at Persepolis to the gardens of the Bagh-e Eram Palace in Shiraz. Iran has 19 UNESCO World Heritage sites—more than Greece—plus a rugged coastline on the Caspian Sea, 20 mountain resorts for winter sports, beaches on the Persian Gulf, and the shrine of Imam Reza in Mashhad, a religious pilgrimage destination. However, in 2014, Iran counted just over four million international overnight visitors, compared with 27 million in Malaysia and 38 million in Turkey. The government is looking to boost the number of international visitors to 20 million per year by 2025. It has identified 1,300 possible investment projects and is expected to provide tax incentives for the construction of new hotels and tourism facilities.¹² It has begun granting tourists visas on arrival to visitors from all but nine countries. We estimate that Iran could increase its tourism GVA from just under \$9 billion in 2014 to almost \$60 billion by 2035, and add as many as 800,000 jobs.

Transitioning to a knowledge-based economy

Iran's strong scientific and engineering tradition, and its young tech-savvy population eager to participate in the digital economy could enable the country to develop its knowledge-based sectors. Innovation will be key to growth in fields ranging from software to pharmaceuticals, and Iran has an opportunity to leverage its skilled but relatively low-cost labour to attract high-value-added work.

An essential starting point would be for Iran to strengthen its financial services sector if its economy is to grow robustly and both attract and deploy trillions of dollars in domestic and foreign investment. Iran's banks, many of them state-owned or semi-privatised with state-appointed board members, provide a degree of basic financial access to the broad population that is relatively high by international comparison; for example Iran in 2013 had more ATMs per 100,000 adults than the United States, France, or Germany. But the banking sector overall lags behind in terms of sophistication of its product offerings, risk management, capital adequacy, and lending efficiency. To support our projections for Iran's

¹¹ *Strategic plan for 2025*, Ministry of Industry, Mine and Trade, July 2015.

¹² Masoud Soltanifar, vice president and chief of the Cultural Heritage, Handicrafts, and Tourism Organization, announced these plans in 2015; see Ali Akbar Dareini, "Iran preparing for 'tsunami' of tourists", Associated Press, October 18, 2015.

overall future growth potential, the financial services sector will need to grow by an average rate of 9 percent annually to 2035, adding 500,000 jobs in the process.

To achieve this rate of growth will require recapitalising banks; upgrading bank information technology (IT) systems, infrastructure, and processes; and expanding debt markets. The insurance market is underpenetrated, both for life and non-life insurance products, and Iran's capital markets are also relatively underdeveloped for an economy of its size and wealth. Investment banking is not yet well established; venture capital and private equity are nascent. Largely as a result of sanctions, the financial system is isolated from the rest of the world; as little as 1 percent of equity and bonds are held internationally, compared with a world average of 30 percent. The government is making a priority of developing the bond market, and in 2016 launched four debt instruments to finance its spending.

In professional services, Iran has relatively strong domestic legal, marketing, and communications firms that serve both multinational companies and domestic Iranian ones. As multinational corporations seek investment and partnership opportunities in Iran, they will require a professional services ecosystem that can assist with the due diligence and other requirements for their market entry, including mergers and acquisitions advisory firms, as fragmented domestic industries undergo consolidation. Professional services in Iran declined between 2010 and 2014 as international sanctions took their toll; three of the big four accounting and auditing firms had been in the country before 2010 but subsequently left. Since the easing of sanctions, all four have announced plans to return to or enter Iran.

Information and communications technology has been identified as a priority in the government's Sixth Five-Year Development Plan. For now it is relatively small; the \$8 billion total revenues in the telecommunications market, for example, are about one-third the size of Mexico's and one-sixth that of Brazil's. Despite low prices, average per capita mobile data consumption lags behind consumption rates in comparable countries, in part due to lower smartphone penetration and slower network speeds. Going forward, Iran has an opportunity to leapfrog in its development of ICT, switching to a new generation of technology and offering a richer palette of services to consumers, both individuals and businesses. Iran could also grow its software industry, which services mainly local clients, and Tehran has potential to become an IT outsourcing hub by harnessing its low-cost engineering talent. We estimate that the ICT sector could more than quadruple in value added by 2035, growing to \$31 billion in GVA from \$7 billion in 2014, and adding as many as 250,000 jobs. To achieve such growth will take a range of measures, including regulatory reform to ease restrictions on telecommunications companies, further investment in physical infrastructure, and a new focus on monetising value-added services. Critically, Iran would also need to take specific steps to improve its business environment for ICT by implementing and enforcing laws on data protection and copyright piracy.

Another area where Iran could leverage its scientific prowess is pharmaceuticals. Supported by the government's goal of self-sufficiency in pharmaceuticals, Iranian companies supply more than 90 percent of Iran's annual drug consumption in volume terms and have developed significant capabilities in several complex subsectors: Iran reportedly ranked fourth globally in stem-cell research in 2015, for example, and first in the region for production using biotechnology.¹³ This scientific know-how could serve as an important basis for a build-out of the sector, which accounts for just over 0.3 percent of both total GVA and employment. Iran's demographic trends and disease burden also suggest it could be a significant market for pharmaceuticals. For example, the prevalence of chronic diseases that are costly to treat pharmacologically has risen steeply since 2000, with diabetes incidence increasing by 56 percent, neurological conditions by 28 percent, and chronic

¹³ "Iran ranks 4th in stem cell research", Mehr News Agency, May 17, 2015; "Iran ranks 21st in biotech scientific productions", Mehr News Agency, July 7, 2015.

respiratory diseases by 32 percent.¹⁴ The government has announced that it is looking to encourage investment and growth in the pharma sector by privatising portions that are now government-controlled.¹⁵ We estimate the sector's GVA could rise sevenfold to about \$7 billion by 2035.

Health care is also ripe for transformation. A broad national insurance system covers about 90 percent of the population, and 49 medical universities train aspiring doctors and health-care professionals. The system has become increasingly strained; despite a young population, Iran has a high disease burden, and the 50-plus age segment is projected to be the fastest-growing demographic through 2035. Iran underspends its peers, including Russia and Brazil, by nearly 25 percent on a per capita basis. (For full details of the peer groups used for the sector comparisons in this report, see Technical appendix). This has resulted in a relatively low number of hospital beds per capita, outdated infrastructure and equipment, and overburdened physicians. Considerable additional investment will be required to transform and add facilities.

Expanding and modernising infrastructure

Iran's infrastructure is already relatively extensive, but it will require more, and more modern, road and rail links within and among its cities. Its seaports and airports are also ripe for expansion. As the economy grows, Iran will need to build more factories and utilities, including water treatment plants. Affordable housing is in short supply. These infrastructure needs are just part of a long list. They add up to a considerable opportunity for Iran's construction sector—and potentially also for foreign companies—over the next 20 years. As the demands for infrastructure grow, Iran will need to become more efficient in the way it responds. It could do more to rein in energy and water usage, and it will need to improve management of its construction sector to cut delays.

Transport infrastructure will be an especially important focus as Iran seeks to serve more international trade. Iran's road and rail networks are already being upgraded, and several ports have expansion plans. The first train from China on the Silk Road Economic Belt arrived in Tehran on February 15, 2016, pulling 32 containers and arriving 30 days faster than the average route by sea. Similar progress is being made on the North-South Transport Corridor project seeking to connect Northern Europe and Southeast Asia through Iran. The Iranian government views links to Europe and Asia as strategic priorities.¹⁶ Within cities, too, there is an opportunity to improve transit, including large-scale metro construction and expansion projects in all eight of Iran's most populous cities. We estimate that the transport sector could grow to as much as \$87 billion in GVA by 2035 from \$22 billion in 2014, adding more than 800,000 jobs.

Utilities will also need to expand, to meet the needs of Iranians as well as the country's ambitions to increase electricity exports. At the same time, changes will be needed to reduce wasteful consumption. Iranian domestic consumption of gas, electricity, and water is considerably higher than in many other countries. Per capita gas consumption has grown 5.8 percent annually since 2006 and is now more than double that of peer countries including Brazil, Malaysia, Mexico, and Turkey.¹⁷ Iranian residential households consume nearly a third more electricity than households in Turkey. Similarly, Iran's water consumption, about 90 percent of which is used in agriculture, is well above environmentally sustainable limits. The government has set aggressive plans to reduce consumption, especially of water, and plans to raise prices over the next five years. It has also launched several programmes

90%
of Iranians are covered by a national health-care system

¹⁴ Global Burden of Disease DALY estimates for 2000–2012, World Health Organization; disability-adjusted life years measure the number of healthy years of life lost to premature death or disability across an entire population.

¹⁵ Ministry of Health web site, www.behdasht.gov.ir.

¹⁶ "Joining the dots", *The Economist*, April 2, 2016.

¹⁷ *BP statistical review of world energy*, BP, June 2015.

aimed at energy and water efficiency in its 2016-2021 Development Plan, including a national smart water metering programme for agriculture.

Real estate prices, particularly in Tehran, have soared over the past 15 years, rising significantly more than in major international cities such as Paris, New York, and London. At the same time, it can be hard for households to obtain a mortgage in Iran. Together, these factors contribute to a shortage of affordable housing. Going forward, Iran could enable delivery of more affordable housing by unlocking vacant land, reducing red tape for developers, promoting use of cost-efficient building materials, and revamping its mortgage system.

Construction rebounded in 2014 following low spending from 2011 to 2013 and grew by 6 percent per year from 2005 to 2015.¹⁸ Given strong demand for housing and other building, we see this growth trend continuing, more than tripling the size of the construction sector, from \$17 billion in GVA in 2014 to \$59 billion by 2035, and adding more than two million jobs.

In order to flourish, construction and infrastructure projects will need to address several challenges. One is the tendency for large project work to be cancelled or put on hold. Gas projects, for example, are delayed on average by 60 percent, leading to cost overruns on average of 20 percent. Projects in process industries such as petrochemicals also are habitually delayed. As a result, construction times in Iran are substantially longer than in many peer countries, including in the region. For example, a downstream oil and gas project in Iran takes on average 5.4 years, compared with 3.3 years in Iraq, Qatar, and the UAE.¹⁹ Productivity will also need to improve; for now labour productivity in construction is about half the level in Turkey and even further behind Poland.²⁰ Building quality control is also low relative to many peer countries.²¹

IRAN WILL NEED TO OVERCOME MAJOR CHALLENGES TO REALISE ITS POTENTIAL

To realise the full benefits from reconnecting with the world economy, Iran will need an economy better able to attract and absorb foreign investment, technology, and expertise. It will require a labour market with greater flexibility and workplace skills, and a business environment that encourages more dynamic competition and innovation. Transparency, the rule of law, and corporate governance will need to be improved. Iran overall will need to improve its productivity record across all sectors (Exhibit E3).

All of these changes will need to take place in a more favourable macroeconomic context, with manageable inflation, stable exchange rates, and a responsible and sustainable fiscal policy. Given the magnitude of the changes required, careful planning and prioritisation will be key. Implementing the required reforms, and transitioning to a more productive economy, will take time and will require complementary partnerships between the government and the private sector, both Iranian and international companies.

In previous years, the Iranian economy has been racked by instability. GDP growth has fluctuated widely, from minus 7 percent in 2012 to plus 4 percent in 2014, although the non-oil and gas sector has been less volatile. Unemployment has exceeded 10 percent since 1997, the currency has undergone large devaluations and depreciation, and inflation peaked at 45 percent in June 2013. Creating a stable macroeconomic environment supported by credible institutions is a precondition for Iran to be able to attract investment and raise exports, domestic consumption, employment, and living standards over the next 20 years.

¹⁸ IHS Global Insight.

¹⁹ McKinsey Infrastructure Projects Analytics Tool (IPAT).

²⁰ IHS Global Insight; ILOSTAT employment statistics.

²¹ *Doing business 2016: Measuring regulatory quality and efficiency*, World Bank, October 2015.

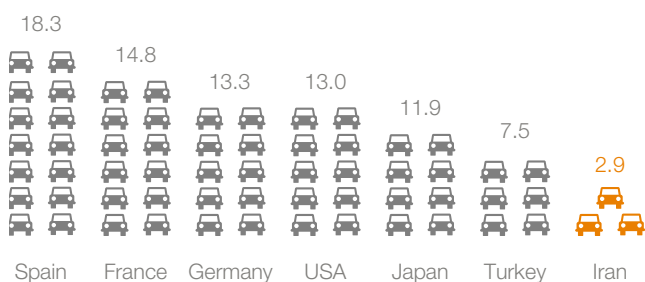
Striking this balance will require a fiscal policy focused on real growth, a monetary policy that maintains price stability, and institutions that are transparent and credible.

EXHIBIT E3

Iran has low productivity across multiple sectors

Labour productivity in automotive

Automobiles per manufacturing employee, 2014



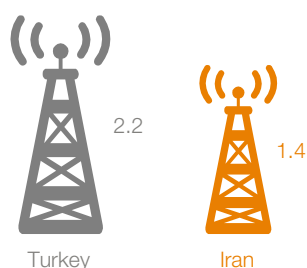
Labour productivity in metals

Output per worker, \$ thousand, 2014



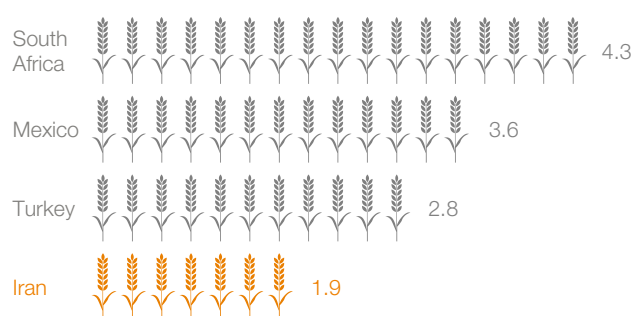
Capital productivity in telecommunications¹

Revenue per unit of plant, property, and equipment
\$ nominal, 2014



Agricultural productivity

Cereal yield, thousand kg per hectare, 2014



¹Based on largest telecom operators in each country.

SOURCE: IHS; ILOSTAT; *World development indicators*, World Bank; Spanish Ministry of Industry; French CCFA; German STABU; VDA; US BLS; SIE; Turkey Workplace & Insured Persons Statistics; company financial statements; McKinsey Global Institute analysis

Iran will also need to become an easier place to do business. Iran scores low on global rankings as a competitive destination for business; for example, it ranks 118th of 189 countries in the World Bank’s 2016 Doing Business indicators, and 74th of 140 countries in the World Economic Forum’s *Global Competitiveness Report 2015–16*. To improve its rankings and attract international business, it will need to put in place a transparent and clear regulatory framework that encourages competition, removes barriers to efficiency and productivity, and creates a level playing field for all. Prices in Iran can be distorted by government subsidies on key commodities, including energy, some foods, and medical goods. High tariffs and domestic content requirements can also dampen incentives to invest and innovate. Gradually reducing such market distortions, deregulating protected sectors including the automotive and pharmaceutical industries, and simplifying bureaucratic procedures could be early steps towards improving competitiveness. For example, obtaining a permit to build a warehouse in Iran requires 15 separate procedures and takes 97 days, according to the World Bank, which calculates that the cost of this red tape amounts to more than 2 percent of a warehouse’s value. Iran will also need to consider putting in place stronger safeguards for property rights, both physical and intellectual, and improving insolvency laws.

2.2M

Number of Iranians reaching working age in next 4 years

Iran will need a productive and flexible labour force with the requisite skills that employers—both foreign and domestic—are seeking. The labour market overall has some significant weaknesses, including a low level of labour-force participation, especially for women and youths, a high level of unemployment and underemployment, and a shortage of business and management skills. Moreover, further action will be required to head off a rise in unemployment as a result of a changing demographic picture. Over the next four years, 2.2 million Iranians will reach working age and many of them will join the labour market, potentially exacerbating the unemployment rate unless enough new jobs are created.

An overhaul of the financial system will also be needed. Iranian banks carry a large amount of underperforming assets on their balance sheets and require large-scale recapitalisation. The central bank's approach to managing risks, regulating interest rates, and structuring the interbank market will need to evolve. Years of isolation from international banking have rendered risk and compliance processes obsolete. For instance, Iranian banks are still governed by Basel I rules regarding capital adequacy and risk compliance and will likely need to shift quickly to the international standards of Basel II and Basel III to meet the risk requirements of international companies. Similarly, Iranian banks will be required to improve transparency, auditing, and disclosure processes and strengthen their credit ratings before doing business with many foreign firms. As a result, multinational companies seeking to transact through Iranian banks are for now hesitant. Moreover, whilst the United Nations and the European Union have lifted sanctions, the continuation of US primary sanctions has complicated international transactions during the immediate aftermath of the nuclear agreement.

AN ACTION AGENDA FOR GOVERNMENT AND BUSINESS

The set of potential reforms we outline in this report would be difficult in any context but is even harder in the environment of ambiguity that economic reintegration inevitably entails. Addressing this uncertainty will depend on the timing, steadiness, and quality of government reforms, and the responsiveness of international and domestic companies. The government will need to embark on an ambitious transformation programme reaching across ministries and provinces. Its ability to communicate to investors and business stakeholders and serve as a role model for effective change will be especially important due to the high degree of public- and private-sector integration in Iran.

In addition to privatisation, the government is seeking to reform subsidies and tariffs, simplify legal frameworks for foreign investment, and reduce the amount of licences and procedures needed to do business in Iran. If carried out quickly and completely, these reforms could make Iran a more attractive investment destination.

The sequencing of reforms should be based on a clear industrial strategy that recognizes the changes required to enable each of the four growth engines, and the sectors within them, to thrive. More complex reforms will require robust planning and accountability mechanisms to achieve results. Iran could look to many other countries, from Estonia to Malaysia, for ideas about how to implement change swiftly and successfully. It will need to set clear targets and milestones and manage progress against them, borrowing a page from effective business transformations. A speedy pace of reform will also require that the government strengthen its workforce and capabilities, especially with regard to change management.

Iranian companies and global firms will also have a role to play as the economy grows and modernises. Domestic companies can leverage their local expertise and established relationships, but they will likely face tough new competition from the international companies now starting to take a serious interest in Iran both as a market and as a production location. The temptation for Iranian companies may be to hide behind tariffs and

other protectionist barriers. But that will only postpone efforts needed to raise quality and increase efficiency.

To compete, Iranian companies will need to bring their cost structures in line with those of international companies, improving their labour and capital productivity. Many companies have not had access to best-in-class expertise for a number of years; they will need to acquire and maintain new equipment and know-how. In the automotive sector, for example, companies will need to improve the quality of production by investing in new facilities and techniques or risk losing all but the very low end of the market. Some companies will be able to improve by partnering with international firms, and to do so they will need to adapt. With more competition, the attraction and retention of talent will become increasingly important; employees with strong management skills and international experience will be in particularly high demand.

To compete internationally, Iranian companies will need to improve their labour and capital productivity.

For global companies, Iran represents both an opportunity and a challenge. Companies that choose to enter Iran can potentially tap a large and fragmented market with growth opportunities in many sectors. But they will face a shortage of local management talent and will need to play a role in solving that problem, both through training and knowledge transfer. The operating environment in Iran is a unique one. Initially there could be uncertainty for international companies about financing, lingering sanctions, or other restrictions on their investment and business activities. They will find a market in which copyright and data protection are not as robust as in some other countries where they operate. Iran's government is signalling its desire to attract foreign investment, and indeed that will be vital if the country is to realise its growth potential. International firms may want to see the sort of changes that will enable Iran to grow faster and become an easier place to do business before they decide to engage.



In one of his famous odes, the great 14th-century Persian poet Hafez cautioned about the unpredictable nature of change: “Don’t be surprised at Fortune’s turns and twists: that wheel has spun a thousand yarns before”. In this report, we discuss Iran’s opportunity to accelerate GDP growth and create millions of new jobs in the coming years. Yet Iran’s transition to this new era is unpredictable, and seizing the opportunity will take time and considerable effort. As it reconnects with the global economy, Iran will need a robust fiscal plan and a sophisticated approach to complex macroeconomic issues such as monetary policy and exchange rate policy. Its labour market will require special attention to ensure that the large cohort of young Iranians, many of them university graduates, who reach working age over the next decade will be able to find gainful employment. A high-performing banking and financial system will be needed to accompany future growth. Iran will also need to become a more reliable and attractive business destination if it is to win over the international business community, which the government is counting on to provide a significant part of the heavy investment the country requires to achieve rapid growth.

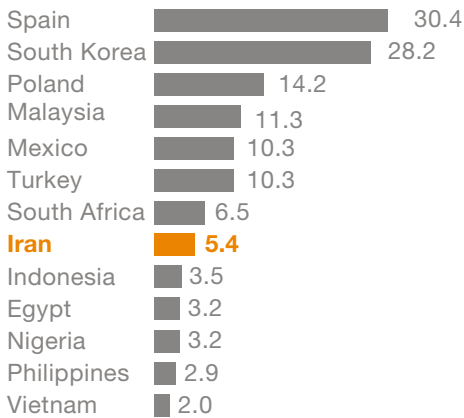
On all of these issues, there are signs that the Iranian government is moving to address concerns, strengthen institutions, and ensure a better regulatory environment. The speed with which it does so will play a decisive role in how quickly Iran will be able to reconnect and reengage fully with the global economy and begin to realise its growth potential.

Iran at a glance

Macroeconomic indicators, 2014

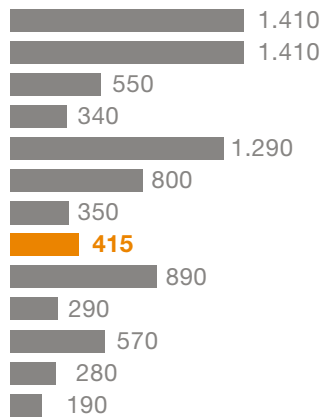
GDP per capita

\$ thousand, nominal



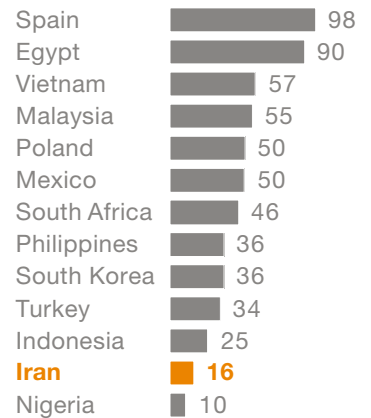
GDP

\$ billion, nominal

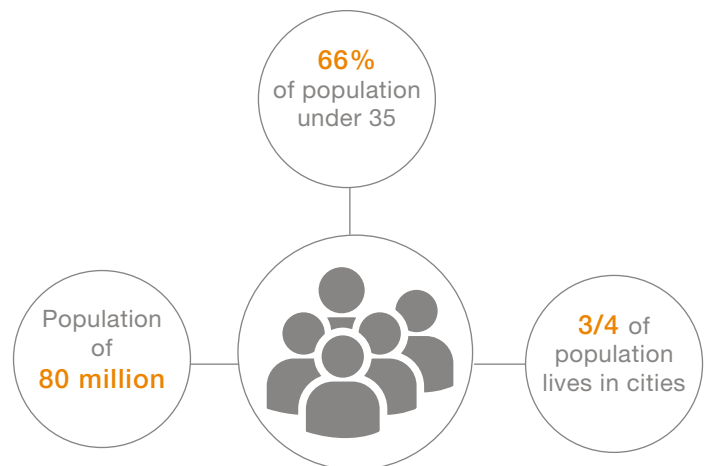
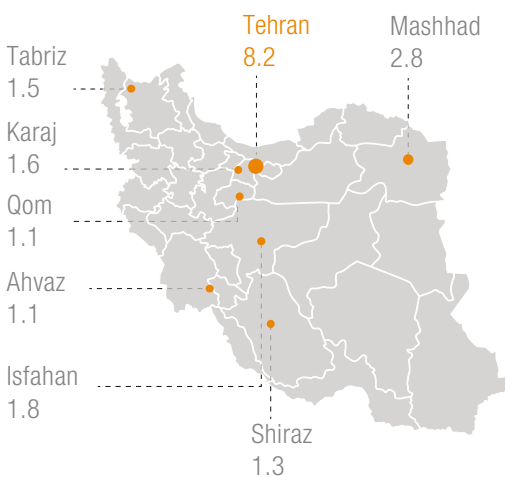


Government debt-to-GDP ratio

% of GDP



8 cities have more than one million inhabitants



Largest gas reserves and **4th-largest** oil reserves in the world



56% of households have income **over \$20,000**¹



Over half of all households own computers



10th-largest producer of petrochemicals



Largest automotive market in the Middle East



90% of pharmaceuticals are produced domestically



9 of top 10 consumer brands are domestic



60% of Iranians have access to 3G/4G networks



Net exporter of electricity



19 UNESCO World Heritage sites



Top 10 reserves of iron ore, copper, and zinc



75% debit-card penetration rate

¹ In purchasing power parity.



Si-o-seh pol is an iconic bridge in Isfahan, featuring Persian architecture from the 17th century.
© Mahdi Alizadeh/500px

1. SIX CORE STRENGTHS

Iran's economy in 2014, with GDP of nearly \$1.4 trillion, was the 18th largest in the world measured on a purchasing power parity basis. In nominal terms, GDP was \$415 billion, about the same size as Austria's.²² The country has a wealth of natural resources, including the world's largest gas reserves and fourth-largest proven oil reserves, and the economy is also highly diversified. There are significant reserves of minerals such as copper and zinc, and a vibrant service sector, including retail, tourism, financial services, and manufacturing, that accounts for about 10 percent of gross value added. For example, in 2014 the country exported \$14 billion of petrochemical products, and the automotive sector produced more than one million vehicles.²³

This diversification of the economy has enabled Iran to meet most of its domestic needs and remain relatively resilient during the period of international sanctions. Indeed, in this era of globalisation, one of the unusual characteristics of an economy of this size is its heavy reliance on domestic producers for a range of goods and services, from cosmetics to pharmaceuticals to electronic equipment. Whilst some international brands, especially in consumer goods, are available in Iran, much of the consumption is of Iranian products—which in turn are not widely exported.

One of the unusual characteristics of an economy of this size is its heavy reliance on domestic producers for a range of goods and services, from cosmetics to electronic equipment.

The current state and structure of Iran's economy can provide an indication of its potential, but that is just a starting point. MGI and other research suggests that some factors less directly related to economic output can be equally important. The degree of urbanisation or the demographic structure of a country, for example, can indicate growth potential, as can some indicators of human capital such as the overall educational level or an economy's openness and geographical positioning in relation to global flows of goods, people, and capital.

In this chapter, we look at six core strengths of the Iranian economy. If Iran is able to reform its economy to overcome considerable challenges, these six elements could become a strong base on which to build future growth and prosperity.

²² World Bank International Comparison Program database.

²³ *Iran petrochemicals report*, Business Monitor International (BMI), May 2015; Organisation Internationale des Constructeurs d'Automobiles (OICA), 2014.

DIVERSIFIED: IRAN'S ECONOMY IS MUCH MORE THAN OIL AND GAS

Iran has the largest proven gas reserves in the world and the fourth-largest proven oil reserves.²⁴ These are key assets that will enable the economy to grow, both in the short term and the medium term. Iranian oil and gas fields have among the lowest costs of all oil- and gas-producing countries, with an average operating cost less than half that of Russia.²⁵ Despite abundant natural gas reserves, Iran's gas fields are underdeveloped because of insufficient investment and technology, and their export infrastructure is limited. One of the priorities of the Iranian's government's 2016–21 Five-Year Development Plan is to increase value added in the oil and gas industry, in particular in downstream products, and to improve recovery rates.²⁶

Retail trade, real estate, construction, and professional services together make up a larger share of the economy than oil and gas.

23%

of gross value-added is from oil and gas

At the same time, Iran's economy is the least dependent on crude oil and gas among major Middle Eastern oil-producing countries. Indeed, in 2014, Iran's government reportedly earned less from oil and gas revenue than it did from other tax revenue.²⁷ In the same year, just 23 percent of its real gross value added came from oil and gas.²⁸ That compares with 30 percent in the United Arab Emirates, 50 percent in Kuwait, and 51 percent in Qatar.²⁹ International sanctions, combined with the drop in oil prices, which fell by as much as 70 percent since mid-2014 before recovering somewhat, partly explain this relatively low level of dependency; in 2000 oil was twice as important for the Iranian economy as a percentage of real value added.³⁰

Iran's economy is diversified; retail trade together with real estate, construction, and professional services make up a larger share of the economy than oil and gas (Exhibit 1). Indeed, separating out oil and gas paints a more nuanced picture of Iran's economic resilience. Whilst the total economy contracted by 1.1 percent per year from 2011 to 2014, oil and gas fell by 3 percent per year whilst non-oil and gas sectors declined by only 0.4 percent per year.³¹

More than 20 Iranian companies have sales exceeding \$5 billion—and only six of them are oil and gas firms.³² As part of its economic plans, the government is seeking to strengthen industry by encouraging it to adopt modern technology, prioritising the supply of raw materials to industries, and creating quality standards and certification for all domestic products. It has identified several strategic sectors including oil and gas, petrochemicals, transportation, advanced materials, construction, information and communications technology, aerospace, marine, agriculture, and water.³³

²⁴ *BP statistical review of world energy*, BP, June 2015.

²⁵ McKinsey Energy Insights.

²⁶ "8% growth p.a. target for Sixth FYDP", *Financial Tribune*, July 2, 2015.

²⁷ "Iran earns more from tax than oil for first time in almost 50 years", *The Guardian*, September 27, 2015.

²⁸ Value added is sales revenue less the cost of purchases of inputs and supplies (operating expenditures) required for production.

²⁹ IHS.

³⁰ *Ibid.*

³¹ *Ibid.*

³² Industrial Management Institute.

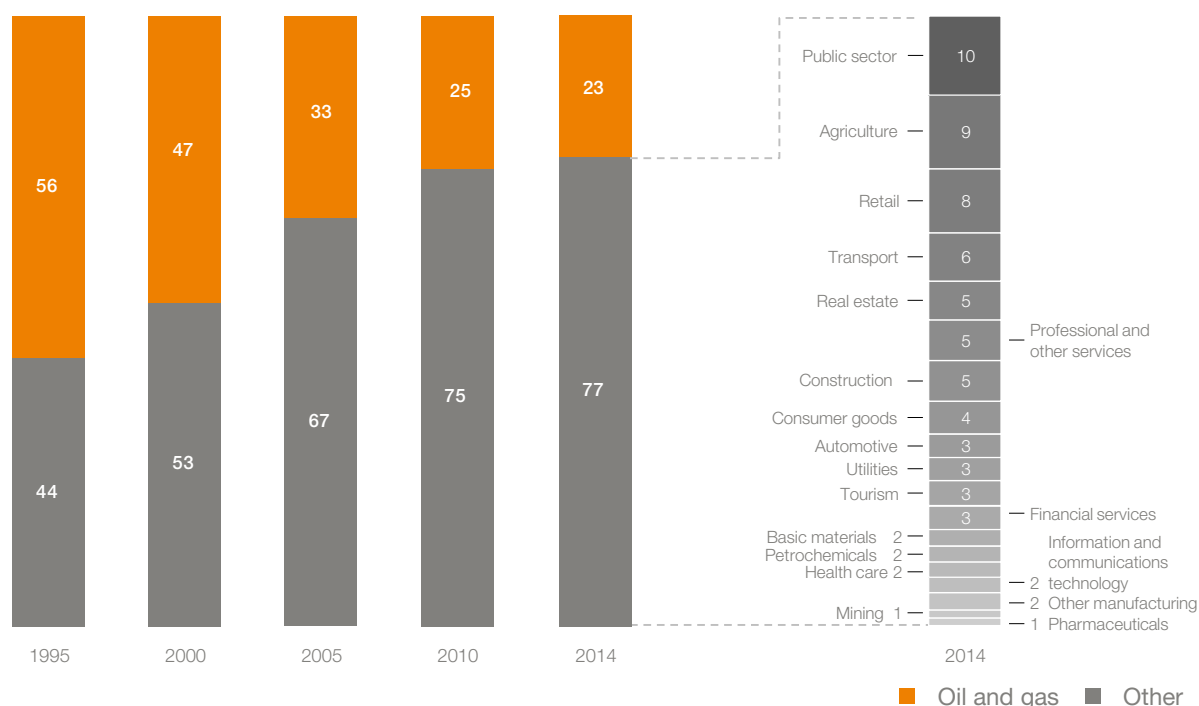
³³ "8% growth p.a. target for Sixth FYDP", *Financial Tribune*, July 2, 2015.

Iran's automotive sector, the largest in the Middle East region, is about 60 percent bigger than Turkey's, and it produces about 90 percent of the cars sold in the country, including PSA Peugeot Citroën and Renault models it builds under licence.³⁴ Its petrochemicals sector, the world's tenth largest, has been growing at a double-digit rate for the past five years.³⁵

EXHIBIT 1

Iran has a diversified economy beyond oil and gas

Sectoral contribution to Iran's total gross value added¹
%



¹ Gross value added (GVA) plus taxes minus subsidies equals GDP; at the sector level, GVA is used in place of GDP.

SOURCE: IHS Global Insight; McKinsey Global Institute analysis

Iran is a net exporter of electricity to its neighbours and has substantial mineral wealth, including large copper, lead, and zinc reserves. In agriculture, it is well known for pistachios, saffron—dubbed “red gold” because of the prices it can fetch—and of course caviar. It also produces a wide range of crops and is among the top five producers of eggplant, onions, and a range of fruits including quince, figs, and watermelons. It has a larger area of arable land than Spain or South Africa.³⁶ To continue to prosper in agriculture, Iran will have to address challenges including drought, deforestation, and other environmental concerns.

³⁴ Organisation Internationale des Constructeurs d'Automobiles (OICA); IHS World Industry Services, 2014.

³⁵ ICIS Supply and Demand database.

³⁶ UN Food and Agriculture Organization, 2013; M. Ghorbani, “The economics of saffron in Iran”, in // *International Symposium on Saffron Biology and Technology*, ISHS Acta Horticulturae 739, April 2007; S. Alvani, E. Mahdikhani, and H. Rouhani, “New records of *Boleodorus* Thorne, 1941 from *Berberis vulgaris* L. in Iran”, *Pakistan Journal of Nematology*, volume 31, number 1, 2013.

Iranian banks have more than \$500 billion in assets. This is comparable in size to the UAE's banking sector but smaller than Turkey's, which has more than \$800 billion in assets. All of Iran's banking assets are sharia-compliant, which makes the sector the largest Islamic banking system in the world.³⁷ Iranian banks overall have relatively low profitability and a high rate of non-performing loans; two-thirds of the banks are state-owned or semi-private. But newly licenced private banks are growing faster than their state-owned competitors.³⁸

Iran has a vibrant service sector. Its retail sector, for example, grew at a 7 percent annual rate between 2009 and 2014.³⁹ Average nominal retail spend per household excluding tax of about \$5,500 per year is on a par with the nominal spend in South Africa but lower than that in Turkey, Malaysia, or Mexico.⁴⁰ In tourism, Iran attracts about 4.4 million international tourists per year, primarily religious visitors to Mashhad.⁴¹ It could do far more to build out other types of tourism to its historic and archaeological sites, including Isfahan, famed for its beautiful historic architecture. Iran's mountain resorts are higher than some in the Alps and could become a playground for skiers and snowboarders, once the facilities and hotels are brought up to international standards.

Recent international business deals have reflected this diversity. Of the more than 220 deals announced in the wake of the nuclear agreement, more than 75 percent are in sectors other than oil and gas. Airbus sold more than 100 planes to Iran's Ministry of Roads and Urban Development for more than \$25 billion. Ferrovie dello Stato has signed an agreement to build two high-speed rail lines in Iran. In chemicals, BASF plans to invest \$4 billion in petrochemical facilities, and in metals Danieli Group has signed an agreement worth more than \$6 billion to produce steel in Iran.

EDUCATED: IRAN PRODUCES AS MANY ENGINEERS AS THE UNITED STATES

A thousand years ago, a Persian scholar named Ibn Sina (known also in the Latin form as Avicenna) wrote *The Book of Healing*, which became a standard medical text in medieval universities for almost seven centuries. That scientific tradition continues today: 36 percent of Iran's university graduates in 2013 earned an engineering-related degree.⁴² Iran ranks in the top five in the world for the total number of engineering-related graduates, almost level with the United States, and ahead of Japan and South Korea (Exhibit 2).⁴³ Two Iranian universities rank in the Shanghai list of leading global academic institutions, compared with one in India. Iran also has the world's fastest-growing scientific output, measured by the number of peer-reviewed papers published in international journals, albeit starting from a low base.⁴⁴

Iran has as many engineering graduates each year as the United States, almost a quarter million.

³⁷ "Top Islamic financial institutions 2014", *The Banker*, November 2014.

³⁸ *Iran commercial banking report*, BMI Q1 2016.

³⁹ Euromonitor retail data. This consisted of 6 percent annual average growth for grocery retailers and 8 percent for non-grocery.

⁴⁰ Ibid.

⁴¹ UN World Tourism Organization compendium of tourism statistics.

⁴² UNESCO Institute for Statistics. Engineering-related degrees consist of engineering, manufacturing, and construction studies.

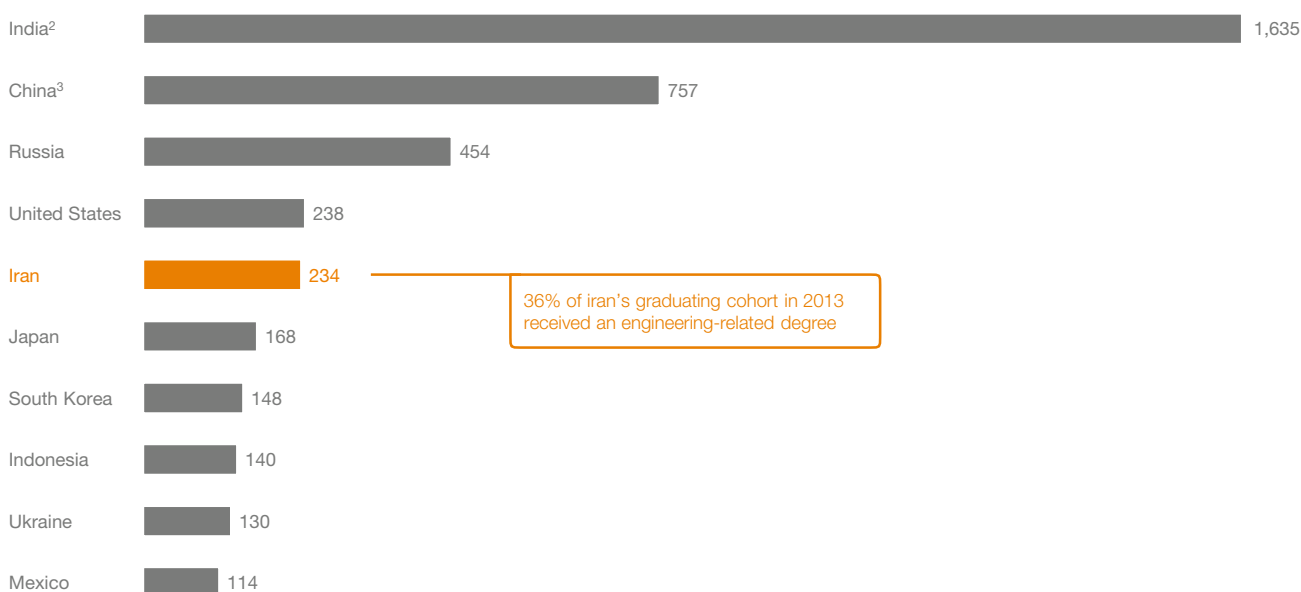
⁴³ UNESCO Institute for Statistics; government statistics, Ministry of Education, People's Republic of China.

⁴⁴ *Science and engineering indicators 2014*, National Science Foundation, February 2014.

Nearly a quarter of a million engineers graduate from Iranian universities each year

Number of graduates in engineering-related degrees, 2013¹

Thousand



¹ Engineering, manufacturing, and construction fields of study, except for India and China (see below).

² India figures based on 2013 intake figures, for engineering only.

³ China figures based on 2012 graduates in materials science, mechanical engineering, instrument and meter, electronics and information, civil engineering and agriculture, hydraulics, survey and measure, chemical engineering and pharmaceuticals, transportation, light industry, textiles and food, aeronautics and astronautics, weaponry, engineering mechanics, and biotechnology.

SOURCE: UNESCO Institute for Statistics; government statistics for India and China; McKinsey Global Institute analysis

As a percentage of the population, Iran has one of the highest levels of participation in tertiary education in the world, ahead of the United Kingdom, France, and Germany, and it edged out Finland for a spot in the top ten.⁴⁵ The share of Iranians with some post-secondary education more than doubled between 2006 and 2011, but this was due in part to the opening up of the university system to part-time and long-distance instruction, which may have led to a decline in quality.⁴⁶ Still, the overall literacy rate for Iranians between the ages of 15 and 24 is 98 percent, above the global average and on a par with most developed countries. In the international TIMSS (Trends in International Mathematics and Science Study) mathematics tests, average scores for Iranian fourth graders have risen steadily since 1995, although they still lag behind scores for their European and US peers.⁴⁷

We have seen elsewhere, especially in India and China but also in Japan, South Korea, and Eastern Europe, how a technically literate workforce can rapidly generate wealth and employment if its talents are unleashed on the economy in rewarding jobs. In India, ICT service exports now account for about 66 percent of the nation's service exports.⁴⁸ ICT is also a major priority for Iran's government, as outlined in the latest five-year development plan.

⁴⁵ World Bank Tertiary Enrollment.

⁴⁶ Djavad Salehi-Isfahani, *The future of the Iranian labour market: Demography and education*, Legatum Institute, September 2013.

⁴⁷ *Trends in International Mathematics and Science Study*, International Association for the Evaluation of Educational Achievement, 2011.

⁴⁸ *World development indicators*, World Bank, 2015.

For now, Iran seems better at educating young people than at finding jobs for them. Youth unemployment has risen steadily since 2007 and stands at 30 percent.⁴⁹ Between 1996 and 2006, the economy created about six million jobs but the jobless rate for young people increased nonetheless, in part because members of the Iranian baby boom generation born in the 1970s and 1980s entered the labour market and the economy was not able to create enough jobs to support this new wave. Since 2006, about half a million net new jobs have been created, which is about the same number of students who graduated in 2013 alone.⁵⁰ Iran's newly educated lack some of the abilities sought after by employers, most notably business and management skills.

The difficulties of finding good jobs at home spur many Iranian top students to move abroad to continue their education or take employment. The size of the brain drain is uncertain, as no reliable independent studies have been conducted since a 1999 article published by the IMF, which found that the share of the Iranian population with a tertiary education living in OECD countries was around 25 percent.⁵¹ But there is plenty of anecdotal evidence that the phenomenon exists, including the presence of several hundred Iranian graduate students in US universities.

Those who have left include Maryam Mirzakhani, who in 2014 became the first woman to win the Fields Medal, the most prestigious global award for mathematics. She went to Harvard University and then Stanford University after completing her undergraduate studies at the Sharif University of Technology in Tehran. Bruce A. Wooley, a former chairman of Stanford's electrical engineering department, has described Sharif's as one of the best electrical-engineering programmes in the world.⁵²

Many of the foreign-trained students decide to return home. Almost two-thirds of the 30 members of Iran's current cabinet have doctorates, six of them from Western universities including three in the United States: the Massachusetts Institute of Technology, George Washington University, and the University of Denver. By comparison, only two members of President Barack Obama's cabinet have PhDs—whilst ten have JDs, doctorates in law.

ASPIRING CONSUMING CLASS: MORE THAN HALF OF IRAN'S HOUSEHOLDS HAVE INCOME EXCEEDING \$20,000

From Brazil to Thailand, one important predictor of rapid economic growth in emerging economies is a rising consuming class with ever-greater spending power—and the aspirations that go with it. Iran has an abundance of that.

Some 56 percent of Iranian households already have annual income exceeding \$20,000, a level we define as “consuming households”.⁵³ The current proportion of consuming households is already more than twice the share in China (24 percent) and India (21 percent). Of the BRIC economies of Brazil, Russia, India, and China, only Russia matches Iran, with 55 percent of households having an income above \$20,000 (Exhibit 3).

⁴⁹ Ibid.

⁵⁰ *Human capital report*, World Economic Forum, 2015.

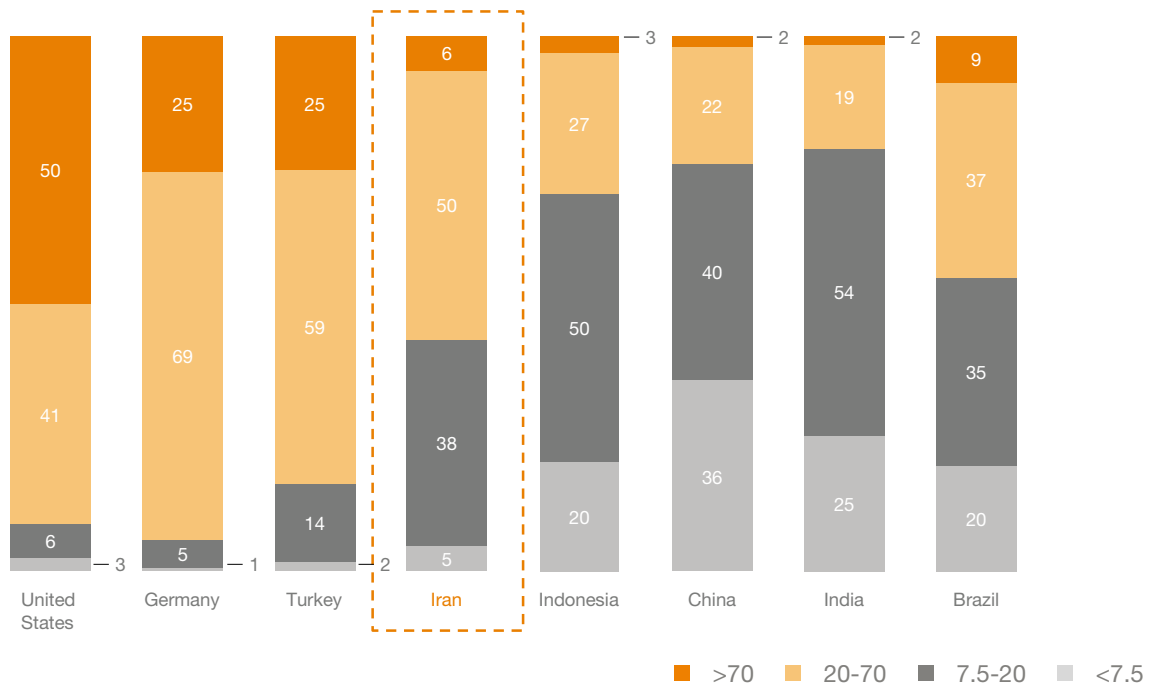
⁵¹ William J. Carrington and Enrica Detragiache, “How extensive is the brain drain?” *Finance and Development*, volume 36, number 2, June 1999.

⁵² “Surprising success of Iran's universities”, *Newsweek*, August 8, 2008.

⁵³ The figures are on a purchasing power parity (PPP) basis. We define annual income categories (all in PPP) as follows: struggling households have income of less than \$7,500; aspiring households, \$7,500 to \$20,000; consuming households, \$20,000 to \$70,000; and global households, \$70,000 or more. For details, see *Urban world: Mapping the economic power of cities*, McKinsey Global Institute, March 2011.

More than half of Iranian households have income exceeding \$20,000

Household income distribution, 2015
%



Income categories
\$ thousand, 2005 purchasing power parity

Note: Numbers may not sum due to rounding

SOURCE: McKinsey Global Institute Cityscope

Generally, Iranian consumption patterns underscore the growth of middle-class aspirations. According to McKinsey’s Global Growth Compass database, Iran is in the “hot zone” of growth for 45 categories of goods, from food and beverage to apparel and accessories, personal care, home care, pet care, and retail hygiene.⁵⁴

As a proportion of the population, Iran has twice as many households with annual income above \$20,000 as China or India.

For example, although many technology companies cannot sell products in Iran directly, they are still readily available in Tehran. They mainly come through Dubai, which has become a critical re-export hub to Iran, supplying as much as 90 percent of consumer electronics sold there.⁵⁵

⁵⁴ McKinsey’s Global Growth Compass measures the penetration of retail consumer categories relative to GDP per capita.

⁵⁵ *Iran consumer electronics report, Q3 2015*, BMI, June 2015.

More broadly, the launch of 3G services in 2011 kick-started demand for smartphones, which now have a 26 percent penetration rate in Iran, just behind Turkey at 30 percent. Mobile penetration at 142 phones for every 100 people is higher than the 134 in Germany and the 125 in the United States.⁵⁶ To promote mobile broadband penetration, the government and telecommunications regulators have imposed a low price ceiling for mobile data, but companies, eager to capture the market, have set prices well below this ceiling.

There is also a consumer electronics assembly business in Iran. Samsung Electronics and LG are major manufacturers. Most computers are assembled locally.

Iranians are big consumers of health and beauty products. Some international skin care brands, including Unilever's Dove, are produced in the country, but for now most cosmetics are manufactured by Iranian companies that sometimes imitate successful products of global companies. Already, the market for beauty products is among the top globally. Iran has the seventh-highest sales worldwide for cosmetic products and ranks tenth for cosmetic surgery.⁵⁷

Other sectors including packaged goods and home care are also dominated by local players. With the lifting of sanctions, this is likely to change. For example, the luxury clothing brand Roberto Cavalli opened a two-story boutique in Tehran in February 2016, and the French cosmetics retailer Sephora reportedly plans to open several retail stores in Iran in 2016.⁵⁸ Apparel Group, a global retail conglomerate, announced plans to expand into Iran by the end of 2017. Similarly, the German retail company Metro is considering opening eight department stores in Iran.⁵⁹

URBANISED: TEHRAN'S GDP IS LARGER THAN RIO DE JANEIRO'S

Eight cities in Iran have more than one million inhabitants, the biggest of which—the capital, Tehran—has over eight million residents. With three-quarters of the population living in cities, Iran is more than twice as urbanised as India, and its urbanisation share is also higher than that of several European nations, including Austria, Ireland, Italy, and Portugal. It is far ahead of China, whose urbanisation level is 56 percent (Exhibit 4).⁶⁰

Iran has a higher proportion of its population living in cities than several European nations, including Austria, Ireland, Italy, and Portugal.

Tehran has a bigger GDP than Berlin, Hamburg, Melbourne, Rio de Janeiro, and Rome, when adjusted for purchasing power parity.⁶¹ MGI research has shown how important vibrant cities are to economic growth, so Iran's degree of urbanisation is an asset.⁶² Dense population centres generate productivity gains through economies of scale, specialisation of labour, knowledge spillovers, and trade. In fact, our research shows that urban density can drive super-linear productivity gains because it affords opportunities for greater social and economic interaction. For example, three-quarters of Europe's GDP gap with the United

⁵⁶ Strategy Analytics, WCIS/Analysys Mason.

⁵⁷ "Le nouvel Iran", *Le Point*, April 7, 2016.

⁵⁸ "France's Sephora to open shops in Iran next year", Reuters, October 30, 2015.

⁵⁹ "Germany's Metro to create 8 stores in Iran", *Middle East North Africa Financial Network*, April 13, 2016.

⁶⁰ *World urbanization prospects*, United Nations Population Division.

⁶¹ McKinsey Global Institute Cityscope 2.55.

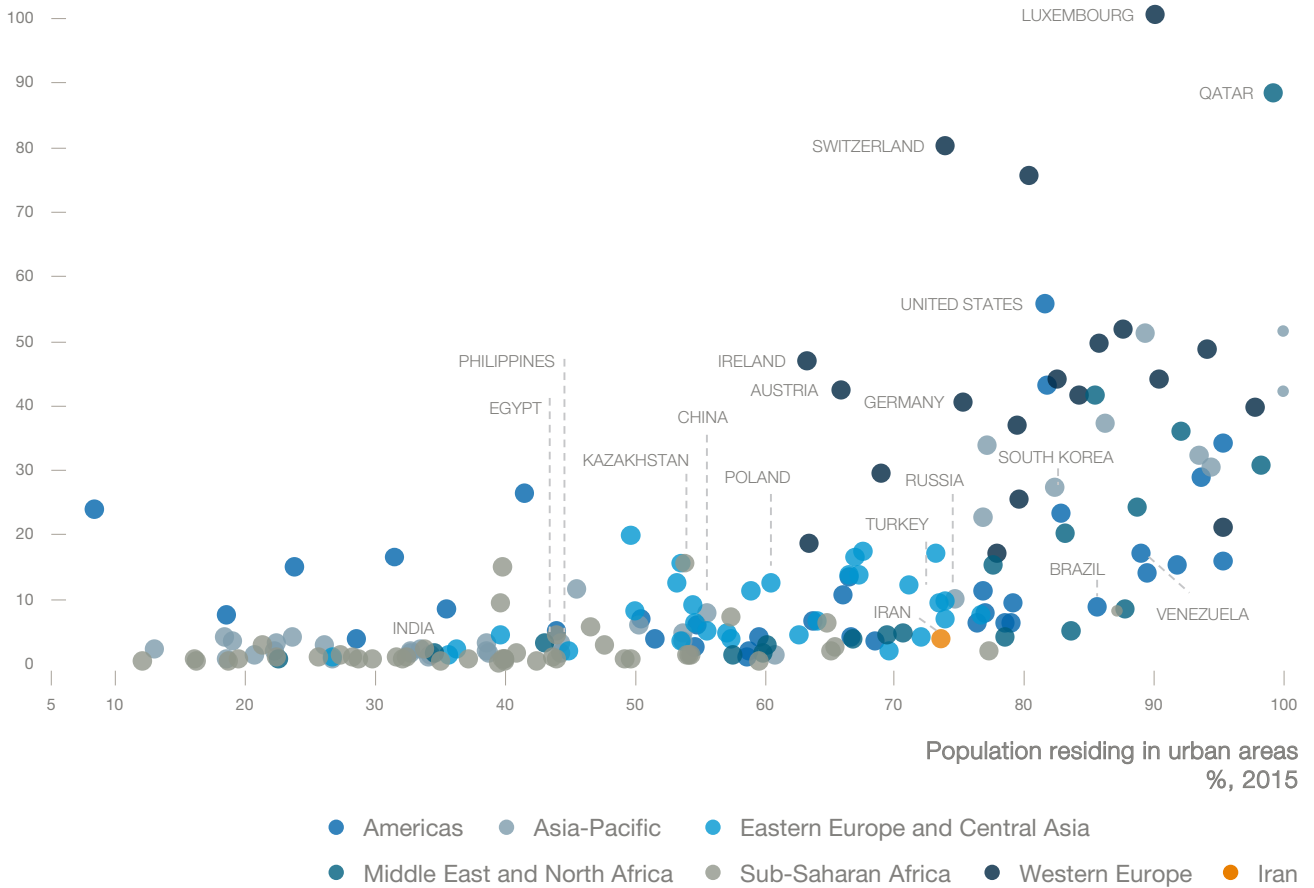
⁶² *Urban world: Mapping the economic power of cities*, McKinsey Global Institute, March 2011.

States can be explained by the fact that more Americans live in big cities, and that even midsized cities in the United States are larger than those in Europe.⁶³

EXHIBIT 4

Iran is as urbanised as many developed countries

GDP per capita, 2015
\$ thousand, nominal



SOURCE: IHS Economics; *World urbanization prospects 2014 revision*, UN, June 2015; McKinsey Global Institute analysis

In Iran, Tehran is the hub of economic activity, with a GDP larger than the next four cities combined. But the seven other cities with more than one million inhabitants help to distribute and diversify economic growth around the country.

Among the other large cities is Mashhad, a former oasis along the Silk Road in the northeast that is now home to some major manufacturing plants including auto plants. Mashhad (population 2.8 million) has a thriving tourism business as a destination for pilgrims visiting the tomb of the Shiite Imam Reza. Isfahan (population 1.8 million) also draws tourists for its famous Persian architecture, and it has a large oil refinery, an aircraft manufacturing plant, and Iran's largest shopping mall. Shiraz (population 1.3 million), where the ancient ruins of Persepolis and the tomb of the 14th-century poet Hafez are located, is the economic centre of southern Iran and headquarters for many of the country's electronics companies. Iran's degree of urbanisation outstrips its global ranking in terms of GDP per capita, which suggests that there is significant potential for future growth.

