Fitch Solutions

Q1 2019

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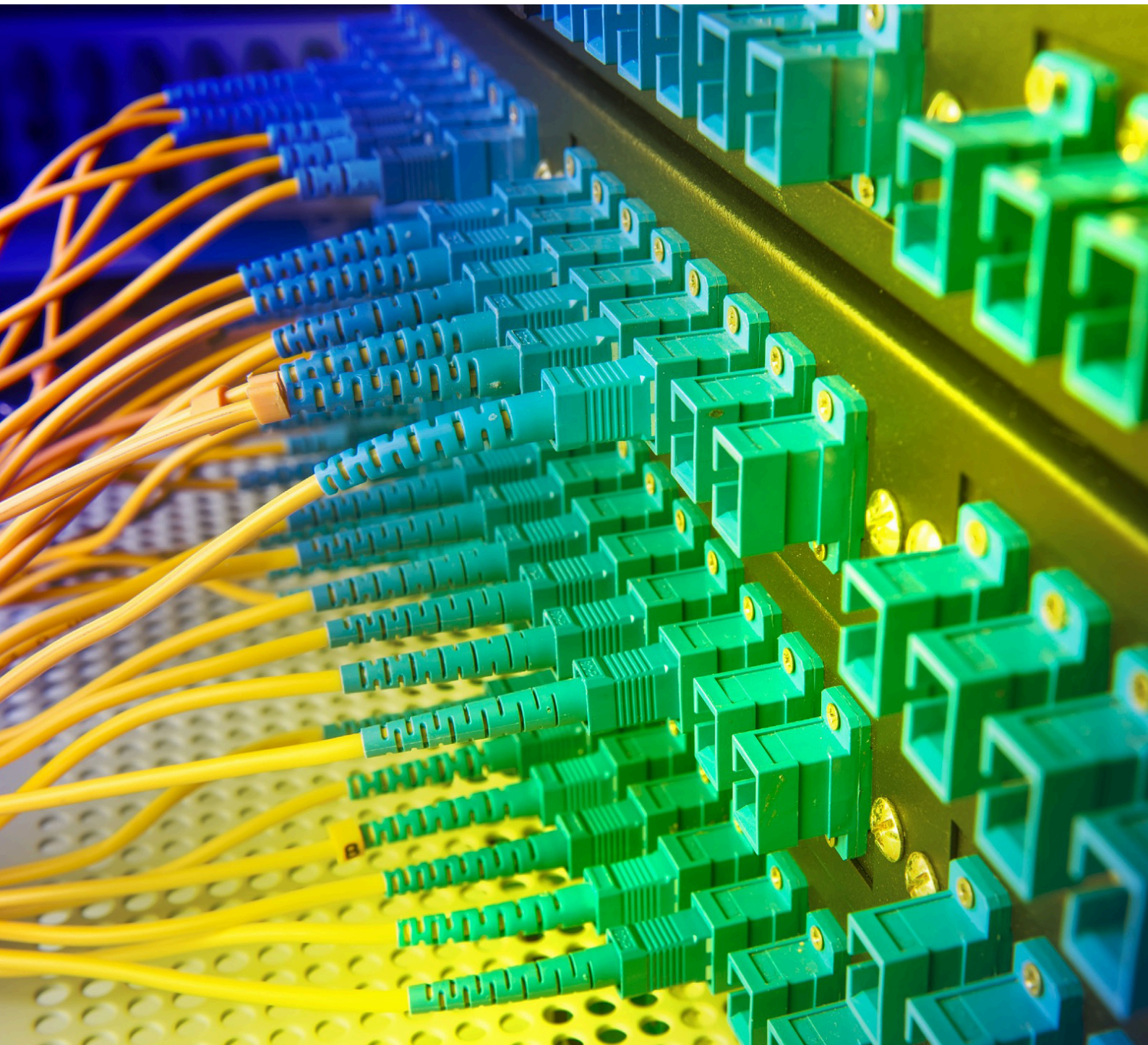
Egypt

Information Technology Report

Includes 5-year forecasts to 2022



Contents

Key View

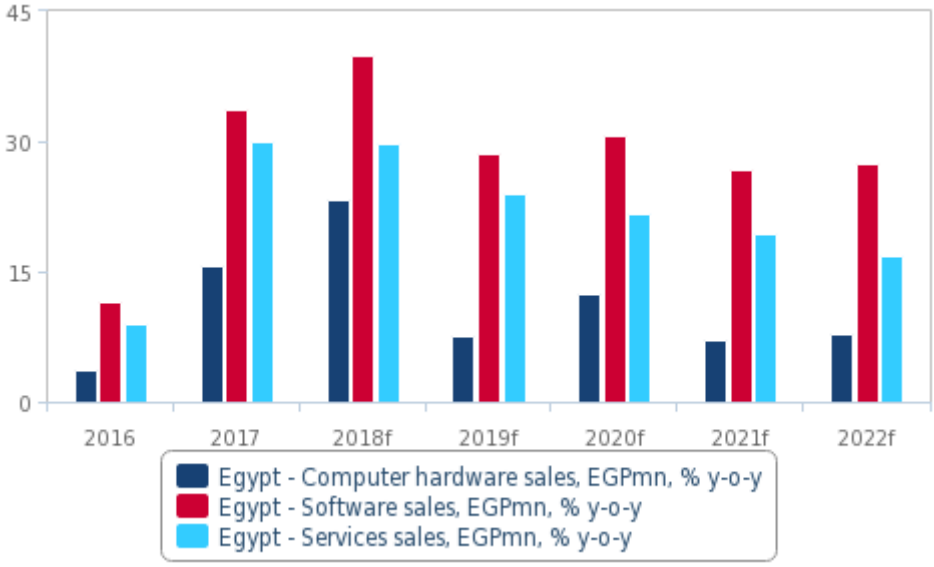
Key View: *There is a strong positive trend for IT spending in Egypt over the medium term because of opportunities that will be created in an expanding and modernising economy where there is potential for catch-up growth as firms and the government deploy IT solutions that have already been proven in more advanced economies. The local industry also has a bright outlook, in part due to domestic IT demand, but also Egypt's expanding role as an IT outsourcing location that is being driven by investments in technology zones, supporting infrastructure and training. The main downside risk is the potential for economic recovery to under-deliver expectations and result in political instability.*

Latest Updates And Industry Developments

- **Computer hardware sales** are predicted to increase from EGP12bn in 2019 to EGP15.6bn in 2022, a compound annual growth rate (CAGR) of 9.1%. Enterprise demand will be the main positive, especially in 2020 when official Windows 7 support ends and triggers upgrades to the PC stock, but the retail outlook is weaker because of smartphone cannibalisation of use cases.
- **Software sales** are forecast to increase from EGP7.9bn in 2019 to EGP16.6bn in 2022, a CAGR of 28.3%. Software penetration is still low across most of the economy but this will improve as the economy grows and strategic investments are undertaken, while cloud solutions could also contribute by reducing the incidence of piracy.
- **IT services sales** are predicted to increase from EGP32.7bn in 2019 to EGP55.6bn in 2022, a CAGR of 19.3%. There is broad potential for growth through the ongoing process of the informatisation of economic activity - and faster growth will occur in key areas, such as the expansion of the outsourcing, manufacturing and retail verticals.

Economic Growth Will Fuel Strong IT Spending Trend

IT Forecast Breakdown



e/f = Fitch Solutions estimate/forecast. Source: Fitch Solutions

SWOT

Information Technology SWOT

SWOT Analysis

Strengths

- One of the largest countries in Middle East and Africa - and there are relatively low levels of IT adoption among enterprises and households.
- Supportive demographics, with the prime device-buying population aged 15-64 forecast to increase at a CAGR of 1.7% over 2019-2022.
- Proactive government policy designed to develop the ICT sector, particularly as a destination for export-oriented outsourcing and software development services.

Weaknesses

- Low-income and price sensitive market, with consumers adjusting to higher local currency prices following the float of the currency in Q416.
- Slow progress in reducing piracy, which has - and will continue to - reduce software market growth.
- Market is shaped by low average incomes, a position that worsened with the blow to purchasing power from devaluation in Q416.
- Network infrastructure deficit, which will stop development of emerging technology ecosystems including cloud computing and Internet of Things smart services.

Opportunities

- Purchasing power growth will increase the affordability of imported hardware and packaged software, with US dollar GDP per capita forecast to increase at a CAGR of 10.4% 2019-2022.
- Expansion of distribution channels and entry of new brands expanding low-cost PC supply and deepening the market.
- ICT initiatives in education boost demand in the short term, and raises medium-term growth potential by increasing computer literacy.
- Development of broadband infrastructure will create a use case for devices and enable a wider range of software and services solutions in the enterprise segment.
- Government is actively promoting the adoption of ICT by the populace as well as small- and medium-sized enterprises and providing incentives for multinationals to invest in the market.
- Regional hub and competitiveness boost to hardware and services export industries following devaluation in Q416.
- Government incentives available for cloud computing, open-source and mobile applications development to serve the Egyptian market and the wider region.

Threats

- Cannibalisation of use cases for tablets and low-end notebooks as an increasing number of consumers use handsets as the only devices through which they access the internet.
- Political and security risks could undermine ICT strategy coherence over the medium term.
- Shift to open-source software in the public sector will reduce sales, but will also reduce costs to government.