⁶³ Richard Dobbs, James Manyika, and Jonathan Woetzel, *No ordinary disruption: The four global forces breaking all the trends*, Public Affairs, 2015.

Whilst extensive, Iran’s urban and industrial infrastructure, including intercity transport, needs to be upgraded and the quality improved if the country is to derive the full benefit of urbanisation. In some areas, Iran is well equipped, for instance with ports including Bandar Anzali on the Caspian Sea and Bandar Abbas in the Persian Gulf. Fixed broadband penetration is starting to take off: the share of Internet users jumped from 19 percent in 2011 to 39 percent in 2014.⁶⁴ On the World Economic Forum’s 2015–16 competitiveness index, Iran has made some modest progress but is still ranked 80th of 140 countries for the quality of its infrastructure. Whilst it scores quite well for quality of roads (63rd) and rail (45th), it does badly on the quality of air transport infrastructure (118th). The government has made rail a priority for modernisation and has also announced plans for a national high-speed broadband network.

ENTREPRENEURIAL: A CENTURIES-OLD BUSINESS CULTURE LIVES ON

There is no Amazon or Uber in Iran because American companies are restricted from selling there. But that does not mean Iranians are digitally starved. On the contrary, local Iranian versions of all of these services have sprung up.

They include Sheypoor, the Iranian Craigslist; Esam.ir, a local version of eBay (which itself was founded by an Iranian); Cafe Bazaar, an app store similar to Google Play; and Cloob, which is akin to Facebook. Among the most successful of the new digital sites is Digikala, one of the biggest e-commerce platforms in the Middle East. It was founded in 2006 and now has 2.4 million unique visitors per month (Exhibit 5).⁶⁵

EXHIBIT 5

Iranian entrepreneurs have developed local versions of global technology businesses

Example companies



SOURCE: Griffon Capital; Small Media, *Iranian internal infrastructure and policy report*, July 2014; company websites; McKinsey Global Institute analysis

⁶⁴ *World development indicators*, World Bank, 2015.

⁶⁵ ComScore Media Trend database.

The entrepreneurial private sector in Iran is much bigger than copycat tech companies. It includes companies such as Turquoise Partners, an investment bank that claims to manage more than 90 percent of all foreign portfolio investment on the Tehran Stock Exchange; Griffon Capital, an asset management firm pioneering the development of Iran's private-equity industry, and CinnaGen, a biopharmaceutical manufacturer based in Tehran that specialises in monoclonal antibodies for blood group typing.

This sort of inventiveness is typical for a culture whose entrepreneurial roots and trading culture go back more than two millennia. The legendary Silk Road traversed what is Iran today—in the late 13th century, the Venetian traveller Marco Polo was enchanted by its wealth and beauty—and through the ages Persian traders built a global reputation.

Today, too, Iranian inventiveness and business acuity are global forces: at least three million Iranians live outside Iran, according to national census data, and some are notable entrepreneurs. They include Pierre Omidyar, the French-born founder of eBay (net worth: \$8 billion); Omid Kordestani, the former chief business officer at Google (\$1.9 billion); Farhad Moshiri, an investor whose holdings include a stake in Everton, the British football team (\$1.9 billion); Manny Mashouf, founder of retailer BeBe (\$1.3 billion); and Arash Ferdowsi, co-founder of Dropbox (\$0.5 billion).⁶⁶

Entrepreneurs in Iran enjoy a status that is on a par with the United States and higher than in France.

This culture of entrepreneurship will be a significant asset. Widespread research shows the critical role that small and medium-sized enterprises play in job creation. In the United States, for instance, companies with fewer than 500 employees account for almost two-thirds of all net new job creation, and they contribute disproportionately to innovation, generating 13 times as many patents per employee as large companies.⁶⁷

In Iran, one sign of the long history and culture of business is the image of entrepreneurs: they enjoy higher status than in France, and on a par with the United States, according to the Global Entrepreneurship Monitor.⁶⁸

The private sector and non-governmental organisations have gained room in recent years from the privatisation of state-owned enterprises, and not all the regulations on them are restrictive. According to World Bank data, starting a business in Iran costs only one-sixth as much as starting one in Turkey, as a percentage of national income per capita. Iran also scores relatively highly for enforcing contracts. But overall, Iran is in 118th place of 189 countries in the World Bank's list ranking the ease of doing business, and it scores very poorly on a range of issues, including registering property, protecting minority investors, and resolving insolvencies.⁶⁹

⁶⁶ Net worth details from Forbes.

⁶⁷ *Restarting the US small-business growth engine*, McKinsey & Company, November 2012.

⁶⁸ *2014 global report*, Global Entrepreneurship Monitor, 2015.

⁶⁹ *Doing business 2016: Measuring regulatory quality and efficiency*, World Bank, October 2015.

LOCATION: IRAN COULD AGAIN BECOME A HUB FOR REGIONAL COMMERCE

Spanning from as far north as Armenia or Turkmenistan, the same latitude as New Jersey, to as far south as the Persian Gulf, about the level of mid-Mexico, Iran is the 18th-largest country by area in the world. The country's size and position historically made it an important stop on east-west and north-south trade routes. The same features could again give rise to a range of benefits, including the potential to be a regional hub for commerce, a centre of diversified trade, and an attractive tourist destination.

Iran borders seven countries with a total population of 430 million. The neighbouring countries represent nearly 40 million consuming households projected to grow at 5.2 percent by 2025.⁷⁰ MGI predicts that the world's economic centre of gravity in 2025 will be on the border of India and China, creating the potential for Iran to act as a link between East and West.⁷¹ Iran also is well positioned for natural resource trade. In the south, Iran's water borders include the Persian Gulf and the Strait of Hormuz, which are vital for crude oil transport.

The pattern of Iran's trade has changed markedly. China today is the number-one partner, accounting for almost 40 percent of all trade.

To realise its potential as a commerce hub, Iran will have to upgrade its relatively good domestic transportation infrastructure and connect it to neighbouring countries and regions. There are already plans, with the possible involvement of international investment, to expand and upgrade rail transport, develop ports, and build more pipelines. A railroad from China was completed recently; this route cuts transport times from China by a month compared with sea travel and finishes a critical piece of the eastern side of the east-west transit corridor.

Further development of services will be needed to build a thriving tourism industry. Activity in this sector is already picking up, and international airport expansions by VINCI, Vitali, Groupe ADP, and other companies will help facilitate international tourism. The first foreign brands international travellers see upon landing in Tehran are the Novotel and Ibis hotels located next to the airport.

Iran's potential to revive the Silk Road is also rooted in its resilience. Even though Iran has among the lowest stock and flows of foreign direct investment in the Middle East, its economy is surprisingly open and it has managed to remain in the global flow of trade despite sanctions.

The pattern of its trade has changed markedly. The United States was Iran's second-largest trading partner before the 1979 Revolution, with total trade volume as high as \$3 billion annually. Trade with the United States and with Western Europe has since dried up, and today the number-one trading partner is China, which accounts for almost 40 percent of all of Iran's trade. India and Turkey also have boosted their commercial ties, with each taking a 16 percent share of overall trade.⁷²

⁷⁰ MGI Cityscope 2.55.

⁷¹ Danny Quah, "The global economy's shifting centre of gravity", *Global Policy*, volume 2, issue 1, January 2011; Richard Dobbs, James Manyika, and Jonathan Woetzel, *No ordinary disruption: The four global forces breaking all the trends*, Public Affairs, 2015.

⁷² UN Comtrade.

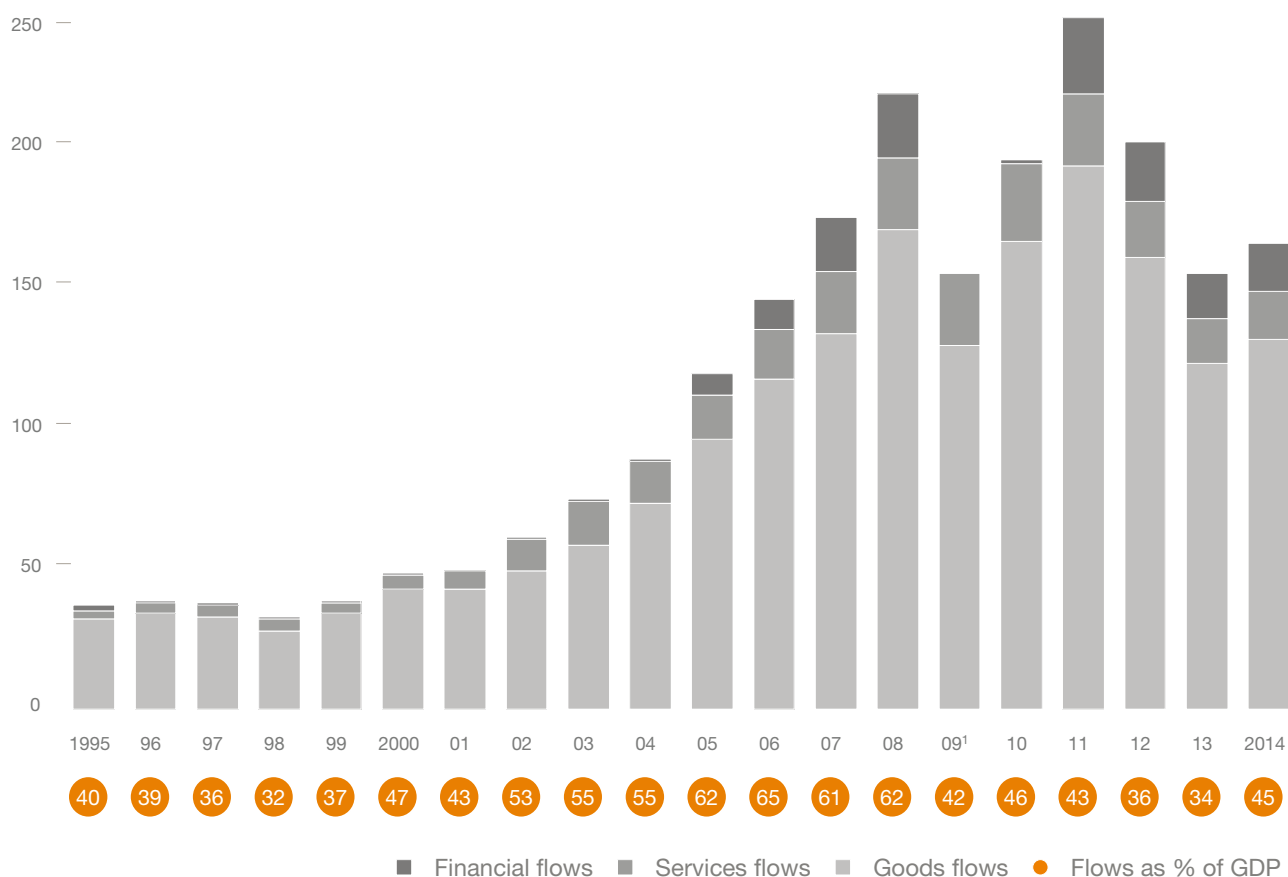
Overall, Iran's exports have fluctuated in recent years but still amount to about one-third of GDP (Exhibit 6). That is on a par with Japan and Australia. In absolute terms, Iran exports more than Egypt, Morocco, and Pakistan combined.⁷³

EXHIBIT 6

Cross-border flows for Iran have diminished but still account for more than 40 percent of GDP

Iran's cross-border flows, 1995–2014

\$ billion, nominal



¹ In 2009, nominal capital flows were -\$3 billion.

SOURCE: UNCTADstat; *World development indicators 2015*, World Bank; McKinsey Global Institute analysis

Oil and oil-related products still account for more than 60 percent of Iran's exports in value, although that share has dropped since 2012, when the European Union imposed sanctions it has since lifted. Iran's natural gas exports have grown slightly but still account for a small fraction of Iran's gas production, and most gas is consumed domestically.⁷⁴ Given the diversity of its economy, Iran also exports many other types of goods. According to the World Trade Organization, 20 percent of its exports in 2014 were in manufacturing. Iran has a 6 percent share of the world market for sulphur. It is a global player in nuts, cereals, straws, and husks. Iran has a 13 percent share of the world export market for bitumen and asphalt. It is even a player in the cabbages and cauliflower market, providing 1 percent of the world's total.⁷⁵

⁷³ *World development indicators*, World Bank, 2015.

⁷⁴ *Iran: International energy data and analysis*, US Energy Information Administration, June 2015.

⁷⁵ McKinsey Global Institute analysis of trade data.

For all its diversity and continued trade activity, Iran's economy is considerably less interconnected to world trade than it was even a decade ago. MGI research suggests that GDP growth is generally faster as countries become more closely linked with a regional and global economy, as measured across five cross-border flows: goods, services, finance, people, and data.⁷⁶ Iran's volume of total flows in 2013 was just 34 percent of GDP, or nearly half what it was in 2005. In Turkey, by comparison, flows amounted to 63 percent of GDP.

These patterns suggest that Iran has considerable potential to rebound as a trading nation. That does not mean the transition will be easy. Externally, financing is a challenge as many major banks are still reluctant to enter Iran. For foreign investors, there are considerable uncertainties and many questions, including how stable the business environment will be, and whether they will be able to repatriate profits. Multinational companies are exploring how to enter the market, and whether and with whom to partner. The government has enacted a number of laws designed to make foreign investment easier, but it will need to show that in practice, the political and other risks of operating in Iran are manageable for multinational corporations.



Iran's young population and unique geographic location, its diversified economy, and its wealth of natural resources are significant advantages that put the country in a strong position to grow as it reconnects with the global economy. On other indicators, too, Iran seems well placed, with the type of core strengths that have helped other countries increase their prosperity and achieve strong growth and job creation. These include overall education standards such as basic literacy as well as the presence of highly skilled and scientifically trained talent; the degree of urbanisation; the size of the population earning above a certain threshold and with the aspiration to consume; and the economy's openness to global flows of people, finance, and trade. All of these amount to potential, not just for Iran itself, but also for the global economy and international companies. How big that potential could be, in which sectors of the economy it is most likely to be found, and how rapidly Iran may be able to realise it, are the focus of the next chapter.

⁷⁶ *Global flows in a digital age: How trade, finance, people, and data connect the world economy*, McKinsey Global Institute, April 2014.



The ceiling of the reception hall of Borujerdi House, Kashan.
© David Wong/Getty Images



Iran has a diverse landscape and climate, attractive for outdoor enthusiasts and tourists.
© Ullstein Bild/Getty Images

2. THE \$1 TRILLION GROWTH OPPORTUNITY

To gauge more clearly both the opportunities and the challenges that Iran's economy faces, we conducted an in-depth study of 18 industry sectors. In our view, the magnitude and speed of Iran's future economic success rests on four engines of growth, which we describe in detail in this chapter.

Harnessing the country's natural resource endowments, especially oil and gas, is the first engine. Making domestic manufacturing industries, including automotive and fast-moving consumer goods, internationally competitive is the second. The third engine calls for Iran to accelerate its transition towards a knowledge-based economy, building on its strengths to grow sectors such as ICT and finance. Finally, physical and digital infrastructure will need to be modernised and expanded to underpin growth.

Iran's government is targeting an annual growth rate of 8 percent in the next five years to 2021, and is seeking to encourage investment by foreigners and Iranian expatriates.

Our analysis shows that, by boosting these four engines, Iran has the potential to add \$1 trillion to the world economy in the next 20 years, at projected real exchange rates. That is more than three times the GDP that East Germany added to the world economy between 1990 and 2010 after its reunification with West Germany. An increase of this magnitude would take Iran's GDP to the level of Spain's in 2014 or, on a per capita basis, above the 2014 level of Turkey, Russia, Malaysia, and Mexico. It would also increase global GDP by more than 1 percent. For Iran, this would mean an average 6.3 percent annual growth in the dollar value of its economy and the addition of nine million jobs. This growth would be broadly distributed across a large number of sectors, reflecting the diversified nature of Iran's economy, and would ramp up gradually over time.

The government is targeting an even higher growth rate of 8 percent in its new Five-Year Development Plan for the period 2016–21. To achieve its goals, the government has outlined 31 economic priorities. They include improving the business environment, strengthening the financial system, and upgrading industry and infrastructure through the adoption of modern technology. They also include encouraging investment by foreigners and Iranian expatriates.⁷⁷

Achieving strong growth, whether it is 6 or 8 percent, will require a significant transformation of the economy. Iran would have to reach the benchmark level of performance already set by other countries, and the government would need to address key economic challenges that limit the economy's potential. For example, labour productivity growth is weak compared with benchmark countries, averaging just 0.4 percent in the period between 1980 and 2012. This compared with 7 percent for China, 4 percent for India, and 3 percent for Turkey. Productivity growth did pick up in the 2000–10 decade to 2.4 percent, boosted in part by rising oil and gas prices, but still remained behind the 4.1 percent rate recorded

⁷⁷ "8% growth p.a. target for Sixth FYDP", *Financial Tribune*, July 2, 2015.

by BRIC countries.⁷⁸ Moreover, Iran is an outlier for labour-force participation: in 2014, just 41 percent of the country's working-age population was economically active, far below the rate for that year in China (71 percent), Russia (69 percent), and Turkey (51 percent). The male participation rate of 69 percent in 2014 was slightly below benchmark countries, but the biggest difference was the female participation rate of 13 percent, one of the lowest in the world.⁷⁹ The government has ambitions to reduce unemployment to 8 percent, yet its unemployment rate has not dropped below 10 percent since 1997. Iran also faces underemployment, especially affecting its youth population. We address these and other challenges in Chapter 3.

If Iran is to achieve \$1 trillion growth over the next 20 years, it will also require substantial investment. Based on our bottom-up examination of different sectors, we estimate the total cumulative investment needs at \$3.5 trillion, at least one-third of which will likely need to come from foreign investment.

Of course, many scenarios for Iran's economy are possible, driven by a large number of uncertainties. These include how rapidly Iran could boost its oil and gas exports, and what that might do to energy prices and global GDP growth; the extent to which Iran's economy would open up to international investment; and, correspondingly, the pace and intensity with which international investors would come to Iran. The speed with which reforms would be implemented would also be a significant factor.

We grouped the 18 sectors into four engines, as follows:

- **Harnessing natural resource endowments**
Oil and gas, petrochemicals, mining, and agriculture
- **Nurturing internationally competitive industries**
Automotive, basic materials, fast-moving consumer goods, retail trade, and tourism
- **Transitioning to a knowledge-based economy**
Financial services, professional services, ICT, pharmaceuticals, and health care
- **Expanding and modernising infrastructure**
Transport, utilities, real estate, and construction.

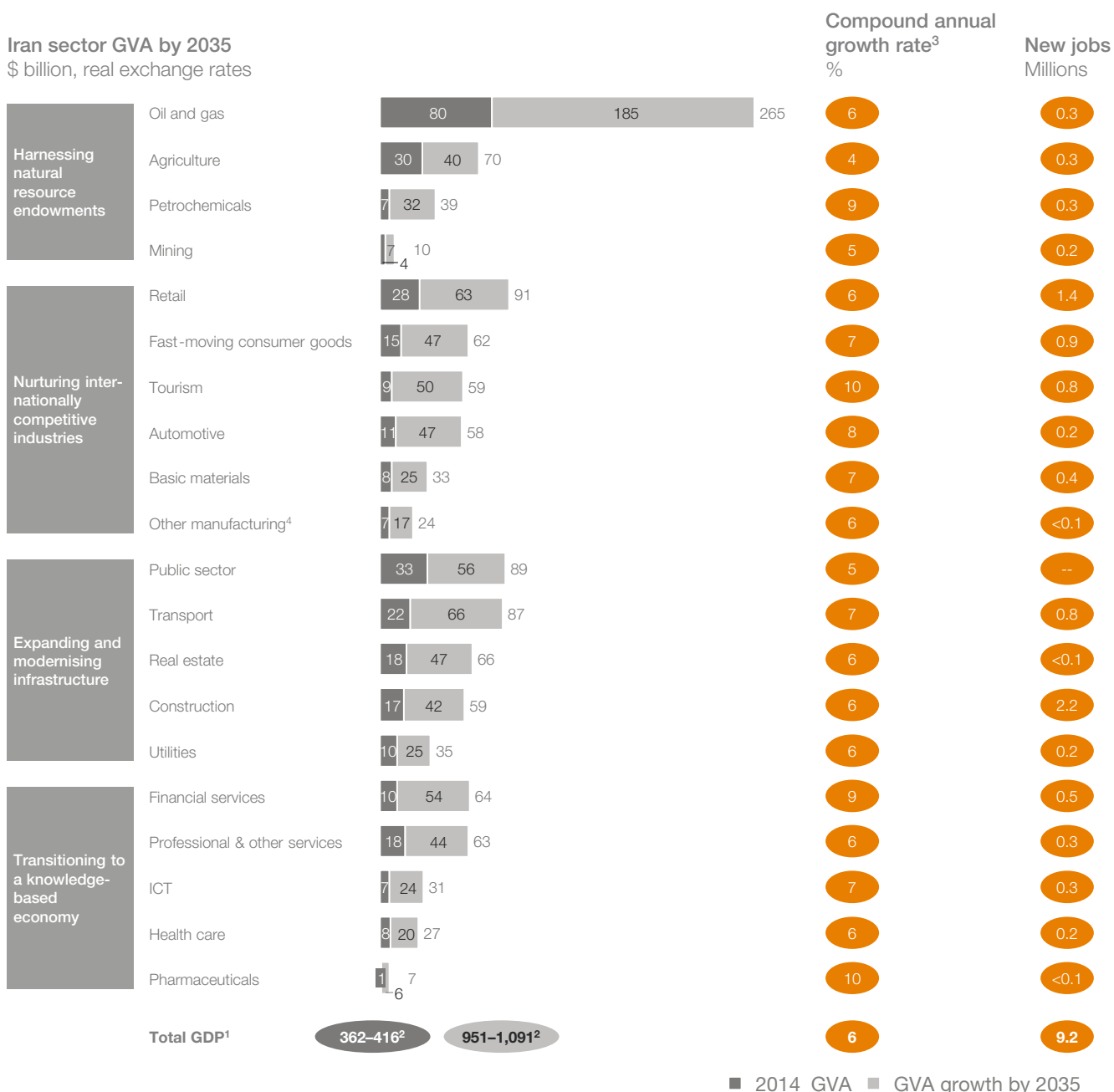
For each of these sectors, we have made projections for gross value added (GVA), employment and cumulative investment to 2035. Together they amount to more than \$1 trillion in additional GDP and the creation of nine million jobs over the next 20 years (Exhibit 7).

⁷⁸ IHS Global Insight; ILOSTAT.

⁷⁹ Iran is one of several countries in the Middle East and North Africa region whose female labour-force participation rate is identified as being particularly low in *The power of parity: How advancing women's equality can add \$12 trillion to global growth*, McKinsey Global Institute, September 2015.

EXHIBIT 7

Four engines of growth could add \$1 trillion to Iran's GDP and create nine million jobs by 2035



Note: Numbers may not sum due to rounding

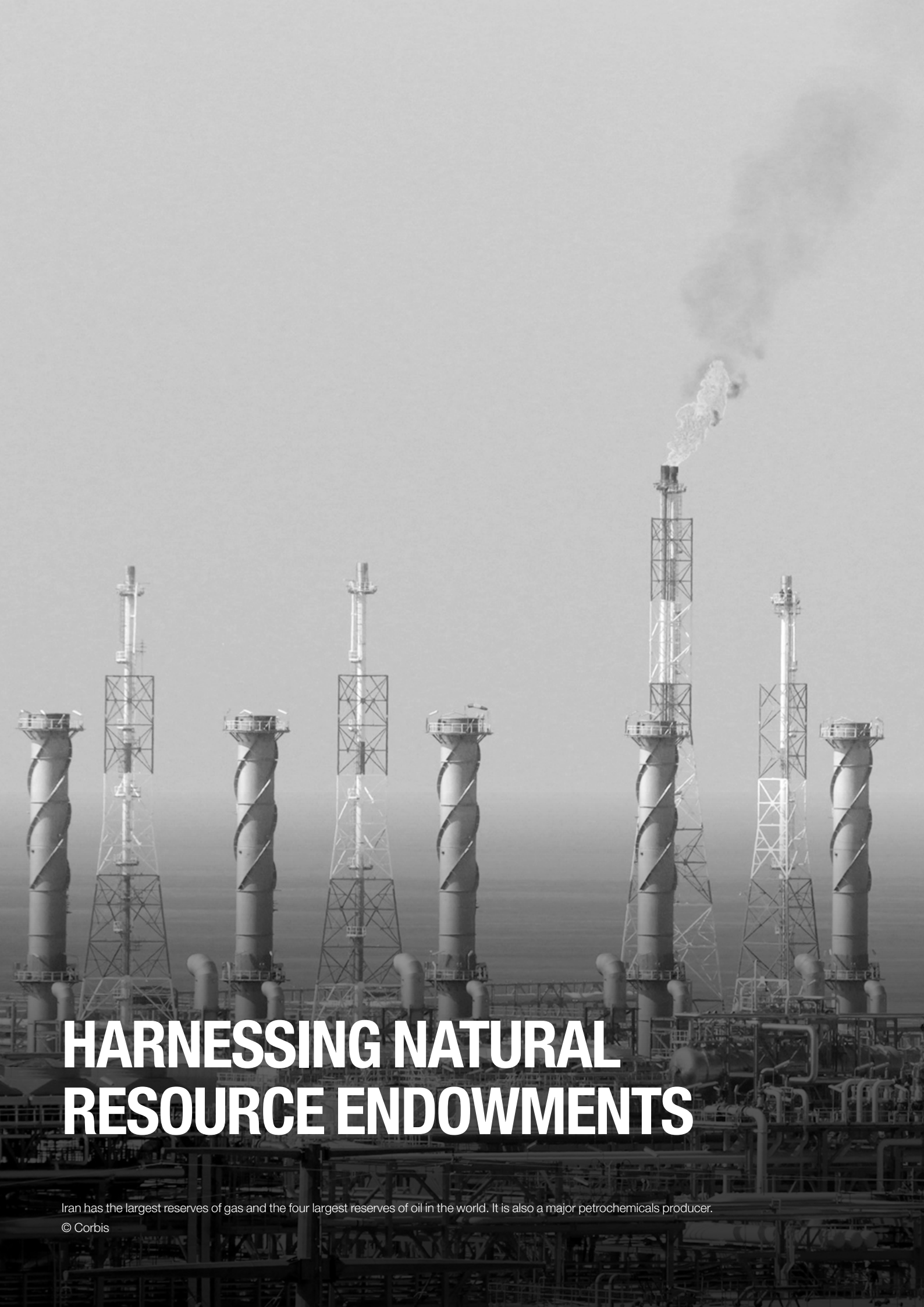
¹ Difference between the sum of the sector GVAs and GDP is explained by taxes and subsidies.

² Estimates for 2014 GDP vary from \$362 billion to \$416 billion, depending on source; the range in future GDP is driven by this baseline variance.

³ Includes 1.12 percentage points per sector from real exchange rate appreciation.

⁴ Other manufacturing includes textiles, paper and pulp, printing and publishing, machinery, equipment, appliances, and others.

SOURCE: McKinsey Global Institute analysis



HARNESSING NATURAL RESOURCE ENDOWMENTS

Iran has the largest reserves of gas and the four largest reserves of oil in the world. It is also a major petrochemicals producer.

© Corbis

Oil and gas will play a critical role in boosting Iran's growth, both in the short term and the longer term. A rebound in oil exports will likely provide the initial boost, whilst gas could sustain growth over the longer term. As noted, the country has the largest proven reserves of gas in the world, and the fourth-largest proven reserves of oil.⁸⁰ Its costs of production for both oil and gas are well below market prices, despite the sharp fall in prices since mid-2014. Although gas is for now mainly used domestically, significant net gas exports are likely to become a possibility for the first time over the next decade.

Iran's gas and natural gas liquids also provide low-cost feedstock for Iran's petrochemicals sector, already the world's tenth-largest producer in volume terms, ahead of Russia. Petrochemicals have a growing domestic market and a favourable infrastructure for reaching export markets. Mining is also likely to be an important growth sector given Iran's wealth of mineral deposits, including major reserves of copper and zinc. Finally, agriculture is a sizable sector and major employer with potential to improve. Farm ownership is highly fragmented, with smallholders dominating the landscape, and Iran is likely to remain a net importer of agricultural products. Adopting more modern techniques, for example in water management, and consolidating farms could bring about steady productivity growth.

All of these sectors will require substantial investment to upgrade sometimes outdated machinery or processes and to develop new untapped resources. Oil and gas in particular, along with some of Iran's other mining resources, are especially attractive to foreign investors. The government will need to strike a balance between maintaining sovereign ownership of the assets and offering international investors risk-adjusted returns that are attractive.

OIL AND GAS: INCREASING PRODUCTION AND EXPORTS

With the delivery of one million barrels from the tanker Monte Toledo to Spain's Cepsa refinery on March 6, 2016, Iran's crude exports to Europe restarted.⁸¹ We estimate that oil and gas together could contribute \$125 billion to \$375 billion annually to Iran's GDP by 2035. The wide range in our estimate is due primarily to considerable uncertainty about the future trajectory of oil and gas prices, as consumption patterns shift with changing demand from emerging markets, the development of alternative technologies for transportation, and possible policy responses to climate change. The outcome also depends on the level of investment the sector will attract to increase production over that period. To exceed the pre-sanctions production levels of more than four million barrels per day and exports of more than two million barrels per day, Iran will need to make substantial investments in both enhanced oil recovery for mature oil fields and the development of new ones.

Iran's government has signalled its intention to boost gas and oil production, and its five-year plan identifies a total need of \$200 billion in investment for the sector: \$135 billion for upstream projects, \$50 billion for petrochemicals, and \$15 billion for refineries.⁸² The government has also said it wants international oil companies to help achieve this goal and is reviewing the contractual basis of its relations with them. It has indicated that a new "Iranian Petroleum Contract" will move from the current buyback arrangement to a system more attractive to multinational firms, including longer-term contracts and revenue proportional to risk.

⁸⁰ *BP statistical review of world energy*, BP, June 2015.

⁸¹ Rick Gladstone, "Embargo lifted, Iranian oil reaches Europe", *New York Times*, March 7, 2016.

⁸² Remarks by Minister of Petroleum Bijan Zanganeh at a March 1, 2016, conference. "The clarification of the sixth development plan and first resistive economy plan", reported in "Iran's oil industry needs a \$40 billion yearly investment in the sixth development plan", Islamic Republic News Agency, March 2, 2016.

Gas will likely play a key role in Iran's long-term development goals.

Boosting natural gas production will create new possibilities and policy choices for the government over how to reach its development goals. At home, increasing gas supplies could be used to meet the growth in industrial demand, including for petrochemicals, and complete the transition of power generation almost entirely to gas-fuelled plants that are more energy-efficient. This would free up oil earmarked for domestic purposes to be exported. Similarly, gas reinjection into mature oil fields would boost recovery. For export, gas could be delivered by pipeline or in the form of liquefied natural gas (LNG), although this would take time and large capital investment to achieve.

Restoring liquids production and exports beyond pre-sanctions levels

Iran produced more than six million barrels of oil per day in the 1970s, but the amount dropped below two million barrels in the 1980s. The Iran-Iraq War in 1980–88 constrained foreign investment and, most recently, international sanctions affected output. Iran's liquids production in 2015 averaged 3.4 million barrels per day (2.8 million of which was crude oil), or about 20 percent below the pre-sanctions level of 4.3 million barrels per day.⁸³ A 50 percent drop in exports to about one million barrels per day was the primary cause.⁸⁴

In 2015 Iran's average liquids production was

3.4M

barrels per day

The oil sector managed its way through the sanctions-related production decline by shuttering individual wells on older fields on a rotation basis, rather than shuttering entire fields. This means it will be easier to bring them back online, although dilapidated infrastructure will require refurbishment. Even during sanctions, the oil sector continued development on some less mature fields, including Yadavaran and Azadegan North.

Post-sanctions, the government has set a liquids capacity target of four million barrels per day by the end of 2016 and 5.7 million barrels per day by the end of the five-year plan in 2021, with up to one million barrels per day coming from condensate, primarily from the South Pars gas field. This boost in liquids production would require new investment of \$70 billion to \$100 billion and the coordination of many new projects concurrently. Other forecasters expect a short-term output increase, but express uncertainty about the pace of any increases that will require new investment.⁸⁵

The \$15 billion the government plans for refinery investment is mainly for condensate and includes completing the Siraf refinery (480,000 barrels per day), Persian Gulf Star refinery (360,000 barrels), and second phase of the Fars refinery (120,000 barrels). With this capacity, all condensate would be refined in Iran instead of being exported unrefined.⁸⁶ This would likely eliminate the need for imports of gasoline, which amounted to 74,000 barrels per day in 2015.⁸⁷ Given excess capacity in Asian and European distillation hubs, further large investment may produce only low-margin products. That said, some foreign investment in refineries in Iran and Iranian investment abroad could solidify long-term trade relationships, mainly with Asia.

⁸³ Wood Mackenzie Upstream Data Tool, Q4 2015; "liquids" includes crude oil, condensate, and natural gas liquids.

⁸⁴ *Regional economic outlook: Middle East and Central Asia*, IMF, October 2015.

⁸⁵ *MENA quarterly economic brief*, issue 5, World Bank, July 2015; *Regional economic outlook: Middle East and Central Asia*, IMF, October 2015.

⁸⁶ Minister of Petroleum Bijan Zanganeh's remarks at the March 1, 2016, conference.

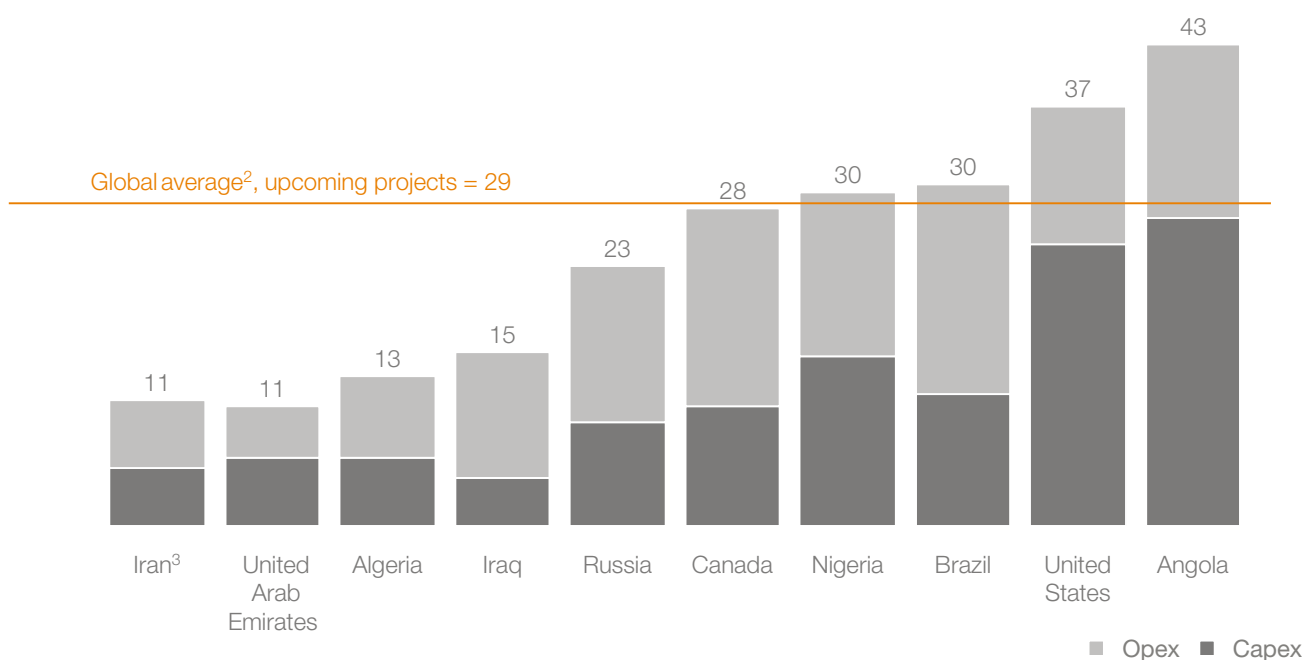
⁸⁷ "Refined products balance", FACTS Global Energy, May 2015.

Historically, Iran's cost per commercially recoverable barrel, measured as capital and operating expenditure excluding government payments, has been as low as \$2 to \$3. Even with expected cost increases due to field geology and the need for advanced technology most likely to come from international oil companies, fields that began producing in the past 20 years are likely to remain economically attractive (Exhibit 8). Several of these relatively newer fields will be Iran's priority, including Azadegan North, Azadegan South, Darkhovin, Yadavaran, and Changouleh. They will likely have a cost of \$10 to \$12 per barrel, including around \$5 per barrel for capital expenditure, comparable to adjacent fields in Iraq operated by international oil and gas players. Assuming a similar cost structure across all fields, we estimate that Iran will need \$60 billion of investment to offset the decline of mature fields and maintain assets for liquids production at the pre-sanctions level of about four million barrels per day through 2035. Increasing production to 5.4 million barrels would require investment of \$125 billion.

EXHIBIT 8

Production costs for Iran's oil fields are among the lowest in the world

Technical cost per barrel of commercially recoverable reserves, upcoming projects¹
\$ per barrel, 2015 real



¹ Total expenditure (not including taxes and royalties) over lifetime of field in real 2015 USD divided by total commercially recoverable reserves; includes fields with associated gas counted as million barrels of oil equivalents (mmbob); "upcoming projects" includes "probable development" and "under development" fields in the Wood Mackenzie Upstream Data Tool Q1 2016.

² Weighted average for all countries with upcoming projects

³ Assessment based on government estimates, industry analysts, and Iraq's adjacent Majnoon field operated by international players.

SOURCE: Wood Mackenzie Upstream Data tool Q1 2016; Syd Nejad, "Is Iran worth the risk?" *Oil & Gas Journal*, December 2015; McKinsey Global Institute analysis

Monetising gas production to boost economic growth in the long term

Iran's 34 trillion cubic metres of total proven gas reserves are larger than Russia's and Qatar's, double those of Turkmenistan, and triple the gas reserves of the United States. For now, Iran is not making full use of those reserves. Its annual production of 173 billion cubic metres is less than one-fourth the output in the United States, the largest producer. At that rate, Iran has sufficient reserves to cover production for 200 years.⁸⁸

Unlike oil, Iran's natural gas production has grown strongly over the past two decades, including during the period of international sanctions, as the South Pars gas field has been developed. This field, which shares a reservoir with Qatar's North Dome fields, is Iran's largest, with 14 trillion cubic metres of recoverable reserves. The cost of producing gas from South Pars, at below \$7 per barrel of oil equivalent at most fields, or \$1.20 per million British thermal units (mmBtu), is similar to Qatar's cost of exploiting gas from the same reservoir. Qatar mainly sells it as LNG in Asia for about \$7 per mmBtu.

79%
share of gas in
domestic power
generation

Development of South Pars continued through sanctions, albeit slowly and with cost increases. With the return of international companies and additional capital expenditure of at least \$30 billion, Iran could increase production from this field to about 280 billion cubic metres (bcm) per year, or 10,000 trillion Btu in the next ten to 15 years.⁸⁹ This would take the South Pars share of Iran's total gas production from less than 50 percent in 2015 to 70 percent by 2030. South Pars is also rich in condensate and produced most of Iran's 450,000 barrels of condensate in 2014.⁹⁰

Gas could play a key role in Iran's long-term development goals. Industrial demand for gas—even after improvements in energy efficiency and the gradual phasing out of subsidies—could grow as much as 5 percent per year, driven by the construction sector and by a government-backed push to boost production of basic petrochemicals including methanol, ammonia, and ethylene products. Gas is also expected to increase its dominant role in the mix of power generation, currently at 79 percent. We expect residential and commercial demand for gas to grow modestly.

Our analysis of supply and demand suggests that, by 2025, Iran will produce up to 70 bcm of marketable gas above the expected demand from power generation, industry, and commercial and residential use. It faces choices over how best to allocate the gas to further economic growth and development. Prices for gas are set by the government depending on the category of end-user.⁹¹ A broader downstream gas plan could encourage efficiency and facilitate investment in the areas most likely to support development goals. Such a plan would consider the trade-offs involved in replacing oil with gas in power generation, using gas to expand petrochemicals and energy-intensive industries, reinjecting gas into oil fields to increase production, and exporting gas by pipeline or as LNG (Exhibit 9).

Over time, increased production of gas would allow Iran to grow exports whilst meeting domestic development goals. The government has indicated that gas exports could exceed 70 bcm per year if obstacles to concluding export agreements are overcome.⁹²

Iran exports about nine bcm of gas via pipeline to Armenia, Azerbaijan, and Turkey. Additional pipeline projects have been planned, although not all are certain to go forward. They include plans for Iran to export one bcm to two bcm of gas annually to Iraq and

⁸⁸ *BP statistical review of world energy*, BP, June 2015.

⁸⁹ Our assumption is that phases 11 and 22–24 come online after phases 20 and 21 with similar investment and production patterns.

⁹⁰ *Iran: International energy data and analysis*, US Energy Information Administration, June 2015.

⁹¹ Elham Hassanzadeh, *Iran's natural gas industry in the post-revolutionary period: Optimism, scepticism, and potential*, Oxford University Press, 2014.

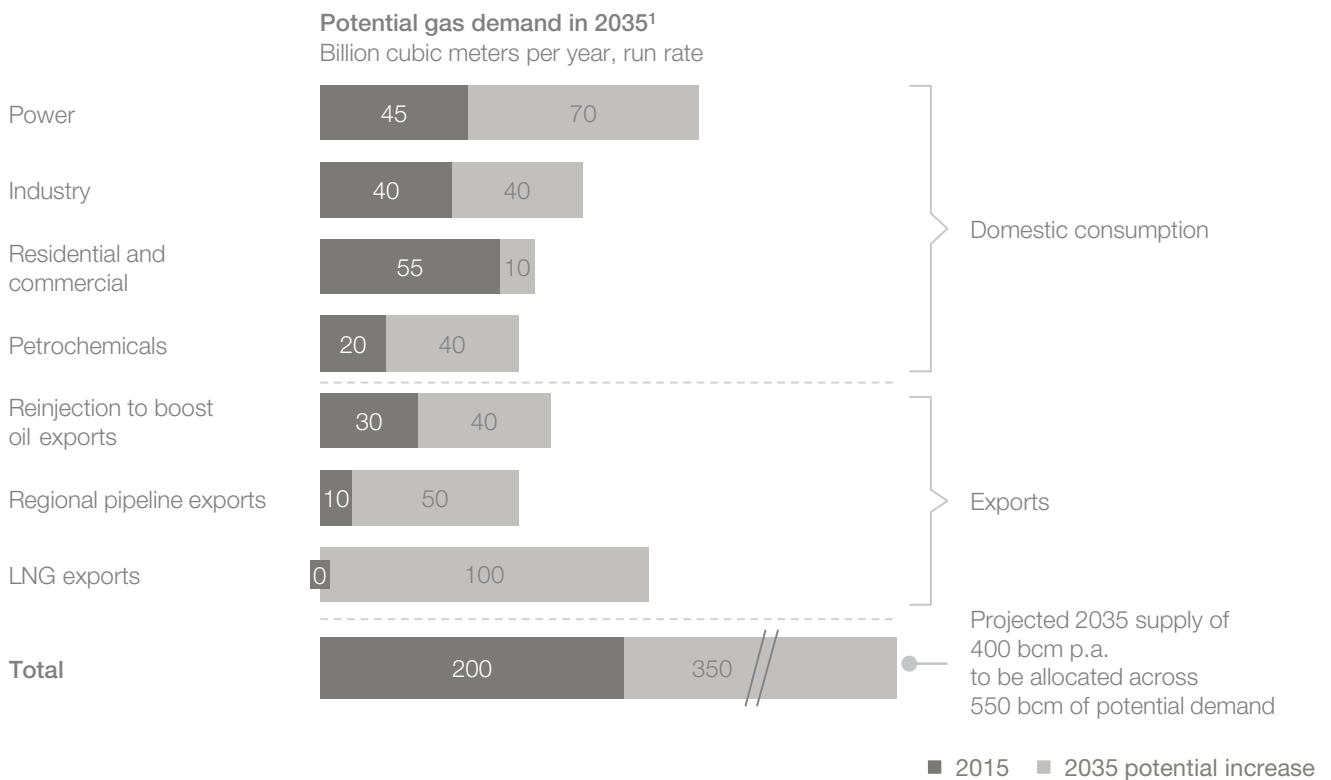
⁹² Minister of Petroleum Bijan Zanganeh's remarks at the March 1, 2016, conference; "Iran's oil industry needs a \$40 billion early investment in the sixth development plan", Islamic Republic News Agency, March 2, 2016.

potentially increase that to nine bcm. Iran also plans a ten-bcm pipeline to Oman, where 30 percent would be liquefied and re-exported as LNG. The government has also highlighted the potential for exports to Pakistan and India, and additional exports to Turkey. We estimate that these and other projects could raise exports to 30 bcm a year by 2025, and more if long-term contracts can be signed for all of the projects.

A larger but longer-term opportunity for Iran to increase gas exports is through downstream processing of natural gas into LNG. The global LNG trade has grown rapidly in the past 25 years at an annual rate of about 7 percent between 1990 and 2013. China, India, Japan, and South Korea have been key markets, although future demand may not be as robust if China's growth continues its slower trajectory and it further develops its own shale gas. Supplies from North America, Australia, and Africa mean the global LNG price may be low for several years, but the market size for a longer-term equilibrium could be anywhere from \$300 billion to more than \$700 billion by 2030. Whilst the outlook is uncertain, Iran could realise high potential value for LNG investment in the long term.⁹³

EXHIBIT 9

Iran will need to make choices about how to monetise its increasing gas supply



¹ Assuming absorption of required investment; with the exception of 15 bcma from Iran LNG, all LNG projects would require international capex for starts after 2025.

SOURCE: McKinsey Global Institute analysis

⁹³ "Capturing value in global gas: Prepare now for an uncertain future", McKinsey & Company, July 2014.

Iran already has in place an embryonic infrastructure for developing LNG. Construction on an LNG terminal at Tombak began pre-sanctions and there were agreements or plans for a range of projects with international partners including Shell, Total, and Petronas. These projects were either cancelled because of international sanctions or have been held up for other reasons such as financing difficulties and changing government priorities. By restarting work on the sole existing domestic project, owned by Iran LNG Company, the country could bring 15 bcm of LNG capacity to the global market alone. If all the projects that have stalled or are in planning were to advance, Iran could increase LNG capacity to 100 bcm with an additional \$60 billion of investment.⁹⁴ In practice, only the Iran LNG project could come onstream within three to five years. Given the uncertainties over prices in export markets and the heavy investment required to build out gas exports, Iran may opt for a gradual expansion.

Creating a regulatory and investment environment attractive to investors

The further development of oil and gas fields and infrastructure for potential exports requires sizable capital investment that we estimate could be as high as \$300 billion to \$350 billion over 20 years. These investment needs could be met in part by international oil and gas and field service companies, whose technical expertise is likely to accelerate oil and gas production growth. Iran's government has said it seeks international investment in the oil and gas sectors, and it signed several deals within weeks of Implementation Day. For example, Shell cleared the way for its return to the Iranian market by repaying \$2 billion of pre-sanctions debt to Iran, and Italy's Saipem signed two agreements in January 2016 to upgrade pipelines and refineries at Shiraz and Tabriz.⁹⁵

To secure the investment in upstream oil and gas it requires, Iran will need to create a regulatory environment that will stimulate such investment. Under current rules, international oil companies are required to operate through locally controlled companies and earn revenue based on a buyback contract that is specific to Iran. The international contractor provides the upfront capital expenditure for the project and is paid by the National Iranian Oil Company based on a formula that includes a fixed rate of return. At the same time, the international firm assumes the risk of scope creep or cost overruns. The Iranian contract is fundamentally different from the concessionary or production-sharing model for international oil companies usually used in other countries, under which these firms assume the risks of exploration and project management but reap high returns over the life of the project if successful.

Iran is revising the commercial terms of its contracts and may move closer to a production-sharing model more in line with other oil-producing countries. A government review committee established in 2013 has described general principles of a new contractual system, under which international firms would set up joint ventures with the National Iranian Oil Company and be paid with a share of the profit whilst complying with the principles of sovereign control of resources in Iran's constitution. The contracts would also cover a much longer period of 20 to 25 years with incentives for each field tied to its financial risk.⁹⁶ Iranian officials reiterated the principles of the new contract at a conference in Tehran in November 2015, but the new process has yet to be approved by parliament.

⁹⁴ Estimates are based on historical brownfield and greenfield capital expenditures per capacity ratios in the Middle East published in *World LNG report – 2015 edition*, International Gas Union, 2015.

⁹⁵ Ron Bousso, "Shell repays Iran 1.77 billion euro debt for oil deliveries", Reuters, March 7, 2016; "Saipem signs a second MoU concerning potential cooperation for future pipeline projects in Iran", Saipem press release, January 26, 2016.

⁹⁶ Elham Hassanzadeh, *Iran's natural gas industry in the post-revolutionary period: Optimism, scepticism, and potential*, Oxford University Press, 2014.

PETROCHEMICALS: LOW-COST FEEDSTOCK GIVES IRAN AN EDGE AS A GLOBAL PRODUCER

With its vast natural gas resources, which provide low-cost feedstock, combined with a growing domestic market and a favourable infrastructure for reaching export markets, Iran has the potential to increase the petrochemicals sector's GVA contribution from about \$7 billion in 2014 to \$30 billion to \$45 billion in 2035 and create up to 300,000 new jobs over the period. Such an increase would put Iran at a production level that is exceeded only by China and the United States.

Such growth would be contingent on Iran's being able to attract the substantial investment required to increase capacity, raise technical efficiency, and develop domestic capabilities. The government has put forward a plan for a total of 120 million tons per year of additional capacity with close to \$80 billion in investment by 2026. About half of these projects are being implemented, and the government has indicated a goal of \$50 billion of investment under its latest five-year development plan.

Iran's petrochemical sector grew at an annual average rate of 26 percent between 2005 and 2010.

Increasing capacity based on Iran's global cost advantage

Iran's petrochemicals sector developed significantly over the past decade, with output growing at an average annual rate of 26 percent between 2005 and 2010.⁹⁷ The main exports are relatively basic products such as polyethylene, methanol, benzene, ammonia, PVC, and propylene. Exports fell by a total of 24 percent between 2010 and 2013 following the imposition of international sanctions, but the ban on petrochemical exports was lifted in 2014, and exports have since resumed their upward trend.

Production in 2014 was about even with 2011 levels and grew by more than 5 percent in 2015. The National Petroleum Company, which is both a policy body under the Ministry of Petroleum and has subsidiary state-owned chemical companies, is seeking to accelerate growth and at least double capacity to 120 million tons per year by the end of the five-year plan. About 40 million tons of capacity would come from the second phase of development of the large gas hub at Assaluyeh.⁹⁸

Whilst the plans are largely focused on basic petrochemicals, including methanol, ethylene, and the fertilisers urea and ammonia, the company has also outlined plans to increase capacity and introduce new technology like methanol-to-olefin to enter the propylene/polypropylene chain.

Even with uncertainties in global growth and petrochemical prices, Iran is likely to remain a profitable producer because low-cost feedstock gives it a global advantage. About 80 percent of Iran's feedstock is ethane, the two-carbon natural gas liquid (NGL) that can be isolated from natural gas. Crackers that use ethane feedstock produce about 79 percent ethylene on average, which is further processed to make polyethylene or other derivatives that could be used in fibres or other commodity plastics.

80%
of Iran's
petrochemical
feedstock is ethane

⁹⁷ ICIS Supply and Demand database; fertilisers not included.

⁹⁸ "Iran petchem industry ready for foreign investment", Shana News Agency, March 15, 2016.

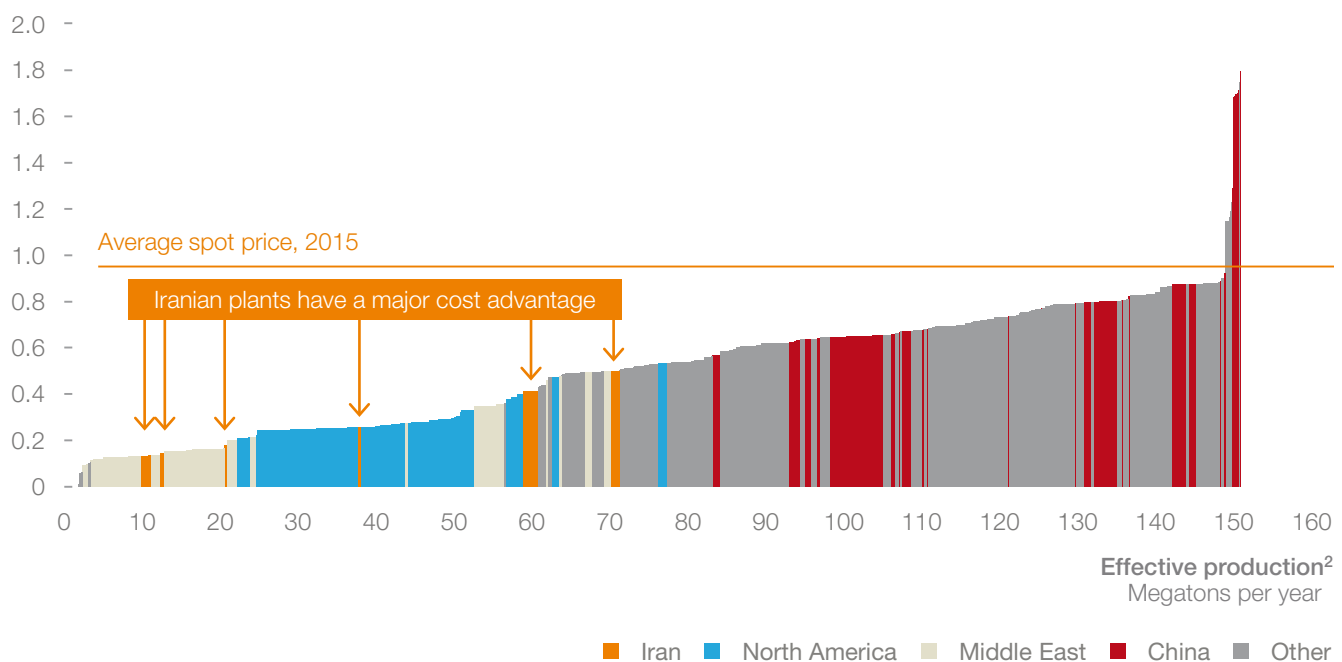
The Middle East and North America are the only world producers that use a majority of NGLs for ethylene feedstock. Producers in Europe and Asia use heavier crude oil products such as naphtha or vacuum gas oil, which are more expensive. Lower world crude oil prices have reduced the cost difference, but Asian ethylene produced from naphtha is still more than three times as expensive to produce as Iran's NGL-based output (Exhibit 10). Even if the cost of ethane feedstock were to triple, we estimate Iranian producers could still add value. Moreover, whilst other Middle East producers are facing NGL shortages, Iran's supply is expected to increase as gas production from South Pars rises, sustaining its advantage for decades.

EXHIBIT 10

Iran is one of the most cost-competitive producers of ethylene in the world

Global ethylene cost curve by plant, 2015¹

\$ thousand per tonne, nominal, per plant



¹ Plant gate costs; based on prices in United States, Western Europe, NEA, SEA, and Middle East netbacks (South America costs based primarily on Western Europe prices); each cracker's cost based on estimated feed mix, scale, and estimated yield efficiency estimate. Net cost of ethylene (total feed, utilities, and fixed cash costs less byproduct credits), based on 2015 average prices, crude WTI \$45.80/billion barrels of oil.

² Assumes 93% utilisation for each plant.

SOURCE: McKinsey global ethylene cost curve; IHS; McKinsey Global Institute analysis

Partnering with international investors to raise value added

To take advantage of the petrochemicals opportunity, Iran will need to attract foreign investment to supplement local investment, increase utilisation, and meet growing domestic demand with a broader product mix that includes end-use plastics and synthetic rubber.

In addition to low-cost feedstock, investment could benefit from developed infrastructure for exports, financial incentives under special economic zones at Mahshahr and Assaluyeh, and local knowledge and skilled technical labour. To facilitate investment and make the sector more competitive, the National Petroleum Company has announced that it will change its role from state-owned developer to become a regulator and policy body.⁹⁹ Privatisation since 2010 has transferred some ownership of petrochemical plants to Iranian investment and pension funds.

⁹⁹ *Iran's petrochemical industry report: Annual report 2014*, National Petroleum Company.

70%
petrochemical
plant utilisation in
2013–14

Iranian officials have already announced a number of large investments, including a \$4 billion investment from Germany's BASF to add new capacity at the special economic zone at Assaluyeh, and a joint Linde-Mitsui (Japan) investment of up to \$4 billion that will go towards projects that have not yet been finalised.¹⁰⁰ Partnerships in petrochemicals have been a topic of bilateral discussions with China, Indonesia, Singapore, and South Korea. Two sets of projects of just under \$6 billion apiece are to be funded by the National Development Fund of Iran.

International companies will be important not only for financing new projects, but also for enhancing operations. Plant utilisation declined from its peak of 91 percent in 2002 to below 70 percent in 2013–14.¹⁰¹ The decline was due in part to decreased demand from sanctions but also to isolation from international chemical and service companies. Without access to top technology, plant construction and equipment utilisation suffered. The National Petroleum Company has identified equipment and supply change management as areas that could benefit qualitatively from foreign investment.¹⁰² With access to improved plant construction, equipment, and operations best practices, increased utilisation from 70 percent to a benchmark close to international standards of 85 percent could account for an additional \$4 billion of GVA by 2025.

In addition to attracting international investment for exports, successful expansion of the petrochemicals sector will depend on supplying the right mix of products to match growing domestic demand. As Iran's economy grows, its consumption of petrochemicals and end-use products will rise, feeding other sectors including automotive and construction. Iran imported about \$8 billion of end-use plastic and rubber products in 2014.¹⁰³ Assuming 7 percent growth in domestic consumption in line with industrial demand, Iran's domestic market in 2025 could be \$25 billion larger than current domestic sales.

Exporting these end-use products at scale will be more challenging. Iran captures the value added from low-cost feedstock in the basic chemicals step of production and would face steep competition in end-use products on the international market. As Iran incrementally increases and diversifies its product mix to meet domestic demand, exports of downstream products are possible, but margins will depend on cyclical international prices.

Given that it will take time to develop export options for Iran's increasing supply of gas, the petrochemicals industry offers a reliable way to monetise it in the near term with a value-adding intermediate step. Indeed, petrochemicals can become an important element of a broader gas and NGLs strategy to support value-added industry.

MINING: IRAN HAS SOME OF THE WORLD'S LARGEST RESERVES OF ZINC, COPPER, AND IRON ORE

Iran has deposits of more than 68 minerals that the government estimates are worth up to \$700 billion. Iran is among the global top ten in reserves for iron ore, copper, and zinc (Exhibit 11).¹⁰⁴ Iran's reserve-to-production ratios are high—roughly four times the global average for zinc and copper—due to political and economic shocks that interrupted the long cycle of exploration to production necessary for mining investment. Since 2005, production of both iron ore and copper has grown at around 15 percent from the low starting point of 15 million tons of iron ore and 0.6 million tons of copper concentrate annually. Major investment would be needed to continue these trends and for the mining sector to realise its potential.

¹⁰⁰ "BASF to invest \$4bn in Iran petchem plan", PressTV, February 12, 2016.

¹⁰¹ ICIS Supply and Demand database.

¹⁰² "Iran petchem exports up 26%", Shana News Agency, March 7, 2016.

¹⁰³ Ministry of Economic Affairs and Finance, Customs and Tariff Administration.

¹⁰⁴ "Mineral commodity summaries 2016", US Geological Survey, 2016; *Strategy of the Iranian government to promote investment in mining and metal sector*, IMIDRO, November 2015.

Iran is in the global top ten for reserves of important metals



SOURCE: United States Geological Survey Mineral Commodity Summaries, 2016; IMIDRO, 2015; Ghorbani, 2013; McKinsey Global Institute analysis

Yet, with the downturn in prices, global mining companies have slashed investment in new projects, even in countries with highly developed mining infrastructure and known ore deposits. Capital available for exploration companies (“juniors”) has also dried up. Should Iran attract investment for new projects, it will likely take ten to 15 years from discovery to production on top of any time needed for exploration. With the right regulatory framework and investment incentives, Iran could take advantage of a global rebound in the industry in the long term. Unlike in the oil and gas sector, foreigners can own 100 percent of the mining rights for a discovery.¹⁰⁵

Unlike in the oil and gas sector, foreigners can own 100 percent of the rights to a discovery in mining.

Two mines had revenue in 2014 exceeding

\$1B

Expanding exploration and production in metals

Whilst most of the output of Iran’s mines are for the bulk materials needed for construction aggregates, the largest untapped value is in copper, iron ore, zinc, and coal. The Sarcheshmeh copper and Gol-e-gohar iron ore mines each produced more than \$1 billion in revenue in 2014, although no other mine topped \$200 million. Given the potential size of its reserves, Iran is also spending relatively little on exploration: its exploration budget increased from \$20 million in 2006 to a peak of \$40 million in 2012, which is only about one-fifth the amount spent by the Democratic Republic of the Congo and one-fifteenth the exploration budget of Chile.¹⁰⁶ With scarce international investment for exploration, Iran will likely have

¹⁰⁵ John Tivey et al., “Mining in Iran: Post-deal opportunities”, *Mining Journal*, October 2015.

¹⁰⁶ *Iran*, SNL Metals and Mining country profile, 2015.

to boost its financing or incentives for exploration. For example, Chile's National Mining Corporation, ENAMI, has provided loans for exploration and equipment and has purchased ore from small and medium-sized Chilean players.

Iran's mining sector as a whole increased in value at 11 percent per year from 2008 until global prices peaked in 2013, driven mainly by iron ore and copper. Iron ore has been the most valuable mining product, at \$2.7 billion in the Iranian year ending March 2014, accounting for 55 percent of the sector. With production costs of \$16 to \$25 per ton, margins have remained high even as the global iron ore price dropped from \$128 per ton in 2013 to \$52 per ton in 2015.¹⁰⁷ Increased domestic demand for iron ore production will likely escalate as Iran seeks to triple steel production in ten years (see the "Basic materials" discussion later in this chapter). Steel producers can import iron ore, but the Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO), a state-owned holding company responsible for mining policy, anticipates an increase in domestic production of 8 percent per year, to go from 56 million tons in 2014 to 116 million by 2025. Towards this end, IMIDRO is undertaking a three-year exploration plan of 200,000 square kilometres focused on the primary iron ore provinces of Yazd and Kerman, as well as the border regions with Pakistan and Afghanistan.¹⁰⁸

30M
Copper reserves,
in tons

Perhaps the brightest potential for a rebound in global mining is in copper, and Iran is well placed to take advantage of it. With 30 million tons of copper reserves, Iran has 4 percent of the world total, similar to Russia, China, and the United States, which trail only Chile, Australia, Peru, and Mexico.¹⁰⁹ Starting from a very low baseline in 2002, Iranian production increased at 17 percent per year in the following decade, primarily at the Sarcheshmeh mine, which is the 16th largest by capacity in the world.¹¹⁰ The 2015 production of 200,000 tons is still relatively low—about a fifth of the production of Chile's single largest mine, Escondida. In 2014, copper revenue reached \$750 million, which was 15 percent of the mining sector, second only to iron ore. As with iron ore, marginal costs in Iran are low at \$1,500 per ton (\$1,250 at Sarcheshmeh) compared with a global average of \$2,750 per ton (before taxes and royalties). The main advantages come from low-cost labour and electricity.¹¹¹

Iran is targeting investment opportunities in copper, iron ore, and zinc

Iran is targeting \$29 billion of investment for existing and new projects across the mining sector. In the short term, IMIDRO has prioritised 250,000 tons per year of copper projects under the National Iranian Copper Industries Company, the state-owned copper subsidiary, and processing plants for iron ore, potash, and coal. By 2025, it is targeting 800,000 tons per year.¹¹² IMIDRO is pursuing a \$1 billion investment to produce 800,000 tons of zinc concentrate and ingot at Mehdiabad, a project for three tons per year of gold from Zar Shuran Phase II, and increases of 450,000 tons of coal mining at Tabas and up to 300,000 tons at Savadkooh for coking.¹¹³

¹⁰⁷ Remarks by Mehdi Karbasian, chairman of IMIDRO, at Middle East Iron and Steel Conference in Dubai, December 8, 2014; *Commodities price forecast*, World Bank, January 20, 2016.

¹⁰⁸ Mehdi Karbasian, "An introduction to the strategy of Iranian government to promote investment in mining and metal sector", presented at International Mining and Resources Conference in Melbourne, November 10–12, 2015.

¹⁰⁹ "Mineral commodity summaries 2016", US Geological Survey, 2016.

¹¹⁰ *The world copper fact book 2014*, International Copper Study Group.

¹¹¹ MineSpan database, McKinsey Solutions.

¹¹² Mehdi Karbasian, "An introduction to the strategy of Iranian government to promote investment in mining and metal sector", presented at International Mining and Resources Conference in Melbourne, November 10–12, 2015.

¹¹³ *Ibid.*

Iran's productivity is mid-range for mining countries with workers half as efficient in copper and iron ore as in the United States but two and a half times as efficient as in the Democratic Republic of the Congo.¹¹⁴ IMIDRO has identified nine initiatives to increase the competitiveness of the mining sector, including high-end technology, but also marketing and sales in exports, human resources development, and moving beyond the main existing mines into higher-risk, higher-reward mines.¹¹⁵ To attract scarce international investment, IMIDRO and the Geological Survey of Iran will also need to broadly communicate and market the regulatory framework, geological information, and partnership opportunities.

The government is seeking to use mining to boost the private sector and enhance economic activity in underdeveloped areas.¹¹⁶ Iran's mining resources are distributed across the country along a wide belt between East Azerbaijan in the north and Baluchestan in the southeast. The top provinces by value cover much of this belt, including the majority of iron ore mines. They are Kerman, with 40 percent of GVA and 21 percent of employment, and Yazd, with 28 percent of GVA and 13 percent of employment, followed by Isfahan, East Azerbaijan, Razavi Khorasan, and Markazi, all at 3 to 4 percent of GVA.¹¹⁷

Prices for commodities have been volatile in the mining industry and have declined by about 40 percent since 2011. Yet with their low costs, Iran's mines can be competitive. The sector would require additional investment that could position Iran for rewards should the market recover. With only a mild rebound in iron ore prices of 1 to 2 percent per year anticipated by the World Bank, we estimate that GVA in Iran could increase from \$3.6 billion in 2014 to \$10 billion in 2035; if iron ore prices return to 2014 levels, that amount would increase to more than \$14 billion.

AGRICULTURE: FROM CEREALS TO SAFFRON, A LARGE AND VARIED SECTOR THAT WILL NEED MODERNISATION

Iran has an arid climate with large deserts in the central and eastern regions of the country. Agriculture nonetheless accounts for about 9 percent of the country's economy and employs almost four million people, or 18 percent of the total workforce. Whilst Iran is well known for pistachios, saffron, and caviar, wheat is the country's highest-volume crop, accounting for 10 percent of total production. Sugar, potatoes, tomatoes, barley, and rice constitute the other main farming products, which together contribute more than two-thirds of agricultural output. Iran also produces a range of high-value horticultural products including citrus, apples, and grapes. Poultry and milk account for the majority of its livestock production.¹¹⁸

Iran's susceptibility to drought already poses a threat to agricultural production. Water resources will need to be managed carefully and efficiently as the sector grows.

¹¹⁴ MineSpan database, McKinsey Solutions.

¹¹⁵ Remarks by Mehdi Karbasian, chairman of IMIDRO, at Middle East Iron and Steel Conference in Dubai, December 8, 2014.

¹¹⁶ "Overview of the Iranian iron and steel markets", IMIDRO, December 8, 2014.

¹¹⁷ "Data summary for extracting mines", Statistical Centre of Iran.

¹¹⁸ *Statistical yearbook*, Ministry of Agriculture, 2014.

Rising demand from a growing population, coupled with geographical limits to the expansion of its farming, means Iran is likely to remain a net importer of agricultural products, especially corn, wheat, and rice. Yet we estimate that Iran has an opportunity to grow its agricultural sector by 4 percent annually over the next 20 years, more than doubling the sector's gross value added and adding an estimated 250,000 jobs by 2035. Such growth would require about \$70 billion in investment and is dependent on both productivity improvements and the adoption of modern agricultural techniques and technology. In a country susceptible to drought, this agricultural growth would need to be accompanied by careful management of water resources.

To supplement its domestic agricultural agenda, Iran has sought to expand cooperation in agriculture with France, Russia, Thailand, and other countries and has held discussions with private investors interested in the farm sector. The government recognised challenges around exporting agricultural products, recently citing issues such as underdeveloped relationships with international distributors, preferential tariffs, and lack of regional agreements.¹¹⁹ In addition to expanding trade, strategic investments in biotechnology, machinery, smart irrigation, and greenhouse technologies present opportunities for both domestic and foreign firms.

Smallholders dominate a fragmented market

The average farm size in Iran is 4.9 hectares, compared with 32.3 hectares in Europe and 178.4 hectares in the United States.¹²⁰ Three-quarters of Iran's farms are smallholdings, occupying less than five hectares and accounting for about 20 percent of total farmland. Comparatively few large commercial farms are greater than 50 hectares, but they nonetheless account for 23 percent of agricultural production.¹²¹ This fragmentation is partially the result of land reform projects in the 1960s that broke up large parcels of land and enabled more Iranians to become landowners. But the fragmentation has also limited opportunities for Iran's farms to develop or adopt innovations in farming methods, such as advanced irrigation technology.

For now, Iran's agriculture sector is substantially less productive than many of its peers.¹²² Agricultural productivity of less than \$8,000 GVA per employee in 2014 was below that of Turkey and South Africa, where per employee productivity exceeds \$10,500. Iran's agricultural productivity is also less than half the level in Malaysia and less than one-third that of Morocco.¹²³ One cause of this is that Iran lags behind its peers on measures of technological readiness and the sophistication of its production processes.¹²⁴

Unlike many other sectors of the Iranian economy, agriculture was not directly affected by international sanctions, although food prices rose sharply due to high inflation and the removal of subsidies on many staples.¹²⁵ To help farmers, the government provides direct subsidies for fertiliser and pesticides.¹²⁶ Crops including wheat and rice are subject to minimum price guarantees that are set by an official producer and consumer organisation

4.9
hectares average
farm size

¹¹⁹ "The issue is not farmers; we have serious challenges exporting agricultural products", Tasnim News Agency, April 7, 2016.

¹²⁰ Klaus Deininger and Derek Byerlee, *Rising global interest in farmland: Can it yield sustainable and equitable benefits?* World Bank, 2011.

¹²¹ Iranian National Census of Agriculture, 2014.

¹²² Based on GVA data from IHS and employment data from ILOSTAT; peer countries include Egypt, Malaysia, Mexico, Morocco, Saudi Arabia, South Africa, and Turkey.

¹²³ GVA data from IHS; employment data from ILOSTAT.

¹²⁴ *Global competitiveness index, 2014–15*, World Economic Forum, September 2014; peer countries include Egypt, Jordan, Malaysia, Mexico, Morocco, Saudi Arabia, South Africa, Tunisia, and Turkey.

¹²⁵ Humanitarian exceptions were included in the sanctions, exempting the sale of agricultural commodities, processed foods, food additives, and supplements, animals, and seeds.

¹²⁶ *Iran agribusiness report, Q4 2015*, BMI, August 2015.

in collaboration with the Iranian parliament; the government is reportedly in the process of reforming food-price and other agricultural subsidies.¹²⁷

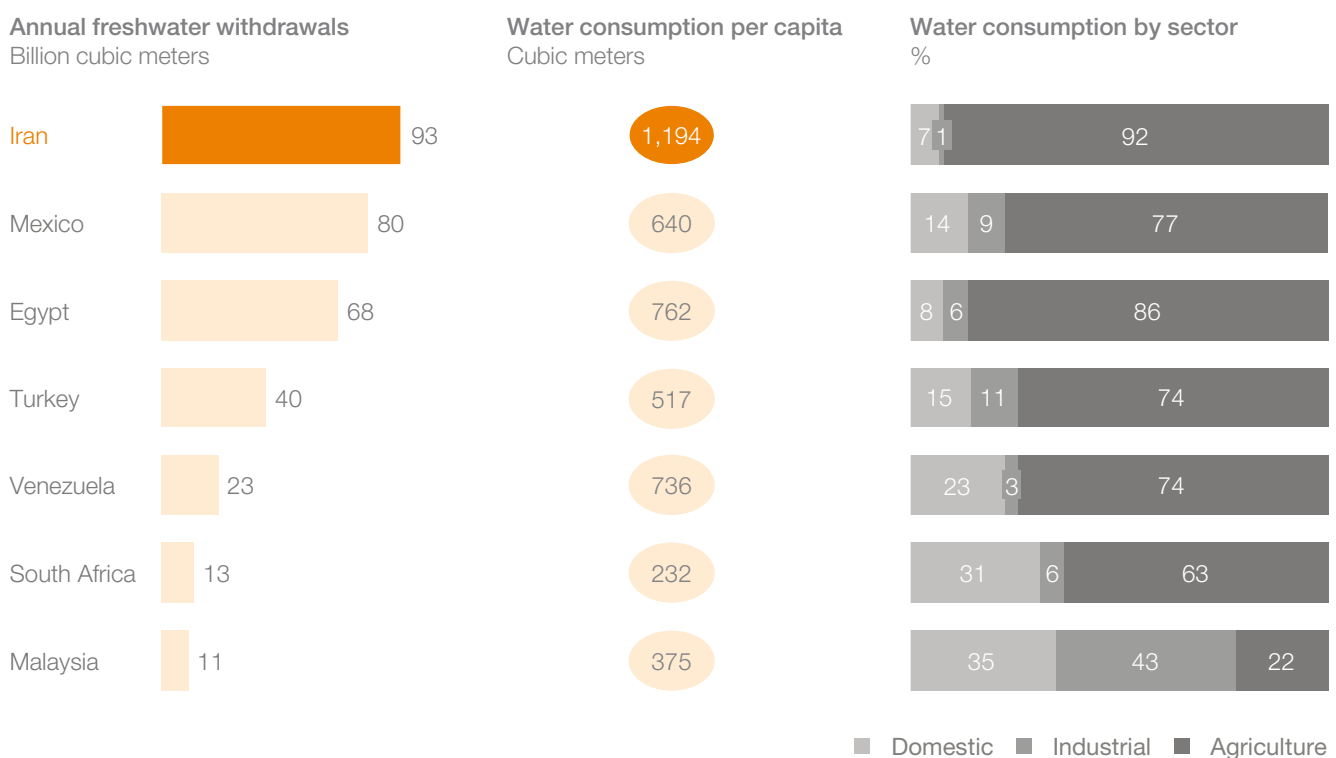
Shifting from overuse of water to conservation

Among the key challenges the agricultural sector faces are water overconsumption and misuse. Agriculture accounts for more than 90 percent of freshwater withdrawal in Iran, a greater proportion than any of its peers (Exhibit 12).¹²⁸ The country's arid climate and susceptibility to drought already pose a threat to existing production; for now, only 17 percent of agricultural land is irrigated, with many areas, especially in northern and western regions, heavily reliant on rainfall.¹²⁹ If the sector is to realise its growth potential, water resources will need to be managed more carefully and efficiently, including through the use of sophisticated irrigation technologies, wastewater recycling, and cropping rotation. Desalination technology could help increase supply, whilst better management of water would reduce the problems of water waste and potentially help raise productivity. For example, introducing drip irrigation in Sistan and Baluchestan Province in southeastern Iran helped improve productivity by about 90 percent.¹³⁰

EXHIBIT 12

Large freshwater withdrawals for agriculture have been straining Iran's ecology

2014



SOURCE: *World development indicators*, World Bank; UN Population Division; McKinsey Global Institute analysis

¹²⁷ "Country fact sheet on food and agricultural policy trends: Iran", Food and Agriculture Organization of the United Nations, September 2014.

¹²⁸ CIA World Factbook; peer countries include Egypt, Jordan, Malaysia, Mexico, Morocco, Saudi Arabia, South Africa, Tunisia, and Turkey.

¹²⁹ *World development indicators*, World Bank, 2015.

¹³⁰ *Increasing water productivity for irrigation*, Islamic Republic of Iran Broadcasting, Sistan and Baluchestan, March 1, 2016.

The government's Five-Year Development Plan (2016–21) focuses on water management and conservation. It seeks to encourage farmers to increase output by increasing yields rather than expanding areas under cultivation, as well as by using crops appropriate for the environment. The plans include significant support for the modernisation of irrigation and drainage systems covering a minimum of 400,000 hectares per year, with the government committing 85 percent of the required financial resources through grants to individual farmers.¹³¹ In addition, the government hopes to reduce overuse of water by widespread introduction of meters on agricultural wells, which would help control consumption and charge farmers accurately for the quantity of water they consume. Of about 450,000 wells nationwide, fewer than 100,000 have meters.¹³²

Raising yields and productivity through consolidation and technology

For the smallholders who occupy less than five hectares, consolidation or greater cooperation among farms would make mechanisation more accessible. Using improved cropping, seeds, and fertilisers will also help increase yields. Although genetically modified crops have been imported and biotech research has been ongoing, genetically modified organisms are not widely used in Iranian agriculture.¹³³ A bill in the government's Five-Year Development Plan targets genetically modified production of rice and cotton, but permission to use such technology is still required from Iran's Ministry of Health and Medical Education, Ministry of Agriculture, and Department of Environment.¹³⁴

Productivity could also be enhanced by the adoption of smart irrigation and greenhouse technologies. In addition to small and medium-sized farms, agribusinesses of more than 50 hectares could improve yields and productivity through better distribution networks, and with more sophisticated machinery and farm equipment supplied domestically or through foreign investment. Shifting production to higher-value commodities, especially horticulture and livestock, could also contribute to the sector's growth. Reducing waste is another necessity. About 35 percent of Iran's agricultural output every year is wasted as a result of logistical inefficiencies and inadequate production technologies.¹³⁵

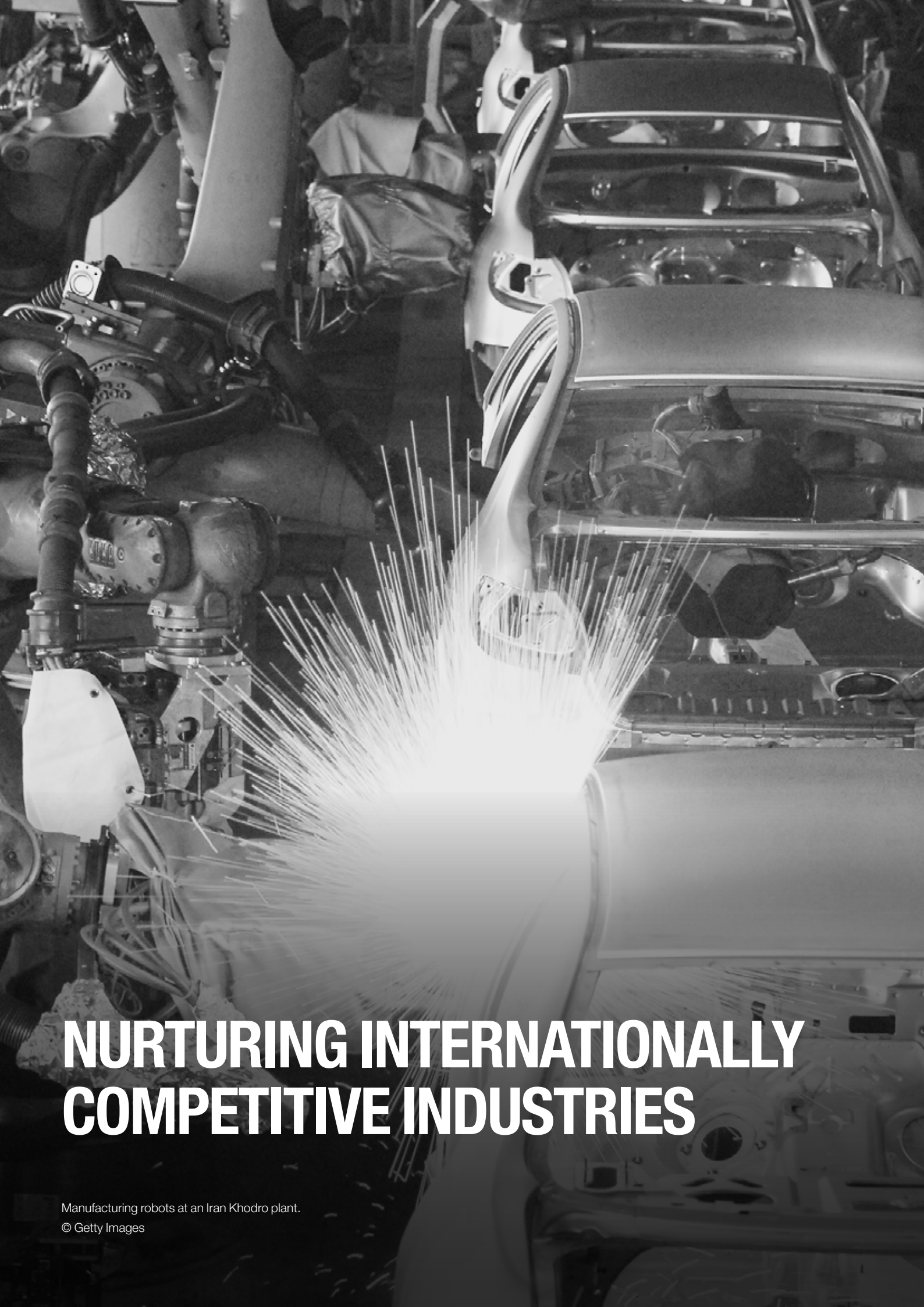
¹³¹ "Regulations for the Islamic Republic of Iran's sixth economic, social and cultural development plan", Management and Planning Organization of Iran, 2016.

¹³² "Report on the economics of water and energy meeting attended by irrigation, energy and agriculture experts", Iranian Agriculture News Agency, March 5, 2016.

¹³³ "GM crops growing in Iran amid lax laws", PressTV, July 6, 2015.

¹³⁴ "Production of genetically modified crops is illegal without a licence", Fars News Agency, February 10, 2016.

¹³⁵ *Market overview of Iran's agricultural food sector*, Italian Trade Agency, January 2016.



NURTURING INTERNATIONALLY COMPETITIVE INDUSTRIES

Manufacturing robots at an Iran Khodro plant.
© Getty Images

Iran has several industries that meet domestic needs but that also have the potential to become internationally competitive. Automotive manufacturing has a long tradition, including cooperation with French automakers Renault and PSA Peugeot Citroën. Iran has also built up a dense network of parts manufacturers. It is the largest automotive market in the Middle East-North Africa region. For now, domestic producers meet 90 percent of this demand. Consumer goods is another sector where Iranian-made products dominate the local market: the top ten food brands are all Iranian. Iran already exports some basic materials including cement to neighbouring countries because it is competitive on price. These industries have an opportunity to become internationally competitive over the next two decades, providing not just for the domestic market but also for regional and global ones.

Transforming these domestically focused sectors into potential exporters will require major improvements in productivity, sizable investment in new technology and equipment, and an upgrade in management and workforce skills. Some industries have thrived in Iran because they have been shielded from global competition by sanctions or by import tariffs or other protectionist barriers, but this has slowed their modernisation.

AUTOMOTIVE: THE ROAD FROM SELF-RELIANCE TO REGIONAL EXPORTS

Iran's automotive sector is the country's tenth-largest industry by GVA, ahead of finance and banking, utilities, information and communications technology, and tourism.¹³⁶ The sector employs almost 5 percent of the Iranian workforce. With annual sales of 1.1 million vehicles in 2014, Iran's market is larger than Spain's. Given the country's demographics and rising consumer class, future demand is expected to be buoyant.¹³⁷

In 2014, nearly one million Iranians worked in the sector, with about 370,000 in the vehicle and parts manufacturing ecosystem (of whom nearly half are highly skilled engineers and technicians) and 615,000 in retail sales. Sanctions and a history of protectionist policies have shielded the industry from international competition. As a result, Iran's automotive labour productivity of 2.9 units per employee and factory utilisation of only 42 percent lags behind other countries, including Turkey. Consumers complain about poor quality and high prices, and domestic choice is limited; just five auto models constitute about 60 percent of sales. Most foreign cars are available for purchase, but are much more expensive, in part because of import tariffs.

Iran's automotive factories have a utilisation rate of only 42 percent.

To become competitive, the automotive sector will need to raise productivity and quality levels to international standards. If it succeeds, Iran has the potential to become a regional automotive manufacturing hub that could meet the needs of neighbouring countries. The sector itself would continue contributing significantly to economic and employment growth. We estimate that, in real exchange rate terms, the automotive sector could increase its GVA from \$11 billion to as much as \$58 billion by 2035, or growth of more than 8 percent annually, and add a total of nearly 200,000 jobs, even with substantial productivity improvements. To achieve this aspiration, automakers will need to attract significant investment to upgrade production, and policy makers will need to make careful choices about how—and at what pace—to open up the market to international manufacturers

¹³⁶ IHS, 2015.

¹³⁷ World Integrated Trade Solution database, World Bank, 2013.

and imports. In addition to deals already signed by PSA Peugeot Citroën and Daimler, Volkswagen has announced that it is discussing investment opportunities.¹³⁸

An extensive domestic manufacturing infrastructure aims to satisfy high pent-up demand

Iran's automotive sales grew at an annual rate of more than 10 percent between 1997 and 2011 before taking a hard knock following the tightening of international sanctions.¹³⁹ Sales and production both dropped by more than 50 percent between 2011 and 2013, although they have since partially recovered.

Two domestic producers, Iran Khodro and SAIPA, dominate the sector with a combined market share of 81 percent in 2014.¹⁴⁰ Both companies have been shielded from international competition since their creation in the 1960s, primarily by tariffs on imports that went as high as 185 percent in 2004 but have since dropped to 75 percent or lower for passenger vehicles. The more than 350 parts manufacturers tend to lack design and technology capabilities relative to the global standard of mature parts makers, but they compensate with a breadth of products spanning the full spectrum of services. For example, Crouse and Ezam, the two leading players, manufacture engine components and transmissions, electronic multimedia systems, steering, and brakes, among other parts.

In the passenger vehicle entry category, Renault models are built by the Renault Pars joint venture established in 2004. It mainly assembles older Renault models using kits that are partly imported and partly produced domestically. Similarly, some Kia models including the popular Pride model are produced by SAIPA under licence. Iran Khodro produced Peugeot-branded cars under licence from PSA Peugeot Citroën, using local suppliers for the majority of its part. PSA Peugeot Citroën officially cut ties with Iran Khodro in February 2012, but the Iranian company continued producing the models using domestic suppliers and foreign intermediaries. In January 2016, Peugeot signed an agreement with Iran Khodro to return to Iran and produce three new models in a new joint venture that expects to invest about \$435 million over three years and source about 40 percent of its parts from Iranian suppliers.¹⁴¹

Iran's auto industry has demonstrated its innovative skills by leveraging the country's abundant supply of natural gas: as of 2013, Iran had the world's largest fleet and third-highest penetration of vehicles that run on compressed natural gas. It also has been developing electric vehicle prototypes (see Box 1, "Iran's automotive innovation").¹⁴²

Total vehicle penetration in Iran is relatively high, at 200 cars per thousand people, compared with a peer average of 138.¹⁴³ All the same, high sticker prices and limited access to consumer financing have acted as a drag on annual sales per capita, which are below those of China, Brazil, and other benchmark countries. Furthermore, the average age of Iran's fleet is significantly older than its peers, with less stringent emissions standards sometimes dating back 15 years.¹⁴⁴ The constraints on demand from the lack of consumer credit were highlighted in November 2015 when the Iranian government extended a consumer auto loan facility with interest rates only slightly above inflation. The decision came after one consumer group attracted support in the media by publicly airing dissatisfaction about the quality and cost of Iranian cars. Pent-up demand was so great that 110,000

¹³⁸ "Volkswagen explores return to Iran after sanctions lift", Bloomberg News, July 16, 2015.

¹³⁹ International Organization of Motor Vehicle Manufacturers, 2015.

¹⁴⁰ IHS Automotive Light Vehicle Sales Forecast, December 2015. The market share includes Iran Khodro's production of Peugeot models and SAIPA's production of Kia Pride.

¹⁴¹ "Peugeot signs car deal with Iran Khodro", *Wall Street Journal*, January 28, 2016.

¹⁴² Natural Gas Vehicle Association, 2014.

¹⁴³ NationMaster; peers include Algeria, Brazil, China, Egypt, Indonesia, Iraq, Kenya, Malaysia, Mexico, Morocco, Philippines, Russia, South Africa, Spain, Syria, Tanzania, Tunisia, UAE, Uganda, and Vietnam.

¹⁴⁴ IHS Automotive Light Vehicle Sales Forecast, December 2015.

1.1M
vehicles sold in
2014

cars—the equivalent of 10 percent of the previous year’s sales—were sold within six days before the government discontinued the loan facility.¹⁴⁵

Whilst the entry and mid-tier price segments comprised 97 percent of total sales volume in 2014, there may be an opportunity for the increased import of high-end cars to Iran. Sales of premium and luxury vehicles have been constrained by 75 percent import tariffs, restrictions on vehicles with engines above 2500cc, and additional licencing and fee costs that can nearly triple globally prevalent prices. Some foreign automakers including PSA Peugeot Citroën and Volkswagen’s Audi are hoping the increasingly wealthy population and eased restrictions will drive sales.¹⁴⁶ Peugeot has announced that it will import up to 1,000 units of its DS brand to Iran in 2016, whilst Audi has said it is in discussions with importers.¹⁴⁷

Commercial vehicles could also be a growth opportunity. Domestic commercial vehicle manufacturing in Iran is concentrated in the hands of four key players: Iran Khodro Diesel, SAIPA Diesel, Bahman Group, and Mammut Group. Since 2000, production volume in this subsector has increased by more than 50-fold to 165,000 units in 2014. Even so, commercial vehicle production has averaged only 15 percent of total vehicle production, well below the peer average of 26 percent.¹⁴⁸ In March 2016 the Ministry of Roads and Urban Development announced a project to renovate Iran’s dated fleet by replacing all 127,000 commercial vehicles that are more than 25 years old.¹⁴⁹

¹⁴⁵ Fars News Agency, November 16, 2015.

¹⁴⁶ Denise Hassanzade Ajiri, “Iran under sanctions: No money for medicine but luxury cars aplenty”, *The Guardian*, August 26, 2015.

¹⁴⁷ “DS preparing for Iran splash”, *Financial Tribune*, December 8, 2015.

¹⁴⁸ Peers include Brazil, Canada, China, Egypt, France, Germany, India, Indonesia, Japan, Mexico, Philippines, Russia, South Korea, Spain, and Turkey.

¹⁴⁹ “Iranian firms to renovate fleet of commercial vehicles: Minister”, Shana Petro Energy Information Network, March 2, 2016.

Box 1. Iran’s automotive innovation

Iran’s automotive sector, with strong government support, has become a world leader in hybrid compressed natural gas (CNG) vehicles, with a fleet of 3.3 million vehicles that run on natural gas as well as regular petrol.¹ In 2000, the government established the Iranian Fuel Conservation Organization and subsidised a switch to CNG. The organisation encourages car owners to convert their engines and has paid up to 90 percent of the cost.

Tehran and some other big Iranian cities suffer from congestion and pollution, but economics also had a role to play in the decision: whilst Iran has the fourth-largest oil reserves in the world, its gasoline consumption combined with insufficient refining capacity is so high that it imports 74,000 barrels per day of gasoline, or 16 percent of its consumption. Reducing consumption of gasoline through the use of CNG vehicles would be consistent with the government’s overall strategy of gas replacement in the domestic economy to boost oil exports.

Iran is also seeking to develop a hybrid and electric vehicle sector. In March 2014, it lowered tariffs on imports of electric hybrids, and Iranian manufacturers and engineering researchers have been working to develop new models. In January 2015, Qazvin Islamic Azad University released a model two-seat electric vehicle, and five months later, Iran Khodro signed a deal with Sharif and Amir Kabir universities to design and produce hybrid electric vehicles.

¹ “Iran has the most hybrid CNG vehicles in the world”, Islamic Republic News Agency, September 2, 2014.

Turbocharging the sector: Improving plant utilisation and product quality

Whilst the automotive sector is well developed in terms of its manufacturing capabilities, it has much ground to catch up to become internationally competitive. Automotive manufacturing labour is unproductive compared to global benchmarks: Iranian automotive workers produced 2.9 cars each per year, compared with 7.5 in Turkey and the best-in-class output of 12 to 15 cars per worker in France, Germany, Japan, and the United States.¹⁵⁰ Even adjusting for Iran's low wage cost, the ratio of output to labour is half that of Turkey. Output per employee fell after 2011 as Iranian auto companies partially maintained employment levels even as production declined. Nonetheless, even before the 2011 downturn, Iranian productivity was below four cars per year per worker. To close the productivity gap with Turkey, for example, Iran would need to increase output per worker by 2.6 times.

Production and sales have yet to regain their pre-2011 level, and factory utilisation in 2014 averaged 42 percent, just over half the 80 percent utilisation level in Turkey. The upside is that Iran could double production by increasing utilisation and modernising existing capacity.

The sector's isolation has also affected the variety and price of cars. Four of the five top-selling passenger models are revamped versions of 30-year-old Peugeot and Kia light sedans, with manual transmissions and an average cost, calculated in purchasing power parity terms, of \$34,000. Relative to people's incomes, these vehicles are more than twice as costly for Iranians as they are for Turks, and about three times the proportion that Germans or French car buyers pay.¹⁵¹ Commercial vehicles are as much as 2.5 times as expensive as those produced in Western Europe, in purchasing power parity terms.

Consumers aspire to greater choice. In January 2016, the Ministry of Industry, Mine and Trade published a report rating cars by quality on a scale of one to five stars (five being the best). Two-thirds of domestically produced cars received only a single star.¹⁵²

An ambition to export regionally

Most future demand will likely come from the domestic market. Based on Iran's existing penetration of autos and projected increases in GDP per capita over the next 20 years, we estimate that Iran's domestic market could grow to up to 3.2 million units per year by 2035. But Iran also has an ambition to become a regional exporter, a stated government goal.¹⁵³

Iran already has several competitive advantages. Its average automotive manufacturing wage levels of \$8,100 per year in market exchange rate terms are 20 percent less than for Turkish autoworkers and 40 percent below wage levels in Morocco and the Czech Republic.¹⁵⁴ An experienced and skilled workforce in the Iranian auto industry, combined with the country's high number of engineering graduates (mechanical engineering is one of the most popular degrees), is also an advantage. Iran benefits from a local supply chain of inputs such as steel. Its geographic proximity to target markets could enable cost-effective regional exports. Finally, low-cost energy and electricity have historically given local manufacturers a cost advantage.

\$8,100
average annual
wages in
automotive
manufacturing

¹⁵⁰ IHS; local country labour statistics agencies.

¹⁵¹ On a purchasing power parity basis. IHS and World Bank GDP per capita statistics.

¹⁵² Ministry of Industry, Mine and Trade, press release, January 9, 2016.

¹⁵³ Remarks by President Hassan Rouhani at the Third Iran Automotive Industry International Conference in Tehran, February 29, 2016.

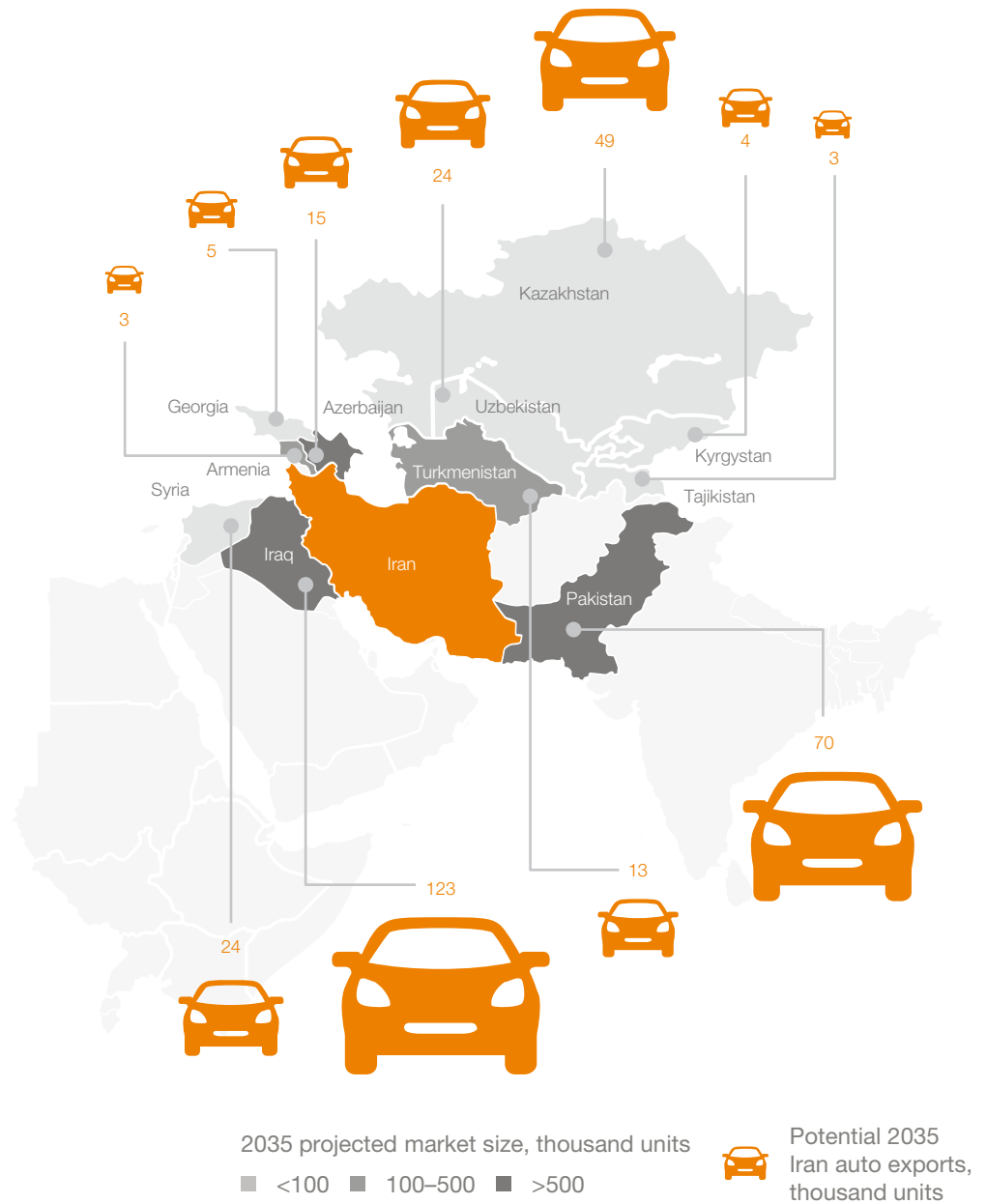
¹⁵⁴ *Iran survey of industrial establishments with more than 10 workers*, Statistical Centre of Iran, 2014; EIU Monitor 2015; Auto SAP 2015.

If Iran's automotive sector is able to raise productivity and quality to global standards, we estimate that it could potentially achieve a sustainable share of the automotive market of 5 to 15 percent of sales volume in select countries. Target export countries could include Iraq, Syria, Pakistan, and Central Asian states including Kazakhstan and Turkmenistan. These countries present an export opportunity of almost 350,000 units per year (Exhibit 13).¹⁵⁵ To achieve this potential, Iran can look to Morocco, which has used its geographic proximity to Europe to establish itself as a major exporter of global automotive brands, including Renault and Peugeot, through a combination of free trade zones, strategic logistics hubs, and automotive manufacturing clusters.

EXHIBIT 13

Iran's automotive export potential as a possible production hub for global brands

Total 2035 projected annual car sales of target countries combined
 8.5 million–10 million units
Total Iran auto export potential in 2035
 350,000 units



SOURCE: McKinsey Global Institute analysis

¹⁵⁵ IHS; OICA; World Integrated Trade Solution database, World Bank.

Opening the sector to competition whilst preserving jobs

Two factors will be especially critical, and must be carefully balanced, for Iran to overcome its productivity challenges and realise its export potential: the extent to which foreign investment and technology flows into the country, and the speed with which the government opens the sector up to competition. We estimate that Iran will need total investment in the auto sector of up to \$50 billion over the next 20 years. The government has set up the Organization for Investment, Economic and Technical Assistance of Iran to attract foreign investment and ensure the necessary technology and skills are transferred to domestic companies.

A second factor that will determine Iran's ability to become internationally competitive is the speed and degree to which the government liberalises the auto sector. Opening the market to international competition too rapidly could have negative effects on domestic jobs in the sector. Moving too slowly could impede the sector's push to become more competitive.

A slow increase in market forces and relaxation of protectionist policies may be necessary. One approach could be to time tariffs to prevent market flooding whilst providing favourable tax and loan incentives to encourage collaboration with local original equipment manufacturers. Incentives could have sunset clauses to encourage global companies to enter quickly. Tariff relaxations would be announced in advance to give domestic companies time to become competitive.

The experience in other countries that have sought to build and modernise their auto sectors could serve as a guide. India, for example, opened its market to new competition in waves over a 30-year period starting in the 1980s. It first exposed the domestic auto industry to imported new technology before beginning to open up the market to competition. Today, its automakers are competitive. By contrast, the experience of many ex-USSR countries, which opened their markets to foreign producers too suddenly, can serve as a warning. Domestic companies were unable to compete effectively and were ultimately acquired by international companies.

BASIC MATERIALS: EXPORTING CEMENT AND REACHING SELF-SUFFICIENCY IN STEEL

Iran's basic materials sectors—especially cement, stone, and steel—are well positioned to meet high demand expected from the construction and manufacturing sectors over the next two decades. Iran is already the top cement exporter in the world, and the government plans a push to triple steel production by 2025, moving from being a net importer to self-sufficiency and possibly a net exporter if global supply recedes.

Iran is already the top cement exporter in the world, and the government plans a push to triple steel production by 2025.

Iran is a low-cost producer of cement and construction aggregates

Iran is the largest cement producer in the Middle East. Strong domestic consumption sparked 10 percent annual growth from 2005 to 2011.¹⁵⁶ During this period Iran was in the middle of the range of \$5,000 to \$20,000 of GDP per capita on a purchasing power parity basis, which is when countries tend to see the highest cement intensity in their development, driven by urbanisation and infrastructure expansion. In 2012, Iran reached a production peak of 750 kilograms (kg) per capita per year, which is the average peak countries reach before transitioning to a mature steady state of about 450 kg per capita per year.¹⁵⁷ However, Iran has several features that will likely lift its steady-state cement intensity above the average, including low-cost production, few building substitutes such as lumber, a high degree of urbanisation, and continued strong construction growth. As a result, Iran could increase consumption intensity closer to the levels of South Korea, which has similar features that pushed up cement demand to a peak of 1,100 kg per capita.

The government banned exports from 2006 to 2008 to meet domestic demand growth. Since then, Iran recently became the largest exporter of cement in the world.¹⁵⁸ Less than 5 percent of cement is traded globally due to the high cost of transportation and wide availability of raw materials. However, due to low production costs and close neighbouring foreign cities, Iran exported about 13 million tons of cement and six million tons of clinker (an intermediate product) in 2014. The primary destination with more than 50 percent of exports has been Iraq, where shortages have pushed prices close to \$100 per ton. Even at the high transport cost of ten cents per ton per kilometre (km), this makes the Baghdad market economical for Iranian producers close to the border with marginal costs of \$20 to \$25 per ton (Exhibit 14). Kuwait, Qatar, and Afghanistan constitute 30 percent of exports with the rest going to 20 additional countries in Asia and Africa.¹⁵⁹

13M
tons of cement
exported in 2014

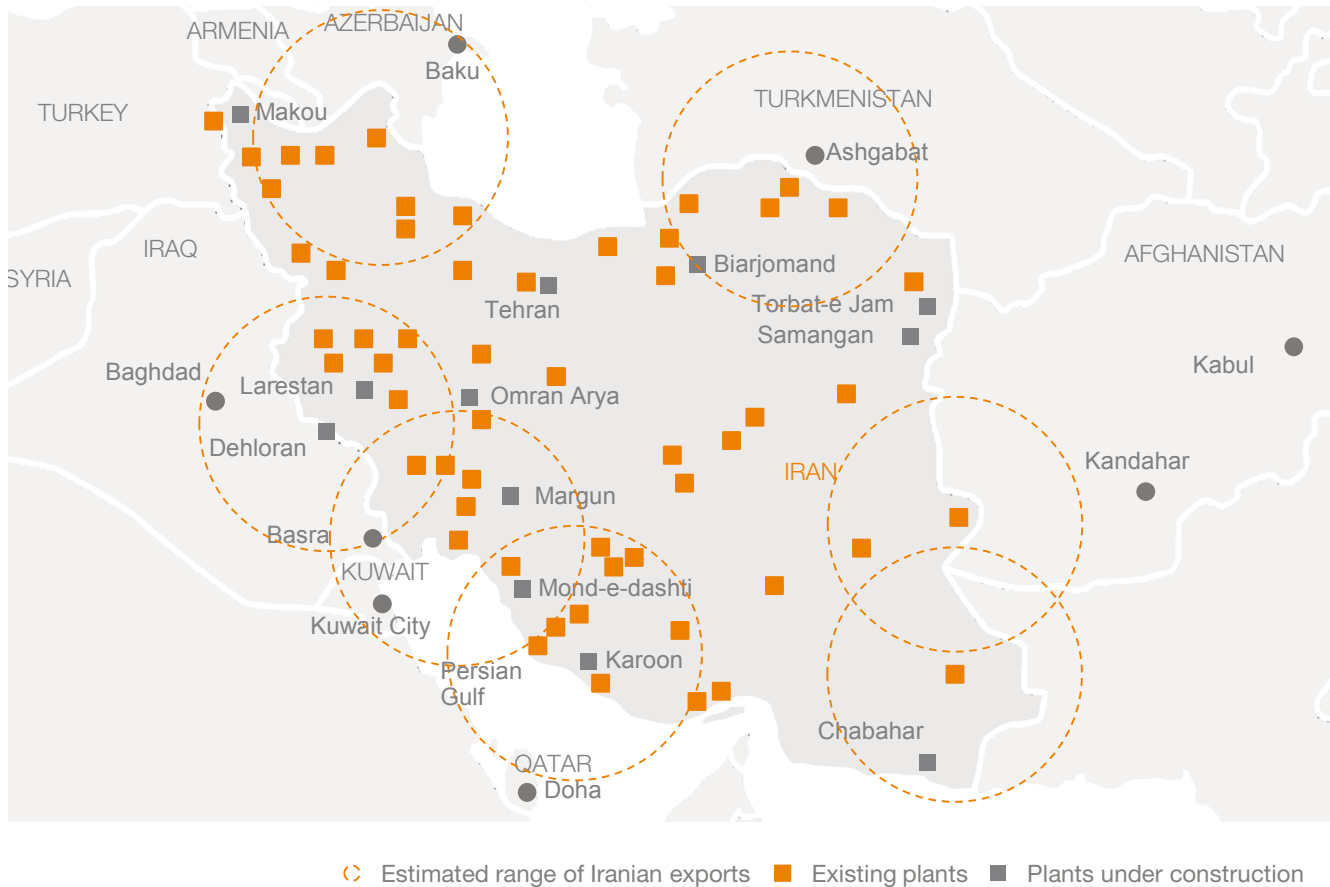
¹⁵⁶ International Cement Review.

¹⁵⁷ IHS.

¹⁵⁸ Global cement report, International Cement Review.

¹⁵⁹ Hamid Reza Tarik, "Iranian exports and a new international cement standard", presented at International Cement Conference in Dubai, February 8, 2016.

Iran is the number-four cement producer and the top exporter in the world



SOURCE: Hamid Reza Tarik, "Iranian Exports and New International Cement Standard", *Irancement.com*; McKinsey Global Institute analysis

During sanctions, domestic demand dropped more rapidly than supply, and government-set prices dropped to reach about \$30 per ton in early 2016.¹⁶⁰ Even at these prices, EBITDA margins (earnings before interest, taxes, depreciation and amortisation) are about 30 percent for Iran's major producers, in line with Turkish peers, and could increase as demand rebounds. Further cost improvements are also possible in operations and capital productivity, particularly among four state-owned enterprises that together have a 40 percent market share but operate at less than 70 percent of capacity. Smoother supplies of natural gas to cement plants would also help boost productivity; 35 percent of Iran's cement kilns operated below capacity in 2016 because of inadequate transmission capacity.¹⁶¹

A similar pattern of high demand growth could affect gravel and sand used in concrete and crushed stone used in road construction over the next five to ten years. Industry structures for these sectors are more fragmented and localised, with few foreign operators and lower average margins. Granite and marble experienced a boom in the 2000s on the back of housing expansions, even reaching the highest level of stone per capita in the world until the housing recession that began in 2014.¹⁶² Iran's building stone is world renowned, with marble shipped to Europe for high-end projects. Still, the profitability of the sector has suffered due to inefficiencies in extraction and outdated equipment. A number of producers

¹⁶⁰ Posted prices from Iranian retailers, March 2016.

¹⁶¹ "Gas shortage cripples 35% of Iran's cement production", *Global Cement*, January 4, 2016.

¹⁶² "A critique of Iran's stone industry situation", *Donya-e-Eqtasad*, September 19, 2015.

shut down because of the sanctions. In total, cement and construction aggregates could increase GVA from \$4 billion in 2014 to \$16 billion by 2035, requiring \$40 billion to \$60 billion of investment and an increase from 500,000 today to 700,000 jobs in 2035.

The government has ambitions to triple steel production

As with cement, Iran's GDP per capita suggests steel consumption intensity could increase rapidly. Iran consumes 20 million tons of steel per year, of which about 20 percent is imported.¹⁶³ Consumption will likely continue to grow at about 6 percent to just under 40 million tons per year by 2025, reaching close to 500 kg per capita. This level is above that of most developed countries in Europe and North America and just below the level in developed Asian countries, indicating that Iran's consumption intensity growth will likely trail off.¹⁶⁴

20%
of world production
of direct reduced
iron

To meet this demand, IMIDRO, Iran's government body in charge of metals and mining policy, has set a target of tripling steel production from the current 17 million tons per year to 52 million by 2025.¹⁶⁵ In an environment of oversupply from China, Iran has import tariffs of up to 20 percent on steel products that are to increase to 35 percent for some products in the 2016 budget. This has enabled Iranian producers to have EBITDA margins close to 30 percent over the past five years despite the global price dip. Almost all of Iran's GVA in steel production is likely to come from the domestic market over the next ten years. Tariffs may be necessary to enable the sector to grow and improve productivity with new investment in the short term, but diversification into higher value-added products will be necessary for competitiveness and sustainability in the medium to long term. Self sufficiency would not make economic sense if the steel industry is able to compete on the low end of the value chain, only because it is protected by import tariffs.