Industry Forecast

Key View: *We forecast IT spending in Egypt will increase at a CAGR of 18.6% over 2019-2022 to a total of EGP87.7bn. The outlook for strong sustained growth in local currency and US dollar IT spending over the medium term is based on the economic rebound from the contraction that followed the decision to float the Egyptian pound in Q416. The improvement in the economic environment will secure a flow of domestic and foreign investment in expansion and modernisation strategies by firms that generates demand for IT solutions.*

Latest Updates

- The positive core scenario faces downside in the potential for the trajectory of economic recovery to be lowered by domestic political challenges to austerity, or global headwinds that could negative impact export industries that are an important driver of economic growth.
- At the segment level, we forecast computer hardware spending growth will underperform because of the cannibalisation of mass market retail PC use cases by smartphones, as well as pressure on printer demand as more households and business go paperless.
- Software and services demand growth will be stronger because of dual growth engines in basic informatisation in the public and private sector, alongside demand for more complex projects and new technologies by large firms and foreign investors.

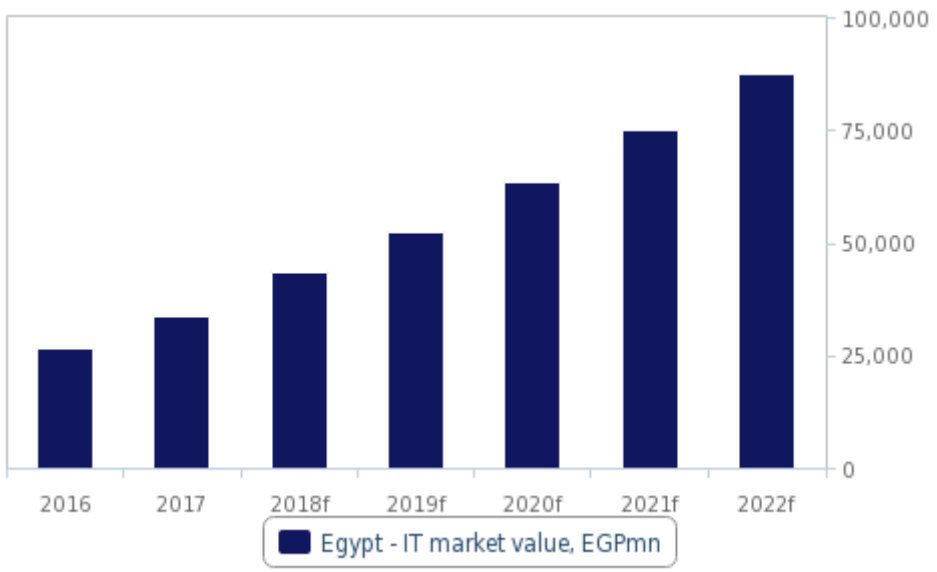
Structural Trends

2019 Outlook

We forecast IT spending in Egypt will increase to a total of EGP52.5bn in 2019, corresponding to annual growth of 20.5%. Meanwhile, in US dollar terms we envisage growth of 17.9% to a value of USD2.9bn. Both the local currency and US dollar growth rates are forecast to decelerate y-o-y in because IT market growth in 2018 was above trend in the immediate aftermath of the crisis due to pent-up demand for IT devices and solutions after the free float fo the currency in Q416, and the introduction of VAT and removal of subsidies in 2017.

- The economic environment will be broadly supportive of higher levels of consumer electronics spending. Customers became accustomed to higher local currency prices in 2018, and as inflation falls further and purchasing power increases in 2019 affordability and sentiment will increase. There is however still downside risk because of the economic and political implications of the ongoing implementation of austerity, as well as the possibility for global headwinds to disrupt Egypt's recovery.
- Computer hardware will again be the underperforming segment in 2019 because of the cannibalisation of PC use cases by smartphones. Stronger growth will occur for software and services as strategic investments from the private and public sector are unlocked by a strengthening macro environment, such as in basic informatisation, digitisation, data analytics, cyber security and cloud computing.

Industry Trends - IT Market
(2016-2022)



f = Fitch Solutions forecast. Source: Fitch Solutions

Market Drivers

The Egyptian IT market is positioned for a period of sustained growth over the medium term, 2019-2022, as the economy recovers from the negative shock that occurred in when tough structural economic adjustment measures taken as part of the IMF programme. A key development was the devaluation of the pound in late 2016 after a free float, which led to a sharp decrease in the affordability of imported devices, components, parts and packaged software. The affordability shock was exacerbated by lower sentiment for firms and households, as well as a VAT rise and reduction in subsidies. This resulted in consecutive years of sharp IT spending declines in US dollar terms 2016-2017, and even after a strong rebound in 2018 there is still potential for sustained growth in IT spending as vendors tap into pent-up demand and opportunities created by the resumption of economic growth. There is however significant downside risk over the medium term as political repression will fuel popular discontent and raise potential for widespread unrest in the event that economic improvements fall short of expectations.

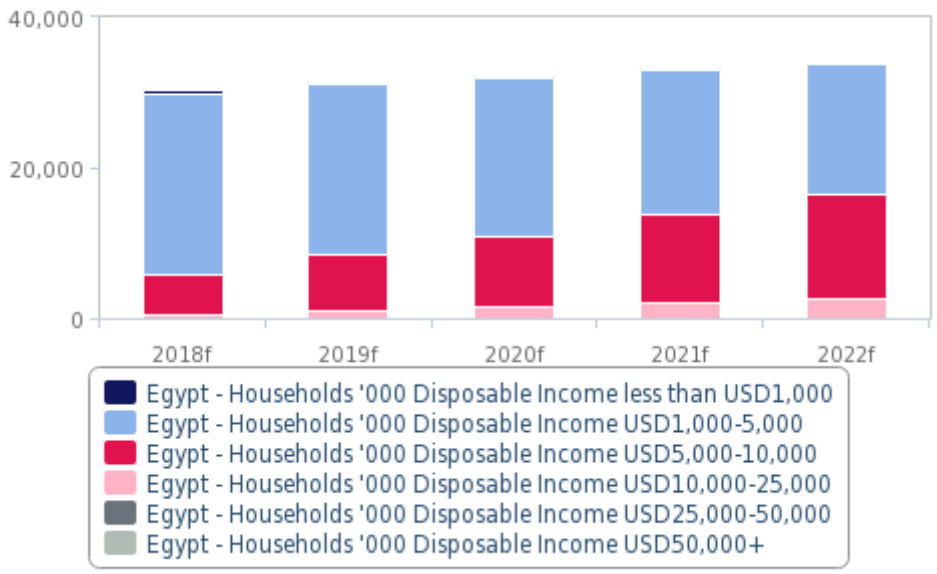
- There is a strongly positive purchasing power trend, with GDP per capita in US dollar terms forecast to increase at a CAGR of 10.4% over 2019-2022. Incomes will however remain low with GDP per capita of USD4,402 expected in 2022, meaning that the majority of consumers will still be highly price sensitive and susceptible to delayed or downsized purchases in periods of economic uncertainty.
- Lower inflation should also allow interest rates to continue to fall, which will allow for a contribution from credit access, though the importance of credit in the retail market is lower in Egypt that most of MENA, with only around 10% of the population having a credit card, but the number of cards is growing at 40% annually according to Santander Bank.
- Demographics will be supportive, with the prime device buying population aged 15-64 forecast to increase at a CAGR of 1.7% 2019-2022 to reach a total of 65.6mn in 2022.
- Improvements to supporting infrastructure will also be positives for market development through investments being made in domestic data networks, international connectivity and datacentres. In 2014, the government announced an investment of EGP130bn over seven years to 2020. EGP45bn (USD6.4bn) was allocated for improving access to high-speed internet services; EGP30bn was earmarked for the second project to improve high-speed internet infrastructure by 2020; and EGP9bn was planned to improve access to communications devices for Egyptians.
- The development of formal retail and logistics infrastructure outside of the main urban areas will also help to make the market operate more efficiently, while e-commerce will expand an important channel for vendors to reach consumers in a new way.
- The principal computer hardware segment opportunities are in middle class and premium retail PC demand for notebooks, the iPad and hybrids - along with enterprise demand as the informatisation of the economy proceeds. There will also be a stronger

period of growth ahead of the withdrawal of Microsoft support for Windows 7 in 2020, which is the main operating system in use in the public and private sector so this even will act as an upgrade trigger for the installed PC stock.

- The sector-specific policy environment has several positive facets through the broader 'Sustainable Development Strategy: Egypt Vision 2030' agenda. The government is aiming to develop cloud computing, developing the domestic ICT industries, designing and manufacturing electronic products, promoting entrepreneurship, transforming Egypt into a digital hub, developing to the digital community to enhance efficiency and transparency of institutions, and strengthening technology education.
- There are a few areas in which we believe the government could adopt a more proactive stance, which would aid growth in IT spending, such as the fight against software piracy and cyber security strategy. According to BSA, Egypt had a piracy rate of 61% in 2015, which is above the global average, and had shown no progress since 2011. The political disruption and security instability is part of the explanation behind the increase, which is in contrast to the broad regional and global trend of declining piracy, but Egypt also made little progress between 2007 and 2011.