Iran is an outlier in its use of direct reduced iron as the primary method of production. This iron is produced from high-quality iron ores that have been reduced by natural gas or coal. Some 63 percent of global crude steel production is made with blast furnace iron; 33 percent uses scrap iron; only 4 percent uses direct reduced iron. In Iran, more than 80 percent is direct reduced iron, accounting for 20 percent of world production.¹⁶⁶ It has a lower level of impurities compared to most types of scrap; however, its higher silica content affects productivity. The value in use of direct reduced iron rather than other metallic sources will depend on the final application of the steel and the cost of the raw materials. As Iran increases its production capacity, it will have to strike a balance among its mix of raw materials, its method of production, and the finished steel products demanded by the domestic market.

Iran's productivity in metal production is just under \$7,000 per worker, or less than one-quarter that of Turkey, the largest producer in the region.¹⁶⁷ Improvements in operations could decrease costs by up to 20 percent. In addition, a steel master plan that considers product mix and consolidated industrial units could further increase productivity and import substitution. Unlike some other capital-intensive industries in Iran, technology transfer will not be a game changer, as Iran already has the two main direct reduced iron technologies developed by Midrex and HYL.

¹⁶³ *Steel statistical yearbook 2015*, World Steel Association, November 2015.

¹⁶⁴ McKinsey steel demand model.

¹⁶⁵ *Strategic plan for 2025*, Ministry of Industry, Mine and Trade.

¹⁶⁶ *Steel statistical yearbook 2015*, World Steel Association, November 2015.

¹⁶⁷ IHS Global Insight; ILOSTAT.

IMIDRO has emphasised opportunities at Chabahar Free Trade-Industrial Zone, Bandar Abbas in the Persian Gulf Special Economic Zone, and Assaluyeh in the Pars Special Economic Energy Zone, for foreign investment totalling \$4.75 billion and 8.2 million tons of capacity per year. Each of these three zones has access to Iran's natural gas and has port infrastructure for the movement of raw materials and potential export of direct reduced iron.¹⁶⁸ To reach the goal of 52 million tons of steel production, Iran would likely need nearly \$25 billion in investment.

The main drivers of value creation in steel, and direct reduced iron in particular, will be the availability of quality iron ore, competing uses for natural gas, and domestic demand. Should Iran need to import iron or face a high opportunity cost in the use of natural gas, the attractiveness of increased direct reduced iron rather than importing steel decreases. Furthermore, Iran is likely to see flattening domestic demand after 2025 given the expected level of GDP per capita and may still face unfavourable global conditions for export. If Iran reaches its goal of 52 million tons per year by 2035, we estimate that the GVA contribution of the metals manufacturing industry could reach almost \$16 billion and increase employment from 600,000 to 850,000.

CONSUMER GOODS AND RETAIL TRADE: DOMESTIC BRANDS DOMINATE A HIGH-CONSUMPTION MARKET

Iranians are big shoppers. Measured on a purchasing power parity basis, retail sales per capita in Iran are higher than in Russia, Turkey, and Malaysia, and almost as high as in Germany (Exhibit 15).¹⁶⁹

Imports account for just 8 percent of all sales in fast-moving consumer goods, compared to more than 40 percent in India, Malaysia, Mexico, and Russia.

Domestic brands dominate both retail trade and fast-moving consumer goods. Carrefour is the only global retailer with a significant presence in Iran, and only a few global brands, including Nestlé, Beiersdorf, and Unilever, have local production. Nonetheless, surveys show that Iranians believe international brands are of higher quality than domestic ones.¹⁷⁰ One manifestation of this is the multitude of food outlets with copycat names such as “Pizza Hat”, “Kabooky Fried Chicken”, and “Mash Donald’s”. Together with the size and dynamism of retail consumption, this interest in international brands makes Iran a growth market for multinational companies, and there has been a flurry of interest. In February 2016, Roberto Cavalli opened a two-story boutique in the upscale Zafaranyeh neighbourhood of Tehran. Apparel Group announced it will expand into Iran by the end of 2017. Sephora has announced plans to open several shops in the country.¹⁷¹

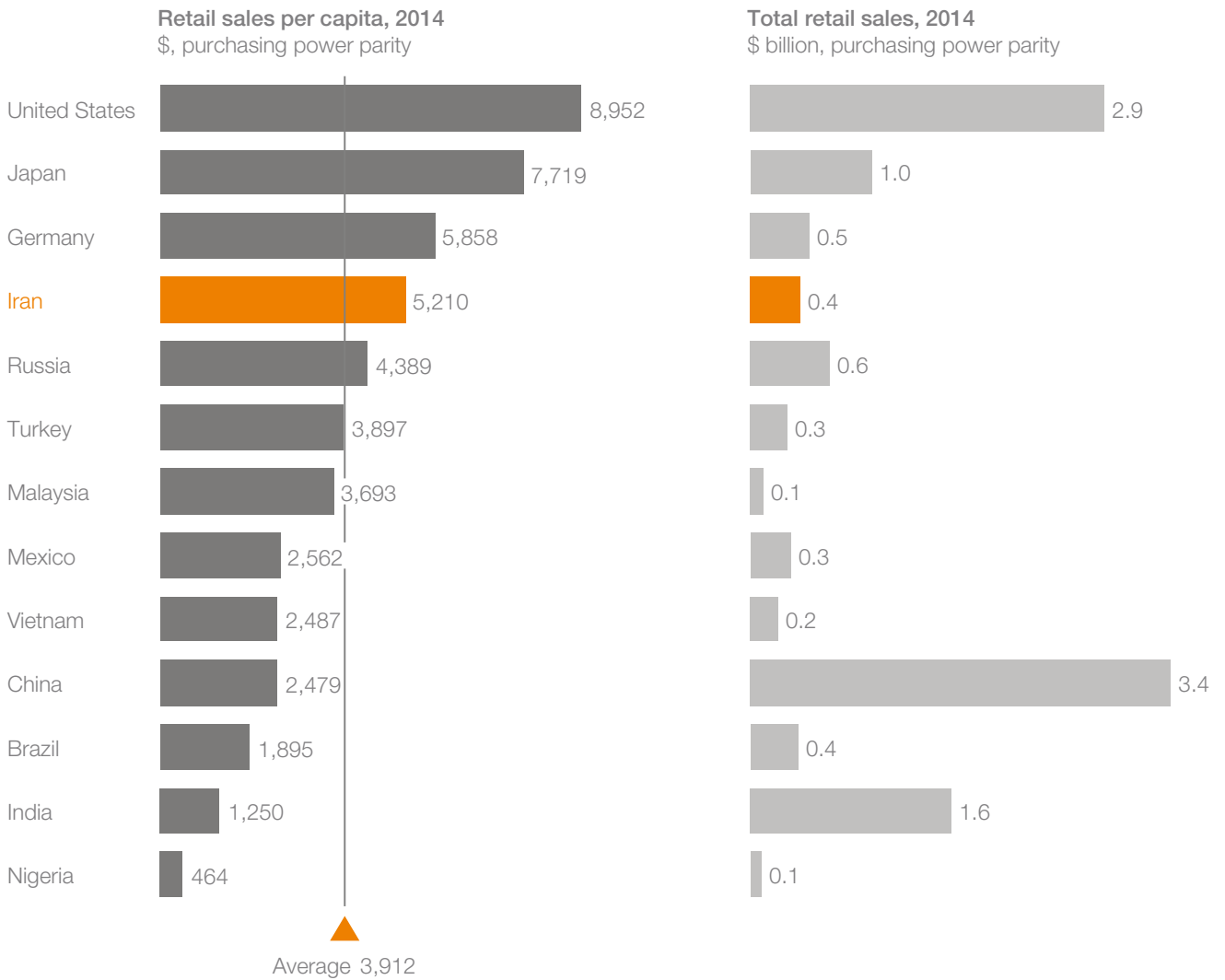
¹⁶⁸ Remarks by Mehdi Karbasian, chairman of IMIDRO, at Middle East Iron and Steel Conference in Dubai, December 8, 2014.

¹⁶⁹ Peers include Brazil, China, Germany, India, Japan, Malaysia, Mexico, Nigeria, Russia, Turkey, United States, and Vietnam.

¹⁷⁰ IranPoll.com.

¹⁷¹ “France’s Sephora to open shops in Iran next year”, Reuters, October 30, 2015.

Iran has above-average retail sales per capita



SOURCE: Euromonitor International; World Bank; McKinsey Global Institute analysis

Fast-moving consumer goods: All top ten food brands in Iran are domestic

Iran's fast-moving consumer goods (FMCG) manufacturing sector supplies much of the domestic retail market, and domestic sales totalled nearly \$60 billion in 2015. We estimate that driven by growth in retail sales and an annual regional exports sales opportunity of more than \$50 billion by 2035, total FMCG sales may reach \$235 billion in 2035. This implies a 2035 GVA of \$62 billion and annual growth of nearly 7 percent, from the \$15 billion of GVA in 2014. Without productivity gains this could increase sector employment by an additional 900,000 jobs by 2035. If Iran is able to reach Mexico's level of productivity (a nearly 50 percent increase), employment in the sector would still increase by more than 850,000.

\$60B
in domestic FMCG
sales in 2015

Iran's FMCG sector is dominated by domestically manufactured products. Imports account for just 8 percent of total FMCG manufacturing sales, compared with more than 40 percent in Malaysia, Mexico, India, and Russia. In Turkey, imports are more than 70 percent.¹⁷² The domestic orientation of the industry is apparent on store shelves, which have a broad array of domestic substitutes for global brands ranging from hand soap and washing powder to ketchup and toothpaste.

¹⁷² Iran Customs Administration; IHS.

No.1

cosmetics market
in Middle East

Food and beverage sales make up the largest proportion of the FMCG sector, accounting for \$51 billion of the \$60 billion in 2015 manufacturing sales.¹⁷³ All of the top ten packaged food brands are local ones processed by Iranian companies. Beauty and personal care, which account for 7 percent of total FMCG sales, has a much larger presence of international brands, with Beiersdorf's Nivea as the number-one brand. Furthermore, Iran is the largest cosmetics market in the Middle East, but with very limited foreign participation.¹⁷⁴ Procter & Gamble is in the market, for example, but with only a 2 percent market share.¹⁷⁵

The dominance of domestic brands is supported by Iran's significant local production capabilities, from the agricultural produce and cooking oils used in packaged food to the minerals and petrochemicals used in detergents. Domestic producers have modern packaging infrastructure and broad supply and distribution chains.

In 2014, Iran exported FMCG products, primarily food, worth \$2.4 billion, or 4 percent of total sales. About 60 percent went to Iraq and Afghanistan, but Iran also exported to Pakistan, Turkey, Turkmenistan, and the UAE.¹⁷⁶ That proportion of sales exports is below the level attained by Morocco, Tunisia, Turkey, and Egypt, whose exports average 36 percent of total sales, suggesting that Iran has potential to grow its exports. Over the past 20 years Iran's exports have grown at an annual average rate of about 4.6 percent, just under half the peer average of 9.5 percent.¹⁷⁷ Should Iran be able to reach peer levels by 2035, exports could increase to \$53 billion.

Despite the dominance of domestic companies, the potential opportunity for international investment is significant. Tariffs that are about 25 percent above the level of peer countries protect Iran's domestic industry, but they also encourage localised manufacturing.¹⁷⁸ For example, Nestlé and Unilever have a long history of operations in Iran, and both companies have local partners and domestic production facilities. International brands hence may also look to Iran as a possible manufacturing site for regional exports. We project the total annual sales opportunity for global food and beverage companies manufacturing in Iran could reach \$53 billion by 2035, from both domestic sales and regional exports.

Retail: Consumption is high, but retailers are fragmented

In 2014 real retail sales in Iran were \$128 billion.¹⁷⁹ By gross value added, retail is the nation's fifth-largest sector (\$28 billion) and the fourth-largest employer, with more than 2.6 million employees, or about 12 percent of all Iranian jobs.¹⁸⁰ By 2035, we project that domestic annual retail sales would increase to more than \$400 billion.¹⁸¹ This implies GVA could rise to more than \$90 billion by 2035, a compound annual growth rate of nearly 6 percent. Even with productivity gains of nearly 70 percent, this could result in an additional 1.4 million retail employees in Iran.

With about 850,000 outlets (about one for every 90 people), Iran's retail landscape is highly fragmented and primarily made up of small independent stores. Iran's largest grocery retailer, Refah Chain Stores, has a market share of just 1.4 percent compared, for example, with the 28 percent share of Tesco, the market leader in the United Kingdom.¹⁸² Non-grocery is even more fragmented and similarly dominated by independent, small-format stores, typically either independent boutiques or outlets in bazaars.

¹⁷³ Certius.

¹⁷⁴ Euromonitor

¹⁷⁵ Ibid.

¹⁷⁶ Iran Customs Administration; IHS.

¹⁷⁷ Peers include Egypt, Morocco, Tunisia, and Turkey.

¹⁷⁸ Peers include Brazil, China, India, Malaysia, Mexico, Nigeria, Turkey, and Vietnam.

¹⁷⁹ Euromonitor.

¹⁸⁰ CIE.

¹⁸¹ McKinsey & Company's Global Growth Compass.

¹⁸² Euromonitor.

Iran's largest grocery retailer has a market share of just

1.4%

Although modern shopping centres such as Isfahan City Center (one of the largest in the Middle East) and the Atlas Mall in Tehran have been on the rise in Iran's largest cities, both grocery and non-grocery retail sales continue to be dominated by traditional outlets; in 2014 modern formats accounted for just over 6 percent of total sales.¹⁸³ For now, online shopping accounts for a small portion of total retail sales, despite a growing number of e-commerce sites. To increase demand and lower transaction costs, in its development plan, the government has tried to encourage the sector, proposing a lower value-added tax on products sold through e-commerce channels.¹⁸⁴

The low penetration of modern formats in Iran is not atypical. MGI research has established that traditional formats in emerging markets have sometimes proved resilient to modernisation.¹⁸⁵ Nonetheless, the example of Turkey suggests that a transition to modern retail can be quite rapid. In 2006 traditional-format mom-and-pop stores accounted for more than 80 percent of grocery retail sales in Turkey; by 2013 they were just under 62 percent, with supermarkets' sales increasing by 42 percent during this period.¹⁸⁶ Iran's labour productivity in retail lags behind that of Turkey by 67 percent. Switching to more modern formats on a larger scale can drive productivity gains from increased retailer buying power and more advanced supply chains, but Iran will need to look for improvements across the board.

Increasing labour flexibility is a priority. Only 16 percent of retail employees in Iran are employed on a part-time basis, compared with about 35 percent in Germany, the United Kingdom, and the United States.¹⁸⁷ Iran has also been slow to adopt technology that can improve productivity, including electronic price tags and other digitised stock-keeping and logistics measures that can increase efficiency, reduce theft, and improve inventory management. Finally, to replicate the scale advantage of modern retailers, Iran's traditional outlets may look to expand their use of buying consortia to increase their purchasing power when negotiating with suppliers.

TOURISM: SKI SLOPES, COASTLINES, AND ARCHAEOLOGICAL TREASURES THAT COULD BECOME GLOBAL ATTRACTIONS

From the ski slopes within a short car ride of Tehran to the 2,500-year-old ruins of the Achaemenid Empire at Persepolis and the harmonious gardens of the Bagh-e Eram Palace in Shiraz, Iran has an abundance of tourist attractions. They include 19 UNESCO World Heritage sites—more than Greece—plus a rugged coastline on the Caspian Sea that makes for good hiking, 20 mountain resorts for winter sports, beaches on the Persian Gulf, and the shrine of Imam Reza in Mashhad, which is a religious pilgrimage destination. When counting both domestic and foreign travellers in 2014, Iran had almost 63 million overnight tourists, of whom just over four million were international visitors. Tourism has been one of the rare sectors of the economy that held up during the recession that started in 2011.¹⁸⁸

Tourism from wealthier developed countries declined sharply during sanctions, but the sector nonetheless held up during the recession that started in 2011.

¹⁸³ Euromonitor; "The entrepreneur behind Iran's billion-dollar super mall", Bloomberg, October 6, 2015.

¹⁸⁴ Management and Planning Organization of Iran.

¹⁸⁵ "Modern grocery and the emerging-market consumer: A complicated courtship", *Perspectives on retail and consumer goods*, McKinsey & Company, number 4, autumn 2015.

¹⁸⁶ Ibid.

¹⁸⁷ Government statistics agencies.

¹⁸⁸ World Travel and Tourism Council, 2014 data.

4M
international
visitors annually

Welcoming visitors from developed countries to boost growth and employment

Compared with other countries in the region with similar attractions, Iran's tourism sector is relatively underdeveloped, accounting for only about 2.3 percent of GDP and 1.8 percent of employment. That is less than half the proportion in Egypt, where tourism represents almost 6 percent of the overall economy and 5 percent of employment. Moreover, tourism from wealthier developed countries declined sharply during sanctions, and more than three-quarters of the four million international visitors annually hail from just six countries: Afghanistan, Azerbaijan, Iraq, Pakistan, Turkey, and Turkmenistan.¹⁸⁹

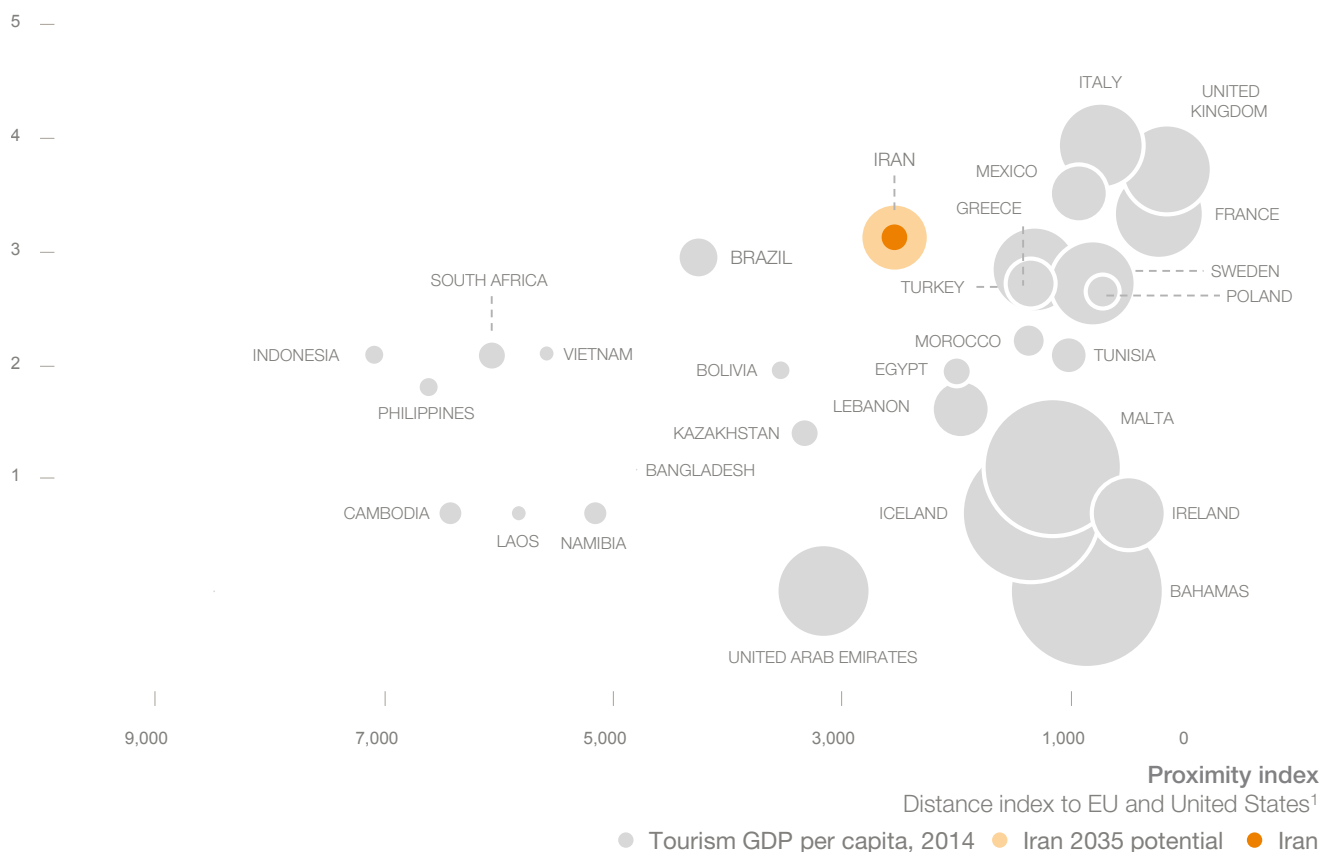
Given Iran's natural and cultural endowments and its geographic location, tourism has the potential to become a significant source of growth and employment (Exhibit 16). Iran's average spend per international visitor declined by nearly two-thirds between 2011 and 2014, from \$545 to \$193. That is less than half the spend of a visitor to Turkey and one-quarter that of a visitor to Egypt, on a purchasing power parity basis.¹⁹⁰ The decline in spend resulted from a variety of factors, including a shift in the mix of tourists as fewer Westerners visited Iran; the tightening of international sanctions, which made it more difficult to take home goods purchased in Iran; and steep depreciation of the rial.

EXHIBIT 16

Iran has potential to become a tourist destination, given its location and attractions

Attractiveness index

Based on UNESCO sites



¹ Index value calculated as minimum distance between capital and Belgium (Brussels) or United States (New Orleans) using latitude and longitude

SOURCE: UNESCO; WTTC; UN Population Survey; McKinsey Global Institute analysis

¹⁸⁹ IHS Global Insight; ILOSTAT; *Yearbook of tourism statistics*, World Tourism Organization, 2015.

¹⁹⁰ World Travel and Tourism Council, 2014 data.

Using international benchmarks for comparison, including the successful Malaysian campaign to boost tourism, we calculate that over the next 20 years tourism in Iran has the potential to grow to more than 94 million travellers, of whom 28 million would be international visitors. Tourism GVA could grow more than fivefold over that period to become a \$59 billion sector, rising from just under \$9 billion today. Tourism could also become an important source of employment, potentially creating almost 800,000 jobs by 2035.

Upgraded services and infrastructure will be needed to deliver on Iran's ambitions

Developing into a mass tourist market will require significant upgrading and development of the tourism sector. Airports and airlines will need to add capacity and improve service. For example, Iran's fleet of passenger aircraft includes about 200 planes with an average age of more than 23 years; by contrast, the average age of Turkey's fleet of about 600 aircraft is less than nine years. Tehran's two international airports serve only 59 international destinations, compared with Istanbul's 248. Hotels and other facilities would also need to provide greater comfort and quality, and there is a need for more of them. Iranian hotel capacity lags significantly behind that of peers, with the average hotel having only 25 rooms compared with 119 in Turkey. Similarly, Iran has relatively few four- or five-star hotels, which limits its appeal for delegations, conferences, and business executives. Iran has begun addressing some of these gaps. The government recently announced deals to purchase more than 100 commercial aircraft from Airbus, Embraer, and ATR.¹⁹¹ Several international hotel chains have also begun entering the market, including Accor, Rotana, and Melia Hotels International, which plans to open a luxury resort on the Caspian Coast in 2017.¹⁹²

59

Number of international destinations served by Tehran's two airports

Beyond the investment requirements, which we estimate at \$130 billion over 20 years, Iran's tourism sector will need to become more efficient. Labour productivity in the sector of about \$71,000 per worker on a purchasing power parity basis lags significantly behind that of peer countries. Turkey's labour productivity in tourism, for example, is more than 70 percent higher. The relatively small size of hotels, insufficient training for employees, limited English fluency, and focus on domestic visitors rather than higher-value international ones all hold back productivity. Iranian hotels are not connected to most global travel websites, which limits their accessibility and visibility to international tourists. Other factors that limit the sector's growth include labour market regulations limiting the availability of seasonal workers, and Iran's disconnection from the global banking system. This latter issue has meant that foreign credit cards and traveller's cheques cannot be used. ATMs in Iran are disconnected from foreign bank accounts, leaving cash as the only means of spending for international tourists. This is slowly beginning to change: though US credit cards remain unusable in Iran, some Asian credit card issuers are working to connect with the Iranian bank system and thus offer international credit cards.¹⁹³

Other countries have successfully boosted tourism with international marketing campaigns, improved service and facilities, and stronger management, including a centralised tourism authority. Malaysia, for example, more than tripled tourist arrivals between 1998 and 2006 with a "Malaysia, Truly Asia" campaign that highlighted the country's rich cultural heritage. Turkey's tourism sector has also grown strongly, in part boosted by government tax incentives for the private sector to develop the southern coast around Antalya.¹⁹⁴

Transforming Iran into a thriving mass market in tourism calls for coordinated and sustained action by international corporations, domestic firms, and the Iranian government. The

¹⁹¹ "Airbus signs \$25 billion deal to sell 118 planes to Iran", BBC, January 28, 2016.

¹⁹² "Accor to enter Iran with two hotels", *Arabian Industry*, September 17, 2015; "Rotana hotel group will open hotel in Iran's Mashhad next year", *Gulf Retail News*, February 22, 2016; Dalia Fahmy and Golnar Motevalli, "Iran to get luxury hotel along Caspian Sea as tourism thaws", Bloomberg News, March 2, 2016.

¹⁹³ "First international cards will be used in 2016", Iran News Agency, February 29, 2016.

¹⁹⁴ Sukru Yarcin, *A comparison of Istanbul and Antalya as tourism destinations*, Istanbul University, 2012.

government has developed a plan to grow the sector, including a goal of increasing international tourism to 20 million visitors by 2025, which is in line with our 20-year projections. To help reach this target, the government has planned more than 1,300 investment projects to attract foreign investment in the industry.¹⁹⁵ It has said that all new hotels and tourism centres will be exempt from income tax for five years and that visitors from all but nine countries will be granted visas on arrival.¹⁹⁶ Going forward, the government could lay the groundwork for tourism development by defining a unified strategy for the sector, encouraging foreign investment, and investing in capital projects to bolster infrastructure, upgrade tourist attractions, and maintain its cultural heritage sites. It could also launch a major marketing campaign to shape Iran's global brand abroad and build interest in Iran as a tourist destination.

20M

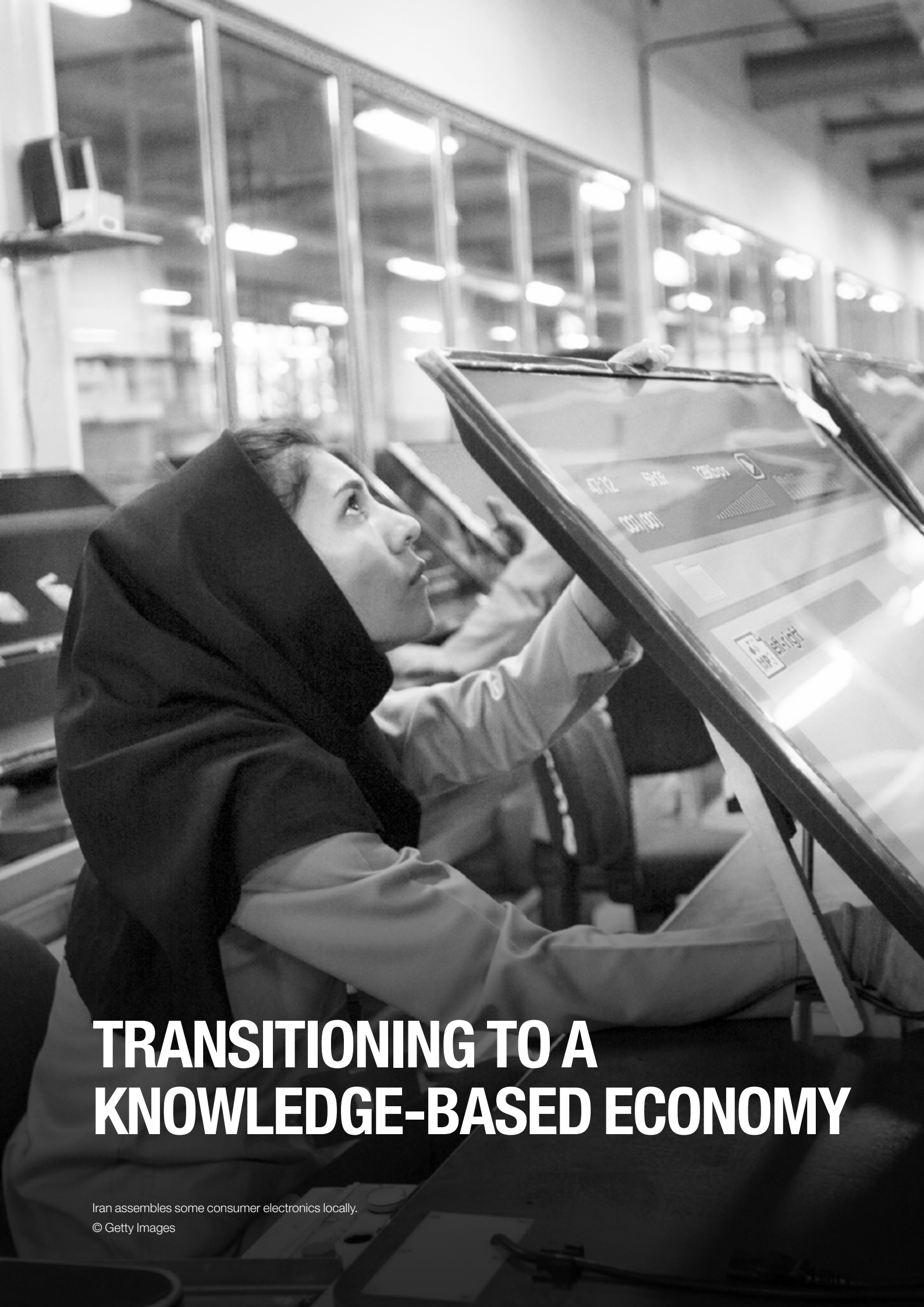
Government target
for number of
international
tourists by 2025

Iranian companies should raise the quality of tourist offerings to appeal to business travellers and tourists alike. We estimate that by 2035 Iran could need as many as 60,000 new hotel rooms, many of which would be built and operated by Iranian companies, to accommodate the anticipated increase in overnight tourism. They could develop high-quality offerings around potential tourism clusters, such as eco-tourists or skiers.

Multinational companies could encourage additional travel to Iran by adding international flight routes to Iranian cities, building high-quality hotels and resorts, and promoting Iran as a tourist destination. By establishing training programmes in hospitality and travel management, they could help improve local management skills. Some hospitality management programmes exist in Iran, for example at the Allameh Tabataba'i University and the Tehran and Savadkuh branches of Azad Islamic University. With a combination of these efforts, tourism could grow by nearly 10 percent per year over the next 20 years.

¹⁹⁵ Masoud Soltanifar, vice president and chief of the Cultural Heritage, Handcrafts, and Tourism Organization, announced this goal; see Ali Akbar Dareini, "Iran preparing for 'tsunami' of tourists", Associated Press, October 18, 2015.

¹⁹⁶ "Iran to offer new tax-exemption incentive to tourism", *Tehran Times*, February 17, 2016; "Iran offers visa on arrival to all except nine countries", *Madhyamam*, February 15, 2016.



TRANSITIONING TO A KNOWLEDGE-BASED ECONOMY

Iran assembles some consumer electronics locally.
© Getty Images

If Iran can harness the tradition of educational excellence, especially in science and engineering that we described in the previous chapter, it could potentially build up not just technology-related sectors but its entire knowledge-based economy, and leapfrog into the digital age. Innovation will be key to developing new, complex products in fields ranging from software to pharmaceuticals. Iran also has an opportunity to leverage its highly skilled labour to attract high-value-added work.

A starting point could be for the country to strengthen and reform its financial system, which lacks the capital market structures vital for its future growth, and further liberalise its insurance market. It would need vibrant professional service firms able to provide businesses with strategy, accounting, and legal advice. Its telecommunications sector is in transition and needs investment in broadband technologies and new IT infrastructure. Iran even has the potential to become a hub for IT outsourcing, and its small pharmaceutical sector has the scientific capabilities to produce advanced medicines now available only through imports. The government aspires to increase the contribution of knowledge-based sectors to Iran's economy, and for Iran to become a leader in the region.

Iran's copyright and data protection do not meet world standards.

To realise this potential will require important changes, in particular in the area of legislation and enforcement of copyright, intellectual property, and data protection, which do not meet world standards. Iran ranked last among 35 countries in the region for intellectual property protection. Pharmaceutical formulas, for example, cannot be patented under Iranian law.¹⁹⁷ This has led to an explosion of counterfeit and black market drugs, with some estimates placing the annual sales of fake, illegal, or smuggled drugs at twice that of legitimate products.¹⁹⁸

FINANCIAL SERVICES: DEEP RESTRUCTURING AND LIBERALISATION WILL BE REQUIRED

Iran's banks, many of them state-owned or semi-privatised with state-appointed board members, provide a degree of basic financial access to the broad population that is relatively high among benchmark countries. But the banking sector overall lags behind in terms of sophistication of its product offerings, risk management, capital adequacy, lending efficiency, and its IT infrastructure.¹⁹⁹

Iran's capital markets are relatively underdeveloped for an economy of its size and wealth. Investment banking is not yet well established, and venture capital is nascent. Largely as a result of sanctions, the financial system is isolated from the rest of the world; a mere 1 percent of equity and bonds are held internationally.²⁰⁰ There is a significant untapped opportunity for Iran's financial markets to become more integrated with global markets. Over time this would enable the country to attract and absorb capital flows of the volume required to finance economic growth.

Overall, we estimate that financial assets could grow by about 10 percent annually on average to 2035. This would increase the GVA of the banking sector to \$52 billion from \$7 billion in 2014, and add 450,000 jobs.

1%

Share of Iranian equity and bonds held internationally

¹⁹⁷ *Iran pharmaceuticals and healthcare report, Q3 2015*, BMI, September 2015.

¹⁹⁸ *Ibid.*

¹⁹⁹ *Global competitiveness report 2015–16*, World Economic Forum, September 2015.

²⁰⁰ According to Turquoise Partners, an investment fund claiming to manage more than 90 percent of all foreign portfolio investment on the Tehran Stock Exchange.

17%

Non-performing loans as share of total outstanding loans of Iranian banks

In building out the depth and sophistication of its financial sector, Iran could benefit from the active participation and expertise of international players. Foreign investors are allowed to own up to 40 percent of a bank's equity capital, or 100 percent in free zones. Foreign holding of Iranian insurers is also limited, to a ceiling of 49 percent. There are plans to ease restrictions for foreigners to start completely foreign-owned banks in Iran.²⁰¹

Iran has a high level of financial inclusion but insufficient financial intermediation

A wave of privatisation and rapid economic growth in the late 1990s fuelled growth of Iran's banking sector, with bank loans increasing on average by 19 percent annually from 1996 to 2011. This expansion came to a halt in 2011 when the economy went into recession. Loan volume has since declined by about 11 percent annually.²⁰² Today, of Iran's 28 major banks, 15 are private and four have been partially privatised; the remainder are state owned. Several new private banks have been established in the past few years. These private banks are growing rapidly and are outperforming state-owned banks in profitability, risk, and operational performance metrics, but they remain dwarfed by state-owned banks in total asset size.²⁰³ The two largest banks in Iran, the state-owned Bank Melli Iran and the partially privatised Bank Mellat, for instance, together accounted for 30 percent of banking assets in 2012.²⁰⁴ Unlicensed financial institutions, such as credit unions, also operate in the sector and account for an estimated 15 to 20 percent of overall liquidity. The central bank is seeking to strengthen its supervision of these institutions.²⁰⁵

By some measures, Iranians have abundant access to financial services. For example, Iran in 2013 had more ATMs per 100,000 adults than Germany, Mexico, the United Kingdom, or the United States.²⁰⁶ Debit card penetration is on a par with developed economies, and 75 percent of households reported that they are less than 20 minutes from a bank branch.²⁰⁷ Overall, there are 27 bank branches per 100,000 population, ahead of Turkey and Germany and only slightly behind the United States.²⁰⁸ The ease of access for households to financial services has contributed to a level of national savings that is far above the world average.²⁰⁹

Despite such advantages, Iran has a relatively low level of domestic credit provided to the private sector, at 52 percent of GDP. This is 32 percentage points behind the world average of 84 percent, and 26 percentage points below the level of BRIC countries.²¹⁰ Domestic credit is not only scarce, but also directed towards large enterprises; roughly three-quarters of the credit provided to the private sector is dedicated to large state-owned or partially privatised enterprises, leaving little credit for small and medium-sized enterprises and households (Exhibit 17). In a 2015 survey by the research arm of Iran's parliament, Iranian business leaders cited access to financing as the most problematic factor they must deal with, even ahead of international sanctions.²¹¹

One example of insufficient access to credit is the widespread use of forward-dated cheques. In Iran, cheques can be cashed only on the date written on the cheque, so businesses and households use them instead of credit lines to promise a future payment to

²⁰¹ "Iran's green light to foreign banks", Islamic Republic News Agency, August 2015.

²⁰² McKinsey Global Institute Financial Asset database.

²⁰³ Azam Ahmadian, *Assessment of banking health index for Iran's banks (2011–2012)*, Monetary and Banking Research Institute Central Bank of Iran, working paper number MBRI-9222, 2014.

²⁰⁴ Industrial Management Institute's ranking of the top 500 Iranian companies based on 2012 financial reports.

²⁰⁵ Testimony by Valiollah Seif, chairman of the central bank, at a meeting with members of the Iranian parliament's economic commission in April 2015, as reported by Iran's Chamber of Commerce.

²⁰⁶ *Financial access survey*, IMF, 2014.

²⁰⁷ "Result of households access to financial services in urban area survey, 2009", Central Bank of Iran.

²⁰⁸ World Bank Global Findex database; World development indicators, World Bank.

²⁰⁹ CIA World Factbook 2014.

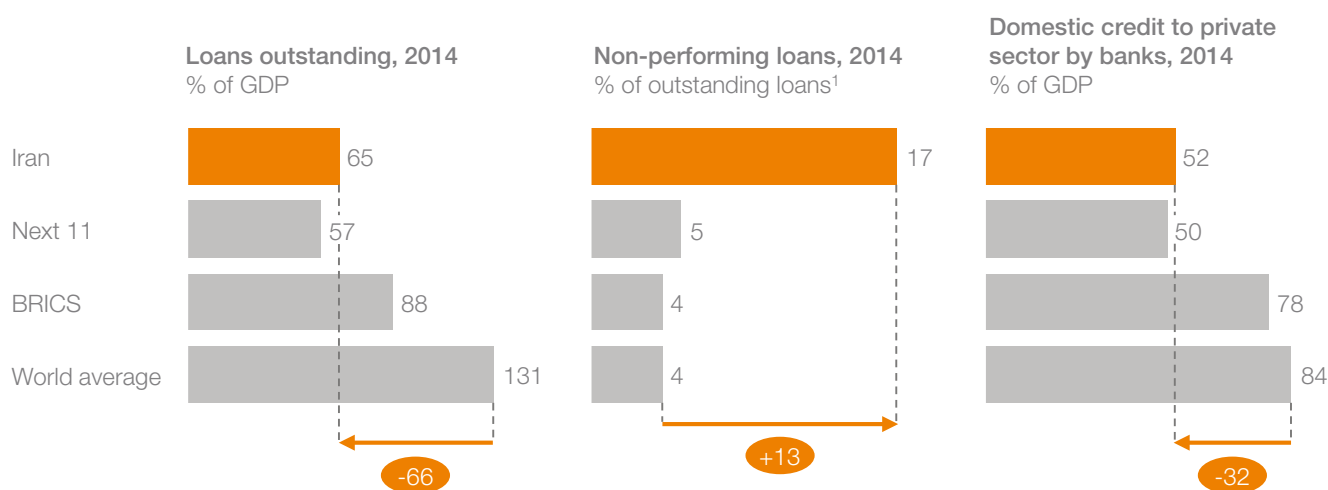
²¹⁰ *World development indicators*, World Bank, 2015.

²¹¹ Farhad Nili and Amineh Mahmudzade, *Credit limitation from micro to macro*, Monetary and Banking Research Institute, Central Bank of Iran, working paper number MBRI-PP-93030, 2014.

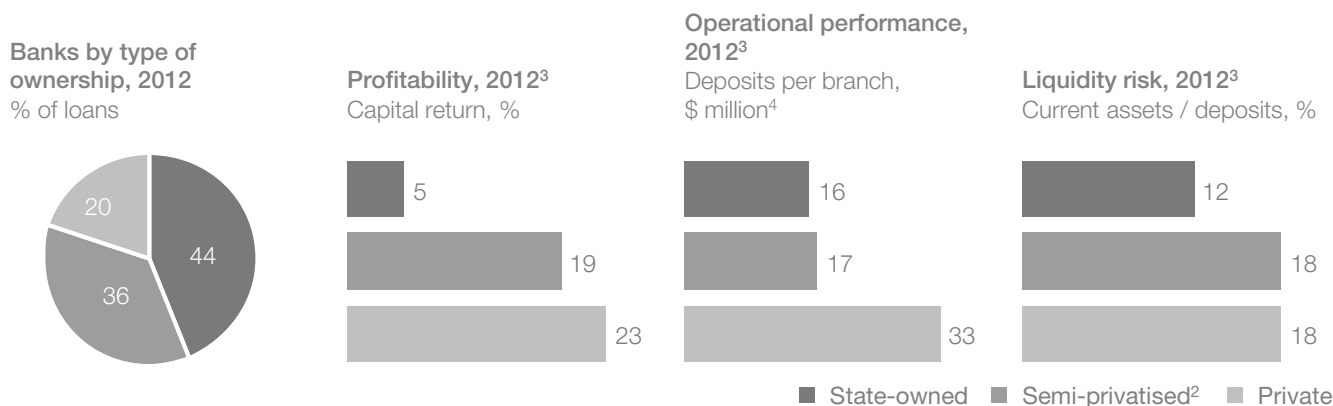
a seller. This causes inefficiencies and risk. A default by one payer can cause the recipient to default on his or her forward-dated cheques, setting off a domino effect of defaults. According to data from the Central Bank of Iran, the number of bounced cheques rose to six million in 2014 from one million in 2004.²¹² Approximately 60 percent of people incarcerated for non-intentional crimes in Iran in the last nine months of 2014 were convicted of crimes related to bounced cheques and similar non-intentional financial offences.²¹³

EXHIBIT 17

The banking sector in Iran has low provision of credit to the private sector and high non-performing loans



State-owned and semi-privatised banks dominate the sector



¹ Data for Iran from the IMF staff report for the 2014 Article IV consultation, March 2014.

² Semi-privatised banks have state-related shareholders.

³ Excludes specialised state-owned banks (e.g., agriculture bank)

⁴ Rial conversion to dollars using the official exchange rate of 12,260 at the end of 2012, announced by the Central Bank of Iran.

SOURCE: McKinsey Global Institute Financial Assets database; *World development indicators*, World Bank; Ahmadian, Azam, *Bank market share analysis*, Monetary and Banking Research Institute, Central Bank of the Islamic Republic of Iran, working paper number MBRI-9223, 2013; Ahmadian, Azam, *Evaluation of health indicators, Bank of Iran*, Monetary and Banking Research Institute, Central Bank of the Islamic Republic of Iran, working paper number MBRI-9222, 2013; "Islamic Republic of Iran: 2014 Article IV consultation. staff report; press release; and statement by the executive director for the Islamic Republic of Iran", IMF, April 2014; McKinsey Global Institute analysis

²¹² "Number of bounced cheques is increased 6 times", Iran Students News Agency, May 2015.

²¹³ *Jamejam Newspaper*, December 29, 2014.

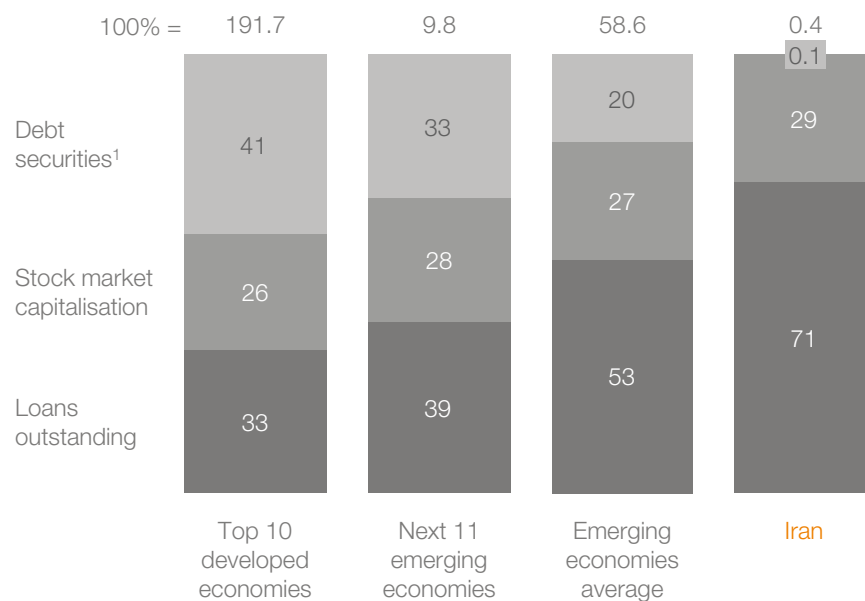
Banking reform will need to enhance flow of credit and strengthen balance sheets

The banking system faces four major structural challenges. First, credit has been predominantly allocated through the banking system, leaving capital markets small and undiversified. Iran's financial sector is dominated by bank loans, with virtually no debt securities (Exhibit 18). The government has stated an aspiration to move away from this approach, making bond markets a more important source of financing for the government and large enterprises. To do so, capital markets will need to build up their supporting infrastructure. There are no credit rating agencies in Iran, and banks typically guaranteed the performance of bonds. The government announced plans in 2016 to introduce treasury bills and a secondary market for government debt, taking the lead on issuing debt securities without bank guarantees in order to develop the bond market and prepare investors for the risk of purchasing bonds unsecured by banks.²¹⁴ This would set the stage for private companies to enter the market once the necessary infrastructure has been established. Iran's investment banking sector is also underdeveloped, with only a few private-sector players such as Amin Investment Bank initiating operations over the past decade.

EXHIBIT 18

Iran's financial system is overreliant on bank loans

Financial asset market composition, 2014
%, \$ trillion



¹ The total value of debt securities (Islamic participation papers, sukuks, and CDs) traded on Tehran exchange market in 2014 was \$570 million. Banks and large projects also issue some Islamic participation papers that do not have any secondary market and only can be cashed through the banking system.

SOURCE: McKinsey Global Institute Financial Assets database; Tehran Stock Exchange monthly bulletin; McKinsey Global Institute analysis

A second challenge is the direct control of the Central Bank of Iran over nominal interest rates. The central bank caps the interest rates banks can pay on deposits and demand on loans. Starting in 2008, high inflation without a sufficient adjustment on caps on lending rates caused banks to shift assets to the real estate sector, which they deemed lower risk in an inflationary environment. In doing so, they scaled back their lending activities in other sectors. At the same time, high inflation caused banks to offer high interest rates on savings.

²¹⁴ "Problem solving papers", *Tejarat-Farda*, issue 172, April 16, 2016.

-3.5%
Average interest
rate spread in
2012–14

This caused the spread on rates between loans and deposits to drop below zero, averaging about minus 3.5 percent from 2012 to 2014.²¹⁵

A step for solving this challenge could be for greater reliance on the interbank market, instead of setting interest rates at the retail level. Established in 2008, Iran's interbank market is small, with about 17,000 transactions valued at \$380 billion in 2014.²¹⁶ Developing this market is a priority, and the Central Bank of Iran has already taken significant steps towards this goal.²¹⁷ For further progress, it could look to China. Although not all of China's financial reforms have been effective, significant reforms over the past five years have successfully increased the liquidity, depth, and foreign participation in its interbank market. In 2010 China launched a programme to allow three types of offshore institutions to invest in the interbank bond market. Two years later, it also began allowing foreign investors access to its interbank bond market.²¹⁸ In 2015 it instituted regulations allowing foreign central banks, international financial organisations, and sovereign wealth funds to access the interbank market without prior approval and with minimal registration requirements. It has also increased investment flexibility by cutting quota requirements and expanding investment scope to forward contracts, interest rate swaps, and bond repurchases.

Third, Iranian banks continue to carry a relatively large proportion of non-liquid and non-performing assets on their balance sheets. Banks' non-liquid assets consist of government debt to the banks that is rolled over from one year to the next or repaid with equities in state-owned enterprises; investment in non-banking assets such as real estate and equities, which became more illiquid in the 2013 economic recession; and loans to businesses that became non-performing. The overall effect is insufficient capital adequacy and serious liquidity constraints in the system. The government has begun addressing its debt to banks and contractors by issuing settlement bonds, which have secondary markets and could unfreeze a portion of these assets.

The high rate of non-performing loans in Iran suggests that banks do not have adequate control over lending decisions. Non-performing loans were reported to be 17 percent of total loans in 2013, but real numbers might be even higher, according to the IMF.²¹⁹ This compares with non-performing loans of less than 4 percent on average in Brazil, Indonesia, Mexico, South Africa, and Turkey.²²⁰ One solution would be to set up a credit bureau agency so banks can better assess the creditworthiness of individuals and small and medium-sized enterprises. Banks can also find opportunities to improve their underwriting, account management, and portfolio management processes by leveraging the latest tools, infrastructure, and risk management practices.

Iran's central bank established capital adequacy requirements in 2003. A 2011 analysis conducted by the central bank's research arm found that between 34 percent and 57 percent of the deposits in the formal banking system were with ten banks whose capital was inadequate by the central bank's standards.²²¹ Given that the incidence of non-performing loans has increased since 2011, it is possible that capital inadequacy has

²¹⁵ *World development indicators*, World Bank, 2015.

²¹⁶ *2014 interbank performance*, Central Bank of Iran, June 2015.

²¹⁷ For example, the central bank reduced the interbank rate to make it closer to retail rates. "CBI plan to manage interbank market", Central Bank of Iran, January 19, 2016.

²¹⁸ China's Securities Regulatory Commission allowed qualified foreign institutional investors to invest in the interbank market from July 2012, although the decision was not officially disclosed until March 2013.

²¹⁹ "Islamic Republic of Iran: 2014 Article IV consultation. Staff report; press release; and statement by the executive director for the Islamic Republic of Iran", IMF, April 2014.

²²⁰ *World development indicators*, World Bank, 2015.

²²¹ Zahra Khoshnood and Marzieh Esfandiari, *Bank capital assessment based on international standards*, Monetary and Banking Research Institute, Central Bank of Iran, working paper number MBRI-PN-93008, 2014.

become even more pronounced. Implementing the latest standards for capital adequacy (Basel III) would probably push non-compliance rates even higher.

The central bank is reported to be preparing a plan to bring banks into compliance with international standards. The plan bolsters the secondary market for government debt, sets up asset management companies to deal with accumulated non-performing loans, and mandates that banks write off or sell their non-performing assets.²²² If implemented in a timely fashion, such a plan could be a significant step towards addressing Iranian banks' capital adequacy. Additionally, Iran needs to draft a plan for a major recapitalisation of its banking system. Reforming bankruptcy laws, for restructuring or liquidating failed banks, could pave the way for acquisition of troubled banks, potentially by foreign entrants.

The last challenge is that Iranian banks are behind global standards in terms of their risk infrastructure and processes. Relative isolation of the banking sector has held back their adoption of latest practices in risk management and governance, and they are also behind on advanced banking technology. Catching up quickly on these aspects will be necessary for banks to reconnect with global payment systems and process international transactions.

Legacy processes also affect banks' profitability and efficiency. Iranian banks reported a cost-to-income ratio of 83 percent in 2014, well above peer countries such as Turkey (46 percent) and Malaysia (51 percent).²²³ This suggests opportunities to improve efficiency. The central bank has already required banks to comply with international financial reporting standards and accounting standards by mid-2016. New IT systems and digitising end-to-end processes can help banks introduce these standards, whilst cutting costs and improving performance. Product innovation has also been left behind, in both retail banking and corporate banking. Some financial products readily available in many other countries, such as unsecured credit cards, point-of-sale loans, overdrafts, and specialised finance, are not available in Iran. The local market demands more sophisticated corporate and retail products.

Increasing the depth and diversity of the financial system

Financial market depth reveals the extent to which businesses, households, and government are able to finance themselves through financial intermediaries. MGI research has shown that developed countries have much deeper financial markets than emerging economies, with the total of outstanding debt and equity amounting to as much as 400 percent of GDP in Western Europe, the United States, and Japan, compared with 200 percent or less in many emerging markets.²²⁴ Iran's financial market has outstanding debt and equity of about 100 percent of GDP and is not as deep as could be expected considering Iran's GDP per capita. To support future economic growth of around 6 percent per year in real terms, Iran would require a financial depth of more than 200 percent of GDP, or a \$2.4 trillion increase in financial assets (Exhibit 19). This implies an annual growth rate of about 10 percent, comparable to Iran's 11 percent financial asset growth between 1990 and 2014.

Iran has been taking steps to deepen its financial markets; between 2006 and 2014, more than \$100 billion in government assets was divested, of which half was sold through the Tehran Stock Exchange. In 2014, Iran's stock market had a total capitalisation of about \$120 billion, or 30 percent of GDP.²²⁵ This is less than half the GDP ratio of BRIC countries and less than one-third of the world average.²²⁶ As little as 1 percent of equity and bonds is

From 2006 to 2014, Iran's government sold assets in excess of

\$100B

²²² *Tejaret-e-farda*, issue 172, April 15, 2016.

²²³ Global Banking Pools database, McKinsey Panorama; financial statements of the 17 largest banks in Iran.

²²⁴ *Mapping global capital markets 2011: Updated research*, McKinsey Global Institute, August 2011.

²²⁵ Tehran Stock Exchange monthly bulletin, March 2016.

²²⁶ MGI Financial Assets database.

held internationally, compared with a world average of 30 percent.²²⁷ This is far below the level in most emerging economies of Iran's size and wealth.

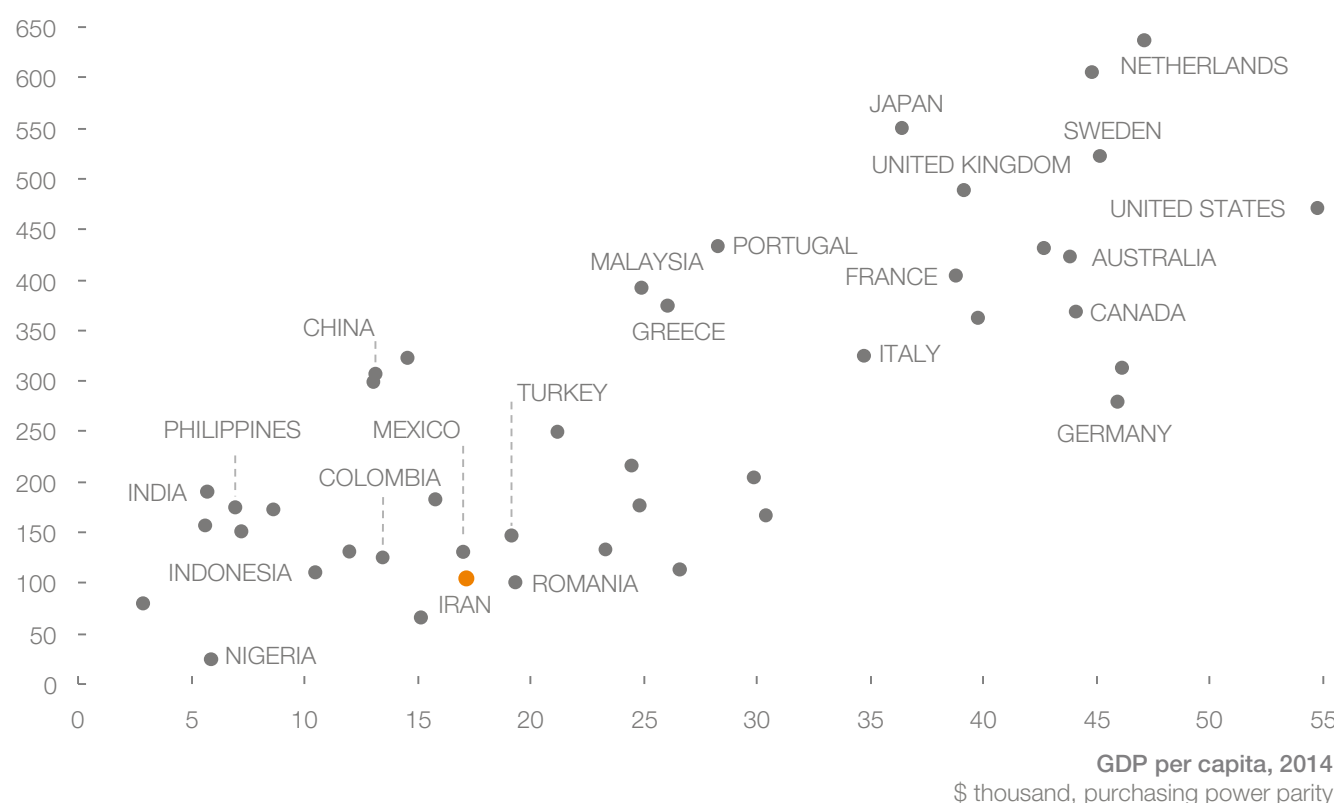
There are some risks in financial globalisation, including possible market volatility, exchange rate pressures, and vulnerability to sudden reversals in capital flows. These risks emphasise the importance of a robust central bank regime, with the appropriate technical expertise and policy tools to monitor and manage financial system stability, which is discussed in Chapter 3.