Strong Purchasing Power Trend To Expand The Middle Class

Egypt Household Income Breakdown (2018-2022)



f = Fitch Solutions forecast. Source: National sources, Fitch Solutions

Verticals

The enterprise IT market in Egypt has considerable potential through the combination of a solid economic outlook and low penetration of technology among local firms. In keeping with its frontier market status, IT spending is significantly lower than in developed markets as a share of GDP and firm revenues. We therefore identify cross-sector growth potential in basic digitisation, which also reaches into the public sector, but it is among SMEs that the biggest pool of untapped enterprises exists. This means that vendors will have to be flexible when targeting Egyptian SMEs over the medium term because of high levels of price sensitivity.

- For large enterprises, which account for the majority of IT spending in Egypt, and will continue to over the medium term, the most important sectors are financial services, ICT, manufacturing, retail, oil and gas. There is however, uncertainty surrounding another major IT spending vertical - tourism - where there was a significant contraction in visitors after travel restrictions imposed by Russia and the UK in 2016, which together account for around 30% of tourist arrivals. Our tourism team anticipates a recovery for the industry based on government marketing campaigns and a more competitive currency, but the extent of new capacity required, which drives demand for IT solutions, could be limited if there are further security incidents.
- Financial services is the most technology-intensive industry globally, and have a strong outlook in Egypt for the duration of the

forecast period. Banking has growth potential because there is a large unbanked population. This could be tapped into over the medium term through traditional infrastructure of centralised hardware and software systems, or technology-backed services such as mobile payments, banking and insurance. There is also considerable scope for technology investments to be scaled up in areas such as consumer insight data analytics, fraud prevention and cybersecurity.

ENTERPRISE TRENDS - GVA BY VERTICAL (EGYPT 2016-2022)

Indicator	2016	2017e	2018f	2019f	2020f	2021f	2022f
Agriculture nominal GVA, % total GVA	11.93	9.75	8.02	6.95	6.13	5.47	4.92
Mining nominal GVA, % total GVA	8.04	11.16	8.66	7.07	5.89	4.95	4.20
Manufacturing nominal GVA, % total GVA	17.07	14.28	11.98	10.37	9.15	8.17	7.35
Construction nominal GVA, % total GVA	5.44	5.00	4.65	4.69	4.74	4.87	5.07
Finance nominal GVA, % total GVA	4.88	4.95	5.43	5.73	5.95	6.12	6.26
Real estate nominal GVA, % total GVA	10.47	12.28	15.10	16.86	18.17	19.20	20.01
Other services nominal GVA, % total GVA	2.41	2.02	1.66	1.43	1.24	1.10	0.98
Utilities nominal GVA, % total GVA	2.35	2.03	1.83	1.70	1.60	1.52	1.45
Trade & tourism nominal GVA, % total GVA	15.83	15.75	17.07	17.87	18.48	18.95	19.32
Transport & communications nominal GVA, % total GVA	7.00	7.48	8.54	9.19	9.68	10.06	10.36
Public sector nominal GVA, % total GVA	14.58	15.30	17.06	18.15	18.96	19.59	20.08

e/f = Fitch Solutions estimate/forecast. Source: National Statistics Office, Fitch Solutions

- ICT is another industry in Egypt with a bright growth outlook, and potential for increased spending on IT as a share of revenue. Egypt is the pre-eminent outsourcing hub in MENA and has received investment from a host of leading global firms including IBM, Procter & Gamble, HSBC, Nestlé, Axxcelera, Mobinil Contact Services, Teleperformance and EMC. The devaluation in Q416 added to industry price competitiveness in this export-focused industry, and we believe it is positioned for further growth over the medium term. This will generate demand for hardware and software services to accommodate higher headcount, while moves up the value chain to software development and consulting could also be a source of new opportunities for IT vendors.
- Oil and gas is traditionally a relatively low-IT spending vertical, but the combination of strong growth in Egypt where the start-up of several large domestic gas field developments is expected over the next two years and the increased utilisation of 'smart mining' technologies create a positive outlook. Oil and gas companies are increasingly utilising sensors, equipment and employee monitoring devices for data collection and analysis - and our Oil & Gas team identifies medium-term opportunities through the adoption of artificial intelligence (AI), blockchain, drones and cybersecurity.

IT INDUSTRY - HISTORICAL DATA AND FORECASTS (EGYPT 2016-2022)

Indicator	2016	2017	2018f	2019f	2020f	2021f	2022f
IT market value, EGPmn	26,697.0	33,722.4	43,614.7	52,540.5	63,547.3	75,022.0	87,716.8
IT market value, % of GDP	1.0	1.0	1.0	1.0	1.1	1.1	1.1
Computer hardware sales, EGPmn	7,797.2	9,024.0	11,137.1	11,978.6	13,471.8	14,438.9	15,568.3
Personal computer sales, EGPmn	4,855.1	5,641.6	7,046.4	7,546.7	8,514.2	9,079.4	9,722.0
Software sales, EGPmn	3,266.9	4,372.5	6,114.9	7,866.1	10,273.9	13,021.6	16,596.7
Services sales, EGPmn	15,632.9	20,325.9	26,362.7	32,695.8	39,801.6	47,561.5	55,551.8

f = Fitch Solutions forecast. Source: Fitch Solutions

Industry Risk/Reward Index

Politics Cloud Middle East Appeal On IT Risk/Reward Index

Key View:

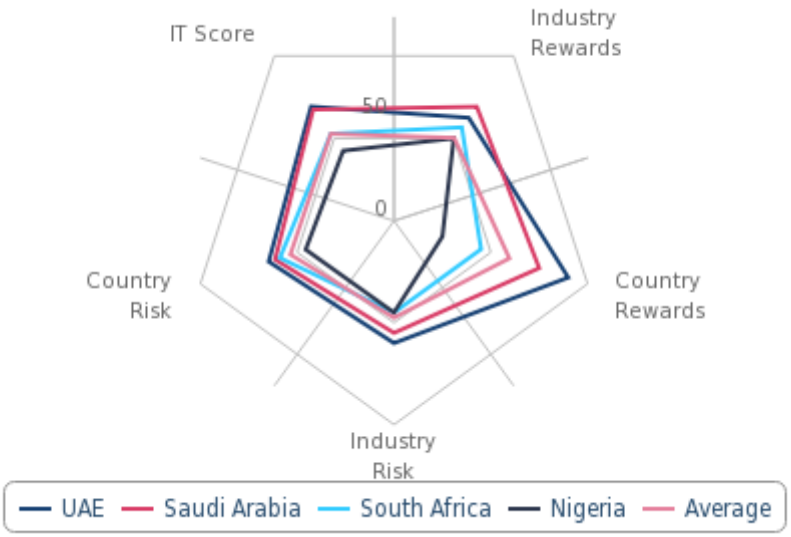
- UAE, Qatar and Saudi Arabia all vie for the top place on the league table, but a softening UAE economic growth trajectory and growing disquiet around Saudi Arabia's civil rights policies suggest Qatar will soon move into first place.
- South Africa's re-energised IT market growth outlook leads to an improved Industry Rewards profile and a small uptick in the country's overall score.

With the bulk of our industry and country risk forecast modifications implemented last quarter, there are very few changes to report in connection with our survey of the Middle East and Africa's IT market. There were no movements up or down the Index, reflecting the stability of the IT market. IT is less volatile than the consumer electronics (CE) sector, where cyclical sales patterns are easily disrupted by changing disposable income levels.

UAE, Qatar and Saudi Arabia head the Risk/Reward Index, as usual, but there is little to distinguish between all three markets, all of which have considerable IT modernisation and ongoing replacement needs within both the small- and medium-sized enterprise (SME) segments as well as within the large utilities and government organisation segments. The economic growth outlook for the UAE has softened, affecting the CE sector, but yet to affect IT spending: we may see a heavier emphasis on lower-value goods in the market as companies complete the latest phase of their investment programmes, but this is likely to be temporary in nature.

The UAE might yet benefit from a potential slump in sales to Saudi Arabia as the country's efforts to deal with the seemingly polar opposite issues of corruption and civil rights reforms appear to have collided in a disastrously public fashion. The disappearance and presumed murder of a prominent Saudi journalist could see a number of high-profile international investors dial-back efforts to engage with the young government and as technology companies are becoming ever more politically sensitive via their employees, we believe cloud, big data analytics and Internet of Things hardware, software and services vendors could scale back their businesses in Saudi Arabia.

UAE, Saudi Downgrades Loom As South Africa, Nigeria Improve
Key MEA IT Market Scores, Q1 2019



Note: Scores out of 100 with high scores denoting low risks. Source: Fitch Solutions

Saudi Arabia's neighbours and allies must weigh their responses carefully, although we doubt that any further antagonism from Qatar or other critics would carry sufficient weight for these countries to become less attractive in the eyes of investors. We therefore expect the status quo to be maintained in the middle third of the Index, which is as well considering the significant potential for cloud computing and IoT services in markets that are still transitioning to the digital age.

It is in Sub-Saharan Africa where we expect macroeconomic pressures to exert the most influence on the IT sector in the short- to medium term. South Africa benefits from a 1.7 point increase to its Industry Risks score as we factored in new and better-than-expected FY2017 sales data (PCs, servers, networking equipment), and the strengthening Rand brought improved purchasing power, facilitating big ticket sales. South Africa remains in sixth place overall, narrowing the gap with Bahrain.