EXHIBIT 19

Iran's financial assets have significant room for growth

Financial depth, 2014¹

% of GDP



¹Calculated as a country's debt and equity outstanding divided by the country's GDP.

SOURCE: McKinsey Global Institute Financial Assets database; *World development indicators*, World Bank; McKinsey Global Institute analysis

Insurance: After two rounds of privatisation, competition is growing in an underdeveloped market

The Iranian insurance market is underpenetrated, both for life and non-life insurance products. Premiums have been growing at 12 percent per year since 2009 (measured in US dollars), whilst insurance penetration has also been rising at an annual rate of about 8 percent.²²⁸ Compared with other markets in the region and other emerging economies, there is still potential for premium growth, especially for life, property, and liability insurance as well as other underpenetrated segments. We estimate that gross value added in the sector could quadruple by 2035, to more than \$12 billion from around \$3 billion in 2014,

²²⁷ *Financial globalization: Retreat or reset?* McKinsey Global Institute, March 2013.

²²⁸ "Premiums" refers to gross written premiums; "insurance penetration" refers to premiums as a percentage of GDP. Annual reports, Central Insurance of I. R. Iran (Bimeh Markazi).

Under
20%
of household
properties insured

assuming best-in-class sales and marketing practices, strong GDP per capita growth, and continued liberalisation of the sector.

Private-sector involvement in Iranian insurance has historically been limited, constraining both investment and innovation.²²⁹ The market was nationalised in 1979 and reopened to private players, with restricted entry for foreign insurers, in 2000. A second wave of privatisation, in 2009, included the sale of state-owned insurance companies. Today, there are nearly 30 private or partially private Iranian insurance companies, accounting for more than half of gross written premiums.²³⁰ They compete with the state-owned market leader, Bimeh Iran, which in 2013 held 45 percent of the non-life market and 23 percent of the life insurance market.²³¹ A second state-run institution, Bimeh Markazi, functions as the industry regulator and mandatory reinsurer for the market. All insurance companies operating in Iran are obliged to cede a certain percentage of gross written premiums to Bimeh Markazi for reinsurance, including 25 percent of non-life premiums and 50 percent of life premiums.²³² Tamin Ejtemaee, or the Iranian Social Security Organization, also plays an important role in providing health coverage to 13 million workers and 22 million of their dependents.²³³

In addition to strong government intervention, the Iranian insurance market is challenged by limited innovation in insurance sales, leading to low penetration rates for multiple product types.²³⁴ Less than 20 percent of household properties are insured, and it is estimated that around half of all automobiles are not fully covered, despite compulsory third-party liability regulations.²³⁵ Given Iran's demographic trends, with a projected sharp increase in the population over 65 years old, the pension system will also face major challenges.²³⁶

The sector could expand despite these challenges, especially if the government continues to liberalise access and strengthen competition. Private health coverage is in demand, especially among affluent segments of the population, because of limits on the benefits paid by public health care.²³⁷ Robust GDP per capita growth, resulting in higher consumption of insurable products, could raise premiums over the next 20 years, and a more stable macroeconomic environment with lower inflation could drive greater demand for life insurance policies.²³⁸

Iran's insurance sector has undergone much-needed change in the past 20 years, presenting numerous opportunities for firms with novel product offerings, best-in-class marketing, and alternative distribution channels. Further success will depend on Iran's ability to bring in capital and expertise from international firms. We estimate around \$60 billion in capital will be required to fuel a quadrupling of Iran's insurance sector by 2035.

²²⁹ Ali Chesomi, Behzad Hassannezhad Kashani, and Mohammad Karimi, "The privatization effect on Iran insurance industry", *International Journal of Economics and Finance Studies*, volume 2, number 2, 2010.

²³⁰ Most industries in Iran are highly fragmented, and a wave of consolidation could occur. This will require an ecosystem of bank advisers, private equity, accounting, and law firms.

²³¹ *Ibid.*; *Iran: Life & benefits insurance market report*, Axco Global Statistics, 2015; *Iran: Non-life (P&C) insurance market report*, Axco Global Statistics, 2015.

²³² Central Insurance of I. R. Iran (Bimeh Markazi).

²³³ The Iranian Social Security Organization is considered part of the public sector for this report; *Statistical yearbook 2014*, Iranian Social Security Organization.

²³⁴ *Iran: Life & benefits insurance market report*, Axco Global Statistics, 2015; *Iran: Non-life (P&C) insurance market report*, Axco Global Statistics, 2015.

²³⁵ *Ibid.*

²³⁶ United Nations Populations Division; *Iran: Life & benefits insurance market report*, Axco Global Statistics, 2015.

²³⁷ *Iran insurance report, Q4 2015*, BMI, July 2015.

²³⁸ *Ibid.*

PROFESSIONAL SERVICES: CREATING A COMPETITIVE ECOSYSTEM TO ENABLE PRIVATISATION AND CONSOLIDATION

Iran was one of the few countries globally whose professional services declined between 2010 and 2014 as international sanctions took their toll. The professional services sector is fragmented and mainly dominated by small local players with major international firms predominantly absent. Whilst Iran has relatively strong domestic legal and communications firms that serve both multinational companies and local firms, there is considerable room for international professional services firms, including those that specialise in accounting, auditing, and management consulting. International companies, including three of the big four accounting and auditing firms had been in the country before 2010 but left due to limitations placed by sanctions. Many large international companies, including oil and gas majors, also left Iran, thereby reducing the size of the professional services sector that served them.

A likely wave of consolidation will require advisory services

As Iran reintegrates with the global economy, a wave of consolidation aimed at improving productivity is likely to occur. Today, most industries in Iran are highly fragmented. For example, in Iran there are 15 major passenger airliners with an average of 13 planes per company, compared with 11 companies in Turkey and an average of 55 planes. The average Iranian bank is 30 percent smaller than banks in Turkey and more than 70 percent smaller than in South Korea. In retail, the top three Iranian companies have a market share of just above 3 percent, compared with 60 percent in the United Kingdom.²³⁹ Mergers and acquisitions will help domestic firms realise the scale and scope necessary to compete with international new entrants. An ecosystem of bank advisers, private equity, consultants, and legal firms will be required to enable this consolidation, as well as advise Iranian companies on a range of technical and strategic issues. For example, the 500 Iranian publicly listed companies will have to prepare their financial statements according to international financial reporting standards from 2016 and may need assistance in doing so.

Investment banking began in its regulated form in Iran in 2007 when the country's Security and Exchange Organization granted licences to two investment banks, Eghtesad Novin Bank and Amin Investment Bank, to expedite the privatisation drive.²⁴⁰ The expected wave of consolidation will increase demand for investment banking advisory services. At the same time, lower inflation and lower interest rates could encourage households to shift their real assets such as real estate into financial assets, creating further demand for financial advisory services.

Management consulting is also nascent in Iran, mostly consisting of small local firms or individuals. These companies have limited mergers and acquisitions experience and will need to build capabilities to meet the rising market needs.

Private equity and venture capital is still in its infancy in Iran with only a limited number of firms in this sector. Iran's venture capital association has 30 members with only six directly active in venture capital.²⁴¹ Several private equity firms focused on raising funds from outside Iran have recently emerged. Iranian asset management firm Turquoise Partners plans to start a \$200 million private equity fund with a Swiss bank.²⁴² Griffon Capital plans to raise \$130 million for its private equity fund.²⁴³

30

members in Iran's
venture capital
association

²³⁹ *Grocery retailers in Iran*, Euromonitor, March 2015; "Tesco market share shrinks to lowest level in almost a decade", *The Guardian*, March 11, 2014; Diio Mi by Innovata database, February 2016; International Financial Statistics database, IMF, 2015.

²⁴⁰ "Iranian investment banking market is still left wanting", *The Banker*, December 1, 2015.

²⁴¹ Iranian Venture Capital Association.

²⁴² "Iranian firm launching private-equity fund to focus on consumers", *Wall Street Journal*, January 28, 2016.

²⁴³ "Iran seeks investment in capital markets", *Financial Times*, January 25, 2016.

For legal services, a large number of small domestic firms serve both multinationals and local companies. Iran has 6.3 lawyers per 10,000 population, on a par with Austria and higher than in Malaysia. More than 7,000 seats in universities are available every year for law students at more than 100 colleges in Iran offering law degrees.²⁴⁴ International law firms have begun entering Iran. In February 2016, CMS, the London-based law firm, became one of the first major international law firms to enter the Iranian market. The world's largest law firm by head count, Dentons, has specialised teams advising multinational corporations on doing business in Iran.²⁴⁵

International companies will need a professional services ecosystem

As multinational companies seek to enter the Iranian market, professional services firms could play an important role by providing a variety of support services, including accounting and auditing, engineering consulting, advertising, market research, and management consulting.

The auditing sector is dominated by the state-owned audit organisation, which audits the majority of government, state-owned enterprises, and publicly listed companies. The audit market was estimated at \$90 million in 2010, of which the state-owned audit organisation has approximately a 70 percent share.²⁴⁶ Large global accounting firms, including KPMG, Ernst & Young, and PwC, were present in Iran until 2010 through affiliations and partnerships, but terminated their operations because of sanctions. Since the easing of sanctions and demand from clients, the big four accounting firms have already held discussions over setting up offices or otherwise commencing operations in the country.²⁴⁷

Local engineering consultancies have a long history and have built strong expertise over the years, mainly through partnerships with large international firms. More than 850 engineering consulting firms are registered with the Iranian Society of Consulting Engineers. Larger firms such as Sazeh and Nargan employ more than a thousand people each and were involved in some of the nation's biggest oil and gas projects. Many small to medium-sized foreign companies have established partnerships with local engineering consulting firms in order to enter the Iranian market.

More than 700 domestic firms and 300 individuals are part of the Iranian Management Consultants Association.²⁴⁸ These firms tend to be small with limited international clients and therefore do not have access to international benchmarks and databases of major consulting firms. That said, alongside their consulting work, many of these firms conduct other activities, which include acting as representative offices of foreign firms and importers.

In advertising, several prominent local players provide full services, including media production, market research, market consultation, and campaign planning. About 110 advertising agencies are registered with the Iran Advertising Agencies Association. The advertising market is less fragmented than other business services with seven top-tier firms, including Anetwork and Kanoon Iran Novin, leading the sector. Some public relations firms such as Mana Payam serve international companies. There also has been interest from global PR networks; Italian PR firm SEC Group became the first Western firm to enter the market.²⁴⁹

6.3

lawyers per
10,000 population,
on a par with
Austria

²⁴⁴ Number of lawyers and law firms, Malaysian Bar; "Unemployment of lawyers is due to their large number", Fars News Agency, October 2015.

²⁴⁵ CMS; Dentons.

²⁴⁶ "Iran exodus: Politics strikes professions", *The Accountant*, April 2010.

²⁴⁷ "'Big four' plan to set up in Iran", *Arabian Business*, March 3, 2016.

²⁴⁸ "Iran management consultancy industry scan", Iliia Corporation, January 2013.

²⁴⁹ "Italian PR firm SEC Group enters Iranian market after lifting of sanctions", *PR Week*, July 29, 2015.

International market research companies do not have a direct presence in Iran, and many global sources have failed to gather comprehensive and reliable data on Iranian sectors. This is not due to a lack of data available in the country. Public agencies such as the Statistical Centre of Iran, the central bank, and government ministries, among others, collect a full range of data. Rather, firms have found it difficult to navigate the myriad disparate sources, often in Persian, to fulfil their data needs.

Transforming the Iranian industrial fabric

To raise productivity across the board and compete with global companies, Iranian firms will have to embark on a transformation of their own to capture opportunities offered by lean management, capital productivity, omni-channel, and big data, among others. A professional services ecosystem will be an integral part of this journey. Professional services companies also tend to invest in talent development, which can benefit Iranian society as a whole with better practical education and training. For example, Iran needs more graduates in business and management. Similar to other countries, professional services firms can partner with business universities such as Sharif University and the Iranian Business School to promote modern management practices and MBAs.

Going forward, we expect the professional services sector to grow at 6 percent annually over the next 20 years, in line with the growth peer countries experienced in the past ten years and to add more than 250,000 jobs.²⁵⁰

INFORMATION AND COMMUNICATIONS TECHNOLOGY: USING THE DIGITAL OPPORTUNITY TO LEAPFROG AHEAD

With its strong scientific and engineering tradition, and a young, upwardly mobile population eager to participate in the digital economy, Iran has the potential to develop a thriving information and communications technology sector. For now, the sector has not developed as fast as in many peer countries.²⁵¹ The telecommunications market, with revenue of about \$8 billion, is about half the size of Turkey's and one-third the size of Mexico's. Average mobile data consumption per person likewise trails that of a number of comparable countries, partly due to lower mobile Internet speeds and despite low mobile data prices. Iran also has a software industry servicing mainly local clients, and its IT services market for now is also small and highly localised but with a potential to grow further as it reconnects to the world economy.

Iran's telecommunications market, with revenue of \$8 billion, is about half the size of Turkey's and one-third the size of Mexico's.

Going forward, Iran has an opportunity to leapfrog in its development of ICT, switching to a new generation of technology and offering a richer palette of services to consumers and businesses. With its large and low-cost talent pool, Iran has potential to become an IT outsourcing hub in areas such as application development and maintenance, hosting, and network services. We estimate the ICT sector could more than quadruple its value added to the economy, growing from \$7 billion in 2014 to more than \$30 billion in 2035 and adding more than 250,000 jobs.

²⁵⁰ Peer countries used are Hungary, Romania, and Slovakia.

²⁵¹ Peer countries used for ICT section of the report include Brazil, China, Egypt, India, Malaysia, Mexico, Nigeria, Russia, Turkey, and Vietnam.

To achieve such growth, Iran will need to focus on a range of measures, including regulatory reform, a new focus on monetising value-added services, and closer cooperation with international companies, which could bring expertise as well as investment. Iran would also need to take specific steps to improve its business environment for ICT, including implementing and enforcing laws on data protection and copyright piracy, reducing political and business risk, incentivising investment in quality infrastructure and rolling out a nationwide broadband network.

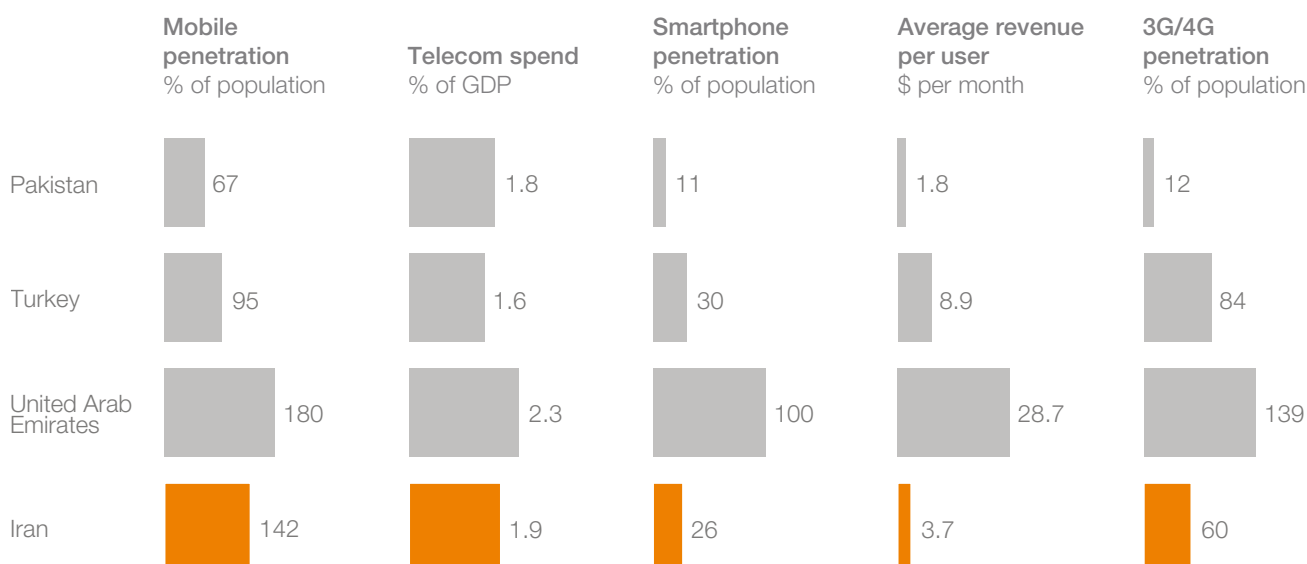
Mobile: Transitioning to the next generation of technology and services

Mobile accounts for about \$5 billion of Iran’s \$8 billion telecommunications revenue.²⁵² With almost 1.5 mobile subscriptions for every person, mobile penetration in Iran is more than 50 percent higher than in China, Mexico, and Turkey, and on a par with penetration in Malaysia and Brazil.²⁵³ As a share of population, 3G/4G mobile data penetration reached 60 percent in Iran at the end of 2015, up from only 2 percent in 2013.²⁵⁴ There are two main mobile operators, MCI Hamrah-e-Aval, the 14th-largest post-paid telecommunications operator by number of subscribers in the world and the largest in the Middle East and South Asia, and MTN Irancell, a joint venture between South African MTN Global and a local partner. A third competitor, RightTel, entered the market in 2011 and had more than two years of 3G exclusivity, but managed to capture only 3 percent of subscribers.²⁵⁵

Despite high penetration and growing access to mobile data, Iran’s average revenue per user is only \$3.70 per month, which is about 60 percent lower than in Turkey and 90 percent lower than in the UAE (Exhibit 20). Whilst the erosion in average revenue per user has been a global trend, the decline for Iranian companies has been faster. This is mainly due to a regulatory regime that sets caps on rates, and a low provision of value-added services.

EXHIBIT 20

Iran’s telecommunication market potential resides in mobile broadband and services 2015



SOURCE: Analysys Mason; Strategy Analytics; WCIS; McKinsey Global Institute analysis

²⁵² “Mobile subscriptions and revenue forecast: 2015–20”, Ovum, 2016; “Fixed voice forecast: 2015–20”, Ovum, 2016.

²⁵³ World Cellular information Service database.

²⁵⁴ Ibid.

²⁵⁵ Ibid; TCI annual performance report 1393 (2014–2015).

With a goal to keep mobile communication affordable and accessible to a broad populace and to promote adaption of mobile broadband, Iran's Communications Regulatory Authority sets a cap on voice, SMS, and data tariffs charged by mobile companies.²⁵⁶ This cap prevented telecommunications companies from passing on to consumers the full effects of high inflation and currency devaluation. In dollar terms, this led to a shortfall in revenue and may have deterred investment, as most capital investment requires foreign currency. Experience in other countries has shown that regulatory caps on tariffs can depress investment and product innovation.

An alternative regime, such as liberalising tariffs and mandating minimum investment levels, can stimulate competition and improve customer satisfaction rates. To promote competition, in August 2015, the Communications Regulatory Authority announced mobile number portability regulations among the three mobile operators a deadline for it to become operational by June 2016. It also announced plans to grant mobile virtual network operator licences, opening the telecommunications market to companies that can lease network capacity and operate as sales and marketing engines. Since the announcement, more than 51 companies, including 32 operators from 18 countries, have applied for such a licence.²⁵⁷

The second factor depressing per-user revenue is the low penetration of data-intensive value-added services, such as location-based services and multimedia. In 2015, per-user data consumption in Iran was a quarter that of Malaysia and 90 percent less than in Sweden.²⁵⁸ Regulations limiting Internet speeds and data-consuming applications are partly to blame. For example, a law passed in 2006 limits Internet speeds to 128 kilobits per second. Many data-heavy over-the-top services such as music, TV, and cloud-based services are also unavailable.

142%
mobile penetration

Inadequate infrastructure has contributed to the low penetration of value-added services. Mobile reception is patchy even in major metropolitan areas, and users must contend with frequent disconnection. Iranian telecommunications companies all had call setup success rates lower than 99 percent and dropped call rates higher than that of peers. The three operators have received warnings from the regulatory agency about quality, insufficient coverage, and failure to uphold their obligations. In a survey carried out during a TV debate with representatives from telecommunications operators and the regulatory agency in November 2014, more than 82 percent of the 315,000 respondents said they were not satisfied with any of the services provided by their telecommunications operators.²⁵⁹ Overcoming these challenges calls for significant investment in network infrastructure and IT systems.

To transition to the next stage of their development and continue their strong growth, Iran's mobile players will need to focus on three areas. The first is to improve sales and marketing practices. For example, they have not been able to provide bundled fixed-mobile offerings that lock customers into long-term contracts with monthly minimum charges. The advent of number portability will make doing so more urgent. Outdated IT systems and organisational challenges have also prevented the Iranian operators from fully embracing fixed-mobile convergence.

Second, operators have an opportunity to tap into the undersupplied enterprise market. As telecommunications firms transition to more developed operating models, businesses and large enterprises become an increasingly important source of revenue. Today, enterprise customers generate more than 25 percent of Turkey's telecommunication revenue.²⁶⁰ Iranian

²⁵⁶ Caps are detailed on the authority's web site, www.cra.ir.

²⁵⁷ "32 international operators applied for MVNO licences", MVNO Dynamics, September 2015.

²⁵⁸ World Cellular Information Service database; Analysys Mason DataHub.

²⁵⁹ "82% of people are not satisfied by mobile services", *Tabnak News*, November 15, 2014.

²⁶⁰ Yankee Global mobile forecast.

operators have recently put further emphasis on the enterprise market and begun moving into this market. For example, MCI has a broad offering in IT services for enterprises through its subsidiary Afranet.

Third, Iran can take advantage of its tech-savvy population and entrepreneurial spirit to leapfrog ahead, adopting the latest technologies available immediately rather than passing through long transition phases with older technologies. For example, in 2014, MTN Irancell launched 3G and 4G services almost simultaneously, with just a two-month gap between launches. Leapfrogging may also occur in other innovative areas such as the Internet of Things and services including mobile banking and e-commerce. For example, the largest Iranian e-commerce player, Digikala, took only one year to reach 20 percent of its sales through mobile channels.

In aggregate, putting all these opportunities together, we calculate that the mobile market in Iran could grow from \$5 billion in 2014 to about \$22 billion in 2035, an average annual growth rate of more than 7 percent.²⁶¹

Fixed broadband: Waiting for fibre to boost the digital economy

Iran's fixed-line voice market has more than 30 million subscribers and is controlled by the national telecommunications monopoly operator, TCI.²⁶² In contrast, the fixed broadband market is open for competition with hundreds of Internet service providers. The penetration of fixed broadband has been growing rapidly, although in 2015 it was still about 23 percent. That compares with 50 percent in Turkey and 75 percent in Mexico.²⁶³ Fibre has yet to be rolled out, which puts Iran behind a number of peer countries. In India, for example, the fibre penetration rate as a share of total fixed broadband is about 14 percent; in China it is almost 70 percent.²⁶⁴ Moreover, Iran ranks lower than peer countries on fixed Internet speeds, although it scores high on affordability. On a purchasing power parity basis, Iran ranks as the 19th cheapest of 140 countries in broadband affordability.²⁶⁵

Iran's telecommunications companies are showing signs of moving towards fixed-mobile convergence. In 2016, MTN Irancell announced intentions to invest in fixed broadband by deploying fibre-to-the-home networks. Many fixed broadband players are applying for mobile virtual network operator licences. During the Italian prime minister's visit to Iran in 2016, TCI signed a cooperation agreement with Italtel to develop and revamp Iran's telecommunication network and infrastructure.²⁶⁶

We estimate that Iran will require investment of approximately \$11.5 billion to reach fibre-to-the-home penetration levels comparable to those of leading peers such as South Korea by 2035.²⁶⁷ The economic benefits of raising broadband penetration could be significant with positive spillover effects throughout the economy. For example, reaching Turkey's level of fixed broadband penetration could add about 1 to 2 percent to Iran's GDP, including spillover benefits, and create about 200,000 jobs throughout the economy.²⁶⁸

23%

Penetration of fixed broadband in 2015

²⁶¹ IHS.

²⁶² *ICT facts and figures*, Iran Information Society 2015, Ministry of ICT.

²⁶³ "Total fixed broadband subscriptions and revenue forecast 2015–20", Ovum, 2016.

²⁶⁴ Analysys Mason DataHub, October 19, 2015.

²⁶⁵ *World telecommunication indicators*, International Telecommunication Union (ITU); *Global information technology report 2015: ICTs for inclusive growth*, World Economic Forum and INSEAD, April 2015.

²⁶⁶ "TCI and Italtel sign cooperation agreement", TCI press release, April 13, 2016.

²⁶⁷ Fibre-to-the-home penetration levels from Analysys Mason DataHub. Investment calculations based on McKinsey's ONE FTTH benchmark.

²⁶⁸ *The impact of broadband on the economy: Research to date and policy issues*, ITU, April 2012

Software and IT services: Iran has the potential to become an outsourcing hub but will need to strengthen data and IP protection

Visiting a computer store in Tehran, a shopper can buy a pirated copy of the Windows 10 operating system for approximately \$3. Iran ranks near the bottom of the World Economic Forum's competitiveness report for intellectual property protection and is not part of the World Intellectual Property Organization's Berne Convention, which has 170 signatories.²⁶⁹ Iran does have rules for protecting its own intellectual property. For example, parliamentary legislation safeguards locally produced software, and violating intellectual property laws can be punishable by fines and up to six months in prison. This has led to a burgeoning domestic enterprise and consumer software market numbering several thousand software companies, and with exports to Afghanistan, Tajikistan, the UAE, Uzbekistan, and elsewhere.

The software sector has access to a large talent pool that includes 180,000 students enrolled in computer science and computer engineering with a concentration on software.²⁷⁰ Iran has said it would like to join global institutions such as the World Trade Organization, which would require it to put in place and enforce global copyright protection agreements. This would be both a challenge and an opportunity for the software sector. Whilst greater protection would increase the price of software for end-users, it will encourage international investment and innovation more broadly.

In addition to end-to-end software development, Iran has potential to become a destination for IT outsourcing, application development and maintenance, hosting, and network services. McKinsey's Location Readiness Index, which measures a city's outsourcing potential on five dimensions (talent pool, quality of infrastructure, risks, environment, and cost), ranks Tehran on a par with Kuala Lumpur, and ahead of Bangalore and Warsaw for its potential to become an IT outsourcing hub (Exhibit 21). Tehran's core strengths include a large pool of engineering talent and low labour costs.

To develop Tehran's potential as an IT outsourcing hub, the government will need to introduce rigorous legislation on data protection laws. As with software, this is one of the most important criteria for foreign companies when making outsourcing decisions. The government also needs to support improvement in English language proficiency. Iran ranks 56th of 70 countries on an English language proficiency index, on a par with Egypt but below most other outsourcing hubs.²⁷¹

It also needs to catch up on outsourcing infrastructure and have global telecommunications costs to and from Iran that are competitive with costs in other outsourcing hubs. Wholesale rates for fixed-line phones and mobiles in Iran are slightly lower than in Egypt but higher than in most other major outsourcing hubs.²⁷² The fibre-optic trunk cable Europe-Persia Express Gateway, which runs through Iran between Germany and the Persian Gulf, is expected to become fully operational by late 2016. Once completed, this will be a significant international telecommunication and data transfer platform, and it can help Iran boost its global connectivity. If Iran's IT outsourcing is executed successfully, its revenue has the potential to grow to approximately \$2.5 billion annually and create roughly 100,000 jobs by 2035.

²⁶⁹ *Global competitiveness report 2015–16*, World Economic Forum, September 2015.

²⁷⁰ "Latest statistics of higher education", GOFToGonews, September 25, 2013.

²⁷¹ EF English proficiency index 2015.

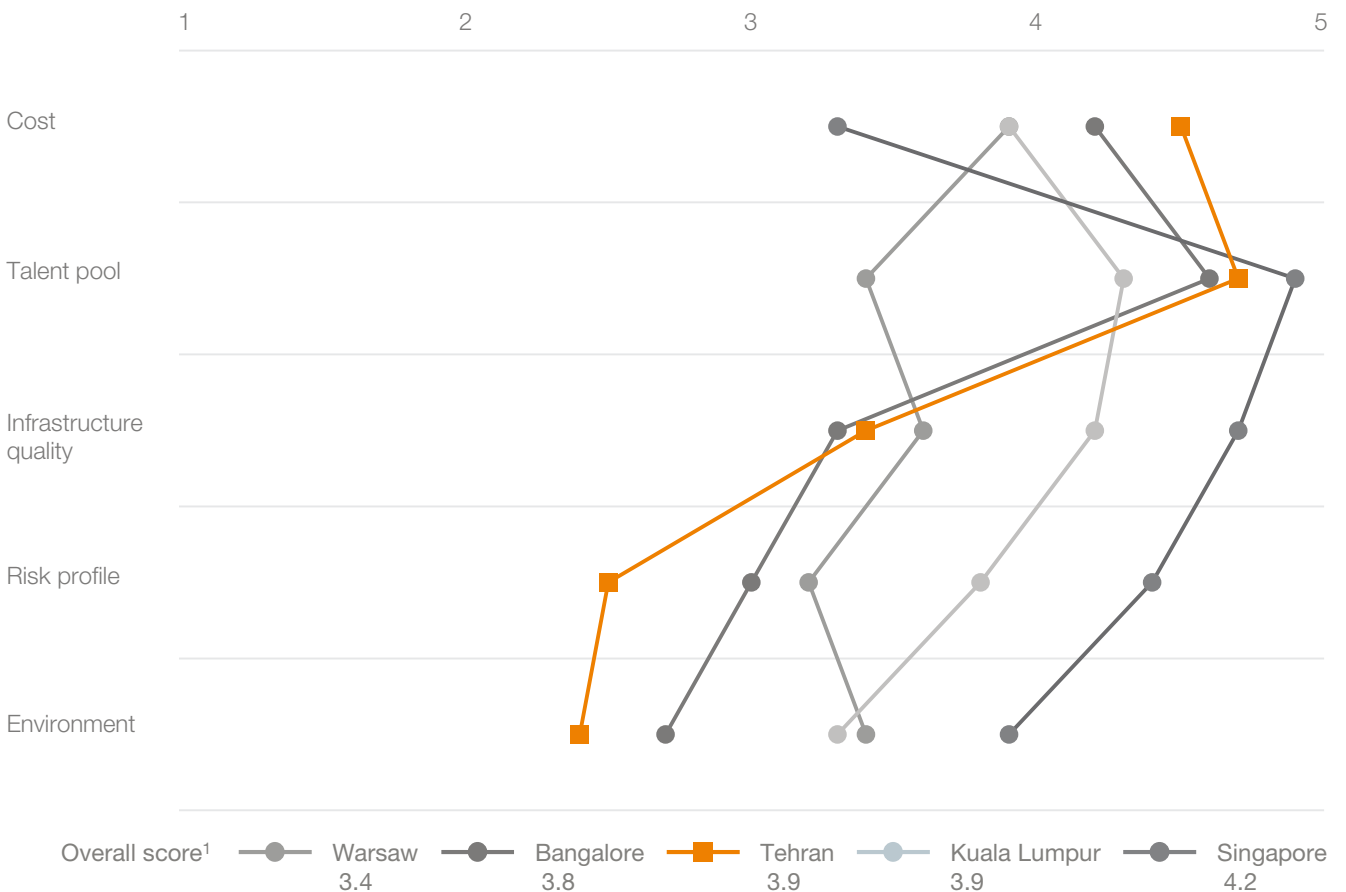
²⁷² "Wholesale rate by country 2011–2015", TeleGeography.

The Iranian government has prioritised development of ICT as part of its five-year plan and has promoted several technology parks. They include the Pardis Technology Park in Tehran, which houses more than 120 companies with more than 2,000 employees.²⁷³ The park is run in association with Sharif University and supports companies in IT, nanotechnology, biotechnology, mechanics, automation, and other sectors.

EXHIBIT 21

Tehran has several advantages as a potential IT outsourcing hub

McKinsey Location Readiness Index (LRI)
1 = least attractive; 5 = most attractive



¹Weighting of overall score based on 30% for cost, 30% for talent, 13% for infrastructure, 13% for risk profile, 14% for environment.

SOURCE: McKinsey LRI database; McKinsey Global Institute analysis

²⁷³ Pardis Technology Park website, March 2016.

PHARMACEUTICALS: IRAN HAS ADVANCED SCIENTIFIC CAPABILITIES INCLUDING IN BIOTECHNOLOGY AND STEM-CELL RESEARCH

Pharmaceutical manufacturing in Iran is small, accounting for just over 0.3 percent of both total GVA and employment, but the market has several strengths that make pharmaceuticals a promising industry. Domestic industry has developed advanced scientific capabilities including in stem-cell research and biotechnology, and demand for many types of drugs is likely to increase in line with Iran's demographics and disease burden. We estimate that pharmaceutical manufacturing could increase its contribution to the Iranian economy sevenfold by 2035, growing from \$1 billion in GVA in 2014 to almost \$7 billion. This would represent growth of more than 9 percent per year and would put Iran's output significantly above that of regional peers today, including Turkey. Such growth will require a major transformation of the industry, including innovation, operational efficiency, evolving government policies, and the involvement of international corporations.

Demand for many types of drugs is likely to increase in line with Iran's demographics and disease burden.

An underpenetrated market with increasing health-care needs

Iran remains one of the few large, untapped markets for pharmaceuticals. Iranians in 2014 spent only \$163 per year on pharmaceuticals on a purchasing power parity basis, compared with \$209 in Mexico and \$508 in Poland.²⁷⁴ Pharmaceutical spending growth has been flat, increasing at just above the rate of population for the past five years, even though Iran has a social insurance system that covers some pharmaceutical expenses. More than 90 percent of the Iranian population has health-care coverage, mostly funded by the government through Tamin, the Social Security Organization (see Box 2, "Iran's health care has strong foundations but is under growing strain and in need of investment"). Reimbursement rates for drugs vary widely between 10 and 95 percent depending on the type of coverage, brand of drug, and location of delivery.

56%
increase in
incidence of
diabetes since
2000

Iran's demographic trends and disease burden suggest it could be a significant market for pharmaceuticals. Iran's population will age over the next 20 years, with individuals aged 50 to 64 growing from 12 percent of the population to 22 percent; those aged 65 and older will grow from 5 percent to 12 percent. In 2012, Iran's overall disease burden, as expressed in disability-adjusted life years, was three times that of Malaysia and nearly double that of South Korea.²⁷⁵ Chronic diseases that are costly to treat pharmacologically have also risen steeply, with diabetes incidence increasing by 56 percent since 2000, whilst neurological conditions have increased by 28 percent, and chronic obstructive pulmonary disease by 32 percent in the same period.²⁷⁶

²⁷⁴ IHS; Islamic Republic of Iran Customs Administration.

²⁷⁵ Global Burden of Disease DALY estimates for 2000–2012, World Health Organization; disability-adjusted life years measure the number of healthy years of life lost to premature death or disability across an entire population.

²⁷⁶ Ibid.

Box 2. Iran's health care has strong foundations but is under growing strain and in need of investment

Iran's constitution guarantees access to health care to its citizens, and a broad national insurance structure covers about 90 percent of the population.¹ But the system has become increasingly strained. Despite a young population, Iran has a high disease burden, and the 50-plus age segment is projected to be the fastest-growing age demographic through 2035. The sector requires considerable investment to modernise and expand facilities, and more doctors are needed.

Iran's Master Health Plan, established in the 1980s, laid the foundation for the current multitiered network of providers. Prioritising accessibility of basic primary care, health houses staffed by *behvarz* (trained health workers) are located in every village. They are supported by more sophisticated secondary care facilities, which are managed by district health centres. In 1986, to increase coordination and boost quality of care, Iran combined medical education with the Ministry of Health and Medical Education. As a result, medical universities have become the keystone of Iran's health network, administering the national health policy determined by the health ministry. Iran's 49 medical universities (at least one is located in every province) provide high-quality training for doctors. Since 1988 the total number of medical students in Iran has grown by an annual average of 5 percent. In 2015 Iran had nearly 13,000 medical teaching staff and almost 250,000 medical students, two-thirds of whom are female.²

The provision of health care is largely public, with 80 percent of the country's approximately 900 medical establishments affiliated with the health ministry. Though total health spending in real terms has increased at an annual average rate of 11 percent over the past decade, Iran still underspends its peers by nearly 25 percent on a per capita basis (well below Russia and Brazil). This is especially apparent in infrastructure, where underinvestment has resulted in a substantially lower number of hospital beds per capita than peers (1.7 beds per thousand people vs. 2.5). An estimated 60 to 70 percent of hospital infrastructure and equipment in Iran is considered antiquated.³ Compounding this is a shortage of physicians, with only 0.9 physicians per thousand people, less than half the average of peer countries.

The government plans to expand universal coverage and improve its quality of care. In February it announced the extension of national health insurance to the five million most vulnerable citizens. The government's Five-Year Development Plan proposes a 60 percent increase in the 2016 health-care budget and encourages privatisation, with the management of public hospitals being assigned to a board of trustees and ownership being transferred to the private sector.⁴ It is also actively seeking foreign investment and encouraging competition in the health sector, with the primary goal of attracting \$2 billion of investment in pharmaceuticals, equipment, and other infrastructure over the next three to four years.⁵ In March 2016 German health-care company HT Health Tec announced plans to build a 400-room hospital in Iran, and Japan signed a deal to provide Iran with about \$10 million in grants to purchase medical equipment from Japanese manufacturers.⁶

¹ "Treatment cost", *Donya-e-Eqtasad*, December 26, 2015.

² Statistical Centre of Iran; Ministry of Science, Research and Technology.

³ "57% of hospitals have depreciated; renovation of 30,000 hospital beds", Young Journalist Club, January 15, 2016; "High number of kidney dysfunction; dialysis equipment is worn out", Iranian Student News Agency, March 7, 2016.

⁴ "Excessive healthcare costs have been reduced; government will buy services from private hospitals", Islamic Republic News Agency, August 17, 2015; "Iran health minister announced healthcare priorities in sixth development plan", Islamic Republic News Agency, January 18, 2016.

⁵ "Foreign countries' willingness to invest 2 billion USD in Iran's health sector", Islamic Republic News Agency, August 2015.

⁶ Allison Williams, "Health companies ready for Iran; German opportunities", *Handelsblatt Global Edition*, March 21, 2016; "Japan to give Iran \$10M USD in grants to overhaul healthcare", Philippines News Agency, March 13, 2016.

Box 2. Iran's health care has strong foundations but is under growing strain and in need of investment (continued)

With much of India's progress in health-care reform coming from the private sector, Delhi is an instructive case study for Iran as it looks to expand private-sector participation. Between 2002 and 2010 more than 70 percent of India's new hospital bed capacity was created by the private sector.⁷ To attract private-sector participation, Iran could institute pricing mechanisms that are attractive to private operators but prevent excessive profits and provide incentives for providers, patients, and other stakeholders. It could also increase transparency on health data and actively seek private-sector support from a targeted list of providers. To ensure the financial sustainability of the system, Iran could consider health system financing reform and expand its sources of funding. As private-sector participation increases, Iran will have to put in place effective regulation to manage potential knock-on effects, such as supply-induced demand and patient cherry-picking, and to ensure cost transparency among providers. Strong governance is essential, including conflict of interest prevention and performance management. Iran could also explore new care models such as improving nurses' skills to decrease physician patient load and further develop focused channels for long-term care, rehab, and mental health.

The government is already visibly promoting public health. Billboards encourage Iranians to eat healthier, exercise more, and drive safely. Iran could continue to emphasise prevention and expand health education on additional topics, such as reducing tobacco consumption.⁸ We project that by 2035 Iran could add nearly 250,000 jobs and increase health-care GVA to more than \$27 billion, an annual growth rate of nearly 6.5 percent.

⁷ *India healthcare: Inspiring possibilities, challenging journey*, McKinsey & Company, December 2012.

⁸ "Iran's underage smoking crisis", *Al-Monitor*, June 16, 2014.

120

domestic
pharmaceutical
manufacturers

Drug manufacturing is both highly advanced and low in cost, yet with low value added

Iran's domestic drug industry, though small, is relatively advanced. Supported by the government's goal of self-sufficiency in pharmaceuticals, Iranian companies supply more than 90 percent of Iran's annual drug consumption in volume terms. They have developed capabilities in several complex subsectors: Iran reportedly ranked fourth globally in stem-cell research in 2015 and first in the region for production of biotechnology.²⁷⁷ Iranian producers have developed biosimilars to many Western medicines, such as CinnaGen's interferon beta-1a drug CinnoVex, a biosimilar of Biogen and Pfizer's treatments for multiple sclerosis. Iran is one of only three countries in the world capable of producing this complex drug, the other two being the United States and Germany. Iran also has numerous advanced pharmaceutical research institutions, such as the Pasteur Institute of Iran and the Razi Vaccine and Serum Research Institute.

The domestic manufacturing market is highly fragmented. It numbers about 120 companies, of which the ten largest control 37 percent of the market. Darou Pakhsh, the largest producer in Iran, has a share of 5.5 percent. These domestic players may need to consolidate in order to fully leverage economies of scale in research and development.

Despite their advanced scientific capabilities, Iranian companies mainly produce low-cost bulk solids, rather than high-value complex treatments. The 90 percent of drug consumption in volume that they produce accounts for only about 60 percent of consumption in value. This indicates that the small portion of imported drugs is of significantly higher value than those produced locally. The margins of the largest Iranian players are lower than most international peers. Going forward, Iranian companies will need to invest more heavily in developing higher-value-added products, especially in areas such as biotechnology where they are already relatively advanced. They could also partner with multinational corporations to manufacture advanced drugs that are scarce in Iran.

Regulatory reform to convert international interest into investment

Despite the large market size and relatively low manufacturing input costs, multinational corporations have not yet fully entered the Iranian market. Whilst several major firms are active in Iran, including Pfizer, Merck, and GlaxoSmithKline, they sell only through local distributors and have no local production. Only one foreign firm, Sanofi, has a contract manufacturing partnership with an Iranian producer. In Turkey by comparison, at least seven of the top 25 global firms have plants. Although pharmaceuticals were exempt from international sanctions, foreign companies struggled with international payments and difficulty repatriating funds, given Iran's exclusion from the global banking system. The lengthy, complex, and opaque drug registration process and similar challenges with government bureaucracy have also made some foreign firms reluctant to commit fully to the Iranian market. This has limited the sale of many advanced medicines in Iran and greatly restricted crucial transfers of scientific and manufacturing knowledge.

Iran will need to significantly increase its labour productivity in pharmaceuticals if the industry is to grow. In 2014, Iranian workers generated roughly \$57,000 of GVA each in purchasing power parity terms, 59 percent lower than those in Turkey, who each produce \$138,000 of GVA, and 73 percent lower than those in Poland, who produce \$211,000.²⁷⁸ Partnerships with multinational corporations as well as foreign direct investment in the pharmaceutical industry will be critical to facilitate knowledge transfers of modern best practices in labour and asset productivity. Examples could include the use of disposable

²⁷⁷ "Iran ranks 4th in stem cell research", Mehr News Agency, May 17, 2015; "Iran ranks 21st in biotech scientific productions", Mehr News Agency, July 7, 2015.

²⁷⁸ IHS; Iran Survey of Industrial Establishments; Polish Ministry of Treasury; Turkish Ministry of Economy.

bioreactors and other manufacturing components to reduce change over time, construction of modular manufacturing facilities, and more sophisticated in-line product inspections.

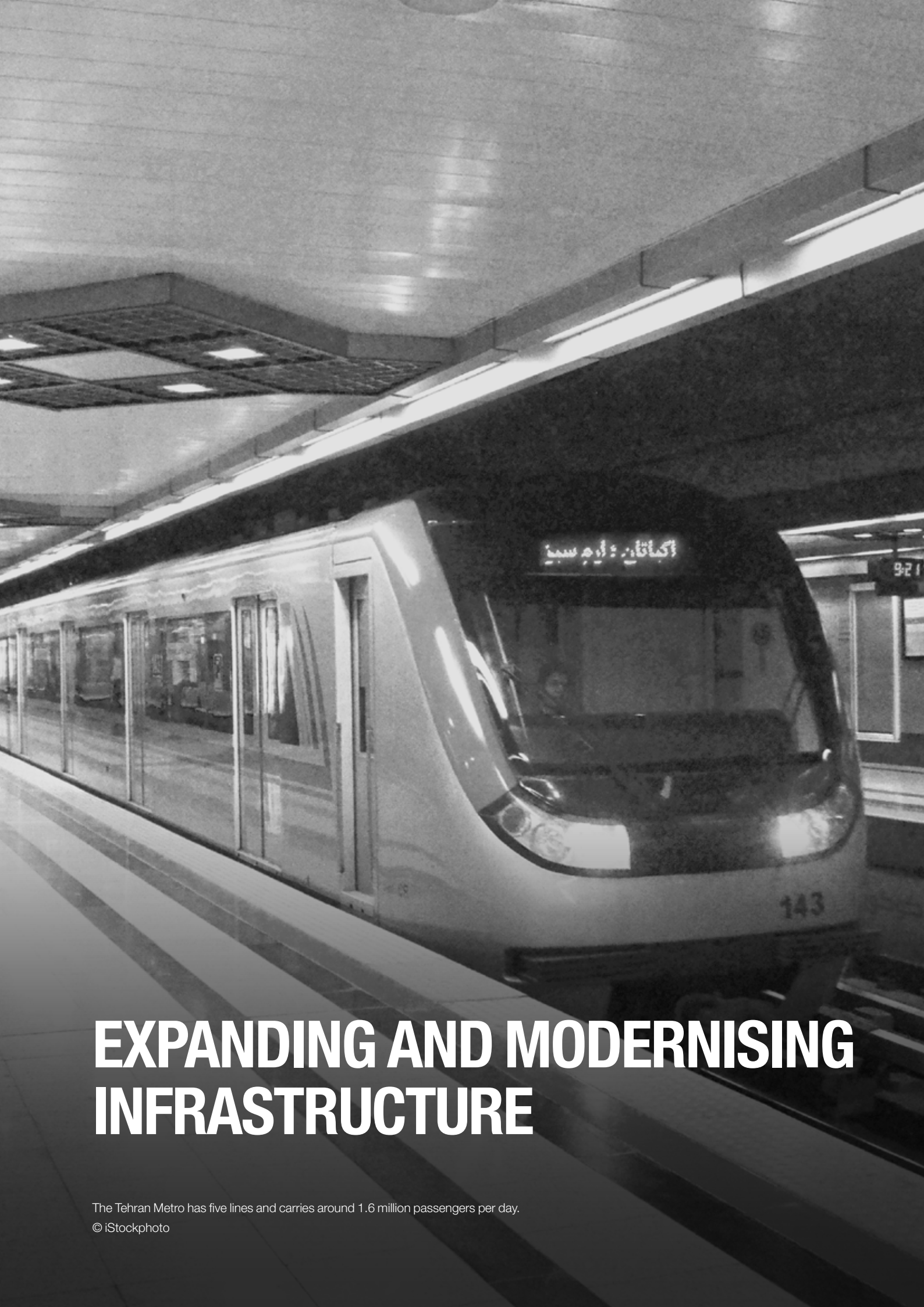
To leverage this international expertise, Iran will need to address the factors, especially the weak intellectual property regime, that have discouraged firms from entering the market. Pharmaceutical formulas cannot be patented under Iranian law, although specific drug manufacturing processes can.²⁷⁹ This has led to an explosion of counterfeit and black market drugs being sold in Iran, with some estimates placing the annual sale of fake, illegal, or smuggled drugs at twice that of legitimate products.²⁸⁰

Several multinational corporations have announced their intention to invest in Iran, including Novo Nordisk, which agreed in September 2015 to build a manufacturing plant for insulin injection devices.²⁸¹ To encourage more investment and skills transfer, the Iranian government will need to simplify and clarify the drug registration process and reduce other red tape, as well as bringing intellectual property protection up to world standard. Local production requirements may be needed to encourage sufficient direct investment, but these could be reduced or eliminated in the long run as the domestic industry becomes more competitive. The government could also continue to invest in greater drug coverage under social insurance, more hospitals and other drug distribution points, and training for pharmacists and other health professionals.

²⁷⁹ *Iran pharmaceuticals and healthcare report, Q3 2015*, BMI, September 2015.

²⁸⁰ *Ibid.*

²⁸¹ "Novo Nordisk to build 70 million plant in Iran", *Financial Times*, September 22, 2015.



EXPANDING AND MODERNISING INFRASTRUCTURE

The Tehran Metro has five lines and carries around 1.6 million passengers per day.
© iStockphoto

Iran is relatively well served by its infrastructure. Access to gas and electricity in homes is nearly universal, for example, and about 780 million tons of freight is transported in Iran annually, 78 percent by truck, and most of the rest by rail.²⁸² Yet pressure on infrastructure is evident and will become more acute as trade flows expand. There is already a need for tens of thousands more hospital beds. Traffic congestion is increasing in cities, and electricity blackouts occur during peak demand in the hot summer months. Water shortages are common. Mobile networks and airports need an upgrade.

Iran will need a substantial build-out across all classes of infrastructure, including transportation, housing, utilities, and social facilities. It will need to build more factories and utilities, including water treatment plants. In addition, affordable housing supply lags behind demand. These infrastructure needs add up to a considerable opportunity for Iran's construction sector—and potentially also for foreign companies—over the next 20 years. Already, there are important signs that the transport infrastructure is developing with the help of international partners. Global companies including VINCI and Groupe ADP have signed preliminary agreements to improve Iran's airports.²⁸³ In utilities, the German government published a report in March 2016 on the high potential for solar electricity in Iran, and companies from across Europe have signed memorandums of understanding to build renewable power generation.²⁸⁴

Modernising and expanding infrastructure will require about \$1.6 trillion in cumulative investment in the next 20 years in our estimate. It will also require improved efficiency and productivity to maximise returns on investment and reduce waste. For example, Iran now has one of the worst records in the region for delays in construction projects.

TRANSPORT: BECOMING AN INTERNATIONAL TRANSIT HUB AGAIN

Iran's transport sector accounts for approximately 6 percent of the economy and employs two million Iranians. With a well-connected road network and low fuel costs, trucking accounts for more than three-quarters of total freight volume, followed by shipping at 18 percent and freight rail at 4 percent. The air cargo industry, which especially suffered under sanctions, accounts for less than 1 percent of overall freight transport.²⁸⁵

Iran has ambitions to be a nexus both for east-west and north-south travel and transport.

Iran has 11 main ports, with three southern ports accounting for more than 90 percent of sea cargo.²⁸⁶ The shipping industry is dominated by two main players, the government-owned Islamic Republic of Iran Shipping Lines and the semi-privatised National Iranian Tanker Company. Significant growth in shipping volume is expected as ports are modernised and regional trade increases.

²⁸² *Economic report and balance sheet 1391 (2012/2013)*, Central Bank of Iran, 2015.

²⁸³ "Iran's dealmaking with Europe: The seven biggest contracts", *The Guardian*, January 29, 2016.

²⁸⁴ *Enabling PV Iran: The emerging PV market in Iran*, German Federal Foreign Office and German Solar Association, March 3, 2016.

²⁸⁵ *Economic report and balance sheet 1391 (2012/2013)*, Central Bank of Iran, 2015.

²⁸⁶ Transport, storage & communications, *Iran Statistical Yearbook*, 2013–14.

Urban transit also contributes to the transport sector of the economy, at 22 percent of transport GVA. With almost three-quarters of Iranians living in urban environments and urban populations growing at around 2 percent annually, supply of urban transport has not kept pace with demand.²⁸⁷ Many of Iran's cities struggle with congestion and pollution, and urban transit systems are still under development.²⁸⁸

Iran's strategic location means the country has potential to serve intercontinental trade (Exhibit 22). Iran's road and rail networks are being upgraded, and several ports plan expansions. In rail, Iran has ambitions to be a nexus for both east-west and north-south travel and transport. The first train from China on the Silk Road Economic Belt arrived in Tehran on February 15, 2016, pulling 32 containers and arriving 30 days faster than the average route by sea.²⁸⁹ Similar progress is being made as part of the North-South Transport Corridor seeking to connect Northern Europe with Southeast Asia through Iran. A Qazvin-Rasht-Astara railway could link St. Petersburg and the Iranian port of Bandar Abbas on the Persian Gulf, a 4,500-km trip through Azerbaijan in which Iran is the missing link. Chinese companies involved in large-scale rail projects include the China Railway Engineering Corporation, which is working to build a \$2.7 billion high-speed rail link between Tehran and Isfahan, and several Italian companies have agreed to work with Iran on two intercity high-speed railway systems.²⁹⁰ Urban transit opportunities exist as well, including large-scale metro construction and expansion projects in all eight of Iran's most populous cities.

Modernising airports is of special importance. Iran's airport quality rates just 3.2 out of 7.0, according to the World Economic Forum, compared with 4.1 in Russia and 5.3 in Turkey.²⁹¹ Groupe ADP and construction firms Bouygues and VINCI will lead airport modernisation projects in Tehran, Mashhad, and Isfahan. Plans to expand Tehran's Imam Khomeini International Airport will bring capacity to a long-term goal of 90 million passengers per year from about 13 million in 2014, enabling Iran to meet increasing demand for international air travel and transport, especially to and from Europe and Asia.²⁹²

Iran's seaports also need to expand and modernise. The port of Bandar Abbas, which handles about 75 percent of cargo passing through Iran's Persian Gulf ports, is doubling its capacity from three million 20-foot equivalent containers (TEUs) per year to six million.²⁹³ Other expansion projects are under way or planned at Bushehr and Chabahar, including a partnership with India to transform Chabahar into a deepwater port that would enable access for larger vessels, as well as expansion projects in the northern Caspian ports of Bandar Anzali and Amirabad.²⁹⁴

Bandar Abbas port is doubling its cargo capacity to

6M
TEUs

²⁸⁷ *Urbanisation rates*, CIA World Factbook.

²⁸⁸ Heather Allen, "An integrated approach to public transport, Tehran, Islamic Republic of Iran: Case study prepared for *Global report on human settlements 2013*", UN-Habitat, 2013.

²⁸⁹ "First 'Silk Road' train in Tehran after 14-day journey from China", PressTV, February 15, 2016.

²⁹⁰ *Iran infrastructure report, Q4 2015*, BMI, July 2015; *Global Construction Review*; Trade Arabia; "Italy invests 4 billion euros in Iran's railway sector", Vestnik Kavkaza, April 17, 2016.

²⁹¹ *Global competitiveness indicators*, World Economic Forum, 2015.

²⁹² *Iran infrastructure report, Q4 2015*, BMI, July 2015; "Imam Khomeini airport to run with annual passenger handling capacity of 25m", Islamic Republic News Agency, January 18, 2015.

²⁹³ Iran Ports and Maritime Organization.

²⁹⁴ *Ibid.*; Iranian Ministry of Roads and Urban Development; *Iran infrastructure report, Q4 2015*, BMI, July 2015; *Journal of Commerce*, IHS.

If Iran is to realise its transportation potential, in addition to investment, it needs to develop stronger trade relationships and reduce barriers to cross-border trade, including the time and cost of trading.²⁹⁵ It will also need to create a regulatory environment that supports domestic and foreign private-sector involvement. We estimate that these strategic investment, alongside diplomatic efforts and policy changes to drive trade and foreign investment, could allow the transport sector to grow to \$87 billion in GVA by 2035 whilst adding more than 800,000 jobs.

EXHIBIT 22

Iran is located at the nexus of east-west and north-south transit routes



SOURCE: Iran Railways; Council on Foreign Relations; International North-South Transport Corridor; McKinsey Global Institute analysis

UTILITIES: REDUCING WASTE AND INCREASING RENEWABLES

Utilities will need to expand, to meet the needs of Iranians as well as the country's ambitions to increase electricity exports. At the same time, initiatives will be needed to reduce wasteful consumption. Iranian domestic consumption of gas, electricity, and water is considerably higher than in most other countries. Per capita consumption of residential gas has grown 5.8 percent annually since 2006 and is now more than double that of most peers.²⁹⁶ For electricity, Iranian residential households consume three times as much as in Turkey.²⁹⁷ Iran's water consumption is well above environmentally sustainable limits.²⁹⁸

²⁹⁵ *Doing business: Trading across borders indicators*, World Bank, 2016.

²⁹⁶ *BP statistical review of world energy*, BP, June 2015. Peers include Brazil, China, Malaysia, Mexico, and Turkey, but the trend is true of many developed and heavily industrial countries.

²⁹⁷ Enerdata; International Energy Agency energy statistics; Iran Power Generation, Transmission, and Distribution Management Company, 2013 data.

²⁹⁸ *Global water market 2015: Meeting the world's water and wastewater needs until 2018*, Global Water Intelligence, October 2014; Amber Brown and Marty Matlock, *A review of water scarcity indices and methodologies*, Sustainability Consortium white paper number 106, April 2011; UN Water World Business Council for Sustainable Development Facts and Trends.

These utilities are government owned and operated with the exception of power generation, where private players can also participate through build-own-operate and build-operate-transfer models. Utility services are widely available and kept at low prices, leading to very high consumption levels. Iranian households pay around two cents per kilowatt hour of electricity, for example, whilst the cost is around 6.5 cents in Russia and more than 23 cents in Brazil.²⁹⁹ Significant amounts of gas, electricity, and water are lost before delivery because of technical inefficiencies. Power generation efficiency in Iran is only around 39 percent, lower than Tunisia at 42 percent and far behind Turkey at 49 percent.³⁰⁰ Iran's older, open-cycle gas turbines contribute to this low efficiency, and in fact the government plans to convert these plants to combined-cycle turbines. Low efficiency, low prices, and high access contribute to high demand and consumption in Iran, at times exceeding generated supply.

The supply of water to Iranian households, agriculture, and industry is an issue of particular concern. More than 90 percent of water in Iran is used in agriculture, often ineffectively.³⁰¹ Iranian farms, for example, produce only about a quarter the volume of dry cereal that the rest of the world does per kilogram of water.³⁰² Iran uses 70 percent of its renewable freshwater resources annually, nearly double the recommended limit.³⁰³

The government plans to raise tariffs for water along with energy prices by the end of 2021, and to reclaim sub-surface water resources using artificial feeding and watershed management.³⁰⁴ It also plans to monitor and control water use better by shutting down unlicensed wells and installing smart volume meters on licensed ones. Additionally, the government intends to assist farmers in paying for modern irrigation systems.

Utilities will need to expand to meet the needs of Iranians as well as the country's ambitions to increase electricity exports. At the same time, initiatives will be needed to reduce wasteful consumption.

Water supply can also be increased to reduce the strain on existing sources. Desalination plants could be paired with power plants, either to provide water for steam turbines or to augment the local water supply. More facilities are needed for wastewater treatment. Several companies, both domestic and international, have shown interest in desalination and wastewater treatment facilities. MAPNA Group, an Iranian company, has built a facility that cogenerates power and water on Qeshm Island and is investigating building more along the shores of the Persian Gulf and the Sea of Oman. Internationally, South Korea's Posco and Korea Electric Power Corp (Kepco) signed a memorandum of agreement to construct a desalination plant in Iran, and other companies from international delegations, including Russia, have also expressed interest.

²⁹⁹ Enerdata, IEA Energy Statistics; Iran Power Generation, Transmission, and Distribution Management Company.

³⁰⁰ Ibid.

³⁰¹ *Global water market 2015: Meeting the world's water and wastewater needs until 2018*, Global Water Intelligence, October 2014.

³⁰² *Iran water report 2015*, BMI, September 2015.

³⁰³ *Global water market 2015: Meeting the world's water and wastewater needs until 2018*, Global Water Intelligence, October 2014; Amber Brown and Marty Matlock, *A review of water scarcity indices and methodologies*, Sustainability Consortium white paper number 106, April 2011; *Facts and trends*, UN Water World Business Council for Sustainable Development.

³⁰⁴ Sixth Five-Year Development Plan (2016–21).

To expand exports of electricity and meet domestic consumption over the next ten years, Iran will need to generate significantly more power. Much of this added generation capacity can come from the country's abundant natural gas, but the climate is also conducive to solar and wind. Abadeh and Bushehr, among other southern and central locations, appear to have high solar potential.³⁰⁵ Foreign and domestic firms are interested in constructing wind farms where there is environmental potential. MAPNA is expanding a wind farm in Kahak, where it plans to have 100 megawatts of wind capacity in a build-own-operate arrangement.

Perhaps most importantly, Iran will have to use its utilities more efficiently. On the supply side, Iran's electricity generation efficiency is only 39 percent, well below Turkey's at 49 percent.³⁰⁶ Iran's transmission and distribution losses are around 13 percent, but by some estimates as high as 22 percent.³⁰⁷ This compares with South Africa's transmission and distribution losses of 9 percent and China's of 6 percent.³⁰⁸ Gas delivery faces similar problems. At the same time, low tariffs and high access have contributed to disproportionately high demand. Electricity prices for residential and industrial users are around two cents per kilowatt hour compared with around ten cents in peer countries.³⁰⁹ A tariff increase in 2010 resulted in an initial consumption decline, but electricity use continued to rise, especially as other sectors including agriculture started to shift from diesel power to electricity. Whilst Iran does have electricity meters, many track group users rather than individual end-users.

As a priority, the government is seeking to diversify, modernise, and expand its electric system. Creating efficient utilities will involve maximising the throughput of electricity and gas, for example by converting simple cycle to combined-cycle power plants that capture waste heat to produce steam for additional electric power. The government has already started to make these conversions, which could potentially produce up to 50 percent more electricity from the same amount of fuel. But end-user consumption patterns will also need to change. As the economy grows, electricity consumption will grow as well, and Iran will need to ensure that these sectors improve their energy efficiency to avoid waste. Ultimately, opportunities exist for those expanding utility output and those enabling its efficient consumption.

We estimate that \$300 billion of investment in water infrastructure along with expansion and diversification of electricity generation capacity and efficiency upgrades would have large spillover effects into the nation's economy. In addition to the economy-wide impacts of this investment, the utility sector could increase GVA to as much as \$35 billion by 2035, a 6 percent per year increase.

³⁰⁵ *Enabling PV Iran: The emerging PV market in Iran*, German Federal Foreign Office and German Solar Association, December 2015.

³⁰⁶ Enerdata; International Energy Agency energy statistics; *Iran's power industry analysis: Investment risks and opportunities in post-sanctions era*, Energy Pioneers, 2015.

³⁰⁷ *Ibid.*

³⁰⁸ Enerdata; International Energy Agency energy statistics; Iran Power Generation, Transmission, and Distribution Management Company.

³⁰⁹ Enerdata; International Energy Agency energy statistics; Iran Power Generation, Transmission, and Distribution Management Company. In 2015, household prices were around eight cents per kilowatt-hour in Mexico and around 11 cents in Turkey; for industrial consumers, prices were around nine cents per hour in Mexico and 11 cents in Turkey.

3x

rate of increase of Tehran real estate vs. London and New York since 2003

REAL ESTATE: SOARING PRICES AND HARD-TO-OBTAIN MORTGAGES

Real estate has been the investment choice of domestic investors for several decades.³¹⁰ This is partly driven by high inflation, which motivates investors to shift investment towards real assets. Moreover, capital gains on real estate are not taxed. Channelling savings into real estate has pushed up prices. Even with the recent declines, Tehran's real estate prices in particular have soared, rising at three times the rate of those in London, New York, Paris, or Singapore since 2003 (Exhibit 23).³¹¹ Whilst this has provided investors with high returns over the past decade, it has come at the expense of the population at large, which has struggled to find affordable housing.

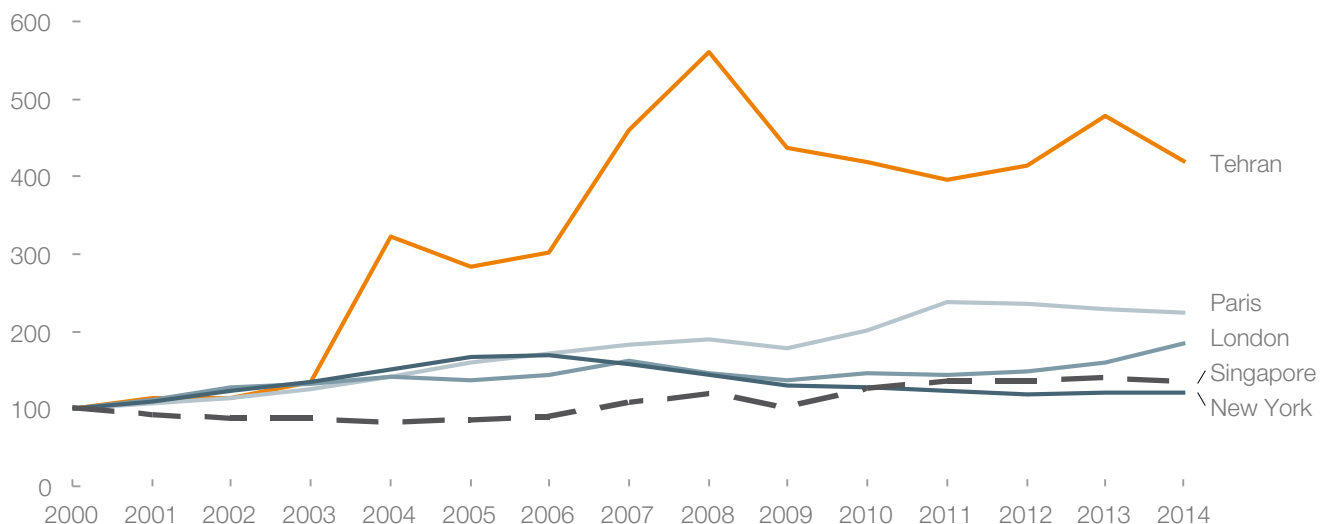
Housing availability is low at 34 square metres per capita, almost half the level of Italy.³¹² Thirty percent of all urban households in Iran—more than twice the level in Russia—live in what is considered as substandard housing.³¹³ Homeownership, at 67 percent, is on a par with Turkey but lower than in Russia (84 percent).³¹⁴ The Iranian government in 2015 introduced taxes on empty homes, in an attempt to encourage the conversion to occupied residences of about 1.6 million vacant houses in the market.³¹⁵

EXHIBIT 23

Residential real estate prices have increased significantly more in Tehran than in other major cities

Residential real estate price performance

Index: 100 = 2000, real local currency units



SOURCE: Bloomberg; Bank for International Settlements; Statistical Centre of Iran; Bloomberg; Bank for International Settlements; S&P 500; UK Land Registry; McKinsey Global Institute analysis

³¹⁰ Foreign investors are barred from investing in real estate with a pure investment incentive.

³¹¹ *Urban residential real estate prices and rental prices 1394 (2015)*, Statistical Centre of Iran.

³¹² *National population and housing census 1390 (2011/2012)*, Statistical Centre of Iran; trend in average residential unit size, Central Bank of Iran. Housing availability is calculated as the number of residential units multiplied by the average area per unit, divided by the population.

³¹³ *A blueprint for addressing the global affordable housing challenge*, McKinsey Global Institute, October 2014.

³¹⁴ *National population and housing census 1390 (2011/2012)*, Statistical Centre of Iran; *Population and housing census 2011*, Turkish Statistical Institute, January 2013; *Russia: Economic indicators*, Trading Economics, December 2013.

³¹⁵ "1.6 million vacant houses reported according to deputy minister of road and urban development", Mehr News Agency, May 5, 2014.

Since 2012, the number of transactions in residential real estate and land in Tehran has fallen by more than 26 percent annually due to stagnant prices and economic recession.³¹⁶ The number of construction permits awarded has followed a similar trend, decreasing more than 24 percent nationwide.³¹⁷ Low numbers of construction permits over the past few years may translate into an inadequate volume of new houses on the market in the future, especially given expected increases in demand.

The affordability of housing has been affected by four factors. First and foremost, Iran lacks a well-functioning mortgage system. Second, property sizes have increased over the past decade to an average of 136 square metres, more than double the size in Russia. Third, high land prices have driven up the price of homes.³¹⁸ Land costs can be three times as large a share of the cost of residential units as the average in affordable areas globally. Finally, substandard construction and inadequate maintenance and operations have reduced the average useful lifetime of properties, diminishing supply.

Mortgages present a particular challenge. In 2008, the Central Bank of Iran banned banks and financial institutions from providing residential mortgages. The sole exception was Bank Maskan, a bank specialised in the housing sector, whose demand for mortgages surged. The value of mortgages extended annually jumped 81 percent between 2008 and 2010, but the bank could not keep up with the demand.³¹⁹ In 2015, the Iranian Monetary and Credit Council, a body under the central bank, revised its policies and allowed other banks to provide housing loans up to a cap set by the central bank in order to increase household buying power, support construction in housing, and incentivise buyers. As part of the new regulation, and to help first-time buyers, the central bank instructed Bank Maskan to provide loans ranging from \$14,000 to \$27,500, depending on the city, for up to 12 years at a favourable rate of 14 percent, which is below prevalent domestic rates.³²⁰

According to a study by the World Bank in 2011, the housing loan penetration in Iran was 16 percent, which is high compared with peer countries Turkey and Brazil, both at 1.6 percent, and Russia at 1.8 percent.³²¹ However, the average value of housing loans extended by Bank Maskan has been only about 10 percent of the house value in Tehran and about 25 percent nationwide, significantly lower than in many comparable countries. Because the loans do not cover the full cost of purchasing, borrowers rely on alternative methods of financing, including family funding or contract builder financing, to make up the difference.³²² Lack of credit rating agencies combined with long, difficult, and costly insolvency procedures and strict government regulation has prevented Iran from having a well-functioning mortgage system.

Along with improving the availability of mortgages, a few other practical steps could help Iran increase the availability of affordable housing. Unlocking vacant serviced land for housing and reforming urban land-use regulations could open space for building and reduce prices for land. Incorporating efficient use of land into the granting of building licences would also help. Further, using cost-efficient and sustainable building materials and methods could reduce construction costs as well as increase the lifetime of buildings.³²³ Reducing system bureaucracy would also simplify development and reduce red-tape costs. By taking these

³¹⁶ *Tehran residential house prices and rentals, autumn 1394*, Statistical Centre of Iran, 2015.

³¹⁷ McKinsey Global Institute analysis of construction permits issued by municipalities nationwide; Statistical Centre of Iran.

³¹⁸ *Average residential unit sizes*, Central Bank of Iran, 1393 (2014).

³¹⁹ *Economic report and balance sheet annual review 1392 (2012/2013), Part three: Statistical appendix*, Central Bank of Iran, 2015.

³²⁰ *Allocation of mn 800 IRR for first time buyers*, Central Bank of Iran, May 2015.

³²¹ *Housing finance across countries: New data and analysis*, World Bank, January 2014.

³²² *Annual review 1392 (2012/2013)*, Central Bank of Iran; *National population and housing census 1390 (2011/2012)*, Statistical Centre of Iran. (2011/2012).

³²³ *A blueprint for addressing the global affordable housing challenge*, McKinsey Global Institute, October 2014.

steps, the real estate sector could accelerate as it did in the first decade of the 21st century, reaching \$66 billion GVA in 2035 and creating a large opportunity for construction firms.³²⁴

CONSTRUCTION: BIG PROJECTS ARE LIKELY TO GENERATE HEAVY DEMAND, BUT IRAN NEEDS TO ADDRESS FREQUENT LONG DELAYS

60%

Average delay for gas projects

Iran's construction market rebounded in 2014 following low spending from 2011 to 2013 and grew by 6 percent per year from 2005 to 2015.³²⁵ As of 2014, the construction sector (excluding upstream oil and gas) created just over \$17 billion in gross value added, or 5 percent of the total economy.³²⁶ We estimate that the construction sector could grow to around \$59 billion in GVA in 2035, representing growth of 6 percent per year. The construction sector could also become a significant source of new jobs. We estimate that at this pace of growth, despite anticipated productivity improvements, it would employ about 5.3 million people by 2035, approximately two million more than in 2014.³²⁷

Such growth would require sizable investment, and the construction sector would need to overcome a number of key challenges. Iran's construction sector labour productivity, measured by GVA per employee at purchasing power parity, is substantially below that of peer countries; it is about half the level in Turkey, for example, and further behind Poland.³²⁸

Even with productivity improvements, we estimate that Iran's construction sector could add two million jobs over the next 20 years if it can sustain growth of about 6 percent annually.

One area that will need particular attention is the tendency for large project work to be cancelled or put on hold. Whilst sanctions contributed to these delays, insufficient management and delayed payments and financing also play a role. Gas projects, for example, are delayed on average by 60 percent, leading to cost overruns of around 20 percent.³²⁹ Projects in process industries such as petrochemicals are habitually delayed. One consequence of such delays is substantially longer construction times in Iran than in regional peers. For example, a downstream oil and gas project in Iran takes on average 5.4 years, compared with 3.3 years on average in Iraq, Qatar, and the UAE (Exhibit 24).³³⁰

The sector will need to attract capital and modern equipment to improve efficiency. Although sanctions have blocked access to Western machinery, growth rates in Iran for construction equipment sales in 2016 are expected to be around 8 percent.³³¹ Moreover, building quality control is insufficient when compared with that of Malaysia and Turkey.³³²

³²⁴ Ibid.

³²⁵ IHS.

³²⁶ Ibid.

³²⁷ ILOSTAT.

³²⁸ GVA data from IHS; employment data from ILOSTAT.

³²⁹ Roya Derakhshanalavijeh and José Manuel Cardoso Teixeira, Causes of cost overrun in construction projects in developing countries, *Proceeding of the 10th international conference on industrial engineering and operations management* in Dhaka, November 2014.

³³⁰ McKinsey Infrastructure Projects Analytics Tool v3.0.

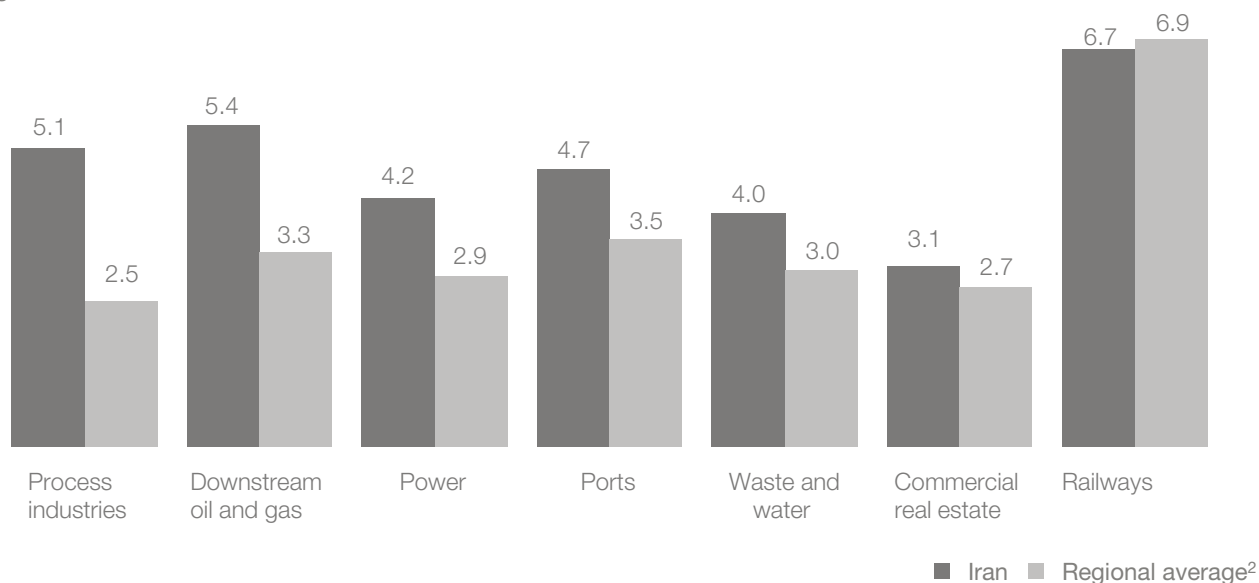
³³¹ *Iran construction equipment market (2016–2022)*, Research and Markets, March 2016.

³³² *Doing business 2016: Measuring regulatory quality and efficiency*, World Bank, October 2015.

Construction in Iran takes longer than in regional peer countries

Construction time¹

Years



¹ Includes delays due to sanctions and conflict.

² Average of Iraq, Qatar, and United Arab Emirates.

SOURCE: McKinsey Infrastructure Projects Analytics Tool; McKinsey Global Institute analysis

The Iranian government will likely need to help the construction sector attract foreign companies. Iran's government could establish a clear, legally substantiated framework for public-private partnerships with foreign firms that minimises risk to increase participation from outside Iran. One step would be to establish a single standard contract format that is supported by Iranian law and acceptable to foreign development. Assuming that Iran is able to streamline delivery of projects, raise labour productivity, and gain access to the necessary equipment and capital expenditures, we estimate that the construction sector will need investment of around \$200 billion over the next 20 years to realise its infrastructure ambitions.

Companies both domestic and international are acting on or considering these construction opportunities, many of which the government has publicised for foreign investment. Italy's Vitali and SEA Group are planning expansions at Tabriz International Airport and Mehrabad International Airport, respectively. Italy's Itinera has signed an agreement to build high-speed rail in Iran. South Korea's Hyundai Engineering and Construction Company and Posco Daewoo Corporation have announced plans to sign an agreement to build a 1,000-bed hospital in Shiraz, whilst Samsung C&T plans to build a 1,200-bed hospital in Tehran.³³³

In 2014, Iranian contractors dominated the domestic market, performing about 75 percent of construction work.³³⁴ Of these domestic contractors, MAPNA Group has the largest market share of publicly traded companies.³³⁵ Iranian contractors have widely varying profitability. MAPNA's profit before tax margin in 2012 was 30 percent, high by international standards.³³⁶ As more foreign contractors enter the market, they will pressure Iranian companies on reliability and quality to justify high margins. Domestic firms may look to the

³³³ "Hyundai E&C and Posco Daewoo to establish a university hospital in Iran", Pulse News, April 8, 2016.

³³⁴ MEED Projects database, February 11, 2016.

³³⁵ Ibid.

³³⁶ Industrial Management Institute ranking of the top 500 Iranian companies based on 2012 financial reports.

example of South Korean companies, which managed to become premier engineering and construction companies globally, largely by acquiring technologies and learning best practices from foreign companies.



In the 18 sectors of Iran's economy we examined, there are multiple opportunities to modernise and become more efficient and competitive. To realise that potential will require significant improvements in the functioning of the Iranian economy, including a substantial acceleration of productivity growth and a much higher labour-force participation rate, along with a large influx of effective investment. Whilst the size of the task may seem daunting, South Korea, Malaysia, and some Eastern European nations have found ways to boost their GDP in a sustained and robust manner over a period of years. For Iran to unleash this potential, it will have to enact significant reforms to attract the right investment, increase competitiveness and product market efficiency, and enhance the dynamism of the labour market. In the next chapter, we outline these challenges in detail, along with an agenda for action that Iran could consider.



SPECIAL FEATURE: INVESTING IN IRAN

The Azadi Tower is a Tehran landmark.
© Tunart/iStockphoto

To add \$1 trillion in GDP over the next 20 years will require heavy investment. We have detailed the approximate total we project in the individual sectors we analysed in this report. The cumulative total comes to about \$3.5 trillion. When this sum is broken down into the four engines of growth, oil and gas and the other natural resource endowments are likely to require less investment than the other growth engines. In particular, expanding and modernising infrastructure will likely require in excess of \$1.5 trillion of the total cumulative investment by 2035, according to our analysis, compared with roughly \$550 billion for natural resources, about \$650 billion for nurturing competitive industries and almost \$800 billion for the transition to a knowledge-based economy (Exhibit 25).

Iran's high savings rates mean that it has the potential to finance much of these investment needs domestically. It also will benefit from foreign investment including foreign direct investment (FDI), not just to fuel growth but also to help transform its business base and drive much-needed productivity improvements. "Smart money" from abroad

can facilitate the transfer of technology, research and development, and enhanced investment governance.

Iran's FDI was affected by sanctions; in 2014, its FDI stock amounted to just \$43 billion, or 11 percent of GDP. This is low relative to other emerging economies' average FDI stock of 27 percent. In the same year and in dollar terms at market exchange rates, Turkey's FDI stock was four times as large and Mexico's was almost eight times as large (Exhibit 26).³³⁷

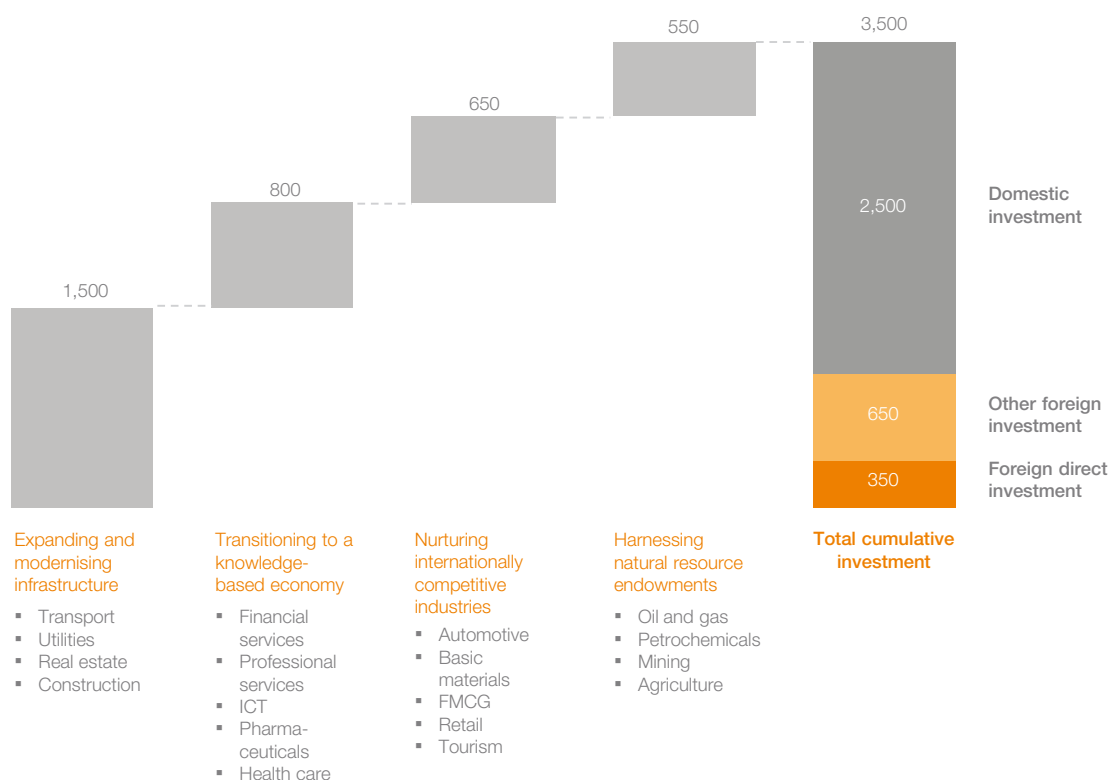
The flow of foreign investment has already started, with Turquoise Partners and Griffon Capital raising funds from outside Iran in order to invest in Tehran's stock exchange. In addition, foreign banks have extended financing facilities to support some of the recently announced commercial agreements signed by Iran and multinational companies.

³³⁷ United Nations Conference on Trade and Development (UNCTAD) country fact sheets.

EXHIBIT 25

The Iranian economy will need around \$3.5 trillion of cumulative investment

\$ billion, real exchange rates



Note: Numbers may not sum due to rounding.

SOURCE: Management and Planning Organization comments on Sixth Five-Year Development Plan, February 2016; McKinsey Global Institute analysis

Based on our projections, Iran will likely require around \$3.5 trillion of investment cumulatively over the next 20 years. We estimate at least \$1 trillion of the projected investment needs will likely be required from foreign sources, and of this foreign investment, we expect at least one-third to come from FDI. The remainder will need to come from domestic sources.

As part of its Five-Year Development Plan for 2016–21, the government plans for \$1.1 trillion of investment to reach its planned economic growth rate and fund projects, including development of oil and gas fields (\$134 billion), building renewables and high-efficiency power plants (\$38 billion), and improving network infrastructure

and connectivity for information and communications technology (\$35 billion).³³⁸ To fund these projects, the government has targeted \$250 billion of foreign investment of which it expects around a quarter to be FDI. The rest will be funded by domestic sources such as banking facilities (\$280 billion), the private sector (\$170 billion), capital markets (\$150 billion), and the National Development Fund (\$90 billion).³³⁹

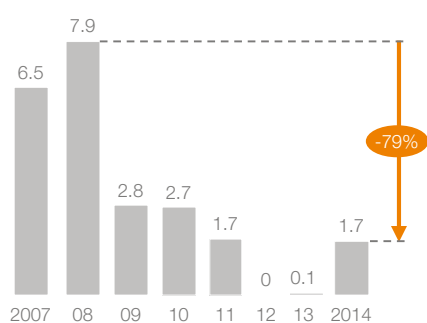
³³⁸ These estimates are based on six benchmark countries — Brazil, China, Egypt, India, Mexico, and Turkey — from 1994 to 2014, taking into account gross fixed capital formation, FDI inflows, and total capital flows excluding remittances.

³³⁹ Iran's National Development Fund is the sovereign wealth fund that oversees the transfer of oil and gas revenue into public investment.

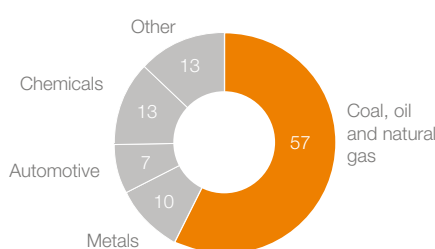
EXHIBIT 26

Investing in Iran

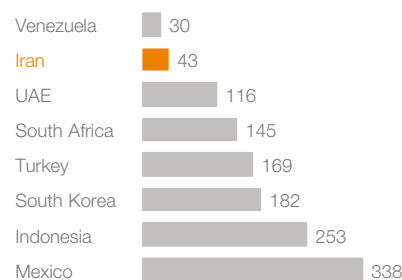
Foreign direct investment (FDI) inflows to Iran¹
\$ billion, nominal



Iran's FDI stock, 2014²
%



FDI stock, 2014
\$ billion, nominal



Potential opportunities in Iran



Foreign companies with operations in Iran

MTN (South Africa)	• 49% stake in the telco operator MTN Irancell	Ferrovie dello Stato Italiana (Italy)	• Agreement signed to cooperate with RAI (Iranian Railways) on construction of two high-speed rail lines	Novo Nordisk (Denmark)	• Continuous presence selling medicine with more than 100 staff in Iran • Plans to build local manufacturing plant
PSA Peugeot Citroën (France)	• Joint venture with Iran Khodro to produce 3 vehicle models in Iran	Nestlé (Switzerland)	• Operations at local factories in Iran • Products in Iran include Jenny Craig and Haagen-Dazs ice cream	Unilever (UK/Netherlands)	• Factory in Qazvin employs around 300 and produces soaps, tea, and detergents

¹ 2012 data not available.

² Stock breakdown based on data as reported between January 2003 and September 2015.

SOURCE: UNCTAD, *World investment report 2015*; fDi Markets, Iran Inward FDI January 2003 to September 2015; Dealogic Analytics; fDi Markets database; *Financial Times*; MTN South Africa; PSA Group; Ferrovie dello Stato; Nestlé; Unilever; McKinsey Global Institute analysis

To promote foreign investment, Iran has been adjusting and clarifying its regulations and intensifying its international outreach. Since the 2002 Foreign Investment Promotion and Protection Act, Iran has provided foreign investors with safeguards including equal treatment of investment and certain legal guarantees. For example, with some exceptions, such as in the telecom sector, foreign companies are now able to own 100 percent of Iranian firms.

To further encourage investment, the government has established seven free trade zones and 16 special economic zones.³⁴⁰ These zones are typically located near borders to strengthen regional ties and global trade. Companies in free trade zones are exempted from most taxes, duties, banking regulations, labour laws, and visa obligations.³⁴¹ Special economic zones have lower export and import duties and promote industrial clustering and cross-border trade. Kerman Motor Company, for example, manufactures the Chinese automobile Lifan in the Argejadid Special Economic Zone. In addition, companies that introduce new science or technology can receive a special designation as “knowledge-based companies” and benefit from tax and legal benefits as well as tenancy in science and technology parks located in urban areas.

The government has also simplified business visa regulations. In free trade zones no visa is required unless the individual wants to enter the mainland. Outside free trade zones, a host partner needs to sponsor the visitor but can request an expedited visa that can be picked up on arrival.³⁴² Recently the government has also sought to publicise opportunities for foreign investment. For example, the Ministry of Energy published a Water and Power Investment and Cooperation document highlighting specific projects for foreign investment.³⁴³ Whilst these initiatives address some of the outstanding challenges, Iran will need a holistic approach to business development if it is to attract a large volume of foreign investment.

For international goods and service firms, Iran could be a potentially attractive market because of its size and the spending power of its citizens. It has the potential to become a competitive manufacturing base from which companies could serve the domestic market and export regionally or globally and where firms can leverage Iran’s educated labour force. Among the foreign investors who could be interested are the more than three million members of the Iranian diaspora, who could bring expertise along with capital if they choose to return to invest.

Multinational companies interested in Iran have indicated in interviews that they will want to perform comprehensive due diligence to understand details of the Iranian market. Many global firms are looking for a local partner in the short term to help navigate Iran’s business landscape, including an understanding of local business norms. Others have indicated a preference to establish an Iranian subsidiary and operate independently. Multinational companies that enter will need to address regulatory challenges and potential obstacles to financial transactions. They will encounter a labour force unaccustomed to the demands of global competition, and they will need to develop Persian language capabilities.

Nevertheless, numerous foreign actors and business delegations have already acted to demonstrate interest in investing or doing business in Iran. More than 220 deals have been signed or proposed since the nuclear agreement in July 2015; more than \$130 billion of business has been publicised as a result (for details, see the annex). These deals include Mittal Steel, which signed a contract worth more than \$1 billion to produce iron in Iran, and UK-based Cyan, which received a smart meter order worth more than \$14 million—larger than its market value at the time.

Centuries ago, Iran was a central point on the Silk Road from east to west. Today it has ambitions to renew that role, and it wants foreign companies to help it get there.

³⁴⁰ The Supreme Council of Iran’s Free Trade, Industrial & Special Economic Zones.

³⁴¹ Najmeh Bozorgmehr, “Iran eyes Iraq trade decades after war”, *Financial Times*, October 28, 2015.

³⁴² “Iran to offer new tax-exemption incentive to tourism”, *Tehran Times*, February 17, 2016; “Iran offers visa on arrival to all except nine countries”, *Madhyamam*, February 15, 2016.

³⁴³ *Iran water and power investment and cooperation opportunities*, Islamic Republic of Iran Ministry of Energy, 2016.



The Tabiat Bridge, which connects two public parks in Tehran, has won several international architecture awards.
© toiran.com

3. CHALLENGES, AND AN AGENDA FOR ACTION

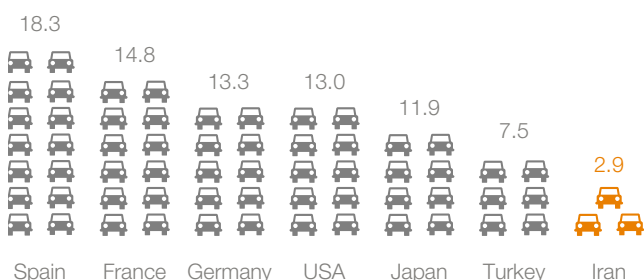
Iran will need to address major challenges across the economy if it is to realise its potential to add \$1 trillion to GDP and create nine million jobs over the next 20 years. It will need an economy better able to attract and absorb foreign investment, technology, and management practices. For companies to thrive, they need a labour market with greater workforce skills and flexibility and a business environment that encourages more dynamic competition and entrepreneurship. As we have seen across many of the sectors we examined in Chapter 2, productivity will need to improve significantly (Exhibit 27). Both the public and private sectors will need to coordinate to create greater transparency and improve the rule of law and corporate governance. The government and a central bank with a clear independent mandate will need to monitor and stabilise the macroeconomic environment to ensure manageable inflation, stable exchange rates, and a responsible and sustainable fiscal policy.

EXHIBIT 27

Iran has low productivity across multiple sectors

Labour productivity in automotive

Automobiles per manufacturing employee, 2014



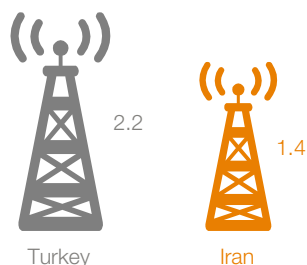
Labour productivity in metals

Output per worker, \$ thousand, 2014



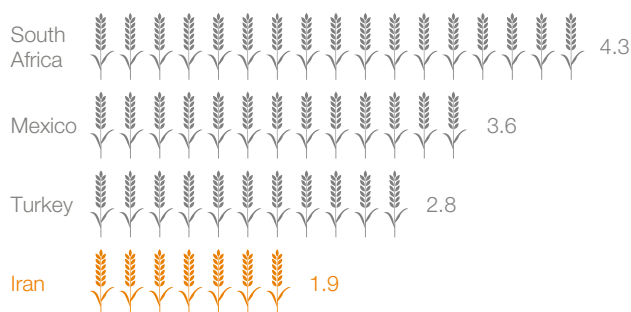
Capital productivity in telecommunications¹

Revenue per unit of plant, property, and equipment \$ nominal, 2014



Agricultural productivity

Cereal yield, thousand kg per hectare, 2014



¹Based on largest telecom operators in each country.

SOURCE: IHS; ILOSTAT; *World development indicators*, World Bank; Spanish Ministry of Industry; French CCFA; German STABU; VDA; US BLS; SIE; Turkey Workplace & Insured Persons Statistics; company financial statements; McKinsey Global Institute analysis

The government has set its sights on many of these goals in its Sixth Five-Year Development Plan for 2016–21, which was announced in July 2015. This plan outlines 31 economic priorities that cover a wide range of issues aimed at lifting GDP growth to 8 percent annually. Several of the priorities cover energy, including a drive to modernise the oil and gas industry and develop more domestic expertise in upstream and downstream activities, reduce energy intensity, and increase the share of renewable energy in the economy. Other priorities include improving macroeconomic management, increasing the size and independence of the National Development Fund (the sovereign wealth fund, which oversees the transfer of oil and gas revenue into public investment), and strengthening the financial system and the ICT sector. Attracting foreign investment is also a priority, as is a general improvement in the business environment and competitive market structure. In some of these areas the government has already begun enacting changes, but considerable work remains to implement this programme.³⁴⁴

In order to add \$1 trillion to GDP over the next 20 years, Iran will need an economy better able to attract and absorb foreign investment, technology, and management practices.

In this chapter we focus on four areas of Iran's economy that in our view present the largest and most pressing challenges. Creating a stable macroeconomic situation is a critical starting point. The others are building an attractive business and regulatory environment, reforming the labour market to spur employment and productivity, and modernising and reintegrating the financial system to absorb and deploy capital. Finally, we discuss the need for the Iranian government to develop an agenda for action and execute reforms with speed and continuity. Iranian domestic companies will also need to make adjustments as they emerge from protected markets and face global competition. Some of these adjustments may be difficult in the short term, but they are necessary for longer-term success. Multinational firms seeking to invest or operate in Iran will face important challenges as well, including finding and nurturing management talent, executing cross-border financial transactions in the short term, and working in a complex country where many uncertainties linger.

CREATING A STABLE MACROECONOMIC ENVIRONMENT

Developing policies and credible institutions that support a stable macroeconomic environment is a precondition for Iran to be able to attract investment and raise exports, domestic consumption, employment, and living standards over the next 20 years. In previous years, the Iranian economy has been racked by instability. GDP growth has fluctuated widely, from minus 7 percent in 2012 to plus 4 percent in 2014. Unemployment has exceeded 10 percent since 1997, the currency has undergone large devaluations and depreciation, and inflation peaked at 45 percent in June 2013.³⁴⁵ Government and central bank action at times might have aggravated these trends. Between 2010 and 2013, for example, interest rates charged by banks were capped by the central bank at rates below inflation, diverting lending to investment in non-financial assets and contributing to a deterioration of banks' balance sheets. The unofficial exchange rate has at times been triple the official one, increasing currency risk and making importing and exporting more difficult. Additionally, some policy responses have had unintended consequences; in December

³⁴⁴ "8% growth p.a. target for Sixth FYDP", *Financial Tribune*, July 2, 2015.

³⁴⁵ Unemployment and GDP data from *World economic outlook*, IMF, October 2015; inflation data from *Regional economic outlook: Middle East and Central Asia*, IMF, October 2015.

2010, for example, the removal of certain subsidies, including energy subsidies—a reform necessary to ensure long-term fiscal sustainability—ended up contributing to rising inflation in the short term at a time of low growth.

Recently, the government and central bank have made substantial progress, having brought point-to-point inflation down to 10 percent by the end of 2015.³⁴⁶ They have also managed the exchange rate by letting it correct through devaluation and then sustaining it. The central bank has announced plans to allow the official and unofficial exchange rates to converge in 2016 contingent on banks upgrading their foreign exchange risk management practices. In addition, the government kept the budget deficit at around 1 percent of GDP in 2014, with estimates for it to stay below 3 percent in 2015 despite the sharp fall in oil prices.³⁴⁷

Inflation has fallen from a peak of 45 percent in 2013 to 10 percent at the end of 2015.

The challenge for the Iranian government and the central bank going forward will be to deliver long-term growth and stability. It will be a balancing act: on the one hand, providing some monetary or fiscal stimulus to accelerate growth could help the economy; on the other hand, macro policies will need to guard against rekindling inflation or building up unsustainable fiscal imbalances or exchange rate expectations. Implementing these policies transparently will be important for developing confidence in the future of the economy to facilitate trade and investment. Striking this balance will require a fiscal policy focused on real growth, a monetary policy that maintains price stability, and institutions that are transparent and credible.

A balanced fiscal policy focused on real growth

Iran's fiscal policy since the 2014 fall in oil prices has been relatively prudent. Going forward, fiscal policy will need to consider the balance of revenue between oil and non-oil sources, and how best to use oil revenue to grow the economy productively and cushion against future shocks (see Box 3, "Managing oil and gas revenue"). It will also need to address government expenditure, making it more efficient and effective.

Average government expenditure fell from 19% of GDP to

15%

Overall, Iran's current fiscal situation—with relatively low expenditure, low debt, and a small deficit—appears robust, despite a challenging environment. According to IMF statistics, government expenditure in Iran averaged 19 percent of GDP from 2008 to 2012, before falling to between 15 and 16 percent in 2013 and 2014. This rate is much lower than in any other country in the Middle East, where the regional average is around 30 percent.³⁴⁸ These statistics, however, do not take account of the size of the wider public sector, where estimates of the amount of the economy controlled or influenced by government or quasi-governmental agencies are much higher.³⁴⁹

Government debt was reported to be as low as 16 percent of GDP in 2015, although this may be an underestimate; the Ministry of Economic Affairs and Finance has suggested that, using a broader definition, it could be closer to 30 percent of GDP.³⁵⁰ This compares with a typical government debt-to-GDP ratio of more than 50 percent for most advanced

³⁴⁶ Monthly consumer price index, Statistics Centre of Iran, December 2015.

³⁴⁷ *World economic outlook*, IMF, October 2015.

³⁴⁸ *Regional economic outlook: Middle East and Central Asia*, IMF, October 2015. This comprises information from 22 countries in the Middle East and North Africa, Afghanistan, and Pakistan.

³⁴⁹ According to Iran's central bank, the size of the total public sector doubled as a percentage of GDP from an average of around 30 percent in the 1980s to more than 60 percent by 2004. Hossein Bazmohammadi and Akbar Cheshmy, *Government size in the Iranian economy*, Central Bank of the Iran, August 2007.

³⁵⁰ *World economic outlook*, IMF, April 2016.

economies. Despite relatively low levels of debt, there are issues with how it is financed. In the absence of functioning primary and secondary markets for government debt, governmental entities financed their deficits either by taking loans from banks or by delaying their payments to contractors. This limits bank resources available for lending to the private sector, and it affects the ability of government contractors to meet their financial obligations. That in turn crowds out private-sector borrowing and causes delays and additional costs for companies working on government projects. The government recently took the first steps to regulate government debt and establish a market for it. In September 2015, the government issued tradeable treasury bills on the Tehran exchange market for the first time.

In terms of Iran's overall fiscal balance, the government has recognised the need to manage spending effectively and broaden its revenue base. On the revenue side, government receipts as a percentage of GDP have been relatively low and declined sharply from a historic rate of more than 20 percent as recently as 2010 to around 14 percent in 2014.³⁵¹ This level of receipts has been associated with relatively low government spending; indeed, the government deficit in Iran averaged less than 2 percent of GDP in 2013–14.³⁵²

Government deficit in 2013-14 averaged less than **2%** of GDP

Whilst oil and gas revenue has been critical for government receipts, Iran's economy is the least dependent on oil and gas among major Middle Eastern oil-producing countries. In 2014, Iran's government reportedly earned less from oil and gas revenue than it did from other tax revenue.³⁵³ Even so, resource dependence does contribute to fiscal volatility. About 43 percent of Iran's government revenue came from oil in 2013, and the decrease in global oil and gas prices combined with tighter sanctions took a toll: government revenue from oil, \$51 billion in 2011, halved to \$24 billion in 2014. Relative to other major oil-producing countries—which had average surpluses of 5.5 percent between 2008 and 2012—Iran's low deficit could indicate missed opportunities to use a favourable oil-price environment to reduce government debt and increase investment.³⁵⁴

Increased oil exports post-sanctions could help reverse this trend, and the government has already made some progress in covering more of its expenditures from non-oil revenue. For example, value-added tax—which was introduced at 3 percent and has risen to 8 percent—rose as a share of GDP from 0.8 percent in 2012 to 1.5 percent in 2014. There are also plans to further increase the rate of the tax, reduce tax exemptions, and improve tax collection.³⁵⁵

In addition to a broader revenue base, government expenditure will need to be focused on areas that most effectively enhance long-term productivity and growth, such as education, health, and infrastructure. The government could phase out subsidies over time as the economy recovers and household income levels rise. By using targeted cash transfers to assist only the neediest, the government could create a trajectory towards cost-reflective market prices, whilst keeping inflation and government deficits in check.

³⁵¹ *World economic outlook*, IMF, October 2015; revenue consists of taxes, social contributions, grants receivable, and other sources.

³⁵² *Regional economic outlook: Middle East and Central Asia*, IMF, October 2015. Iran's deficit figures are reported differently in different data sets.

³⁵³ "Iran earns more from tax than oil for first time in almost 50 years", *The Guardian*, September 27, 2015.

³⁵⁴ *Ibid.*

³⁵⁵ Tax data from *Annual review 1392 (2013/14)*, Central Bank of the Islamic Republic of Iran.

Box 3. Managing oil and gas revenue

As Iran's government prepares for a likely increase in oil and gas revenue after the lifting of international sanctions, it could learn from Iran's own mixed experience with managing windfall revenue to ensure it does not repeat the same mistakes.

After oil prices rose sharply starting in 1973, Iran's economy entered into a volatile era that continued through the late 1980s. It was followed by a period of higher investment but little buildup of reserves and excessive short-term borrowing. This led to a balance of payments crisis in 1993 and a sharp decline in investment. More recently, from the early 2000s until 2012, a currency savings account from oil and gas proceeds was managed by the government, but it was used mostly for domestic loans and subsidies rather than productive investment. This left the economy vulnerable to external shocks, which, among other factors, led to the 2012 crash of the rial, high inflation, and falling investment and GDP growth.¹

MGI research suggests that this type of volatility is not unusual for resource-rich countries, many of which have difficulty converting their natural wealth into long-term prosperity for their people. Since 1995, more than half of these countries have failed to match the average global growth rate. Few have translated growth into broad-based prosperity, and only one-third of them have been able to maintain growth beyond the resource boom.²

All else being equal, there is a negative correlation between natural resource income and growth, which is even more severe in countries with low measures of institutional strength.³ These countries have difficulty saving natural resource wealth and investing it productively.

For savings, some of the problems are that windfalls are easily consumed in partisan competition and funds are not protected from the volatility of commodity prices. Iran's government has already stated its ambition to reduce oil revenue as a share of total budget income, largely by increasing taxation revenue. The government

is also seeking to strengthen the National Development Fund, which is slated to receive 30 percent of oil and gas revenue. This fund features among the 31 priorities set out by the government in its 2016–21 development plan. In particular, the government is seeking to establish an arm's-length relationship with both the Central Bank of Iran and the government budget, presumably to avoid diverting the fund's assets for short-term political and financial ends.⁴

The government will also have to invest oil and gas revenue carefully and in a way that reflects Iran's particular situation. Capital-scarce countries such as Iran likely benefit from investing a higher proportion of resource savings more than wealthier countries such as Norway. Data from the Public Investment Management Index show that in developing countries, less than half of public investment translates into productive capital, and the picture is worse for countries with high oil revenue. Countering this risk requires a rigorous review process for public investment, which was one factor in Botswana's remarkable success with natural resource endowments.⁵

Such a process will be important for Iran's National Development Fund, which earmarks \$100 billion in the Five-Year Development Plan for capital projects with high growth potential, for example in petrochemicals. Finally, sound investment can help mitigate the effect of Dutch disease—an appreciated currency crowding out exports—by boosting productivity and increasing employment rather than only pushing wages to uncompetitive levels.

Resource-rich countries face a dilemma in that countries with the strongest need for institutions to protect public resources are the ones least likely to have them. Iran benefits from already having a diverse economy, institutional arrangement to save and invest public funds, and long-term investment plans. Strengthening these institutions and converting the rebound in oil export revenue and potential new streams of gas revenue into productive investment in infrastructure and human capital will depend on sound policy choices.

¹ S. Hadi Esfahani, "Iran's experience with oil windfalls", *MENA Quarterly Economic Brief*, issue 5, World Bank, July 2015; growth data from *World development indicators*, World Bank, 2015.

² *Reverse the curse: Maximizing the potential of resource-driven economies*, McKinsey Global Institute, December 2013.

³ Frederick van der Ploeg and Anthony J. Venables, "Natural resource wealth: The challenge of managing a windfall", *Annual Review of Economics*, volume 4, September 2012.

⁴ "8% growth p.a. target for Sixth FYDP", *Financial Tribune*, July 2, 2015.

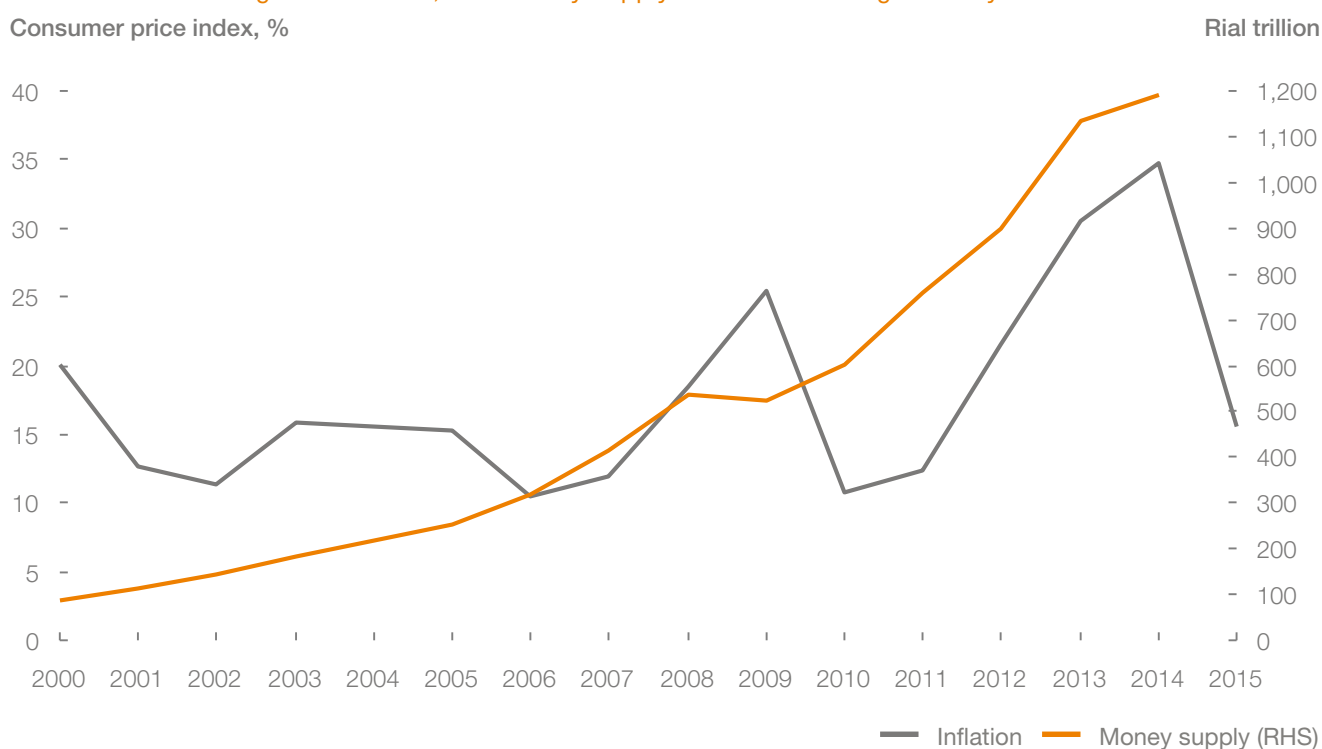
⁵ Frederick van der Ploeg and Anthony J. Venables, "Natural resource wealth: The challenge of managing a windfall", *Annual Review of Economics*, volume 4, September 2012.

A monetary policy to maintain price and currency stability

Iran is emerging from a period of considerable economic and monetary instability marked by soaring consumer inflation, rapid expansion of the money supply, negative real interest rates that averaged minus 10 percent between 2010 and 2013, and two years of GDP contraction (Exhibit 28). Previously, two government actions exacerbated monetary instability. First, the government took initial steps towards food and energy subsidy reform in 2010, but partial price liberalisation provided insufficient revenue to cover the cost of compensatory cash transfers delivered to citizens, resulting in a large financial burden for the government. Then, the government instituted an affordable housing programme known as the Mehr housing project in which it supported construction of more than 1.5 million housing units between 2009 and 2013 at prices below the prevailing market rate.³⁵⁶ A substantial proportion of the financing for these two programmes was provided by printing money, which contributed heavily to inflation.

EXHIBIT 28

Inflation has been high and volatile, and money supply has increased significantly



NOTE: Data points are for March, Iranian year end. Money consists of currency in circulation and sight deposits. Inflation calculated as average annual rate.