Ghana's scores remain unchanged this quarter, but we anticipate needing to make significant changes to our five-year forecast for IT spending in light of rebased GDP data, published in early October 2018. The base year has moved from 2006 to 2013. The subsequent revisions to GDP data were significant, with the economy in 2017 proving to be 24.6% larger than previously believed. The data revisions have also highlighted that the mining and manufacturing sectors have become more significant economic drivers than previously thought and as these sectors spend heavily on IT, so we believe our historical IT spending figures may need to be revised.

Nigeria, meanwhile, continues its economic recovery, with our country risk team improving Nigeria's risk profile very slightly. As yet, there is no direct impact on the IT sector, but improved government budgets - already swelled by further fines and back-tax claims levied on leading mobile operator **MTN** as well as the sale of **9mobile** to **Teleology** - are likely to see at least a modest rise in IT spending. Datacentres and fibre-optic backbones have received considerable investment in 2018 and we expect increased spending on PCs, servers and cloud-related infrastructure to follow as a result.

MIDDLE EAST & AFRICA IT RISK/REWARD INDEX, Q1 2019

Country	Industry Rewards	Country Rewards	Industry Risks	Country Risks	Q119 IT Score	Q-o-Q Chge	Q119 Rank
United Arab Emirates	62.5	90.0	60.0	64.7	**69.3**	0.0	1
Qatar	57.5	100.0	55.0	60.5	**68.2**	0.0	2
Saudi Arabia	69.2	75.0	55.0	61.4	**67.5**	0.0	3
Kuwait	49.2	95.0	40.0	58.5	**61.0**	0.0	4
Bahrain	36.7	85.0	57.5	52.7	**53.9**	0.0	5
South Africa	56.7	45.0	45.0	58.9	**52.8**	0.7	6
Egypt	61.7	25.0	45.0	46.9	**48.0**	0.0	7
Oman	35.0	65.0	52.5	51.2	**47.4**	0.0	8
Ghana	43.3	35.0	40.0	58.5	**43.6**	0.0	9
Nigeria	50.0	25.0	45.0	45.6	**42.5**	0.0	10
Lebanon	33.3	65.0	20.0	47.2	**42.0**	0.0	11
Kenya	48.3	10.0	55.0	35.9	**37.5**	0.0	12
Average	***50.3***	***59.6***	***47.5***	***53.5***	***52.8***	***0.0***	

Note: Scores out of 100, with 100 the best. Scores are weighted as follows: 'Rewards' at 70%, of which Industry Rewards 65% and Country Rewards 35%; 'Risks' at 30%, of which Industry Risks 40% and Country Risks 60%. The 'Rewards' score evaluates the size and growth potential of the IT market in any given state and broader economic/socio-demographic characteristics that affect the industry's development. The 'Risks' score evaluates industry-specific dangers and those emanating from the state's political/economic profile, based on Fitch Solutions' proprietary Country Risk Indices. Source: Fitch Solutions

Market Overview

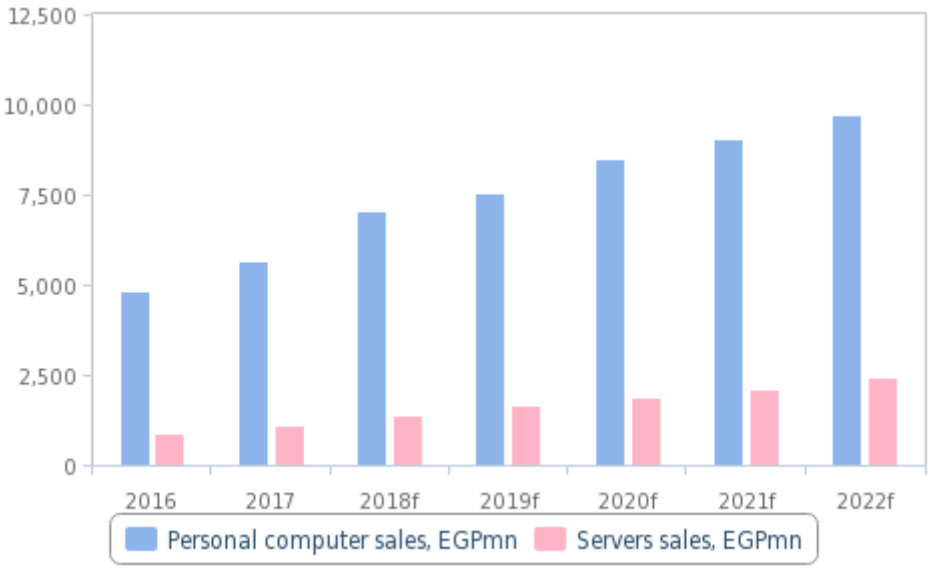
Recent Developments

- Strong growth in PC spending after the economic and political situation stabilised came to an abrupt end in 2016-2017 because of product trends and the fact that local currency affordability declined sharply following the devaluation in Q416.
- The software and services market was also negatively affected in 2017, but unlike hardware, there were positive usage and technology trends during the review period such as enterprise expansion and modernisation, and the increased adoption of cloud computing solutions.

Hardware

Computer hardware was the underperforming segment of the market during the review period, when aside from strong growth in 2014 when deferred spending from 2012-2013 was unlocked by a stronger economic and more stable political environment, there was a sustained decline in spending. By 2016 the segment was once again contracting in US dollar terms - a trend that resulted from negative product trends when tablet and low-end notebook use demand being cannibalised by smartphones - and was then exacerbated by the devaluation in 2017 that saw widespread deferral of purchases across the PC and peripherals market.

Hardware Market
(2016-2022)



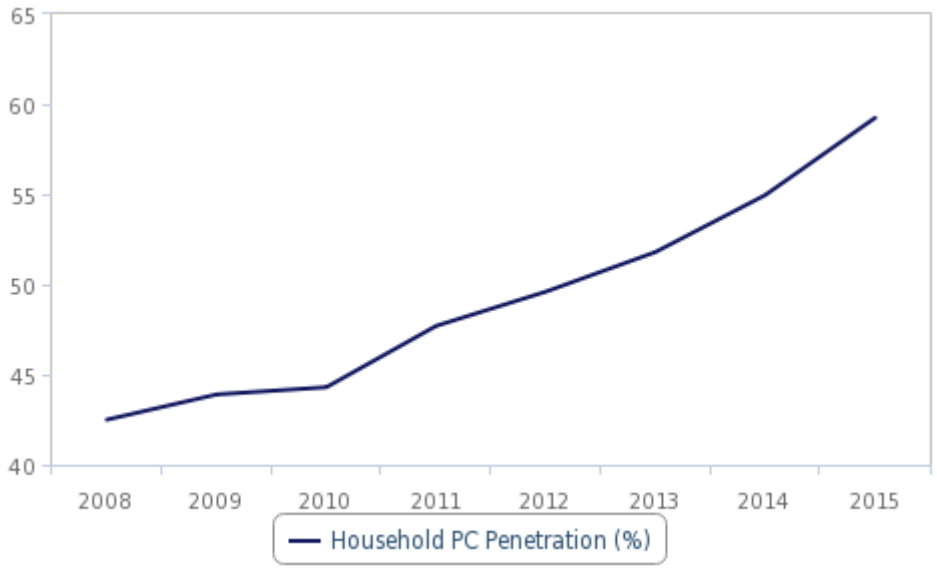
f = Fitch Solutions forecast. Source: Fitch Solutions

PCs

Egypt had a higher household PC penetration rate than other African markets and there were steady increases to reach a figure of 59.2% in 2015, but overall retail market ownership levels were still substantially below those observed in developed markets. There was also impressive growth in the utilisation of PCs by enterprises, for which Ministry of Communications and Information Technology data show penetration increased from 71.6% in 2012 to 79.9% in 2016.

Data for 2016 and 2017 PC ownership was expected to show no significant increase. This is as a result of the plateau in ownership observed in emerging and frontier markets due to the negative impact of smartphones on retail PC demand, particularly for tablets and low-end notebooks. This was a significant break on development in price-sensitive markets with weaker legacy PC ownership and use, meaning consumers were more likely to consolidate distinct devices into using smartphones as their only devices for internet access.

Egypt Household PC Penetration (%)
2008-2015

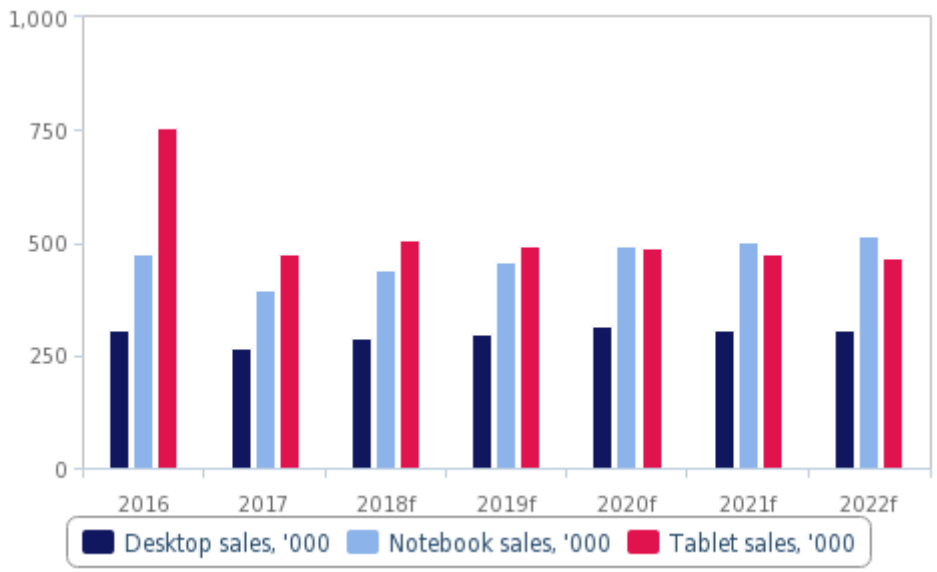


Source: Ministry of Communications and Information Technology, Fitch Solutions

Competition from smartphones put the PC market on a permanently lower trajectory for installed base - however, in 2017 there was a sharp decline in units sold because technology trends combined with the economic shock from devaluation. The reduction in local currency affordability resulted in widespread deferred purchases, exacerbating the impact of smartphones cannibalising use cases, and creating conditions for existing owners and power users to maintain their existing devices for longer.