SOURCE: Central Bank of Iran; McKinsey Global Institute analysis

Recently, the government has taken measures to get inflation under control, which contributed to the large drop in inflation between 2013 and 2015. This has largely been achieved through stabilising dollar exchange rates despite the shock from falling oil prices, tightening the money base and spending, and taking early steps to improve the mandate and operating efficiency of the central bank. As a result, consumer price inflation has declined from its 2013 peak of 45 percent to 10 percent at the end of 2015. The administration is aiming for single-digit inflation by March 2017.³⁵⁷ Going forward, Iran faces two principal monetary policy challenges: further maintaining a predictable exchange

³⁵⁶ "Mehr housing programme performance report in urban areas", Department of Housing, Ministry of Roads and Urban Development, 2015.

³⁵⁷ "IMF staff completes 2015 Article IV mission to Islamic Republic of Iran", IMF press release, October 5, 2015.

rate and implementing a monetary policy that targets price stability whilst not unduly constraining growth.

- **Stabilising the exchange rate.** Between January 2011 and January 2014, the official dollar-rial exchange rate devalued by 60 percent and the unofficial parallel rate depreciated by 70 percent.³⁵⁸ This created a gap between the official and parallel exchange rates, causing further inflationary pressure. As Iran reintegrates into the global economy, the effects on its exchange rate are unpredictable. On the one hand, relatively fast productivity growth and a trade surplus driven by increased oil and gas exports is likely to put upward pressure on the exchange rate. On the other hand, the opening of trade will result in higher imports, increasing demand for foreign currencies relative to the rial. Given this uncertainty, the central bank will need to be prepared to use its foreign exchange reserves and other monetary policy tools to maintain currency stability. There is also a need to manage towards a convergence of official and parallel exchange rates—a goal the central bank has stated—but the effect of this on price stability and the possible inflationary consequences will need to be managed carefully.
- **Controlling inflation without constraining growth.** The Central Bank of Iran is already tightening its control of the monetary base with the growth in money supply having fallen from 26.6 percent in 2012 to 5.2 percent in 2013 and 1.0 percent in 2014.³⁵⁹ The government's continued commitment to manage spending has been reinforced by a pledge to remove the financing for the Mehr housing project from the central bank's balance sheet and contain further money growth by placing profit participation papers, or interest rate equivalents, at higher rates.³⁶⁰ Indeed, in 2014 real interest rates turned positive for the first time since 2009, even though, at 18.5 percent, nominal interest rates as of March 2016 are still high.³⁶¹ In Iran, the central bank's ability to manage the interest rate without expanding the monetary base and causing inflation or destabilising the financial system is hindered by unlicensed financial institutions with lower risk standards that offer higher deposit rates than the formal banking sector, as well as by the sizable volume of non-liquid assets in the banking sector. The central bank has recently taken steps to address these issues, including publishing lists of licensed financial institutions and referring unlicensed institutions to courts for legal penalties.

1%

Growth in money supply in 2014

Despite this progress, managing inflation and exchange rates remains a challenge. Iran will need to transition to a sustainable interest rate policy whilst managing the liquidity and solvency issues in the banking system. The central bank could be empowered to set and manage a credible transition path for the rial that is focused on containing inflation whilst also taking into account growth and competitiveness. An independent review of the financial system acknowledged that important first steps have been taken towards reform and that strong plans have been adopted, although implementation may need to be accelerated.³⁶²

Turkey has managed such a transition. It began undertaking structural reforms and bank privatisation after a banking crisis in 2000 and gave its central bank full independence in 2001. The central bank went on to bring inflation down from more than 54 percent in 2001 to

³⁵⁸ "Islamic Republic of Iran: 2014 Article IV consultation. Staff report; press release; and statement by the executive director for the Islamic Republic of Iran", IMF, April 2014.

³⁵⁹ *Annual review 1392 (2013/14) and Monetary and credit aggregates for 1393 (2014/15)*, Central Bank of the Islamic Republic of Iran. Note: includes currency in circulation and sight deposits.

³⁶⁰ "Islamic Republic of Iran: 2014 Article IV consultation. Staff report; press release; and statement by the executive director for the Islamic Republic of Iran", IMF, April 2014.

³⁶¹ "Government plan to exit recession/Increase housing facilities for married couples to 1600 million rial", Government Information Portal, www.dolat.ir, March 2, 2016.

³⁶² "Islamic Republic of Iran: 2015 Article IV consultation. Staff report; press release; and statement by the executive director for the Islamic Republic of Iran", IMF, December 2015.

less than 9 percent in 2004, an outcome that restored financial strength to the economy and built the necessary credibility to attract foreign investment.³⁶³

Institutions that are transparent and credible to investors

Companies and citizens respond not just to current economic conditions but also to expectations about the future. If the government and central bank want to instill confidence in expectations of macroeconomic stability, they will have to promote transparency and credibility and enable companies to assess and manage the risk of their investment. Some key elements of this institutional setup could include:

- Rolling medium-term fiscal plans with credible assumptions, underpinned by robust and transparent statistics from an independent statistics agency, to obtain a strong credit rating.
- Use of best international standards to prepare whole-of-government accounts, showing both income and expenditure, and assets and liabilities to ensure transparency and comparability with other countries.
- Independent scrutiny of the government's fiscal plans and implementation, for example by international institutions such as the IMF.³⁶⁴
- An independent central bank with a clear remit and accountability on price stability with regular public communication and transparency of decision making.

MAKING THE BUSINESS AND REGULATORY ENVIRONMENT MORE COMPETITIVE

To boost the private sector and attract the substantial investment Iran needs to create rapid and sustainable growth, the government will have to make doing business in Iran much easier.

Three broad groups all have an interest in fostering an attractive and sustainable business climate: domestic entrepreneurs looking to expand or start operations; members of Iran's diaspora who might seek to invest in Iran, and whose interest could act as a signal for broader engagement by others; and multinational corporations, which bring with them technology, expertise, and management practices, as well as supply chains and business processes that could all help to upgrade Iran's business environment. This could be the start of a virtuous circle of adding value and improving quality and competitiveness that could enable Iran avoid the curse of resource-rich countries that too frequently end up selling raw materials without adding much value beyond extraction and basic processing.³⁶⁵

For now, Iran scores low on global rankings as an investment destination. It ranks 118th of 189 countries in the World Bank's 2016 Doing Business indicators and 74th of 140 countries in the World Economic Forum's Global competitiveness report 2015–16.³⁶⁶ To attract investment, the government will need to address several challenges in the business environment: it will need to reform protectionist measures such as tariffs and subsidies that distort the market and impede competitiveness, reduce bureaucratic burdens to improve the cost and ease of doing business in Iran, and improve legal safeguards and transparency.

74TH
out of 140
countries for global
competitiveness

³⁶³ *World economic outlook*, IMF, October 2009; OECD Economic Surveys: Turkey 2000–2001.

³⁶⁴ See, for example, *Recommendations of the Council on Principles for Independent Fiscal Institutions*, OECD, February 2014.

³⁶⁵ For more details, see *Reverse the curse: Maximizing the potential of resource-driven economies*, McKinsey Global Institute, December 2013.

³⁶⁶ *Doing business 2016: Measuring regulatory quality and efficiency*, World Bank, October 2015; *Global competitiveness report 2015–2016*, World Economic Forum, September 2015.

Doing business in Iran will need to become much easier.

Limiting protectionism to boost competition and investment

Economic policies designed to protect local industries, such as preferential exchange rates and high import tariffs, have hindered competitive advances in Iran. The tariff on imported automobiles, for example, can be up to 75 percent, compared with 7 percent in Morocco and 3 percent in Turkey.³⁶⁷ Some sectors are completely or partially closed to foreign investors. Article 153 of Iran's constitution bans foreign control of the country's oil and gas resources, and in finance, laws prohibited full foreign ownership of banks until recently. Ownership requirements in Iran's telecom sector stipulate at least 51 percent domestic ownership. Putting an end to market distortions caused by high tariffs and deregulating protected sectors could be essential early steps leading to increased competition, better quality products and services, and a reduction in the cost of doing business in Iran.³⁶⁸

Locally manufactured pharmaceuticals are protected by import duty of

65%

Tariffs and protective measures are not necessarily destructive. Iran imposes a 65 percent import duty on all pharmaceuticals that are manufactured locally, a practice commonly used by emerging economies to encourage development of their domestic pharmaceutical industries and achieve drug self-sufficiency.³⁶⁹ Likewise, high steel tariffs are in place to protect Iranian steel producers against dumping. That said, protectionist measures have allowed Iranian domestic firms to thrive without becoming highly efficient. In many sectors, from cosmetics and household goods to automobiles, Iranian firms have been spared the full force of competition. This in part explains the low productivity record that we noted in Chapter 2.

Reducing tariffs across several industries could provide a short-term price benefit to Iranian consumers through increased competition. It would also bring about a long-term benefit to firms and to the economy as international competitive forces drive increased efficiency and quality. In an effort to attract investment and international expertise whilst keeping its tariff regime in place, Iran has operated a number of special zones with tax incentives, customs and visa exemptions, and more efficient banking, insurance, and labour-related regulations. Iran has a history of free trade zones dating to the 1970s and recently expanded to a total of seven free trade zones and 16 special economic zones.³⁷⁰ At the same time, legal and regulatory frameworks governing the zones have proliferated as well. There are around 45 different frameworks, bylaws, and decrees governing these zones, diminishing the potential for companies to reap the cost and efficiency benefits they offer.³⁷¹

As the country opens up to international investment and business, the government will likely come under pressure at home to protect domestic companies in some ways, through subsidies, tariffs, procurement practices, or other national preference programmes. Whilst the long-term goal is to institute reforms, there may be a case for phasing them in. The transition may need to be timed and managed carefully, to avoid unduly damaging industries that have a chance to be viable but will require some time to adjust, or sectors that are large employment pools, such as the automotive industry. At the same time, policies should not deter Iranians from gaining access to the best global products and services at competitive prices.

³⁶⁷ World Integrated Trade Solution database, World Bank.

³⁶⁸ Shantayanan Devarajan and Lili Mottaghi, "Economic implications of lifting sanctions on Iran", *MENA Quarterly Economic Brief*, issue 5, World Bank, July 2015.

³⁶⁹ *Iran pharmaceuticals and healthcare report, Q3 2015*, BMI, September 2015.

³⁷⁰ Government of Iran, www.freezones.ir.

³⁷¹ *A legal guide for investing in Iran's FTIZs and SEZs*, Energy Pioneers, February 2016.

The government could mitigate the impact on local companies and jobs by encouraging the creation of joint ventures, introducing a series of financial reforms that will improve the flow of credit to companies of all sizes, and supporting Iranian companies' efforts to upgrade technology, such as through research and development grants. It could also adjust its social and unemployment policies and focus on improving skills and training of Iranian workers to better deal with the possible short-term dislocation to the workforce that the arrival of new international competition will likely bring.

Subsidy and regulatory reform are needed to eliminate price distortions

Other forms of market distortion that have an impact on Iran's business environment are subsidies and centrally regulated retail prices. Some prices are artificially low for key commodities, including energy, some food, and medical goods. End-user prices are heavily regulated in financial services, telecommunications, and agriculture.

\$78B

Total subsidy costs
on fossil fuels

Subsidies in Iran have historically been high, especially for energy; in 2009, total subsidies amounted to 20 percent of GDP, one of the highest ratios in the world, and even after several years of reform efforts they remain elevated.³⁷² In 2014 Iran incurred around \$78 billion in total subsidy costs on fossil fuels, compared with \$38 billion in India and \$17 billion in China.³⁷³ Approximately 80 percent of Iran's total subsidies are indirect, taking the form of artificially low energy prices charged by government-owned utilities and incurred as the opportunity cost of pricing energy below market levels. The remaining 20 percent are direct subsidies that are part of the government budget and have been mostly allocated to the agriculture and food sectors.

The government has taken some steps towards replacing subsidies with cash transfers.³⁷⁴ In 2010, Iran enacted the targeted subsidy plan, which increased energy prices—including for gasoline, diesel fuel, electricity, and natural gas—closer to their global market equivalents. For example, the price of subsidised gasoline in Iran increased fourfold, from \$0.10 per litre to \$0.40.³⁷⁵ To compensate for increased energy prices, the government distributed direct cash transfers to the public. The additional energy revenue was insufficient to finance the full cash transfer, causing the government to fund it through increased money supply. This contributed to inflation, the devaluation of the rial, and the dollar price of gasoline falling back down to \$0.12 per litre. In 2014 another price increase was instituted, although gasoline prices were lifted only modestly, from \$0.12 to \$0.21 per litre.³⁷⁶ As such, Iran continued to outspend the rest of the world on indirect energy subsidies.³⁷⁷

The Iranian government renewed its commitment to partial price liberalisation and subsidy reform in the Sixth Five-Year Development Plan (2016–21), in order to improve production, increase employment and productivity, reduce energy intensity, and improve social welfare. In April 2016, the Iranian parliament eliminated cash transfers to the top three income deciles, in an effort to target assistance to those with the most need, with potential savings of \$4 billion per year.³⁷⁸ The government still intends to support the industrial, manufacturing, and social sectors using funds recovered from energy price liberalisation. Looking forward, the government could devise a gradual approach to further liberalise prices and narrow cash transfers to remove distortions from the economy and improve government finances.

³⁷² *World energy outlook 2010*, International Energy Agency, November 2010.

³⁷³ Fossil-Fuel Subsidies database, International Energy Agency, 2015.

³⁷⁴ Dominique Guillaume, Roman Zyteck, and Mohammad Reza Farzin, *Iran: The chronicles of the subsidy reform*, IMF working paper number 11/167, July 2011; "Iran overview", World Bank website, September 2015.

³⁷⁵ *Gas insights*, Facts Global Energy, July 3, 2014.

³⁷⁶ *Ibid.*

³⁷⁷ Fossil-Fuel Subsidies database, International Energy Agency, 2015.

³⁷⁸ Iranian Students News Agency, April 12, 2016.

Reducing bureaucracy to drive efficiency

Other obstacles to doing business in Iran are bureaucratic in nature. These can make it hard for newcomers and incumbents to operate. For example, obtaining a permit to build a warehouse in Iran requires 15 separate procedures and takes 97 days, according to the World Bank, which calculates that the cost of this red tape amounts to more than 2 percent of a warehouse's value.³⁷⁹ In addition to domestic bureaucratic burdens, there are significant non-tariff barriers to trading across borders in Iran that will need to be improved if the country is to fulfil its potential as a transit hub. It takes an estimated 432 hours to import goods into Iran, including border compliance and documentary compliance, compared with 34 hours in Malaysia and 47 hours in Turkey. Time and cost constraints for both importing and exporting leave Iran ranked 167th of 189 countries on the World Bank's Trading Across Borders indicators, down from 134th in 2010 and last among a set of ten international peers.³⁸⁰

97

Average number of days it takes to obtain a permit to build a warehouse

As a first step to overcoming these challenges, Iran could convert its foreign investor service centres into one-stop shops for companies looking to do business in Iran, helping them navigate the regulatory landscape. In the longer term, all these areas will need to be addressed through a comprehensive reform of Iran's regulatory framework for international business. Other countries that have successfully managed to attract investment created high-level inter-ministerial units whose job it is to work closely with companies and ensure not just that business regulation is improved but also that government delivers on its commitments. In Turkey, for example, committees have been put in place to improve the investment climate since 2001, coordinating across government ministries and facilitating bilateral trade and investment agreements. The country introduced a new FDI code in 2003 that minimised foreign capital requirements, removed the need for foreign investors to establish limited liability or joint stock companies, and eased the process of obtaining authorisation to commence commercial activities in Turkey. This all contributed to a strong uptick in FDI inflows over the past ten years.³⁸¹

Domestic companies also suffer from bureaucratic burdens, and the government has taken some measures to reduce administrative rules and procedures. In 2011, Iran's parliament passed the Law for the Continuous Improvement of the Business Environment, and in 2013 it established a department to monitor improvements. The government has also started a process of identifying and categorising all existing licences to determine which can be removed or combined to ease regulatory processes.³⁸² In November 2015, the government pledged to make all licences digitally available in the near future.³⁸³

To improve the ease of entry for international companies and help domestic businesses further prosper, the professional services industry also needs to develop, as mentioned in Chapter 2. Accounting and law firms, in addition to market researchers and consultancies, would help foster an ecosystem that facilitates business establishments, supports businesses looking to scale up, and improves operations.

³⁷⁹ *Doing business 2016: Measuring regulatory quality and efficiency*, World Bank, October 2015.

³⁸⁰ *2016 Doing Business indicators*, World Bank; peer group includes Egypt, Jordan, Malaysia, Mexico Morocco, Saudi Arabia, South Africa, Tunisia, and Turkey.

³⁸¹ Safak Herdem, "On the move: Turkey's foreign direct investment market", *World Finance*, January 17, 2014.

³⁸² "Monitoring and Doing Business Improvement Office", Iran Ministry of Economic Affairs and Finance website.

³⁸³ Interview with Shapour Mohammadi, deputy minister of Economic Affairs and Finance. "The Ministry of Energy was very effective in improving the business environment", Iranian Labour News Agency, November 2, 2015.

2.2M
young Iranians
reaching working
age by 2020

Ensuring a transparent and fair business environment

In addition to curbing market distortions and eliminating bureaucratic barriers, the government will need to convince international investors, as well as private domestic firms seeking to partner or expand, of Iran's ability to provide a fair and transparent business environment with acceptable levels of risk and adequate legal protections. Iran does better on some international rankings than others in this regard; it is above the regional average for enforcing contracts, reflecting changes in court procedures since 2011.³⁸⁴

Some of the challenges Iran faces relate to the legal system governing investment. Iran ranks 150th of 189 countries for protecting minority investors and received a two out of a possible score of ten on the World Bank's corporate transparency index.³⁸⁵ Property rights, both physical and intellectual, need safeguards.³⁸⁶ Resolving insolvency takes 4.5 years on average and costs 15 percent of the debtor's estate, with a recovery rate of only 18 percent, well short of global best practice.³⁸⁷ Bankruptcy should be subject to an orderly and transparent regime. Additionally, some issues with regard to accounting and corporate governance could be improved by adopting best practices already well codified by international organisations including OECD and the G20.³⁸⁸

The Iranian government will also need to take action against black market operations, graft, and corruption, which international investors and organisations consider to be especially problematic; on Transparency International's Corruption Perceptions Index, Iran in 2014 was ranked 136th of 175 countries.³⁸⁹ Finally, the government will need to convince international investors that they can invest in the country without undue political risk.

A MORE FLEXIBLE LABOUR MARKET THAT TAILORS SKILLS TO NEEDS

If Iran is to take full advantage of its reconnection with the global economy, it will need a productive and flexible labour force with the requisite skills that employers—both foreign and domestic—are seeking. Whilst Iran has a sizable cohort of young people with good mathematics and science skills, its labour market overall faces some significant weaknesses. Iran has a low level of labour-force participation, especially for women and youths, and unemployment in 2016 stood at 13 percent. Bringing this number down will require rapid economic growth: in the four years to 2020 alone, 2.2 million Iranians will reach working age and many of them will join the labour market.³⁹⁰ On the supply side, the large number of university graduates and education outcomes described in Chapter 1 have nonetheless left Iran with a mismatch between the skills of the workforce and the needs of employers, including in management. On the World Economic Forum's Global Competitiveness Index, Iran ranks 142nd of 144 countries for efficient use of talent.³⁹¹

Whilst some of these labour challenges could be overcome through a revival of robust economic growth, others are structural problems that will need to be addressed through labour market and education policy measures. The government has taken a number of steps to improve the functioning of the labour market, including through initiatives to provide more flexible labour laws to knowledge companies and international investors in free trade zones, and through efforts to upgrade education and vocational training. Whilst these have brought about significant improvements in education and literacy, the impact on the labour market has been limited. Along with macroeconomic pressures, technical and vocational

³⁸⁴ *2016 Doing Business indicators*, World Bank.

³⁸⁵ *Ibid.*

³⁸⁶ Iran ties for last place among 17 countries in the Middle East and North Africa on the property rights index of the 2015 Index of Economic Freedom, published by the *Wall Street Journal* and the Heritage Foundation.

³⁸⁷ *Doing business 2016: Measuring regulatory quality and efficiency*, World Bank, October 2015.

³⁸⁸ *OECD Principles of Corporate Governance*, G20/OECD 2015.

³⁸⁹ *Corruption perceptions index*, Transparency International, December 2014.

³⁹⁰ United Nations population statistics, 2013.

³⁹¹ *Global competitiveness report 2014–15*, World Economic Forum, September 2014.

training development has faced challenges due to information limitations and ineffective coordination between programme developers and businesses.³⁹²

The labour market has not been able to absorb the increasing number of university graduates, and the unemployment rate among highly educated Iranians has increased sharply.

Matching skills and training with workplace needs

As we noted in Chapter 1, Iran's education system is capable of producing graduates with world-class talent in scientific subjects (Exhibit 29). However, the excellence of the educational elite is not reflected in Iran's basic standard of learning, which is in line with levels in developing countries.³⁹³

The tertiary education system has undergone some important changes since the 1990s, with a large influx of students and an increase in university places.³⁹⁴ Over the past decade, tertiary enrolment grew by about 11 percent annually, to about 4.4 million students, or triple the number in 2000.³⁹⁵ Since 2013, the rate of increase in enrolment has stabilised.

The labour market has not been able to absorb all these graduates, and the unemployment rate among highly educated Iranians has increased sharply. Unemployment rates among tertiary education graduates increased from 17 percent in 2000 to 26 percent in 2008, the latest year for which figures are available.³⁹⁶

The potential growth in employment that we highlight in Chapter 2 is possible only if Iran's talent has better opportunities to prepare for globally competitive and knowledge-based sectors. Demand for graduates in the STEM fields of science, technology, engineering, and mathematics created by economic growth in these sectors will not be fully met by young Iranians unless the education system includes more vocational and managerial emphasis. Currently, employers often prefer keeping older workers who have practical skills and a commercial background.

The government has traditionally pursued a policy of increasing tertiary education enrolment, but it has done less to smooth the transition from education to employment, such as with monetary incentives, including tax breaks or apprenticeships and skill-building opportunities. Iran ranks 115th of 144 countries in on-the-job training, according to the World Economic Forum's Global Competitiveness Index. In 2006, only 16 percent of upper secondary students were enrolled in vocational programmes, compared with 35 percent in Indonesia and 38 percent in Turkey.³⁹⁷ Labour laws do not recognise unpaid employment, which has resulted in a shortage of apprenticeships and internship opportunities that provide training outside the education system. That focus is starting to shift. Among other measures, the government has been working with some international institutions to review

16%
Number of
upper-secondary
students enrolled in
vocational training

³⁹² *National report on the situation of adult learning and education (ALE)*, National Commission of UNESCO in Iran, April 2008.

³⁹³ For example, Iran's TIMSS score in 2011 was 474 for mathematics and 431 for science. This compares with 524 and 498 for the UK, 551 and 517 for South Korea, 524 and 498 for Russia, and 491 and 462 for Turkey.

³⁹⁴ Iran Institute for Research and Planning in Higher Education.

³⁹⁵ UNESCO Institute for Statistics.

³⁹⁶ *World development indicators*, World Bank, 2015.

³⁹⁷ *Participation in formal technical and vocational education and training programmes worldwide: An initial statistical study*, UNEVOC-UNESCO 2006.

and upgrade the quality of vocational education. Possible additional solutions include offering incentives to the private sector to provide a minimum level of training.

Management skills are also particularly needed, with business schools producing a relatively small cohort of MBAs for a country of Iran's size. There is a well-documented strong correlation between management skills and productivity, and insufficient management capabilities prevent focus on long-term planning and inhibit the growth potential of the highly skilled labour force across sectors. Whilst there are some attempts to address this need, such as the creation of a business school in Tehran by private investors in 2007, the challenge is a high priority for the government to address.³⁹⁸

EXHIBIT 29

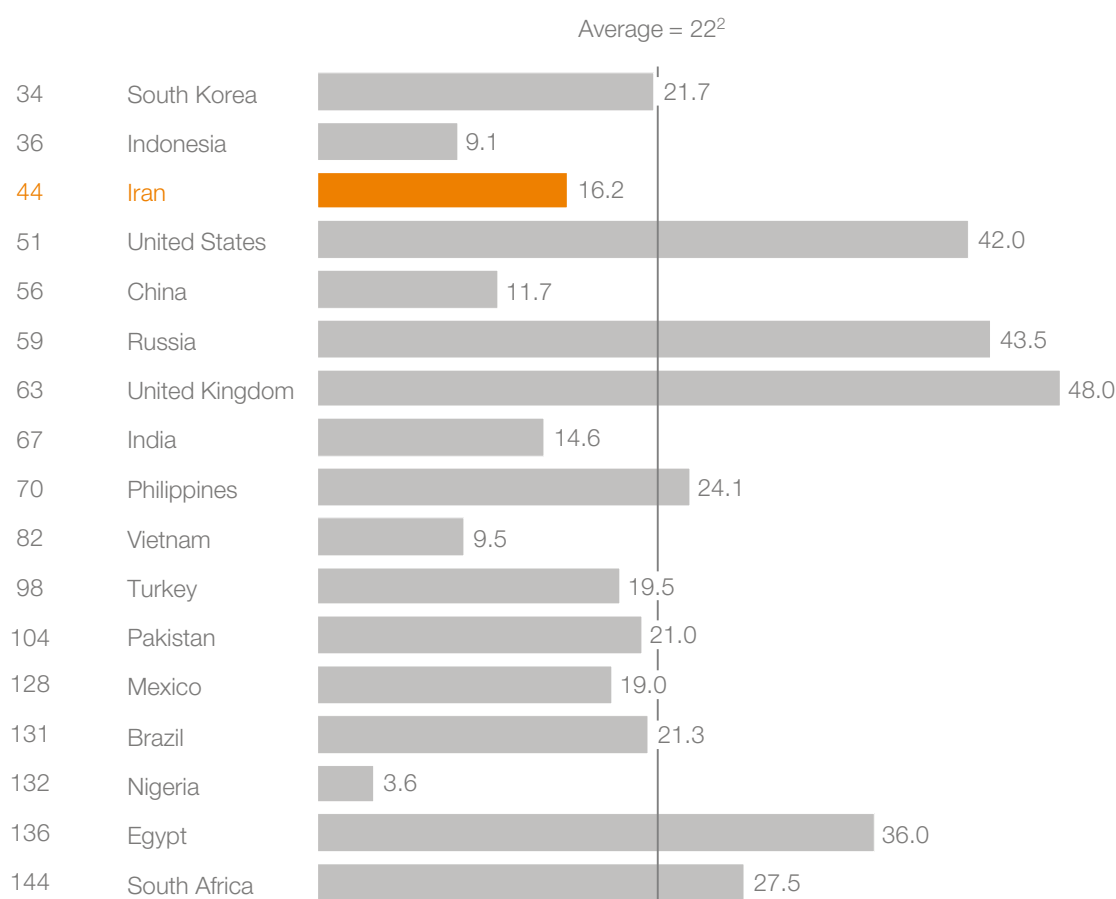
The quality of Iran's mathematics and science education is not reflected in high-skilled employment

Share of high-skilled employees, 2015¹

%

Quality of mathematics and science education

Ranking, 2014–15



¹ Using BRICs, next 11 countries, and OECD benchmarks for comparison.

² Average excluding Iran.

SOURCE: *Human capital report 2015*, World Economic Forum, 2015; *Global competitiveness report 2014–15*, World Economic Forum, September 2014; McKinsey Global Institute analysis

³⁹⁸ Iranian Business School, www.ibs.ir and www.ibsproject.org.

\$250

Iran's monthly minimum wage

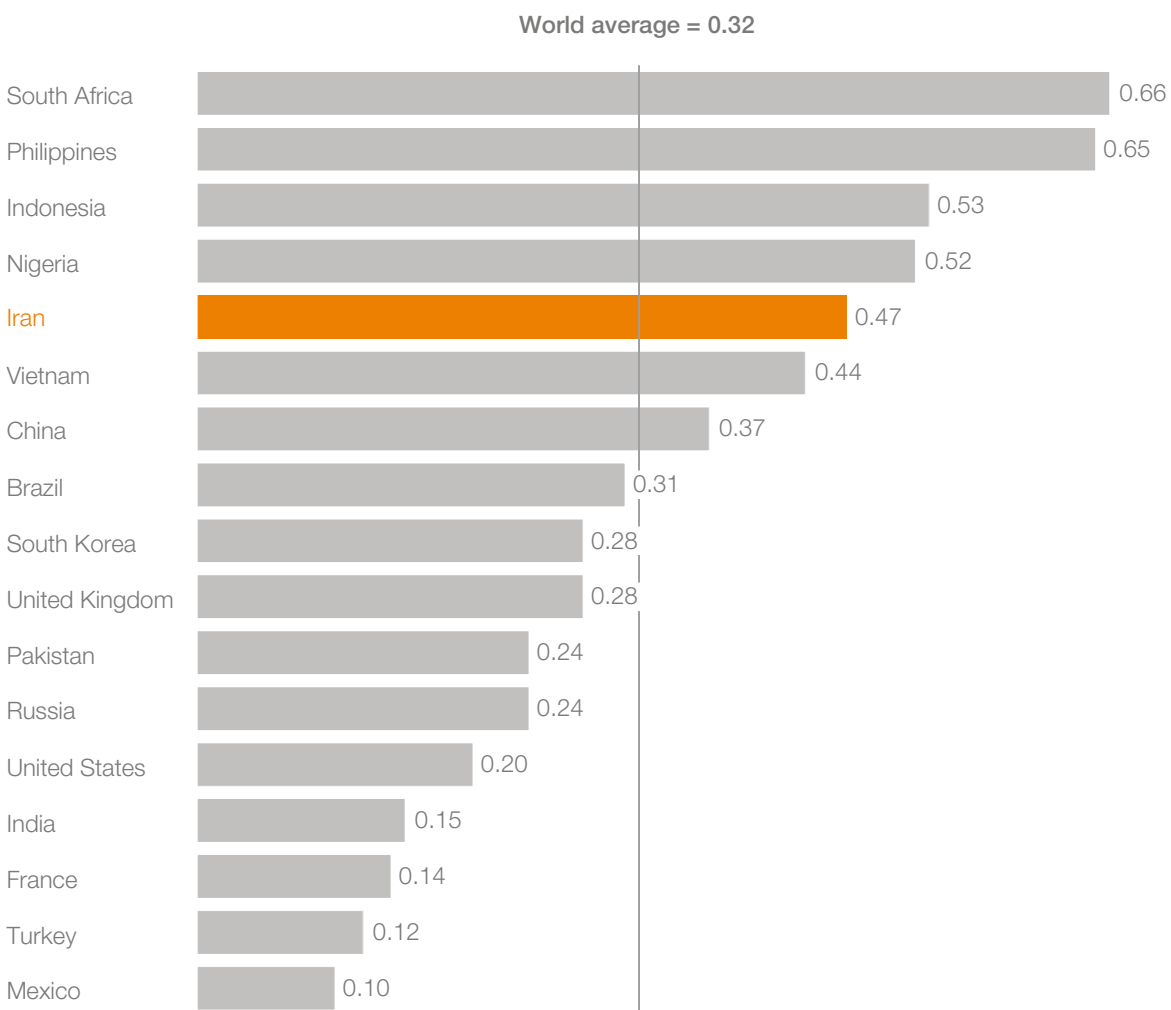
A focus on making labour costs competitive and raising productivity

Iran's minimum wages are competitive when compared to developed economies. For example, at \$250 per month in March 2015 at market exchange rates (about \$860 on a purchasing power parity basis), Iran's minimum wage is relatively attractive to international companies and has become more so with the rial's devaluation.³⁹⁹ Exports in metals, cement, and petrochemicals are competitive in part because of comparatively low labour costs in combination with strong natural resource endowments. Yet, in nominal terms, Iran's minimum wage is more than double the level of Turkey's and considerably higher than minimum wages in Egypt, Kuwait, Morocco, and other countries in the region.⁴⁰⁰ Furthermore, Iran has one of the highest ratios of minimum wage to productivity globally. The ratio is about 1.5 times the global median (Exhibit 30).⁴⁰¹

EXHIBIT 30

Iran's minimum-wage-to-productivity ratio is high relative to comparable countries¹

Ratio of minimum wage to average value added per worker, 2014



¹ Iran is ranked 38th out of 153 countries.

SOURCE: *Doing business 2014: Understanding regulations for small and medium-size enterprises*, World Bank, October 2013; McKinsey Global Institute analysis

³⁹⁹ Ministry of Labour and Social Welfare.

⁴⁰⁰ *Doing business 2014: Understanding regulations for small and medium-size enterprises*, World Bank, October 2013. Database for manufacturing sector minimum wages.

⁴⁰¹ *Doing business 2015: Going beyond efficiency*, World Bank, October 2014.

To increase output without cutting wages will require an increase in labour productivity. This can come from at least three sources: international investment, technology, and trade, as discussed in Chapter 2; the better match of skills to opportunities discussed above; and a shift towards a more competitive but sustainable labour market through constructive relations among business, labour, and government. For example, the minimum wage is set annually via negotiations among government, business, and labour representatives. All three sets of stakeholders have struggled with inflation and slow economic growth. A solution that safeguards both business competitiveness and household income could be achieved through a combination of productivity growth, continued government efforts to contain inflation, and agreement on flexible labour laws that will attract new investment and increase employment.

Introducing more flexible laws to make better use of the labour force

23

Average number of weeks of severance pay for worker with less than 10 years on the job

A number of Iran's labour policies act as a brake on companies offering permanent employment. Among the most pressing is the difficulty and expense of terminating employment. For example, workers who are laid off after less than ten years on the job are entitled to 23 weeks of severance pay on average. This compares with less than nine weeks of severance in Brazil and South Africa. It is also more than double the severance pay in Russia and India.⁴⁰² Dismissal of an employee in Iran requires approval from the Islamic Labour Council and written warnings to the employee. New low- and semi-skilled full-time hires in Iran have a relatively short probation period of just one month.⁴⁰³

Faced with restrictive labour laws that have not evolved with business needs, companies have found creative solutions to allow for more flexibility, such as part-time employment. One consequence is a reluctance by companies to hire full-time employees at all. Today, 80 percent or more of Iranian workers are on fixed-term contracts that are rolled over.⁴⁰⁴ Informal work in Iran was reported to be quite high at over 48 percent of total employment. This number includes workers who have both formal and informal employment, but it is nonetheless high. For example, the estimate for Turkey is 33 percent and for Russia it is 9 percent.⁴⁰⁵ Semi-permanent and informal employment further hurt the economy in the long term as employers may not be willing to invest in developing worker skills.

Starting in 2003, businesses with fewer than ten employees have been exempted from some requirements in the labour code, which in turn makes it more likely that entrepreneurs can create jobs through small businesses. In the long term, reforms that promote a more flexible labour market will be sustainable if planned through constructive collaboration among business, labour, and government. Such agreements might find alternative ways to provide social security and ensure that wages align with productivity increases that are likely to result from flexibility.

⁴⁰² *Doing business 2015: Going beyond efficiency*, World Bank, October 2014.

⁴⁰³ Islamic Republic of Iran, Labour Code, November 20, 1990; International Labour Organisation.

⁴⁰⁴ Mehdi S. Mansour, Mehran L. Foroushani, and Parviz Bagheri, "Effects of temporary contracts in labour law of Iran", *GSTF International Journal of Law and Social Sciences*, volume 2, number 1, December 2012.

⁴⁰⁵ Johannes P. Jütting and Juan R. de Laiglesia, eds., *Is informal normal? Towards more and better jobs in developing countries*, OECD, April 2009.

IRAN NEEDS A WELL-FUNCTIONING FINANCIAL SYSTEM GEARED FOR GROWTH

If Iran's economy is to grow robustly and both attract and deploy trillions of dollars in domestic and foreign investment, it will need to be underpinned by a well-functioning financial system. The financial sector, including banks and capital markets, will have to play a central role as an enabler for future growth by attracting capital from a variety of sources and then allocating that capital to productive uses.

The Central Bank of Iran has been seeking to bring domestic banks into compliance with Basel II and Basel III international banking standards.

Financial market depth reveals the extent to which businesses, households, and government are able to finance themselves through financial intermediaries. MGI research has shown that developed countries have much deeper financial markets than emerging economies, with the total of outstanding debt and equity amounting to as much as 400 percent of GDP in Western Europe, the United States, and Japan, compared with 200 percent or less in many emerging markets.⁴⁰⁶ Iran's financial market has outstanding debt and equity of about 100 percent of GDP and is not as deep as would be expected considering current GDP per capita.

An outdated banking system requiring recapitalisation, upgrades, and global connections

As mentioned in Chapter 2, Iranian banks are undercapitalised; in 2011, up to 57 percent of deposits in the formal banking system were held by banks with insufficient capital.⁴⁰⁷ Iran can look to the experience of other countries, such as Spain, which restructured banks after the financial crisis. It included efforts such as consolidating weak institutions with sounder ones, transferring troubled assets to a government-sponsored national wind-down unit, and injecting capital into solvent banks facing liquidity issues.

Although the United Nations and European Union lifted banking sanctions in January 2016, Iranian banks have been finding it difficult to conduct international transactions. After years of the country's isolation from global financial systems, risk and compliance processes have become outdated. For instance, Iranian banks are still governed by Basel I rules regarding capital adequacy and risk compliance. They will need to shift to the international standards of Basel II and Basel III to meet the risk requirements of international companies. Similarly, Iranian banks will have to improve transparency, auditing, and disclosure processes and strengthen their credit ratings before doing business with many foreign firms. As a result, multinational companies seeking to transact through Iranian banks may need to wait until the financial sector is recapitalised and banks implement the controls and upgrades necessary to comply with international rules to engage in international transactions.

⁴⁰⁶ *Mapping global capital markets 2011: Updated research*, McKinsey Global Institute, August 2011.

⁴⁰⁷ Zahra Khoshnood and Marzieh Esfandiari, *Bank capital assessment based on international standards*, Monetary and Banking Research Institute, Central Bank of Iran, working paper number MBRI-PN-93008, 2014.

\$110B
Tehran stock
exchange total
capitalisation

The Iranian government could play a key role in this process by requiring domestic banks to conform to international standards whilst strengthening banking regulation and oversight. The Central Bank of Iran has been attempting to bring domestic banks into compliance with Basel II and Basel III, but only limited progress has been made. The government could also boost foreign confidence in domestic banks by instituting tougher standards on money laundering and corporate governance and reforming bankruptcy laws.

At the same time, multinationals have found it difficult to move money to and from Iran using foreign banks. Although the implementation of the Joint Comprehensive Plan of Action allows European and Asian banks to transact with Iranian counterparties, the continuation of US primary sanctions on Iran precludes involvement of Americans or the US financial system in the transaction and restricts Iran's ability to access and use the US dollar.⁴⁰⁸ As the financial nexus has become more interrelated and complex, many global banks are finding it difficult to settle dollar-denominated transactions without crossing over to US territory. The prohibition on these so-called U-turn transactions, in which transactions that are priced in US dollars, such as oil sales, pass through a US clearing bank but do not remain there, greatly limits Iran's ability to pay international suppliers and fully reconnect to the global financial system. Additionally, many large European banks with American operations could be wary of doing business with Iran even if no access to the US dollar or financial system is required.⁴⁰⁹ The complexity of US sanctions law could make many banks willing to delay restarting business with Iran rather than risk their access to the US market. This, coupled with hefty fines levied on multinational banks for sanctions violations prior to the nuclear agreement, could discourage European banks from transacting with Iranian counterparties until the United States provides further clarity and assurances against adverse consequences.

At the time of the publication of this report, several small to medium-sized European banks, including KBC of Belgium, DZ Bank of Germany, and Mediobanca and Popolare di Sondrio of Italy, had already resumed transacting with Iranian firms, whilst larger banks were still sorting the technical and legal complexities of initiating operations.⁴¹⁰ Numerous European governments have been pressing their banks to reengage with Iran to facilitate business and align with government policy of normalised trade relations with Iran. The US Treasury Office of Foreign Assets Control has been conducting road shows across Europe to clarify how financial transactions can be carried out without violating the remaining sanctions and providing details to insurance companies on what specific transactions are legitimate.⁴¹¹ When these critical issues are resolved will be a key determinant of how rapidly Iran is able to reap the full benefits of reconnecting to the global economy.

A shallow capital market that could expand and liberalise

Relative to the country's size, Iranian capital markets are very small. In 2015, Iran's stock market had a total capitalisation of about \$110 billion, or 30 percent of GDP.⁴¹² This is less than half the GDP ratio of BRIC countries and less than one-third of the world average.⁴¹³ Furthermore, Iran's stock market is relatively undiversified; the top ten companies account for almost 40 percent of its value. The bond markets are even smaller. In 2015, only \$2.9 billion of bonds were traded; in contrast, nearly \$300 billion of debt securities were issued in the same year in Turkey. Given Iran's large investment requirements to enable 6 percent annual growth over the next 20 years, we estimate the stock and bond market will need to increase by nearly \$1 trillion by 2035.

⁴⁰⁸ "Treasury secretary says US financial system will stay closed to Iran", *Al-Monitor*, April 11, 2016.

⁴⁰⁹ "Sanctions confusion leaves European banks wary of Iran business", *Financial Times*, January 17, 2016.

⁴¹⁰ "Europe's banks begin tentative return to Iran", *Financial Times*, April 3, 2016.

⁴¹¹ "Officials: US considers easing ban on dollars to help Iran", *Associated Press*, March 31, 2016.

⁴¹² Tehran Stock Exchange monthly bulletin, March 2016.

⁴¹³ MGI Financial Assets database.

The government has prioritised growing bond markets; in 2016, it launched four debt instruments to finance its own spending and settle its debt to contractors. These actions could pave the way and build the infrastructure for a more robust corporate bond market, which is virtually non-existent today. A network of enabling institutions, including investment banks and credit rating agencies, will also be required to grow bond markets.

To further develop its bond market, Iran could look to the historical success of other emerging markets. Since creating the Clearing Corporation of India in 2001 to handle the clearing and settlement of government securities, India has pushed to further establish and modernise its bond market, migrating to electronic limit order books, holding regularly scheduled debt auctions and offering a broad spectrum of debt instruments. The Securities and Exchange Board of India, the country's independent regulator, has leveraged the country's modern equity trading platform to create a liquid secondary market for debt securities. This has been largely successful for government debt.

Today, as little as 1 percent of equity and bonds is held internationally, compared with a world average of 30 percent.⁴¹⁴ This is far below the level in most emerging economies of Iran's size and wealth, and it suggests significant untapped opportunity for Iran's financial markets to become more integrated with global markets. There are some risks in financial globalisation, including possible market volatility, exchange rate pressures, and vulnerability to sudden reversals in capital flows. These risks emphasise the importance of a robust central bank regime, with the appropriate technical expertise and policy tools to monitor and manage financial system stability, as discussed previously.

SETTING AN AGENDA FOR ACTION

The set of potential reforms we outlined in this report would be difficult in any context but are even harder in the environment of ambiguity that economic reintegration inevitably entails. Addressing this uncertainty will depend on the timing, steadiness, and quality of government reforms and the responsiveness of international and domestic companies.

To meet all these challenges, the government will need to embark on an ambitious transformation programme.

President Hassan Rouhani's visit to Europe in January 2016 and the more than \$130 billion in international deals announced indicate both the determination of the government and the depth of foreign interest in Iran.⁴¹⁵ For these initial deals to go forward and demonstrate potential rewards to more cautious investors, the reforms we have outlined will need to be implemented in a timely manner. Some are already in motion and will create momentum for further reforms. For example, the fall in inflation from a high of 45 percent in 2013 to a low of 10 percent in 2015 means that businesses can now plan more accurately and operate more efficiently. Similarly, stabilising the exchange rate and shielding government budgets from the volatility of international oil prices is necessary for ministries and foreign companies to make long-term plans for investment.

⁴¹⁴ *Financial globalization: Retreat or reset?* McKinsey Global Institute, March 2013.

⁴¹⁵ See Annex.

Iran's government faces a daunting challenge: how to deliver services that meet the public's rising expectations whilst improving government efficiency, stabilising the macroeconomic environment, ensuring domestic competitiveness, and attracting foreign investment. To meet this challenge, the government will need to embark on an ambitious transformation programme reaching across ministries and provinces. Its ability to communicate to investors and business stakeholders and serve as a role model for effective change will be especially important due to the high degree of public- and private-sector integration in Iran.

Domestic and international companies may need a purposeful strategy on how to approach the markets and face international competition. A range of improvements in business operations will help incumbent firms become competitive, and consolidation could provide much-needed scale. The Iranian market is filled with complexity and nuance, and international investors will likely want to get to know the market and test opportunities before deciding whether to establish a presence. For the country to realise its growth potential, the government and domestic and international companies all will need an agenda for action, with the government setting the pace for change.

Accelerating a large-scale transformation

Iran's government appears determined to take advantage of the reopening of its economy and has set a target of 8 percent GDP growth, in addition to ambitions to deliver inflation and unemployment rates below 8 percent. To achieve these goals and the opportunities we have outlined in this report, the government will need to embark on a transformation programme of significant size and scope.

Iran is not the first government to face the need for transformation to enable economic growth. Singapore, Estonia, and Malaysia have taken major steps to improve government management, and valuable insights can be gained from these and other reform programmes around the world. From these experiences, four initiatives could constitute an agenda for change for the Iranian government. A thorough restructuring of the government's approach to managing public finances will be needed, in addition to redesigning public services to improve quality and cost efficiency. Improving the government's structure, scale, and operating model to reduce bureaucracy will also be key. Finally, a clear vision for change with accountability mechanisms to guarantee progress will be necessary for a speedy and productive transformation.

Effective methods of managing public finances, including budgeting, investment, and revenue and working-capital management, are fundamental to promote economic growth. A move towards output-based budgeting, as the Swedish government practices it, or an initiative to embed capital productivity in investment planning processes, as happens in Singapore, could lead to better financial management. Iran's five-year plan for 2016–21 includes some new approaches to public financing, with a specific goal of improving oil and gas revenue management through greater independence between the National Development Fund and the central bank. Independent governance of the fund will make it more difficult to provide oil and gas handouts to government institutions. The government has also announced plans to issue tradable settlement bonds in exchange for payments to contractors that are in arrears, thereby providing liquidity to government creditors.

Redesigning public services could also help keep expenditures down and improve quality. Estonia has successfully enhanced public services by investing aggressively in digital efforts to bring processes and programmes online. In 2003, it launched the first version of its e-government portal; ten years later, more than 90 percent of citizens were using electronic ID cards to vote, pay taxes, and access more than 160 services online, from unemployment benefits to property registration. Private-sector entities in Estonia, such as banks and telecom companies, can offer services through the state portal and thus have an incentive to invest in its infrastructure. In Iran, a few initiatives to improve public services have

8%

Government target
for GDP growth,
inflation, and
unemployment
rates

been included in the government's latest five-year plan. As mentioned earlier in this chapter, the government announced plans to simplify and digitise licencing services to make them easier to access and cheaper to administer. It also proposed establishing a comprehensive national statistical system to better measure and communicate policy outcomes.

Reducing bureaucracy will enable companies to work more efficiently, but it will also require changes to the government's structure and operating model. Iran's government has announced various plans to minimise the impact of bureaucratic barriers. If carried out quickly and clearly, these reforms could improve the business environment for domestic and international firms. In addition to privatisation, the government is reforming subsidies and tariffs, simplifying legal frameworks for foreign investment, and aiming to reduce the amount of licences and procedures needed to do business in Iran.

More complex reforms will require robust planning and accountability mechanisms to achieve results. Malaysia was able to reach \$55 billion of investment—12 percent of its ten-year target—in just the first eight months of a large-scale transformation programme. The government achieved 112 percent of the key performance indicators it set for the first year using only 79 percent of budgeted funds. Essential to the speed and quality of Malaysia's delivery was a centralised Performance Management and Delivery Unit with concrete targets, milestones, and accountability mechanisms across government agencies.⁴¹⁶ Iran could borrow a page from such examples, and also from effective business transformations, to set clear targets and milestones and manage progress against them. A rapid reform pace will also require that the government strengthen its workforce and capabilities, especially with regard to change management. A successful government transformation cannot happen without talented individuals working together across ministries and at all levels of government.

To achieve the potential we have outlined, the government will have to ensure its reforms are both steady and rapid, and clearly communicate them, in Iran and abroad. Iran already demonstrated that stable macroeconomic policy can have lasting impact when growth averaged 6 percent per year from 1999 to 2007. Looking forward, the government's ability to communicate effectively and maintain stability will be important for investor confidence. For instance, Iran's low-cost natural endowments in energy and mining are not sufficient to attract investment on their own. Companies will want certainty in the new regulatory frameworks. Credibility from well-managed expectations and delivering on the promise of reforms will become as valuable to Iran as the resources themselves.

To achieve the potential we have outlined, the government will have to ensure its reforms are both steady and rapid, and clearly communicate them.

Setting priorities for domestic and international companies

Iran's private sector will also need to make rapid improvements to compete globally and to earn the loyalty of customers who will have a broader array of choice. Iranian consumers are unlikely to continue buying domestic brands if international products introduced in the market are of higher quality and lower cost. Similarly, auto customers in neighbouring countries will not seek out global brands made in Iran if the competitive price does not come with impeccable safety credentials and quality that reflects well on the new owner.

⁴¹⁶ Eoin Daly and Seelan Singham, "Jump-starting Malaysia's growth: An interview with Idris Jala", *McKinsey Quarterly*, October 2011.

Competitive offerings in ICT and professional services are preconditions for success in sectors that rely on digital technology and business advisory.

Given that Iranian companies have been isolated from international competition and that a heavy state role in the economy persists, a step change in efficiency and operations is required. Capital productivity improvements, lean management techniques, organisational science, digitalisation, and data analytics can all be used to transform Iran's businesses. Additionally, Iranian firms will need to consolidate and scale. For instance, a fragmented landscape of companies in basic materials can consolidate to invest in new technologies that improve capital productivity, and consolidation in pharmaceuticals would allow domestic firms to be more competitive.

Decisive action by international companies will also be necessary. MGI research has shown that emerging market growth is rarely linear, and successful market entry requires the anticipation of explosive growth. As this report shows, Iran could soon be at this inflection point—quickly reintegrating into the global economy with a wealth of intellectual capital, natural resources, and a robust consumer base. International companies with a history in Iran are in the best position to capitalise on this and have already taken steps to restart and expand operations. In the automotive sector, PSA Peugeot Citroën has announced a \$435 million investment and renewed partnership with Iran Khodro, whilst Novo Nordisk, with a history of distribution in the country, will become the first large pharmaceutical company to build a plant in Iran with a \$100 million investment. For global companies new to Iran, capturing growth will require managing the complexity and uncertainty of new market entry by embarking on plans to get to know the market, test new opportunities, and establish a presence in Iran. Given Iran's complex business environment, robust due diligence will be required to evaluate risks and opportunities and plan the potential entry.



What is Iran's growth potential? How big an opportunity could it become for international companies? How many new jobs could be created? In this report we have sought to answer these questions through a detailed analysis of 18 industry sectors. The \$1 trillion in possible growth that we project is substantial, the equivalent of adding about 1 percent to global GDP. Yet, as we have made clear, growth of this magnitude will not come overnight, and it will not come automatically with the lifting of international sanctions. Iran will need to carefully plan and prioritise changes to its macroeconomic and business environment, its labour markets, its financial system, and the government's capacity to deliver change if it is to realise such potential. The government has announced important reform measures, and ambitious targets. Yet even with the right policy reforms, carefully prioritised, the government and private sector will have to implement them with timeliness and persistence. Reconnecting with the global economy will require Iran to win the confidence and trust of domestic and international investors. Iran will also have to become a reliable and stable player in the world economy. The effort, energy, and determination required of all stakeholders, including the 80 million people of Iran, will be considerable, but the \$1 trillion growth opportunity is a prize that beckons to be seized.

ANNEX: INTERNATIONAL CORPORATE DEALS SINCE THE NUCLEAR AGREEMENT¹



Sector	South Korea	Italy	Germany	Russia	France	Japan	China	India	UK	Others	Total
Oil and gas	10	8	1	8	2	6	2	2	2	13	54
Transport	6	4	6	3	5		5	1	2	8	40
Automotive			2	4	3	4				5	18
Financial services	2	1	5		1	1			1	6	17
Metals and mining	4	1	1		1	1	4	3		1	16
Infrastructure	10	2	1			1		6		1	21
Healthcare	4	4								2	10
Trade	2	1	1	2					1	2	9
Energy		2	1	3					1	5	12
Chemicals	1	1	1			1	1			2	7
Professional Services	1		1			1				1	4
Telecom		1							1	1	3
Manufacturing			1		1					1	3
Tourism					1					3	4
Pharmaceutical					2					1	3
Consumer				1						1	2
ICT		1									1
Agriculture										2	2
Total	40	26	21	21	16	15	13	12	7	55	226

Out of the 226 deals, values have been announced for at least 52 deals totaling more than \$130 billion

¹ Data as of May 27, 2016

SOURCE: McKinsey Global Institute analysis



Iran's handmade carpets feature intricate designs in global demand.

© CactuSoup/Getty Images

TECHNICAL APPENDIX

For this report, the McKinsey Global Institute developed an iterative economic model incorporating publicly available data from multiple sources to simulate growth of the Iranian economy to 2035. Each sector was examined independently and then aggregated to establish Iran's GDP potential. The purpose of this exercise was to approach GDP growth without any top-down assumptions about the overall economy's growth; instead we employed a bottom-up method to determine sector potential and the consequent aggregate GDP growth rate.

The MGI Iran Economic Model consists of two interconnected modules, an investment module, and a GVA module, which together provide 2035 GDP projections. The investment module is used to project total investment required in the overall economy. The GVA module is used to project the gross value added of the Iranian economy as well as productivity and employment levels. We detail key assumptions and methodologies employed for each sector in this appendix.

A few caveats need to be made. First, given the inherent uncertainties involved in long-term economic projections, these numbers should not be taken as a McKinsey Global Institute or McKinsey & Company forecast for the Iranian economy. Rather, the model is a tool to better understand the potential of the economy in 2035 depending on a range of internal and external factors.

Second, the model draws on a comprehensive review of publicly available data, from both inside and outside Iran, on the Iranian economy and other economies (see Box A1, "Principal data sources and interviews"). Given some discrepancies in publicly available data, we have tried to keep databases consistent for each analysis and to employ only the most reliable sources.

Third, though the model takes a comprehensive approach to economic growth potential, it does not explicitly account for feedback loops between macroeconomic policy and private-sector actions. In reality, developments in policy, investment, and sector growth will likely be sequenced and interrelated. The sector models we have developed do not take into account potential delays, for example, that the political decision-making process or cautious investment could drive.

Box A1. Principal data sources and interviews

We used the following main sources from inside and outside Iran in our research, and modelling:

Iranian sources: Central Bank of Iran; Customs Administration of Iran; Islamic Parliament Research Center; Ministry of Agriculture; Ministry of Economic Affairs and Finance; Ministry of Energy; Ministry of Industry, Mine and Trade; Ministry of Information and Communications Technology; Ministry of Labour and Social Affairs; Ministry of Petroleum; Ministry of Roads and Urban Development; Office of the President of the

Islamic Republic of Iran; Organization for Investment, Economic and Technical Assistance of Iran; Statistical Centre of Iran; Tehran Stock Exchange.

International sources: Certius, Euromonitor International, ICIS Supply and Demand, IHS, International Energy Agency, International Labour Organisation, International Monetary Fund, United Nations, Wood Mackenzie, World Bank, World Cellular Information Service, World Economic Forum.

INVESTMENT MODULE

The investment module projects total investment required in the overall economy to 2035. Major inputs into the module include historical investment data (both in Iran and comparable countries) and sector-level value added. We estimate the total investment needed in each sector.

MGI research has established a strong empirical relationship between a country's investment rate and its growth rate. We call this the "rule of 2.5". In essence, this rule stipulates that it takes an additional investment of 2.5 percentage points of GDP to bring about each additional 1 percent of GDP growth.⁴¹⁷ We have used this empirical relationship to review and validate the total investment required in the Iranian economy.