Prior to 2016, there was a significant shift within the Egyptian PC market in the types of devices owned. Desktop penetration peaked in the household sector and was in decline through most of the review period, the trend enabled price declines for the portable PCs that are more popular with retail customers. Tablets were the most successful mobile PC type, in the retail market, but also with a boost to volumes from government procurement after MCIT signed a protocol with the Federation of Egyptian Chambers of Commerce (FEDCOC) for the supply of computing devices (with priority given to devices manufactured and assembled locally) to schools in 2014 to benefit 2mn teachers and 18mn students at the pre-university level, although the exact number of units to be distributed was not revealed.

PC Volume Forecast
(2016-2022)

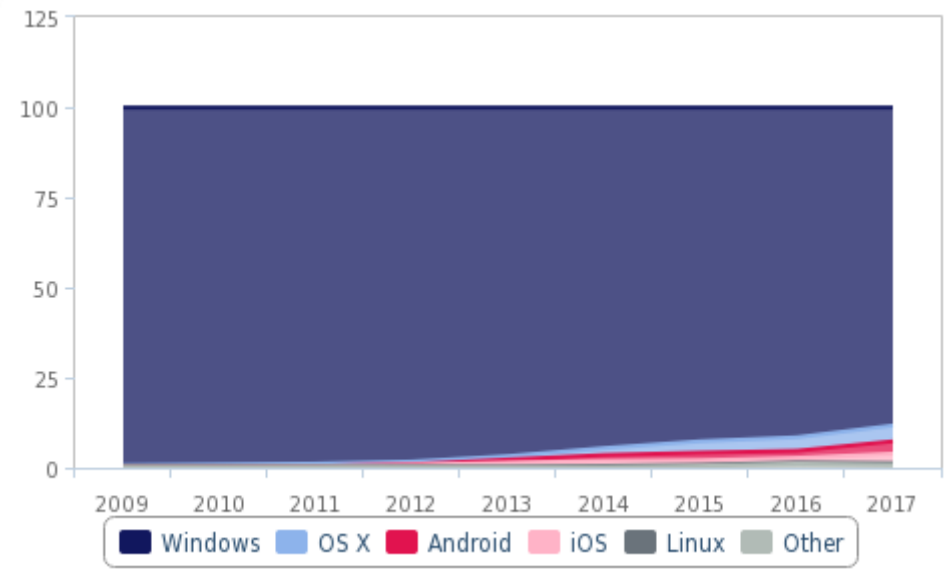


f = Fitch Solutions forecast. Source: Fitch Solutions

The Egyptian PC market is dominated by Windows partner vendors, while premium-oriented **Apple** has a very low share of desktop and notebook sales because its range of Mac devices are simply unaffordable for the majority of households. **Lenovo**, **Dell** and **HP** are the leading international brands operating in Egypt's PC market, where they target retail customers, as well as having a strong presence in the corporate market. There was also competition from some regional brands, for instance, Dubai-headquartered and value-focused **InnJoo**, and another low-end vendor in US brand **I-Life Digital** (Zed) that manufactures in China and has a strong presence in the Middle East and South Asia.

There is also some supply from local assembly and refurbished PC service providers such as **Sary** (developed by **Raya**), **Centra Technologies**, state-owned **Benha Electronics** and **International Electronics**. However, they do trail the major international brands, for instance, Lenovo reported a 20% share of PC sales in 2014, making it the second largest vendor, despite only selling notebooks in Egypt. Another leading global PC vendor raising its growth target for its Egyptian operations in late 2014 was privately-owned US vendor Dell. In order to support its growth drive, Dell has a special hub for spare parts in Cairo, as well as a new hub it established in Alexandria.

Egypt PC Browsing Traffic By OS (%)
(Egypt 2009-2017)



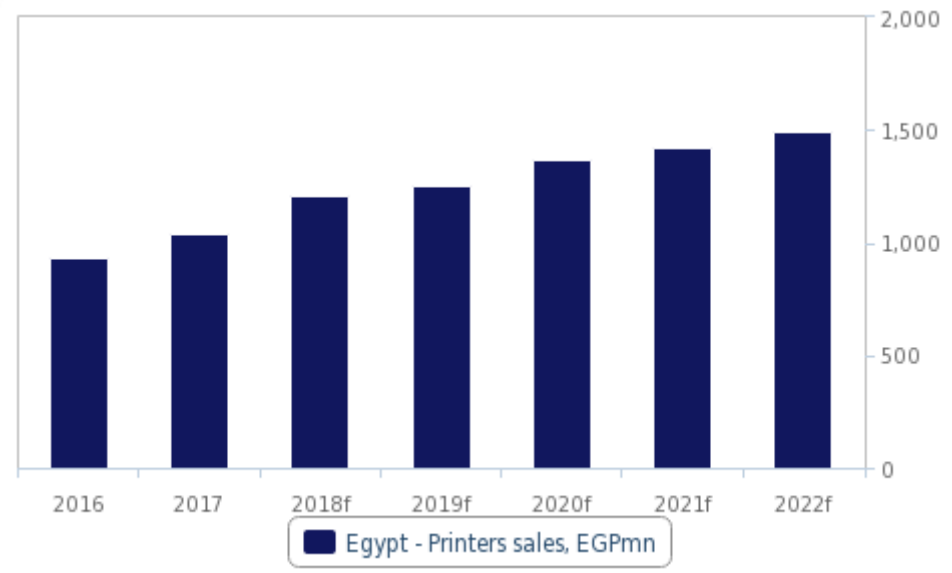
Source: Statcounter, Fitch Solutions

Printer, Copier And Multifunctional Peripherals

As was the case across the region, printer and copiers were the underperforming product category in the computer hardware segment throughout the review period. There was pressure on retail and enterprise demand throughout the review period, which intensified in later years. This was due to the wider ownership of mobile PCs and smartphones, the trend towards paperless offices and meetings, and environmental initiatives. In terms of products, there was stronger demand for multifunctional devices, but this was insufficient to offset the declines in spending on stand-alone inkjet and laser printers.

While not immune to this pressure, performance was stronger in frontier markets such as Egypt. This was relative to developed markets because of modest upside delivered by the increased informatisation of the public and private sectors that accompanied economic development. Though, this was not the case in 2017 when devaluation resulted in a sharp decline in printer and copier spending.

Printer & Copier Spending Forecast
(2016-2022)



f = Fitch Solutions forecast. Source: Fitch Solutions

Servers and Storage

The technological intensity of Egypt's economy is low and a reflection of this is the small and underdeveloped market for servers and storage equipment. The low level of business sophistication and limited budgets meant a historically small in-house enterprise infrastructure market. While low-value, there was a strong positive trend for server and storage spending growth over 2012-2016, with a boost in 2015-2016 from the Windows server refresh, before a decline in spending in 2017 due to devaluation. There was also broad support from data centre infrastructure investment that took place prior to 2017 when firms were positioning to capitalise on rising demand for cloud and online content services.

Software & Services

Software and services spending growth outperformed hardware throughout the review period in Egypt as demand from both the private and public sector recorded sustained growth, although there was still a sharp slowdown in 2017 due to the devaluation. The worst affected areas of the market were imported packaged software solutions and associated services, where reduced local currency affordability pushed customers to delay spending or substitute for local alternatives where available.

Software

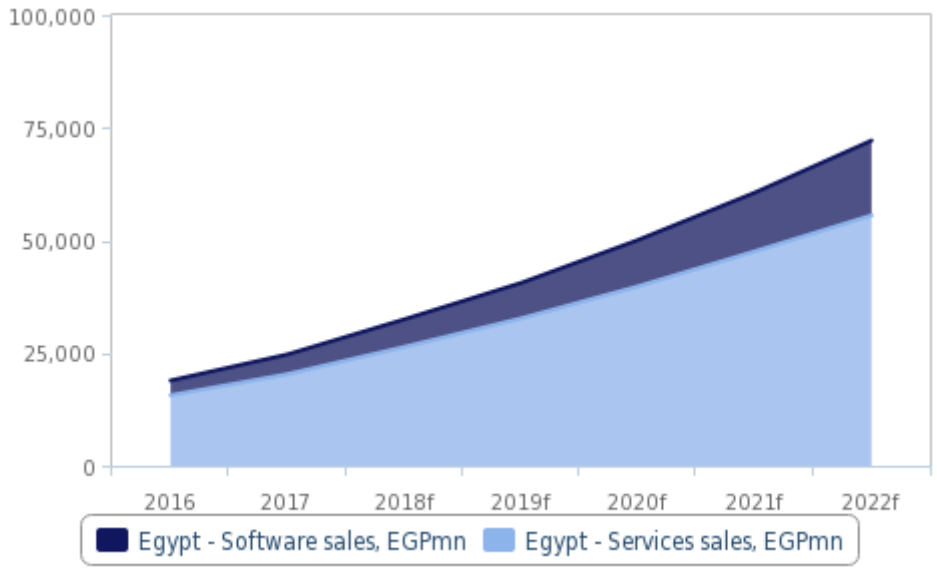
As a frontier market, Egypt is a relatively late-developer and even at the end of the review period the market was characterised by low levels of enterprise software adoption, as well as a high level of price sensitivity and piracy especially once vendors look beyond large enterprise and central government users. However, prior to 2017 there had been strong growth in software spending, especially for applications, as firms looked to support expansion and modernisation initiatives.