GVA MODULE

The GVA module projects gross value added, productivity, and employment by sector. Major inputs into the module include historical sector GVA, employment, and international labour productivity benchmarks, as well as each sector's specific relationship to the rest of the economy (for example, sensitivity to broader macroeconomic conditions and citizens' levels of income). We examined 18 sectors in depth: oil and gas, petrochemicals, mining, agriculture, automotive, basic materials, fast-moving consumer goods (FMCG), retail, tourism, finance and insurance, professional and other services, information and communications technology, pharmaceuticals, health care, transport, real estate, utilities, and construction. We also calculated the increased GVA for two additional sectors: public sector and other manufacturing. We chose not to use a uniform set of peer countries throughout the analysis. Instead, we picked peer comparisons for each sector in order to apply the most relevant benchmarks for those industries. Outputs from each sector were built into an iterative model to determine the growth rate of the whole economy applied to total gross value added in 2014. We then applied currency appreciation to this output and reconciled it with taxes and subsidies to determine GDP in 2035. This was allocated to each sector to determine sector-level GDP.

We estimated current labour productivity in Iran by dividing GVA by total employment on a sector-by-sector basis. For tradable goods we used GVA per employee as a measure of productivity; for non-tradable goods we used GVA on a purchasing power parity (PPP) basis to account for relative price differences. This analysis revealed some sectors with very high levels of productivity and others with very low levels. These disparities reflect the unique economic makeup of the country, including its large natural resource endowment and the fact that some sectors are still relatively small and in an early stage of development. These observations led us to take sector-specific approaches to modelling future labour productivity.

EXCHANGE RATE CONVENTION AND CURRENCY APPRECIATION

The results of our analysis and projections are expressed in projected real exchange rates. Real exchange rates, rather than market exchange rates or purchasing power parity, best approximate the expected dollar value of revenue or income earned in local currency. In practice, we have used constant 2014 dollars (at market exchange rates) as our base, and then applied an estimated currency appreciation factor of 1.1 percent per year to 2035. We have derived this magnitude of real exchange rate appreciation from the difference in the growth rate in Iran's GDP per capita and that of the United States, adjusted for the share

⁴¹⁷ *Farewell to cheap capital? The implications of long-term shifts in saving and investment*, McKinsey Global Institute, December 2010.

of non-tradables in the economy. Thus, our estimates of the 2035 potential GDP include currency appreciation and are expressed in 2035 projected real exchange terms.⁴¹⁸

SECTOR-LEVEL ANALYSIS BY GROWTH ENGINE

The sector analyses arranged by growth engine are as follows:

- Harnessing natural resource endowments:
Oil and gas, petrochemicals, mining, agriculture
- Nurturing internationally competitive industries:
Automotive, basic materials, fast-moving consumer goods, retail, tourism
- Transitioning to a knowledge-based economy:
Financial services, professional services and other services, information and communications technology, pharmaceuticals, health care
- Expanding and modernising infrastructure:
Transport, utilities, real estate, construction.

Harnessing natural resource endowments

Oil and gas

We calculated the GVA for oil and gas separately. For each we estimated revenue based on scenarios for prices and for production, which in turn was a function of investment.

We calculated GVA as revenue minus non-labour operating costs. For liquids—crude oil and condensates—we considered a range of price scenarios articulated by McKinsey's Energy Insights projected out to 2035. We assumed that Iran's producers will sell oil and gas to the domestic market until the profit for domestic and export sales reaches equilibrium. This will not be the case if any kind of government intervention persists in the market, but in a 20-year projection it is a meaningful simplifying assumption. The lowest price was \$30 per barrel, which is close to current prices but historically very low, whilst the highest price of \$110 per barrel was similar to the historically high price range sustained from 2011 to 2014. For natural gas we used a range of \$3 per mmBtu to \$9 per mmBtu reflecting the range of prices in the Asian LNG market over the past five years minus \$3 per mmBtu in liquification costs and \$1 per mmBtu of transport.

To calculate production scenarios we first assumed a long-term cost per barrel of \$11 per barrel in liquids with \$5 per barrel in capital expenditure, based on an Iraqi benchmark for similar fields and industry analysts, and \$2 per barrel of oil equivalent in capital expenditure for gas, based on historical production in the South Pars field when foreign companies were involved. We then ran investment scenarios that increased investment at a fixed compound annual growth rate (CAGR) to 2025 before flattening off. We assumed 5 percent depreciation and back calculated installed capital expenditure (capex) from current production and investment data from Wood Mackenzie. We could then calculate sustaining capex going forward and subtracted this from total capex to find the portion that would go to new production.

⁴¹⁸ Real exchange rates, rather than market exchange rates or purchasing power parity, best approximate the expected dollar value of revenue or income earned in local currency. *Urban world: Mapping the economic power of cities*, McKinsey Global Institute, March 2011. For a theoretical discussion, see Paul A. Samuelson, "Theoretical notes on trade problems", *Review of Economics and Statistics*, volume 46, number 2, May 1964, and Bela Balassa, "The purchasing-power parity doctrine: A reappraisal", *Journal of Political Economy*, volume 72, number 6, 1964.

We calculated costs using historical levels of operating expenditure (opex) per installed capex. We then subtracted these costs from revenue and added labour costs back in to find GVA.

Using an investment CAGR of 7 percent to 2025 and flat to 2035 allocated 50-50 to liquids and gas, we found about \$125 billion to \$375 billion for 2035 GVA. Total investment in this scenario is about \$350 billion (of which nearly \$100 billion is for downstream and sustaining capex on new capex after 2015). Mid-range values were used in the report. Production for 2035 in this scenario is about 5.4 million barrels per day in crude and condensate, about 400 bcm per year in gas, and 340 kboe per day of natural gas liquid equivalents. These numbers imply a lower rate of investment than if the government's targets for the Sixth Five-Year Development Plan were projected to 2035, but we assume that even if these ambitious investment targets are met, they would not be sustained to 2035.

We did not make a strong assumption about employment or productivity since labour is a small percentage of costs. Rather, we assumed that employment would scale with operating costs, accounting for a modest increase of 2.5 percent per year in real wages and growth from our starting point data of 173,000 jobs to 450,000 jobs.

Petrochemicals

As with oil and gas, we calculated GVA for petrochemicals by separating revenue and cost. We used a McKinsey cost model to estimate costs, based primarily on ethylene. This slightly underestimated average margins because some products involve further processing (and lower margins), but most production and planned production comes from basic chemicals, and the GVA we calculated using this method was consistent with IHS 2014 baseline data. We then assumed an improvement in utilisation up to global benchmarks of 90 percent and ran scenarios based on ICIS's projected capacity and the much more ambitious government plan, giving a range of 90 million tons per year to almost 180 million per year by 2035. Using fixed prices based on average price per ton from government data, these production scenarios implied a GVA range of \$30 billion to \$50 billion.

Based on government targets of \$80 billion of investment for the capacity we used for the upper range and an assumption of 3 percent sustaining capex, total investment could reach \$130 billion, or just above \$50 billion in the baseline scenario. As with oil and gas, mid-range values were used in the report.

As with oil and gas, labour is a small fraction of costs, reducing pressure to economise on labour force. We therefore projected employment in line with operating costs from 414,000 to a total of about 750,000 by 2035.

Mining

As with the other natural resources sectors, we calculate mining GVA by projecting production and using exogenous price scenarios to determine revenue. Rather than calculate each mineral individually, we use iron ore and copper (about three-quarters of revenue in metals) as a proxy for growth of the sector as a whole. Price projections were taken from World Bank data through to 2025 and then held constant. As with oil and gas, there is a large bound of uncertainty around these assumptions.

For iron ore, we used the production goal set by the Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO), a state-owned holding company responsible for mining policy, of 138 million tons as a 2035 target, a 5.2 percent CAGR. However, as prices have dropped since 2014 and the projections do not increase back to that level, the GVA growth we projected is from \$1.6 billion in 2014 to \$1.7 billion in 2035. There is high uncertainty around this number: at constant prices and production growth of 5.2 percent, GVA from iron ore in 2035 would be \$4.6 billion.

We did a similar calculation for copper, assuming that Iran will increase production to match the global reserve-to-production ratio, World Bank price projections, and utilisation improvements of 1 percent per year. This gave a GVA growth rate of 6 percent, from \$570 million to just under \$2 billion. Using an international benchmark of \$10,000 per ton of capex intensity for a 30-year mine, the production increase will require about \$9 billion of investment. Projecting for the whole sector gave about \$35 billion by 2035, consistent with the \$20 billion that IMIDRO is seeking for projects by 2025.

Together these calculations for iron and copper indicate an increase in GVA from \$2.2 billion in 2014 to \$3.8 billion by 2035. Using a weighted average of iron and copper GVA for the rest of the sector, we found a total GVA growth of 4.3 percent for mining. Using the government's reported GVA of \$3.6 billion in 2014, we found a 2035 GVA of \$10 billion. With a rebound in iron ore prices to 2014 levels, this total would reach about \$14 billion. As with oil and gas, mid-range values were used in the report. Using the government's baseline of 94,000 workers in the mining sector in 2014, employment that increases at the overall production rate of 6 percent would reach just over 300,000.

Agriculture

In the agriculture sector, we assumed different growth potential for higher- and lower-value products. Based on the average farm size of Iranian smallholdings, midsized farms, and large agribusinesses, we chose benchmark countries to model growth for high-value crops, which included milk, saffron, certain fruits, and fishery products like caviar. We assumed these crops will follow a weighted average growth rate of benchmark countries with similar sized agricultural enterprises, for an overall growth rate of around 3.5 percent per annum. All other lower-value crops were expected to grow at the same rate Iranian agriculture achieved from 2010 to 2014, around 3 percent per annum. With currency appreciation factored in, the agriculture sector as a whole was assumed to grow at an annual rate of 4 percent.

With regards to productivity, we assumed Iran's labour productivity in agriculture would improve from 2014 to 2035 at the same rate as Turkey's productivity over the past five years. That is a growth rate of 2.7 percent per year. This signifies a rise in Iran's productivity to \$13,600 per worker in 2035 from about \$7,900 in 2014, and adds around 250,000 jobs in the sector.

Investment in agriculture was assumed to grow at a similar rate as the sector overall, and was expected to come largely from domestic sources. With current investment levels in agriculture around \$2 billion per year, we estimated total investment over 20 years to be around \$70 billion.

Nurturing internationally competitive industries

Automotive

To estimate Iran's 2035 vehicle manufacturing GVA, we identified a group of high-potential export targets: former top-ten importers of Iranian automobiles, geographic neighbours, and other Middle Eastern and Central Asian nations. To project the market size for each of these countries, we used multiple regression analysis on 98 countries to determine the relationship between vehicle penetration and a country's GDP per capita and average gasoline price. We then calculated implied 2014 and implied 2035 vehicle penetration and applied the growth between the two to the actual 2014 vehicle penetration in these target countries. We then multiplied 2035 penetration by expected 2035 population to estimate 2035 sales volume per country. To calculate sales value, we applied the average price of the three top-selling cars in comparable countries (based on geographic and developmental similarities) to each of our target countries, and then multiplied this by our projected 2035 volume. To calculate Iran's achievable market penetration in Central Asia, we used Turkey's historical market share as a baseline. For Iraq and Syria, we used Iran's existing penetration. For Pakistan, Turkey, and the Gulf Cooperation Council countries, we compared Iran's production capabilities to those countries' vehicle preferences and other market dynamics (i.e., high compressed natural gas penetration in Pakistan, robust domestic market in Turkey). We then applied achievable 2035 penetration rates to our projected 2035 market size to determine Iran's 2035 export potential and applied Iran's prevailing GVA margin of 26 percent. To project growth in domestic sales, we used a similar approach, using Iran's pre-2011 vehicle penetration as a base to remove the distortion created by sanctions.

To calculate the total investment required to achieve our projections we performed a bottom-up cost estimation of the three different types of required investment. First we analysed the investment required to improve the quality of existing production—ranging our estimate from the cost of minimal equipment modernisation on the low end to a complete overhaul of existing models as an upper bound. Second, we estimated the cost of increasing factory utilisation to peer levels through the addition of new production lines. Finally, we looked at the cost of constructing greenfield facilities to meet additional demand. Additionally, we assumed maintenance on existing capital assets remained at Iran's historical level and included additional depreciation-related expenses. We also assumed average entry costs for new export markets. To estimate total future employment, we benchmarked Iran's 2035 productivity to Turkey's current level.

Basic materials

We calculated GVA in basic materials for domestic and export markets, with higher margins coming from the former due to lower transportation costs and, in the case of steel, tariffs.

In each case we first calculated domestic demand by looking at average consumption intensities (kg per capita) as a function of a country's GDP per capita and compared Iran's recent trajectory. These data suggested Iran would increase cement and steel consumption above GDP growth for five to ten years, after which they may drop below GDP growth. For simplicity in the dynamic aggregate model we estimated growth in basic materials at 1.3 and 1.0 GDP growth for the two ten-year periods between 2015 and 2035. However, we carried out the calculation in more detail in each of the two sectors.

For cement, we projected consumption at 6.5 percent CAGR from 2015 to 2025 and then a decrease to replacement levels of cement. We assumed capacity would increase based on government targets of about 4 percent per year. Assuming that future profit margins on domestic sales will be like past margins in Iran of 30 percent to 35 percent and export margins of about 20 percent, we found a cement, concretes, and aggregates GVA CAGR of 5.1 percent to 2035. Using the same capacity growth for finished stone brought the total GVA for 2035 to \$16 billion.

We assumed a capex intensity for cement of \$200 per ton with a depreciation period of 25 years based on industry benchmarks. This is extremely capital-intensive and requires about \$40 billion of investment, about half of that for sustaining capex, to meet production estimates. The other elements of this sector, mainly concrete and building stone, are not as capex-intensive, and we estimated a total of \$60 billion of capex between 2014 and 2035 for the whole sector.

As with cement, Iran is in a period of development where steel consumption intensity is high and will likely rise further. Projecting intensity growth from the 2005–11 period out to 2025 it could reach about 450 kg per capita, where global benchmarks suggest it will level out. This demand is equivalent to 37.5 million tons per year, which equates to a 6.3 percent CAGR. We then assumed that growth would slow down to a level between population and GDP growth of 3 percent to reach 50 million tons per year by 2035. Assuming that Iran could increase production in the future at the high rate that it did from 2008 to 2014 (8.6 percent CAGR), it will reach self-sufficiency in 2022, 50 million tons per year by 2030, and 65 million per year by 2035. Whilst this is a fast growth rate for production, it is somewhat lower than the government target of more than 11 percent CAGR to reach 52 million tons per year by 2025.

Using these supply and demand estimates and projecting historical profit margins of 30 percent for domestic sales and estimating a lower margin for potential exports of 10 percent, we found a 2035 GVA CAGR of 5.3 percent. Applying this CAGR and currency appreciation to the GVA of the overall manufactured metals category from IHS, we found an increase from \$4 billion to \$16 billion. Both construction aggregates and metals were then adjusted to real exchange rates for our 2035 estimate. Using the benchmark from current government plans of \$570 per ton capex intensity implied a requirement of \$25 billion for steel and \$40 billion for metals overall. Assuming that Iran could double its productivity to approach about half the productivity in Turkey—the main player in the region with more workers further downstream—Iran would add 300,000 jobs to take the total in metals to just under 900,000. A similar increase in productivity in non-metals would bring an increase from just under 500,000 jobs to more than 700,000.

Fast-moving consumer goods and retail trade

To derive the relationship between fast-moving consumer goods (FMCG) category sales and GDP per capita we used a fixed-effects model to calculate a growth multiplier for each retail sales category. We then summed these multipliers to forecast aggregate retail sales growth. As FMCG manufacturing is driven by retail sales, we applied the same aggregate growth rate to the 2014 sales of both categories, which yielded our projected 2035 domestic annual sales of the FMCG and retail sectors. For FMCG, we accounted for net exports by benchmarking Iran's export share (exports as a percentage of total sales) to other regional manufacturing hubs (i.e., Algeria, Egypt, Morocco, Tunisia, and Turkey) and netting out projected imports (which we calculated by applying Iran's historical import CAGR to existing imports). To calculate domestic GVA, we then applied Iran's existing GVA margins (22 percent for retail and 26 percent for FMCG) to the total forecast 2035 sales.

To calculate the investment required for both FMCG and retail, we used historical capex margin benchmarks. For FMCG we applied a ten-year historical average capex margin (capex as a percentage of sales) of a select group of peer countries to Iran's projected annual sales to estimate investment. For retail, we used the average capex margin of the top 250 grocery retailers as a proxy for overall retail investment. To calculate total investment required, we applied this to our projected 2035 retail sales. To estimate future employment in retail, we benchmarked Iran's 2035 productivity to Turkey's current level. For FMCG, given Iran's already high level of development, we benchmarked Iran to Mexico.

Tourism

To calculate tourism's GVA potential, we projected the change in number of visitors and spending per visitor in each of the two major subsectors—international and domestic tourism. In domestic tourism, we assumed that the number of visitors would rise in line with Iran's population growth and that spending per visitor would increase at the same rate as Iran's overall GDP. For international overnight tourism, we assumed that the opening of Iran's economy, greater government and business focus on the tourism sector, and a major international marketing campaign could attract significant additional visitors over the next ten years. We assumed increases similar to those seen in Malaysia from 1998 to 2007 after the launch of its "Malaysia: Truly Asia" campaign. We assumed that spend per international visitor would grow to reach the level of Turkey today as tourism facilities are upgraded and tourists are willing to spend more for an improved, upscale experience. For international excursionists, those visitors who do not stay overnight, we assumed that spending per visitor would return to pre-sanctions levels whilst the number of excursionists would grow in line with the average increase seen in Malaysia from 1998 to 2007.

We assumed that as the sector expands and adopts international best practices, Iran could reach Turkey's productivity today by 2035. Future employment was calculated by dividing the projected 2035 GVA in tourism by this 2035 productivity number, expressed in terms of GVA per employee.

Finally, we calculated investment by benchmarking to three developing countries that have experienced significant growth in tourism over roughly 20-year periods: Malaysia, Morocco, and Ukraine. We divided each country's investment in the tourism sector over these periods by the increase in number of international tourists per year they experienced to establish the investment required per additional tourist. We applied an average of these numbers to the projected increase in tourists per year in Iran to estimate Iran's required investment to attract and support these new visitors.

Transitioning to a knowledge-based economy

Financial services

The financial sector is an enabling sector whose value equally affects and is affected by the value of the whole economy. Whilst the main output of the financial sector is financial services, including intermediation and transactions, their value added can be difficult to estimate. A more concrete metric of the size of the financial sector is financial assets, defined as the total value of outstanding debt and equity instruments. MGI research has shown that the ratio of financial assets to total GDP in emerging markets is 200 percent on average.⁴¹⁹ Assuming a constant GVA margin in the future, the input of the banking sector into the integrated GVA model is one that grows the sector in the same proportion as the emerging market average.

Capital requirements in the banking sector are driven by the amount of capital banks need to retain in order to provide loans and the amount of investment required for expanding capital markets. For the former, using the average capital structure from emerging markets and benchmark capital requirements from developing country peers, we calculated the additional capital requirement for the banking sector by 2035 to be \$140 billion. We calculated an additional \$80 billion for depreciation (using a rate of 4 percent based on previous MGI research) to compensate for the capital that will erode due to non-performing loans and building/maintaining technology and infrastructure.⁴²⁰ This brought total investment in the banking sector to \$220 billion. To expand capital markets, we calculated an additional \$25 billion capital requirement by using the same investment-to-GVA ratio between the banking sector and capital market administration and sell-side activities as

⁴¹⁹ *Mapping global capital markets 2011: Updated research*, McKinsey Global Institute, August 2011.

⁴²⁰ *Financial globalization: Retreat or reset?* McKinsey Global Institute, March 2013.

reported by IHS. This brought the cumulative investment for the financial sector from 2014 to 2035 to around \$250 billion.

Employment in banking and capital markets will likely be driven by GVA growth and productivity. Based on the calculation above, Iran's banking GVA was projected to grow by a CAGR of 10 percent. At the same time, we assumed that productivity in the banking sector would grow by 5 percent per annum, in line with the growth in Turkey over the past 15 years. The growth in productivity would temper the growth in employment to 4.7 percent, increasing Iran's banking sector employment from 280,000 in 2014 to 730,000 in 2035.

Growth in Iran's insurance sector has been considered separately for motor, health, life, and all other non-life insurance lines. Motor insurance GVA was expected to grow in line with the total number of automobiles in Iran over the next 20 years, based on Iran's current fleet, expected auto sales, and old vehicles retiring each year, for just over 5 percent per year growth. Growth in health and life insurance GVA will likely be driven by current penetration rates and expected income growth. Using McKinsey's Global Insurance Pools database to calculate the ratio of Turkey's health insurance premiums to GDP per capita growth from 2000 to 2014, we estimated health insurance growth in Iran of 6.4 percent per annum. Similarly, using a ratio of Turkey's life insurance premiums to GDP per capita growth from 2000 to 2014, we calculated life insurance growth of 5.4 percent per annum. All other non-life insurance lines were expected to grow in line with the Iranian economy to 2035. With all four segments combined and currency appreciation included, Iran's insurance sector was estimated to grow at 6.7 percent per year over the next 20 years.

Employment estimates were also benchmarked against the productivity of Turkey's financial and insurance sector on a purchasing power basis, assuming Iran would reach the benchmark level by 2035 whilst adding around 55,000 jobs to the economy. Capital investment in Iran's insurance sector was based on current levels of investment projected to grow at the same rate as the sector GVA to 2035.

Professional services and other services

Professional services were divided into three segments: professional, scientific, and technical activities; private household services; and leasing of machinery and equipment.

The GVA of professional, scientific, and technical activities was projected to increase at 6 percent per year, in line with the experience of peer countries over the past decade.⁴²¹ Productivity on PPP terms was higher than comparable countries and therefore assumed to stay constant until 2035. Investment as a percentage of GVA in the business services sector has been very high in Iran over the past few years, at times surpassing the GVA. As countries develop, the investment as a percentage of GVA decreases. We expected Iran's investment as a share of the GVA in business services to decrease to the current world average.

Private household services comprise a small part of the Iranian economy. We assumed going forward that the sector would grow at the same level as Turkey between 2010 and 2014. Productivity was also estimated to reach Turkey's level. Investment as a percentage of GVA was assumed to be the average of Iran's investment intensity over the past ten years.

Leasing of machinery and equipment was projected to grow at the same rate as Turkey's from 2010 to 2014. This sector's productivity in Iran in PPP terms is high; we therefore assumed it would remain constant. Investment as a share of GVA has decreased in Iran over the past five years and we assumed it would remain at the same level as a percentage of GVA going forward.

⁴²¹ Includes Eastern and Central European countries such as Hungary, Slovakia, and Slovenia.

Information and communications technology

To develop an integrated perspective of this sector in the model, we looked at subsectors separately: mobile telecoms, fixed telecoms, software and IT services, and hardware. This modelling approach differed slightly from the structure of Chapter 2, which focused on the most important strategic subsectors.

Mobile telecoms. Revenue for mobile telecom operators is a function of average revenue per user (ARPU) and the number of subscribers. The ARPU of Iranian mobile telecoms is dominated by SMS and voice, with only a low percentage of revenue coming from data. We assumed that in the future SMS and voice would constitute a lower share of total revenue and that data consumption would increase significantly and dominate the ARPU of mobile telecom operators. We used the following projections to calculate the size of Iran's mobile telecom sector in 2035:

- Data consumption will experience growth in line with Middle East and Africa growth forecast by Cisco up to 2019. Beyond 2019, due to the difficulty of forecasting growth rates, we used regression analysis between the Networked Readiness Index (NRI) and telecommunication GVA per as a predictor for growth in Iran's data consumption up to 2035, if Iran was to reach Turkey's levels on the NRI.
- ARPU of SMS was estimated to decline at the same rate as China over the past five years and ARPU of voice was expected to remain the same throughout the next 20 years as over-the-top services replace traditional mobile voice, and increases in usage are offset by lower prices because of increased competition.

As mobile penetration is already very high in Iran, we projected the number of subscribers to increase at the same rate as the overall population.

Iran has experienced periods of high capex intensity with the rollout of new technology and low capex intensity as a result of sanctions and of exclusivity barriers since 2008. We estimated average investment as a percent of revenue going forward to continue to be the same as the average between 2008 and 2014. Because Iran's productivity is high in this sector, we projected it to remain constant going forward.

Fixed telecoms. Fixed telecom GVA was divided into fixed broadband and fixed voice.

We projected that fixed broadband GVA would grow based on the NRI and GVA per regression methodology outlined above. For productivity, we used the number of subscribers per full-time equivalent as a benchmark and estimated that it will improve to the level of Turkey's largest fixed broadband operator. Investment in fixed broadband will likely be dominated by the rollout of fibre technology. We used McKinsey's One Benchmark proprietary database to estimate the investment required if Iran is to reach South Korea's level of homes connected to fibre-to-the-home networks. We assumed 20-year straight-line depreciation for the investment.

Fixed voice GVA was divided between consumer and business. We assumed revenue of business customers would grow at the same rate as the number of new businesses registered in Turkey between 2004 and 2014. Meanwhile, due to high penetration, we assumed consumer GVA would grow with the population. Productivity in fixed voice telecoms in Iran is higher than for some other large fixed voice operators of the same scale, and therefore we assumed it would remain constant. Average capital intensity in Iran between 2008 and 2014 was in line with our eight other comparable countries, and therefore we assumed capital intensity would remain the same going forward.

The positive spillover effects of broadband penetration on employment and GDP have not been included in the overall model because every sector considered growth opportunities independently. For the purpose of the report where we have mentioned spillover effects, we used the following methodology: an increase of 27 percent in broadband penetration implied a GDP elasticity of $2.7 \times (0.6 \text{ to } 0.7) = 1.6 \text{ to } -1.9$ percent of GDP, according to research by the International Telecommunication Union. At the same time, we assumed employment elasticity of 0.5 percent of GDP growth. In other words, a 0.5 percent increase in employment per 1 percent increase in GDP would yield 200,000 jobs in all sectors through spillover effects.

Computer programming and related activities. This sector comprises five subsectors: motion picture production and music publishing; programming and broadcasting activities; computer programming and consultancy activities; information service activities; and the IT outsourcing (ITO) sector. As employment data on Iran was available only at the overall sector level, we used Turkey as a benchmark to divide employment into each of the subsectors. Given the unique characteristics of Iran in the first two subsectors, we assumed that the GVA in these sectors would grow at the same rate as Iran's GVA CAGR in the same sectors over the last 14 years. We projected the next two subsectors would grow at the same level of GVA growth in Turkey between 2000 and 2014. We expected productivity of the overall sector to reach Turkey's level by 2035. We also expected capital efficiency to improve and reach Turkey's level in 2035 on a straight-line basis. We estimated that the ITO sector would reach \$1 billion in revenue by 2025, the same level that Egypt reached in 2010 after ten years of focus on becoming an ITO hub. Going forward from 2025 to 2035, we assumed the ITO sector would increase by the same level experienced in other ITO hubs since 2008 and forecast to 2020. We expected that productivity and export share of this subsector in Iran would be at the same level as Egypt's.

Hardware. This sector includes computers, office machinery, communications equipment including semiconductors, and TVs. We did not see the potential for Iran to expand its domestic capabilities in this sector. As a result, we assumed flat-line GVA and investment numbers until 2035. Furthermore, Iran's current productivity is in line with that of Turkey and other countries, and as a result we expected productivity to remain the same.

Pharmaceuticals

Our methodology to project GDP, productivity, employment, and investment in pharmaceutical manufacturing used Poland's pharmaceutical sector growth from 1992 to 2012 as an international benchmark. Numerous similarities exist between Poland in 1992 and Iran today that make Poland a suitable benchmark. Poland in 1992 had a similarly underpenetrated pharmaceutical market, ageing population, growing wealth, existing industrial base, and closed economy. It was able to leverage its opening to Western investment at the end of the Cold War to significantly boost the pharmaceutical sector.

To project GDP, we calculated how Poland's pharmaceutical sector grew relative to its overall GDP between 1992 and 2012. Given the similarities between the two countries, we assumed a comparable coefficient in Iran and applied it to Iran's projected GDP growth to estimate the potential size of the industry by 2035. For productivity levels, we assumed that as the sector expands and adopts international best practices, Iran could reach Poland's current productivity by 2035, almost quadrupling productivity. Future employment was calculated by dividing the projected 2035 GVA in pharmaceuticals by this 2035 productivity number, expressed in terms of GVA per employee. Finally, we assumed that Iran would require a similar amount of investment in pharmaceuticals over the next 20 years as Poland did from 1992 to 2012. We adjusted this number up to account for Iran's larger starting industry size and higher population.

Health care

We assumed that the health-care sector would grow in line with the overall economic growth rate plus the population growth rate, as Iran expands its health-care infrastructure to serve a larger and wealthier populace. We assumed that productivity would rise at the average level of the other sectors in the economy. Employment in health care was calculated by dividing projected 2035 GVA by 2035 productivity, expressed in terms of GVA per employee.

To calculate the total investment required for Iran's health-care sector we benchmarked against Poland's historical health-care capital expenditure per capita from 1992 to 2012. We chose Poland during this period because of the numerous similarities to our projections for Iran, including being largely cut off from Western investment and having similar sized elderly age segments and similar rates of GDP growth. We then applied Poland's historical capital expenditure per capita to Iran's projected population through 2035 and calculated the cumulative sum.

Expanding and modernising infrastructure

Transport

Growth expectations in transport have been treated differently among freight transport, urban transit, and post services. We assumed that transport GVA growth is an enabler of broader economic growth and at the same time is propelled by the growth of other sectors in the economy. Freight transport, including rail freight, air cargo, shipping, trucking, and warehousing, was assumed to grow with the expected GVA growth of Iran's basic materials, oil and gas, construction, agriculture, and FMCG sectors, proportionate to the freight volumes covered by these sectors. Growth assumptions for urban transit were based on the growth rates of comparable cities that have undergone expansion of their public transit systems, specifically Shanghai and Moscow. Using a ratio of transit growth to urbanisation rates against these benchmark cities, we assumed an estimated growth rate of nearly 6 percent for urban transit GVA. The final component of transport growth, post and parcel services, was based on both expected population growth in Iran and expected increases in e-commerce.

In terms of productivity levels, we assumed that Iran by 2035 could reach the average productivity levels in transport of a set of countries with a heavy mix of maritime and freight rail. The countries, which cluster around a productivity of \$93,600 on a purchasing power parity basis, include Finland, Greece, the Netherlands, Norway, Panama, Portugal, and Turkey. This benchmark implied more than a doubling in Iran's transport productivity as the transport sector modernises and adopts global best practices.

Investment estimates were driven by the current average ratio of transport infrastructure stock to transport GVA in Germany, Turkey, and the United Kingdom, given that these transport-heavy economies provide a midpoint between developing and developed contexts. Using this ratio, we calculated the transport investment required to move Iran's current transport infrastructure stock to the required level by 2035, based on our estimation for Iran's 2035 transport GVA and assuming 5 percent depreciation.

Utilities

The utilities sector consists of gas, electric, and water utilities. GVA data were allocated among these three, with electric utilities receiving the highest proportion. For gas GVA, we estimated elasticity of demand for population increases and for income increases combined with anticipated increases in price and its counteracting impact on demand, resulting in approximately a 3 percent CAGR for gas GVA. Electricity was divided between residential and non-residential consumption. The residential consumption GVA growth rate was assumed to grow slightly faster than the population's growth rate due to price increases. Non-residential use was expected to grow at the rate of the economy as a whole. Electricity growth could be reduced if energy-efficiency measures are introduced and become

widespread, or it could increase if exports rise more quickly. Considering electricity reliability issues in neighbouring countries, we estimated Iran's utility exports would continue to increase at historic rates. We also expected water use to grow slightly faster than the rate of the economy in light of efforts to raise revenue through better monitoring and charging for use.

Utilities are low labour intensity and therefore we assumed it would be unlikely for employment to increase dramatically. We used high-productivity countries for benchmarking. Spain's utility sector productivity on a PPP basis shows it is reasonable for Iran to increase its labour productivity by around 50 percent. Investment estimates were based on the publicly available pipeline of large projects as well as the need to maintain existing utility infrastructure.

Real estate

GVA of the real estate sector is dominated by commercial and residential imputed rent. To break down the GVA of this sector we took into consideration McKinsey Cityscope's floor space demand for commercial and residential properties. We expect the commercial GVA to grow at the same rate as the economy. For residential GVA, our forecasts were based on McKinsey Cityscope's CAGR of residential floor space up to 2025; we extrapolated that to 2035. We expected investment intensity as a percentage of GVA in real estate Iran to follow the same trend as the average over the past ten years in Iran.

Most real estate employees in Iran are real estate agents. To calculate productivity, we considered the total number of transactions per employee annually as a metric. In light of real estate similarities between Iran and Russia, we benchmarked productivity with that in Russia. To find the total number of transactions in 2035, we assumed the same number of transactions per household for both Iran and Russia and used McKinsey Cityscope's estimate for the number of households.

Construction

We defined the construction sector as the building of real estate, transport, utilities, social infrastructure, and industrial construction except upstream oil and gas. This construction is a function of other sectors' investment. To determine the 2035 GVA, we examined investment for each sector and applied typical proportions of investment spend allocated to construction. In telecom, for example, we assumed that construction as a proportion of investment would be around 22 percent. Real estate investment, meanwhile, would require about 70 percent construction spend. Historic margins from the McKinsey Infrastructure Projects Analytics Tool and the IHS value added and revenue sources were used to estimate the sector's value added from these revenue estimates. Construction services exports are expected to reach \$5 billion by 2035.

Productivity and employment were determined using Poland's labour productivity as a benchmark. Poland's labour productivity has improved significantly since opening to the West and is superior to Iran's labour productivity of today, although it still trails best-in-class countries. This benchmark would require around a 60 percent improvement in productivity for Iran. For investment in infrastructure, we looked at upcoming investment requirements in Iran as well as typical investment-to-GVA ratios. These were checked against reports on Iran's investment needs. We then applied potential rates of improvement to investment spend if the construction companies and asset owners improved operations and strategy. Streamlining delivery of projects could reduce investment by 15 percent, and optimising use of existing asset infrastructure decreases investment spend by an additional 8 percent. These and other improvements amounted to a total potential reduction in investment spending of 38 percent.

Other sectors

Public sector

To project growth in the public sector, we used Turkey's historical performance as a benchmark. We assumed that GVA would grow in line with Turkey's 20-year historical average in the public sector and social services. We did not project future employment or productivity in the public sector, as only private-sector jobs were considered in our employment analyses.

For investment, we assumed that roughly 2.5 times the GDP added by the public sector would be required in investment, in line with previous MGI research.

Other manufacturing

We assumed that the other manufacturing sector would grow in line with the overall economic growth rate. Given Iran's low productivity, we assumed that employment would remain flat through 2035. To calculate 2035 productivity, we divided 2035 GVA by 2035 employment.

For investment, we assumed that roughly 2.5 times the GDP added by other manufacturing would be required in investment, in line with previous MGI research.

FOREIGN INVESTMENT AND FDI CALCULATION

To estimate the percentage of foreign investment, we used gross fixed capital formation (GFCF), which is a measure of gross net investment in fixed capital assets, as a proxy for total investment. We looked at average total capital flows as a percentage of GFCF over the past 21 years for peer countries to find the percentage of Iran's total investment that could come from foreign investment. To estimate FDI, we used a similar methodology and took the average of FDI inflows as a percentage of GFCF for the peer countries over the past 21 years and applied that to our bottom-up total investment number calculation. Based on this calculation, 33 percent of total investment could come from foreign sources and 10 percent of total investment from FDI.



The tomb of Hafez, in Shiraz.
© Emad Aljumah/Getty Images



An orchestra plays a concert in Tehran.

© Hadid Golab

BIBLIOGRAPHY

A

Ahmadian, Azam, *Assessment of banking health index for Iran's banks (2011–2012)*, Monetary and Banking Research Institute, Central Bank of Iran, working paper number MBRI-9222, 2014.

Ahmadian, Azam, *Bank market share analysis*, Monetary and Banking Research Institute, Central Bank of the Islamic Republic of Iran, working paper number MBRI-9223, 2013.

Ahmadian, Azam, *Evaluation of health indicators, Bank of Iran*, Monetary and Banking Research Institute, Central Bank of the Islamic Republic of Iran, working paper number MBRI-9222, 2013.

Allen, Heather, "An integrated approach to public transport, Tehran, Islamic Republic of Iran: Case study prepared for *Global report on human settlements 2013*", UN-Habitat, 2013.

Alvani, S., E. Mahdikhani, and H. Rouhani, "New records of *Boleodorus Thorne* 1941 from *Berberis vulgaris* L., in Iran", *Pakistan Journal of Nematology*, volume 31, number 1, 2013.

Axco, *Insurance market report: Iran: Life & benefits*, 2015.

Axco, *Insurance market report: Iran: Non-life (P&C)*, 2015.

B

Badev, Anton, Thorsten Beck, Ligia Vado, and Simon Walley, *Housing finance across countries: New data and analysis*, policy research working paper number 6756, World Bank, January 2014.

Bakhtiari Ghale, Ali, *Copper industry in world and Iran*, National Iranian Copper Industries Company, June 14, 2015.

Balassa, Bela, "The purchasing-power parity doctrine: A reappraisal", *Journal of Political Economy*, volume 72, number 6, 1964.

The Banker, "Top Islamic financial institutions 2014", November 2014.

Bazmohammadi, Hossein, and Akbar Cheshmy, *Government size in the Iranian economy*, Central Bank of the Islamic Republic of Iran, August 2007.

Bimeh Markazi Iran (Central Insurance of I. R. Iran), *Annual report 2012–2013*, 2013.

Bimeh Markazi Iran, *Annual report 2014–2015*, 2015.

Bimeh Markazi Iran, *Ten-year performance report*, 2013.

Bimeh Markazi Iran, *Industry strategic plan*, 2013.

BP, *BP statistical review of world energy*, 64th edition, June 2015.

Brown, Amber, and Marty D. Matlock, *A review of water scarcity indices and methodologies*, Sustainability Consortium white paper number 106, April 2011.

Business Monitor International, *Iran agribusiness report Q4 2015*, BMI Research industry report and forecasts series, August 2015.

Business Monitor International, *Iran freight transport report Q4 2015*, BMI Research industry report and forecasts series, August 2015.

Business Monitor International, *Iran infrastructure report Q4 2015*, BMI Research industry report and forecasts series, August 2015.

Business Monitor International, *Iran insurance report Q4 2015*, BMI Research industry report and forecasts series, August 2015.

Business Monitor International, *Iran pharmaceuticals and healthcare report Q3 2015*, BMI Research industry report and forecasts series, June 2015.

Business Monitor International, *Iran shipping report Q4 2015*, BMI Research industry report and forecasts series, August 2015.

Business Monitor International, *Iran water report 2015*, September 2015.

C

Carrington, William J., and Enrica Detragiache, "How extensive is the brain drain?" *Finance and Development*, volume 36, number 2, June 1999.

Central Bank of Iran, *2014 Interbank performance*, June 2015.

Central Bank of the Islamic Republic of Iran, *Economic report and balance sheet 1391 (2012/2013)*, 2015.

Central Bank of the Islamic Republic of Iran, "Trends in average real estate sizes in urban areas throughout the country", 2014.

D

Daley, Eoin, and Seelan Singham, "Jump-starting Malaysia's growth: An interview with Idris Jala", *McKinsey Quarterly*, October 2011.

Deiningner, Klaus, and Derek Byerlee, *Rising global interest in farmland: Can it yield sustainable and equitable benefits?* World Bank, 2011.

Devarajan, Shantayanan, and Lili Mottaghi, "Economic implications of lifting sanctions on Iran", *MENA Quarterly Economic Brief*, issue 5, World Bank, July 2015.

Derakhshanalavijeh, Roya, and José Manuel Cardoso Teixeira, *Causes of cost overrun in construction projects in developing countries*, Proceeding of the 10th international conference on industrial engineering and operations management, Dhaka, November 2014.

Dobbs, Richard, James Manyika, and Jonathan Woetzel, *No ordinary disruption: The four global forces breaking all the trends*, Public Affairs, 2015.

E

Energy Pioneers, *Iran's power industry analysis: Investment risks and opportunities in post-sanctions era*, 2015.

Energy Pioneers, *A legal guide for investing in Iran's FTIZs and SEZs*, February 2016.

Esfahani, S. Hadi, "Iran's experience with oil windfalls", *MENA Quarterly Economic Brief*, issue 5, World Bank, July 2015.

Euromonitor International, *Grocery retailers in Iran*, March 2015.

Euromonitor International, *Packaged food in Iran*, December 2015.

Euromonitor International, *Retailing in Iran*, March 2016.

F

FACTS Global Energy, “Refined products balance”, May 2015.

FACTS Global Energy, “Iran’s South Pars gas development: How much gas and condensate will be supplied to the market?” *Energy Advisory*, issue 387, March 3, 2015.

FDI Markets, *Iran inward FDI: January 2003 to September 2015*, October 2015.

Food and Agriculture Organization of the United Nations, “Country fact sheet on food and agriculture policy trends: Iran”, September 2014.

G

Ghorbani, Mansour, *The economic geology of Iran*, Springer, 2013.

Ghorbani, M., “The economics of saffron in Iran”, in *II International Symposium on Saffron Biology and Technology*, ISHS Acta Horticulturae 739, April 2007.

Global Entrepreneurship Monitor, *2014 global report*, 2015.

Global Water Intelligence, *Global water market 2015: Meeting the world’s water and wastewater needs until 2018*, October 2014.

Guillaume, Dominique, Roman Zyteck, and Mohammad Reza Farzin, *Iran: The chronicles of the subsidy reform*, IMF working paper number 11/167, July 2011.

H

Hassanzadeh, Elham, *Iran’s natural gas industry in the post-revolutionary period: Optimism, scepticism, and potential*, Oxford University Press, 2014.

I

IHS Automotive, “Vehicle forecasts”, December 2015.

Industrial Management Institute, *Ranking of top 500 Iranian companies in 2013 (based on 2012 financial reports)*, 2013.

Information Technology Industry Development Agency—Egypt, *Destination Egypt: ITO-BPO value proposition*, January 2012.

International Cement Review, “World overview”, in *The global cement report, 11th edition*, 2015.

International Copper Study Group, *The world copper factbook 2014*.

International Energy Agency, *World energy outlook 2010*, November 2010.

International Gas Union, *IGU world LNG report—2015 edition*, 2015.

IMF, *Islamic Republic of Iran: Selected issues*, IMF country report number 04/308, September 2004.

IMF, “Islamic Republic of Iran: Staff report for the 2014 Article IV consultation”, IMF country report number 14/93, March 2014.

IMF, *Regional economic outlook: Middle East and Central Asia*, 2015.

IMF, *World economic outlook*, 2014.

IMIDRO (Iranian Mines and Mining Industries Development and Renovation Organization), “An introduction to the strategy of Iranian government to promote investment in mining and metal sector: Foreign investor opportunities”, November 10, 2015.

IMIDRO, "Overview of the Iranian iron and steel markets", December 8, 2014.

International Organization of Motor Vehicle Manufacturers (OICA), "2005–2014 sales statistics", 2014.

International Organization of Motor Vehicle Manufacturers (OICA), "2005–2014 production statistics", 2014.

International Telecommunication Union, *The impact of broadband on the economy: Research to date and policy issues*, April 2012.

International Telecommunication Union, *Measuring the information society of Iran (Islamic Rep.): ICT and sustainable development*, 2015.

Invest in Iran (Organization for Investment, Economic and Technical Assistance of Iran), "Transportation", 2016.

Iran Information Society, *ICT facts and figures*, 2015.

Iran Jib, "Cement prices", March 2016.

Iran Management and Planning Organization, "The Sixth Five-Year Development Plan", February 2016.

Islamic Republic of Iran Ministry of Energy, *Iran, water and power investment and cooperation opportunities*, 2016.

Italian Trade Agency, *Market overview of Iran's agricultural food sector*, January 2016.

J

Jütting, Johannes P., and Juan R. de Laiglesia, eds., *Is informal normal? Towards more and better jobs in developing countries*, OECD, April 2009.

K

Karbasian, Mehdi, "An introduction to the strategy of Iranian government to promote investment in mining and metal sector", presented at International Mining and Resources Conference in Melbourne, November 10–12, 2015.

Karimi, Mohammad, Ali Cheshomi, and Behzad Hassannezhad Kashani, "The privatization effects on Iran insurance industry", *International Journal of Economics and Finance Studies*, volume 2, number 2, 2010.

Ken Research, *Iran insurance industry outlook to 2017: Growth steered by rising health insurance penetration*, November 2013.

Khoshnood, Zahra, and Marzieh Esfandiari, *Evaluation of banks' capital based on international standards*, Monetary and Banking Research Institute, Central Bank of the Islamic Republic of Iran, number MBRI-PN-93008, 2014.

L

Levine, Ross, *Finance and growth: Theory and evidence*, NBER working paper number 10766, September 2004.

Lowder, Sarah K., Jakob Skoet, and Saumya Singh, *What do we really know about the number and distribution of farms and family farms in the world? Background paper for The State of Food and Agriculture 2014*, ESA working paper number 14-02, Food and Agriculture Organization of the United Nations, 2014.

M

Mansour, Mehi S., Mehran L. Foroushani, and Parviz Bagheri, "Effects of temporary contracts in labour law of Iran", *GSTF International Journal of Law and Social Sciences*, volume 2, number 1, December 2012.

McKinsey & Company, *Capturing value in global gas: Prepare now for an uncertain future*, July 2014.

McKinsey & Company, *India healthcare: Inspiring possibilities, challenging journey*, December 2012.

McKinsey & Company, "Modern grocery and the emerging-market consumer: A complicated courtship", *Perspectives on retail and consumer goods*, number 4, autumn 2015.

McKinsey & Company, *Restarting the US small-business growth engine*, November 2012.

McKinsey Global Institute, *A blueprint for addressing the global affordable housing challenge*, October 2014.

McKinsey Global Institute, *Farewell to cheap capital? The implications of long-term shifts in saving and investment*, December 2010.

McKinsey Global Institute, *Financial globalization: Retreat or reset?* March 2013.

McKinsey Global Institute, *Global flows in a digital age: How trade, finance, people, and data connect the world economy*, April 2014.

McKinsey Global Institute, *Mapping global capital markets 2011: Updated research*, August 2011.

McKinsey Global Institute, *The power of parity: How advancing women's equality can add \$12 trillion to global growth*, September 2015.

McKinsey Global Institute, *Reverse the curse: Maximizing the potential of resource-driven economies*, December 2013.

McKinsey Global Institute, *Urban world: Mapping the economic power of cities*, March 2011.

Ministry of Agriculture, *Farming products 2014*, 2014.

Ministry of Agriculture, *Fishery and livestock 2014*, 2014.

Ministry of Agriculture, *Horticultural products 2014*, 2014.

N

National Commission of UNESCO in Iran, *National report on the situation of adult learning and education (ALE)*, April 2008.

National Petrochemical Company, *Iran's petrochemical industry report: Annual report 2014*, 2015.

National Science Foundation, *Science and engineering indicators 2014*, February 2014.

Nejad, Syd, "Is Iran worth the risk?" *Oil and Gas Financial Journal*, December 2015.

NGVA Europe (Natural and Bio Gas Vehicle Association), "Total NGV population (other than ships, trains and aircraft)", September 23, 2013.

Nili, Farhad, and Amineh Mahmoodzadeh, *Credit crunch in Iran: Micro evidence and macro implications*, Monetary and Banking Research Institute, Central Bank of the Islamic Republic of Iran, number MBRI-PP-93030, December 2014.

Nili, Massoud et al., *Evaluation of the consequences of energy subsidy reform*, Tehran Chamber of Commerce, Industries, Mines and Agriculture, 2010.

Nili, Massoud et al., *Where is the Iranian economy headed towards?* World economy publication, 2015.

Nili, Massoud, Hassan Dargahi, and Farshad Fatemi, *Productivity of the Iranian industry- evaluation of the competitiveness of industrial enterprises*, Iran economy, 2012.

Nili, Massoud, Hassan Dargahi, Mohammad Kordbache, and Farhad Nili, *The government and the economic growth in Iran*, Nashre Ney, 2010.

O

OECD, "Looking to 2060: A global vision of long-term growth", *OECD Economics Department Policy Notes*, number 15, November 2012.

P

Ports and Maritime Organization, "Iranian ports: Basic ports information", Islamic Republic of Iran Ministry of Roads and Urban Development, December 30, 2015.

Q

Quah, Danny, "The global economy's shifting centre of gravity", *Global Policy*, volume 2, issue 1, January 2011.

R

Railways of the Islamic Republic of Iran, "Investment and participation: Opportunities", 2016.

Research and Markets, *Iran construction equipment market (2016–2022)*, March 2016.

S

Salehi-Isfahani, Djavad, "Education, jobs, and equity in the Middle East and North Africa", *Comparative Economic Studies*, volume 54, number 4, December 2012.

Salehi-Isfahani, Djavad, *Equality of opportunity in educational achievement in the Middle East and Africa*, Springer, 2013.

Salehi-Isfahani, Djavad, *The future of the Iranian labour market: Demography and education*, Legatum Institute, September 2013.

Salehi-Isfahani, Djavad, *Iranian youth in times of economic crisis*, Belfer Center for Science and International Affairs, Harvard University Kennedy School, September 2010.

Salehi-Isfahani, Djavad, "Rethinking human development in the Middle East and North Africa: The missing dimensions", *Journal of Human Development and Capabilities*, volume 14, issue 3, 2013.

Salehi-Isfahani, Djavad, "Youth transitions to employment and marriage in Iran: Evidence from the school to work transition survey", *Middle East Development Journal*, volume 2, number 1, 2010.

Samuelson, Paul A., "Theoretical notes on trade problems", *Review of Economics and Statistics*, volume 46, number 2, May 1964.

SNL Financial, "Country profile: Iran" and "Metals & mining: Iran", in *Briefing book*, 2016.

Statistical Centre of Iran, *Fourth Iranian national census of agriculture 2014*, 2014.

Statistical Centre of Iran, "Agriculture, forestry and fisheries", in *Iran statistical yearbook 2013–2014 (1392)*, 2015.

Statistical Centre of Iran, "Construction and housing", in *Iran statistical yearbook 2013–2014 (1392)*, 2015.

Statistical Centre of Iran, "Mining", in *Iran statistical yearbook 2013–2014 (1392)*, 2015.

Statistical Centre of Iran, *Price information and rental housing*, autumn 2015.

Statistical Centre of Iran, *Price information and rental housing in urban areas*, 2015.

Statistical Centre of Iran, *Real estate prices*, 2013.

Statistical Centre of Iran, *Selected findings of national population and housing census, 2011*, August 2012.

Statistical Centre of Iran, "Survey of industrial establishments with more than 10 workers, 1392 (2013–14)", 2014.

Statistical Centre of Iran, *Tehran house prices and rents*, autumn 2015.

Statistical Centre of Iran, "Transport, storage and communications", in *Iran statistical yearbook 2013–2014 (1392)*, 2015.

T

Tajik, Hamid Reza, "Iranian exports & new international cement standard", February 11, 2016.

Technology Studies Institute, *A brief representation of technological achievements in the Islamic Republic of Iran*, August 2014.

Tehran Stock Exchange, *Monthly bulletin*, March 2016.

Telecommunication Company of Iran, *Performance report*, 2014.

Tivey, John, Rebecca Campbell, Sajjad Khoshroo, Astrid von Preussen, and Sally Tucker, "Mining in Iran: Post-deal opportunities", *Mining Journal*, September 2015.

U

UN Population Division, 2015.

UNESCO, World Heritage List, January 2016.

UNEVOC-UNESCO, *Participation in formal technical and vocational education and training programmes worldwide: An initial statistical study*, 2006.

UN World Tourism Organization, "Compendium of Tourism Statistics", January 2016.

United Nations Conference on Trade and Development, "Country fact sheet: Iran, Islamic Republic of", in *World investment report 2015*, June 2015.

United Nations Population Division, *World urbanization prospects*, 2014.

US Department of the Treasury, Office of Foreign Assets Control, *Clarifying guidance: Humanitarian assistance and related exports to the Iranian people*, 2013.

US Energy Information Administration, *Iran: International energy data and analysis*, June 2015.

US Geological Survey, "Copper", "Iron ore", and "Zinc", in *Mineral Commodity Summaries*, January 2016.

V

Van der Ploeg, Frederick, and Anthony J. Venables, "Natural resource wealth: The challenge of managing a windfall", *Annual Review of Economics*, volume 4, September 2012.

W

World Bank, *Doing business 2016: Measuring regulatory quality and efficiency*, October 2015.

World Bank, *World development indicators*, April 2016.

World Business Council for Sustainable Development, *Facts and trends: Water*, 2005.

World Economic Forum, *Global competitiveness report 2015–2016*, September 2015.

World Economic Forum, *Networked Readiness Index*, 2015.

World Economic Forum and INSEAD, *The global information technology report 2015: ICTs for inclusive growth*, April 2015.

World Health Organization, "Global Burden of Disease DALY estimates for 2000–2012", February 2016.

World Steel Association, *Steel statistical yearbook 2015*, November 2015.

World Travel and Tourism Council, *WTTC Tourism Metrics*, January 2016.

Y

Yarcan, Sukru, *A comparison of Istanbul and Antalya as tourism destinations*, Istanbul University, 2012.

RELATED MGI AND MCKINSEY RESEARCH



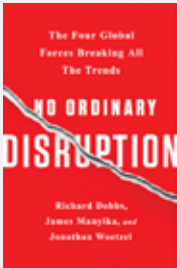
Playing to win: The new global competition for corporate profits (September 2015)

The world's biggest corporations have been riding a three-decade wave of profit growth, market expansion, and declining costs. Yet this unprecedented run may be coming to an end. This new MGI report projects that the global corporate-profit pool, which currently stands at almost 10 percent of world GDP, could shrink to less than 8 percent by 2025—undoing in a single decade nearly all of the corporate gains achieved relative to the world economy during the past 30 years.



Global flows in a digital age: How trade, finance, people, and data connect the world (April 2014)

The movement of goods and services, finance, and people has reached previously unimagined levels. Global flows are creating new degrees of connectedness among economies—and playing an ever-larger role in determining the fate of nations, companies, and individuals.



No ordinary disruption: The four global forces breaking all the trends (May 2015)

This new book builds on 25 years of MGI research to explore a world that will be very different from the one we have grown up in—and the implications of this transformation for business leaders, individuals, and policy makers. The sheer volume of change could be overwhelming, but the opportunities are enormous.



Reverse the curse: Maximizing the potential of resource-driven economies (December 2013)

In 20 years, almost half of the world's countries could depend on their resource endowments for growth. These economies have a huge opportunity to transform their prospects, and a new model could help governments capture the coming resource windfall instead of squandering it.



Global growth: Can productivity save the day in an aging world? (January 2015)

Over the past 50 years, the world economy expanded sixfold, average per capita income almost tripled, and hundreds of millions were lifted out of poverty. Yet global economic growth will almost halve in the next 50 years—unless the world can engineer a dramatic improvement in productivity.



Urban world: Mapping the economic power of cities (March 2011)

This MGI report draws on a proprietary database with economic and demographic indicators for 2,000 cities, projecting their contribution to global growth through 2025. The report focuses on the 600 fastest-growing cities (the "City 600").

www.mckinsey.com/mgi



E-book versions of selected MGI reports are available at MGI's website, Amazon's Kindle bookstore, and Apple's iBooks Store.

Download and listen to MGI podcasts on iTunes or at www.mckinsey.com/mgi/publications/multimedia/

Cover image: © Shahin Kamali/toiran.com



McKinsey Global Institute
June 2016
Copyright © McKinsey & Company
www.mckinsey.com/mgi

 @McKinsey_MGI
 McKinseyGlobalInstitute