The largest product categories throughout the review period were core applications such as enterprise resource planning (ERP), customer relationship management (CRM), while important growth drivers included business intelligence, data analytics and management, cybersecurity and vertical specific solutions. There was weaker performance for middleware, especially in the later years of the review period as cloud migrations gathered momentum.

The highest value verticals for software vendors were financial services, telecoms, retail and the public sector. Egyptian banks were notable for spending on core banking systems, CRM and solutions to support services such as mobile payments. And telecoms operators were investing in OSS and BSS systems, as well as applications and service platforms. Meanwhile, the SME market continued to be low-value because of price sensitivity, high incidence of piracy, and free alternatives for basic applications.

Global leaders **Oracle, SAP** and **Microsoft** are all present in the Egyptian software market. Oracle was the market leader after cultivating a strong position with the financial services industry, putting it ahead of Microsoft Dynamics and SAP, while **Software AG** was a leader in business process management. **Datanyze** reports **Salesforce** as the clear CRM market leader in Egypt in 2017, ahead of **Zoho**, while **Tableau** and **Qlik** were at the forefront for business intelligence. **EMC**, **HPE**, **IBM**, **Veritas** and **Netapp** were prominent players in the backup and data storage/management space.

Software & Services Market
(2016-2022)



f = Fitch Solutions forecast. Source: Fitch Solutions

Consulting, Maintenance And Systems Integration

The IT services market in Egypt weakened in 2017 when economic conditions weakened and enterprises focused to a much greater extent on improving returns on existing solutions rather than implementing new major projects. However, there was still strong local currency growth because of inflationary pressures, and the longer-term nature of important IT contracts.

The core of the IT services market throughout the review period was the implementation of hardware and software solutions, and as the review period progressed there was a greater emphasis on technologies such as cloud, mobile and the Internet of Things. There was strong growth prior to 2017 as the level of informatisation of firms increased, alongside a positive trend for IT use in the public sector and the adoption of more advanced solutions by larger firms in higher value verticals such as financial services, manufacturing, ICT and retail where liberalisation and privatisation were important trends.

The IT services market features a wide range of vendors, but with Egypt's position as an outsourcing hub, a large share of this activity is geared toward export rather than domestic demand. Leading companies include IBM, and systems integrators **Raya IT**, **Giza Systems** and **Intercom**.

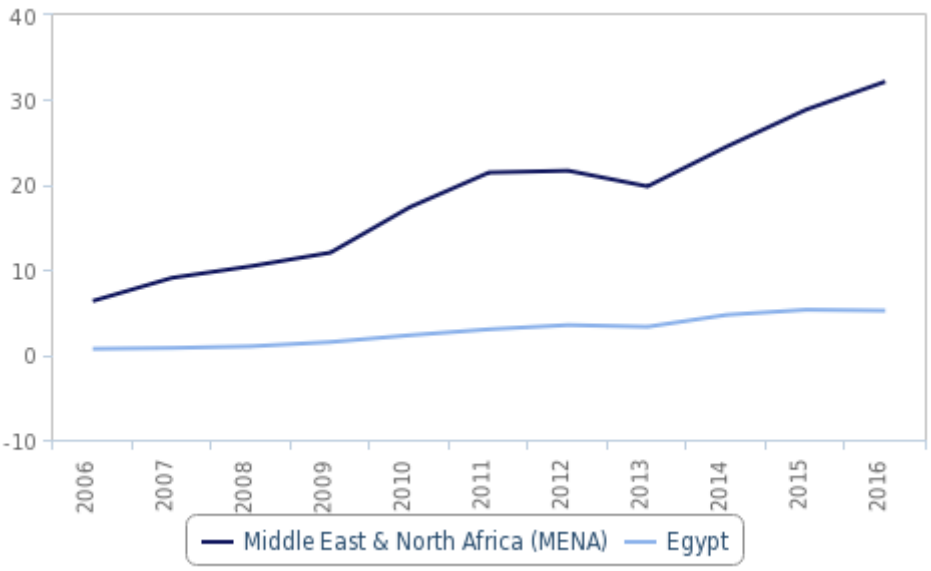
Data Processing And Hosting

The data hosting and processing market includes firms that provide the infrastructure for hosting and/or data processing services. Hosting includes traditional managed hosting services and cloud, while processing includes optical scanning services, text processing and computer input preparation. The market in Egypt was small and low-value throughout the review period, reflecting the cost and capacity restrictions of data centre services and bandwidth, and demonstrated by the low density of secure servers, even compared to the Middle East and Africa average which is far lower than developed markets.

There was growth during 2012-2017, albeit from a low base as data hosting and processing services spending accelerated in the later years of the review period. Positive trends included the migration from legacy to cloud systems, as well as in the maintenance of cloud-based services, as well as spending from consumer facing services for online video, gaming and other content.

Most data centre facilities in Egypt are concentrated in and around Cairo. Telecoms operators are large players in the market, where **Telecom Egypt** claims to have the largest facility in the country offering enterprise IT infrastructure services, while **Etisalat** also has a data centre in Cairo. The competitive landscape also features specialist providers **GPX Global Systems**, **Raya Data Center**, **CityNet**, **ECC Solutions** and **Link Datacenter**.

Secure Internet Servers Per 1mn Of Population
(Egypt 2006-2016)



Source: NetCraft, World Bank, Fitch Solutions

Cloud Computing

The cloud computing market recorded strong growth in Egypt during the review period for software, infrastructure and platform-as-a-service. This was however from a low base, and even at the end of the review period in 2017 the value for the market and the level of adoption was far lower than in developed economies, and most emerging markets.

Several factors contribute to the underdeveloped status of the cloud ecosystem, including the relatively high cost of solutions, in part due to the quality of domestic broadband and international connectivity infrastructure. There was also a general lack of awareness of the potential benefits of cloud migration among enterprise decision makers until the later years of the review period.

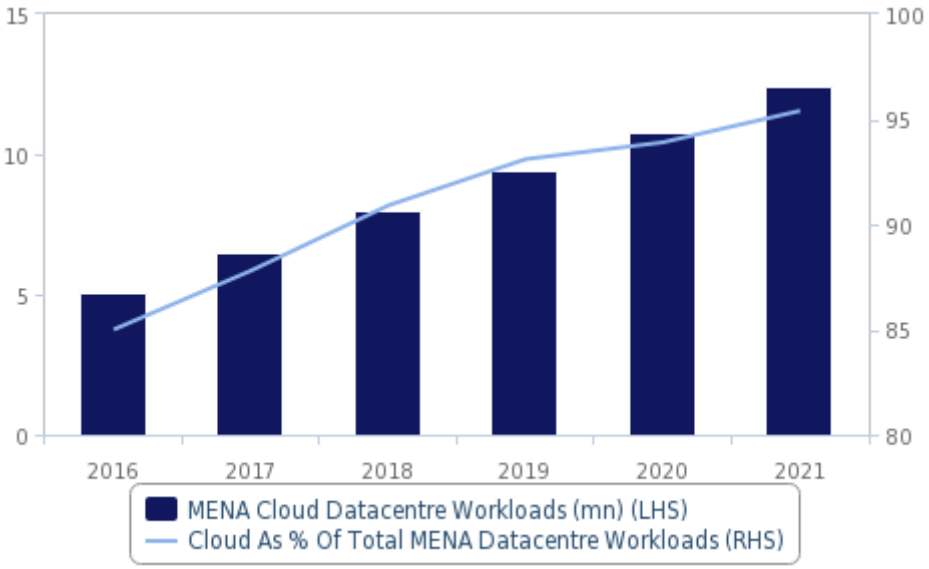
The key rationales for cloud adoption over 2012-2017 were the cost savings of cloud subscriptions versus the on-premises

licensing and maintenance model, and the increased pricing and usage flexibility on offer. Another factor was the operational flexibility, for instance the centralisation of maintenance functions with the cloud solutions providers, the ability to launch new products and services for customers, speed up innovation, and create new links with clients.

There was increased migration momentum in the later years of the review period from large firms, especially those in more technologically intensive verticals such as financial services, ICT, manufacturing and logistics. However, there was very limited adoption of cloud solutions among small firms, most of which had very low utilisation of technology beyond basic use of PCs, and were not in the market for cloud solutions beyond free email and other basic applications.

The government sector did undertake cloud migrations during the review period in order to generate efficiencies in public service delivery and operations, as well as to underpin new e-government services. For instance, in 2014 the Egyptian ICT Ministry and Ministry of Supply and Internal Trade entered an agreement to build a technological infrastructure for the Ministry of Supply and the Internal Trade Development Authority. This project was also designed to promote the adoption of ICT in the private sector.

Cisco Cloud Datacentre Workloads Forecast
(Egypt 2016-2021)



Source: Cisco, Fitch Solutions

The hyper-scale cloud provider with the deepest presence in Egypt's cloud market is IBM. It developed its position via investments and public sector partnerships. In 2014, it entered a collaborative agreement with ITIDA to offer cloud computing expertise to 100 independent software vendors and provide training for Softlayer infrastructure and Bluemix. This contributed to strong performance for IBM cloud services in Egypt, for which it reported growth of 67% in 2014 and 50% in 2015, though no actual revenue figures were reported. IBM also works with partners in Egypt, most notably platinum partner Intercom.

IBM's rivals in Egypt are the global cloud leaders such as **Amazon Web Services** (AWS), Microsoft, **Google**, and Salesforce - which are present in Egypt via partnership delivery models. AWS is available in Egypt through commercial and government reseller and managed service provider **Cloudnexa**, and **Information Dynamics** works as a local consulting partner. **WeboCloud** is a local consultancy and migration partner that works with Google, Salesforce and CRM solutions provider Zoho.

Microsoft Azure managed services and Dynamics or SAP on Azure partners in Egypt include **Accenture**, **Mirabeau**, **Dimension Data**, **HPE** and **Wharfedale Technologies**. Microsoft had a notable sucess in Egypt in 2017 with the migration of the public

broadcaster Egyptian Radio and Television Union to an Azure IaaS solution, and sister companies managed service provider Link Datacenter and development house **Link Development** were chosen to consolidate and manage infrastructure on Azure and development critical solution components.

Industry Trends And Developments

Key View: *The software and services industry was an economic success story in Egypt during a period (2011-2016) of political and economic crises as the country strengthened its position as a leading regional centre for outsourcing services. The government is aiming to build on this success with an ambitious sector development plan announced in 2018 that aims to capitalise on the competitiveness boost conferred by the devaluation through the creation of technology zones and investments in training. Meanwhile, the hardware market continued to be import-dependent, but there was the beginning of a recovery in import demand in 2017 as the economic environment stabilised.*

IT Trade

The IT hardware trade deficit in Egypt widened y-o-y in 2017 when imports increased after the steep decline that occurred in 2016 when the economy faltered and the currency was devalued in Q416. The primary growth driver was electronics components where imports were up almost 40% y-o-y in 2017 and five-fold compared to 2012, with the majority of components' imports attributable to diodes, transistors and semiconductor devices. The increase in computer hardware imports was more subdued in 2017 at 4% growth, and with import value still 29% below the pre-devaluation peak in 2015. In 2017, the computer hardware import increase was derived from the PC product category, including desktops, notebooks and servers - but there was a decline elsewhere, for instance peripherals, printers, copiers and monitors all saw import value lower in 2017 than the previous year.

The trend 2015-2017 was mainly the result of devaluation, and before that political upheaval resulted in volatility, but there were also underlying product trends. For instance, pressure on notebook and tablet import demand as smartphones cannibalised use cases, and pressure on Egypt's domestic desktop assembly industry as it struggled to be price-competitive against imports from East Asia. More than half of total computer hardware imports to Egypt were direct from China (a figure that was even higher for notebooks), and other major computer hardware exporters to Egypt included Germany and the US. Meanwhile, Egypt continued to have no large-scale or formal IT hardware export channels throughout the review period 2012-2017, instead relying on imported hardware to serve the domestic market.

EGYPT IT HARDWARE TRADE

Trade Balance (USDmn):

	2012	2013	2014	2015	2016	2017
Computer Hardware	- 334	- 270	- 321	- 319	- 221	- 231
Computer Parts	- 239	- 203	- 96	- 82	- 38	- 27
Electronic Components	- 28	- 30	- 71	- 94	- 108	- 147
IT Hardware Total	- 601	- 503	- 488	- 496	- 368	- 405

Exports (USDmn):

	2012	2013	2014	2015	2016	2017
Computer Hardware	2	1	9	6	0	0
Computer Parts	2	2	2	1	1	0
Electronic Components	1	1	0	0	3	8
IT Hardware Total	5	4	12	7	4	8
IT Total As % Of National Exports	0.0	0.0	0.0	0.0	0.0	0.0

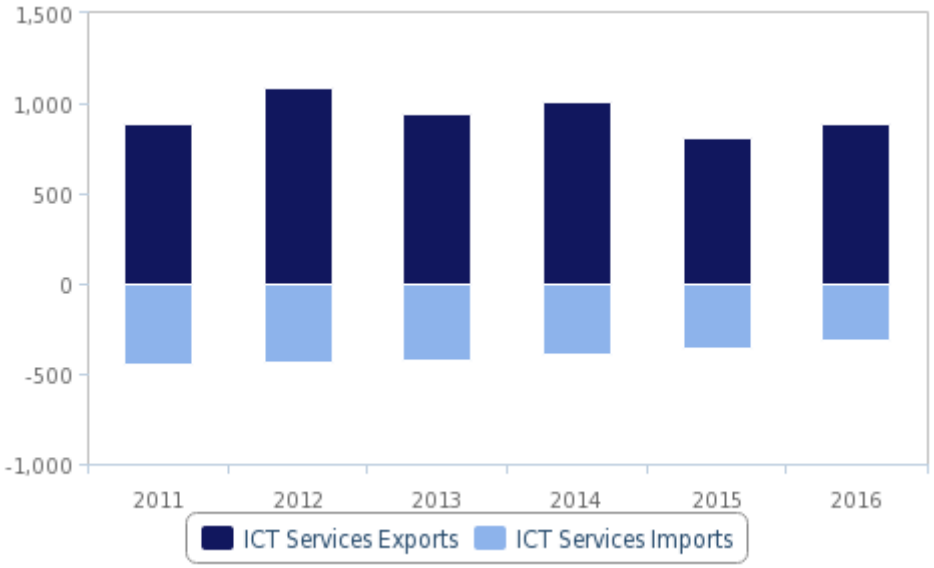
Imports (USDmn):

	2012	2013	2014	2015	2016	2017
Computer Hardware	336	271	330	325	221	231
Computer Parts	241	205	98	83	39	27
Electronic Components	29	31	71	95	112	155
IT Hardware Total	606	507	500	503	372	413
IT Total As % Of National imports	0.9	0.8	0.7	0.7	0.6	0.6

Source: Intracen, Fitch Solutions

Egyptian ICT services trade is characterised by a wide surplus that has existed for a decade by 2016. The level of the surplus showed some mild volatility in US dollar terms during the review period, a reflection of shifting currency value and the disruption from political changes. The official statistics do not breakdown ICT services into their constituent parts of computer, information and telecommunication services, but based on industry level information, it is expected that computer services are the single largest contributor to Egyptian ICT services trade flows because of the role the industry has as an outsourcing services provider.

Egypt ICT Services Trade (USDmn)
2011-2016



Source: Intracen, Fitch Solutions

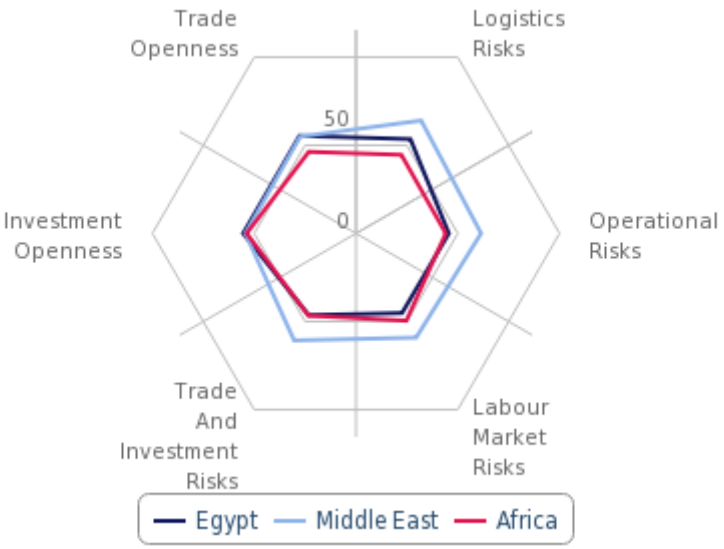
Industry Analysis

Egypt's scores in our Operational Risk Indices for the IT industry increased slightly y-o-y in 2018, giving it a profile that was above the regional average score for Africa in most categories, but below the Middle East. The slight improvement did however come after a period of volatility that had seen political risk become an increasing concern after two regime changes, and then heightened economic risks with the devaluation in Q416 after the currency free float. The devaluation was a short-term disruption, but it was also a potential positive by making domestic labour costs more competitive in the global market, which could allow Egyptian firms to capitalise on their traditional geographic advantages that allow for relatively low trade costs.

In terms of ICT industry policy, the government has ambitious targets for 1mn direct and indirect job openings by 2021. Out of the

predicted figure, direct job openings will be around 250,000 and indirect ones will number 750,000. Meanwhile, the expected contribution of ICT to GDP is expected to reach EGP195bn by 2020, up from EGP58.3bn in 2014, according to ministry officials. There are also initiatives in place for developing electronics manufacturing, with a budget of EGP361mn assigned in 2017 for the development of the main industries, of which two are related to consumer electronics: mobile devices and GPS, and the manufacture of screens (rather than just assembly of TV sets).

Operational Risk Indices
(Egypt 2018)



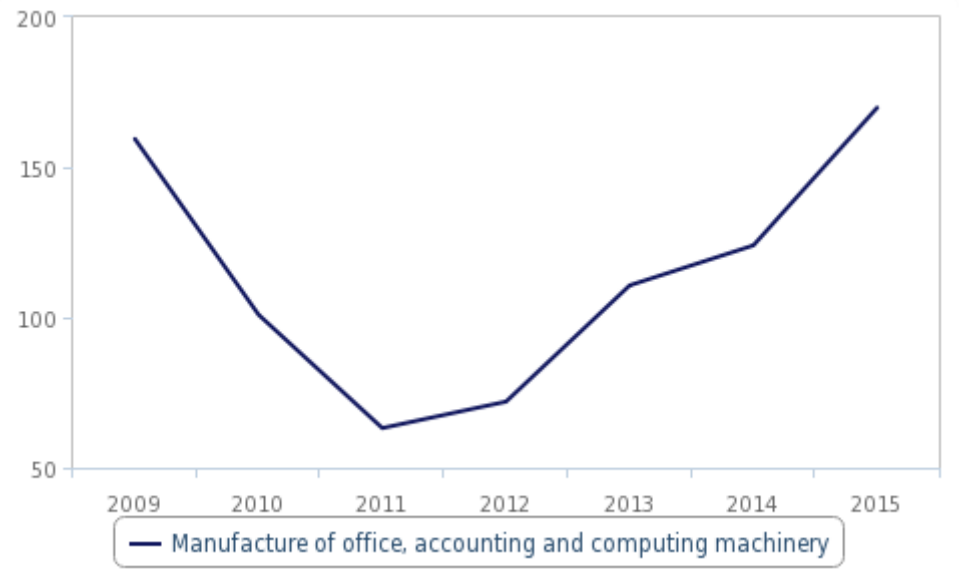
Source: Fitch Solutions

IT Hardware

Egypt's IT hardware industry has achieved nothing like the scale of audio-visual production, but official statistics did show that computer hardware and components manufacturing output increased steadily over 2011-2015. This saw the industry recover from the 2010-2012 lows and passing the level of the production index in 2009 by 2015. This trend was aided by the tender from the government in 2013 to provide 2mn tablets over four years. One major winner was **Benha Electronics** (**Katron**) that supplies devices under the Inar brand. Katron is traditionally a producer of electronics for military production, with around 3,000 total employees, but has diversified into consumer electronics, and produces tablets as well as PCs, digital receivers, TV sets and printed circuit boards.

The rest of the industry is small-scale and informal, with some desktop assembly taking place at single store operations where the main revenue stream is for repair services. However, there has been some recent development in Egypt's local PC assembly sector, with Egyptian companies such as **Centra**, **Metra** and **Prosylab** all assembling desktops locally. These companies have, however, lost out as demand has switched towards mobile form factors - ie, notebooks and tablets - the majority of which is imported directly from East Asia where the assembly industry is much more sophisticated and well established.

Computer Hardware Production Index
(Egypt 2009-2015)



Note: Base year 2002 = 100. Source: Capmas, Fitch Solutions

Software And Services

The software and services industry in Egypt recorded strong growth during the review period, with its attractiveness as an outsourcing services centre not undermined by political upheavals - causing competitiveness to actually benefit from devaluation after the free float of the currency in late 2016. This saw it become one of the leading IT outsourcing centres in Europe, Middle East and Africa against rivals such as Romania, Bulgaria, South Africa and Poland. In addition to labour cost competitiveness, Egypt also offers strategic location, language skills and other infrastructure advantages such as quality telecommunications via submarine cables. However, the cost advantage is still central to the industry base case, for instance, **Avasant** estimates Egypt to be one of the cheapest destinations for call centre and technical support provision in EMEA at USD14,800-USD16,100 annually, around 30% cheaper than Morocco and 40% cheaper than Central and Eastern European markets.

In 2018, Egypt's Communications and Information Technology Ministry announced plans that target USD20bn of IT exports by 2025, up from Ministry figures of USD1.8bn of exports in 2016. The plan also targets an increase in IT sector GDP share to 8% by 2025, up from 3.5% in 2016. Furthermore, it is ambitious in raising the annual growth rate from the 2.5% level to more than 15%, and targets multiple industry activities including web-enabled export-oriented services, offshored IT services by multinationals, and developing Egypt as a data centre hub. The policy will be supported by the creation and construction of seven technological zones outside Cairo to be completed in 2018, continued modernisation of communications infrastructure, technology transfer and investment in training centres.

An industry workforce provides technical services for IT leaders such as **Microsoft**, **HP**, **Oracle** and **Intel**, with other IT multinationals such as **IBM** having established a presence in Egypt and was operating six centres in Egypt in 2017. A number of blue-chip multinationals have also outsourced call centres in Egypt, including **General Motors** and **Unilever**. In H115, ITIDA reported that around 50,000 of the total of 90,000 jobs in Egypt's outsourcing industry were offshore related. Vendors including IBM, **Procter & Gamble**, **HSBC**, **Nestlé**, **Axxcelera**, **Mobinil Contact Services**, **Teleperformance** and **EMC** signed agreements to extend their partnerships with ITIDA in Egypt.

OUTSOURCING OPERATIONS IN EGYPT		
Business Process Outsourcing	**IT Outsourcing**	**Knowledge Process Outsourcing**
IBM, Vodafone, VISA, RAYA, P&G, Stream Global Services, HSBC, Schneider Electric, Perpsi, Teleperformance, Citibank	IBM, EMC, SAP, Oracle, Amadeus, Ericsson, Atos, Huawei, Fujitsu, Siemens, Teradata, HP, ITWorx, ITS, SQS	Intel, IBM, Invensys, EMC, Microsoft, Orange, Alcatel Lucent, Huawei

Source: ITIDA, Fitch Solutions

ITIDA has an Export IT programme with an annual budget of around EGP40mn that allows Egyptian companies offering software products, IT training services, application development services, IT consultancy services or outsourcing services to receive a direct cash rebate amounting to a maximum of 10-20% of their value-added exports with a ceiling of USD500,000 per company per year according to ITIDA regulations. The Export IT programme provided rebates to 105 companies with total exports of EGP2.3bn over 2010-2014.

Meanwhile, ITIDA has, through its Africa Together initiative, helped ICT companies conclude deals worth USD7mn with 17 African telecoms companies, financial institutions and ICT enterprises. Among the agreements, local firm **Raya Corporation** signed with **IE Networks**, **Tahses ICT and Consultancy** and **Mayakorp Nigeria Limited**. Egypt-based **Softec International** entered a deal with **IPMC Ghana** in the area of field force automation and unified emergency response platforms.

Competitive Landscape

Egypt IT Companies

IBM Egypt

IBM has had a long-term presence in Egypt since 1954, but its operations scaled up considerably since 2000 as an outsourcing location - and by 2018 it had six centres in the country that serve its global operations, with more than 500 software developers employed. These include: the Cairo Technology Development Center that supports IBM business units and clients globally, especially software consulting services for IBM software in the Middle East; the IBM Client Innovation Center, which was its first Global Delivery Center in the region and provides consulting, application development, maintenance, software testing and embedded software development services globally; Cairo Digital Center that is focused on new solutions and markets in the region such as cloud, software services and Watson; the Global Competence Center that provides remote technical support for EMEA, initially for System X servers and then other hardware and software after System X server line was sold to Lenovo; the Global Competency Center that was founded in 2011 and provides remote technical support for software clients in North America, Europe, the Middle East and Africa; and the Global Process Services Center that provides finance, HR and mobile outsourcing client support.

Orange Business Services

Orange Business Services, a subsidiary of **France Telecom**, provides communication services, as well as IT and managed services to enterprise customers. It began operations in 2005 and by 2018 it employed more than 1,400 people that work on the provision of IT implementation and fault management services in more than 20 languages. It selected Egypt for its outsourcing location because of geographic and time zone compatibility with Europe, its core market in terms of client location.

Samsung Electronics Egypt

Samsung Electronics Egypt is responsible for local sales and marketing, and is one of the South Korean giant's two production facilities in the Middle East and Africa. Samsung established its factory in Beni Suef with an investment of EGP1.7bn (USD280mn) in 2012, before investing a further USD35mn in August 2014 as part of the second phase of its expansion plan. It restated its commitment to Egypt (and South Africa) as its MENA production hubs in 2016 when citing economies of scale and tax incentives as the reason for not investing in manufacturing in Nigeria, and, instead, serving West African markets from Egypt. Samsung also exports monitors to Europe, and in 2015 announced its home appliances division was preparing an investment of USD300mn in Egypt to produce refrigerators, washing machines and air conditioners.

Production of TV sets, monitors and PCs began at Beni Suef in 2013, with output of 500,000 units, a figure that rose to 2.8mn in 2014 and 2.9mn in 2015 - by which time the factory employed 2,400 workers. In 2016, Samsung exported 2.8mn devices from Beni Suef across 36 markets in the Middle East and North Africa, worth more than USD790mn. Samsung expects that the sales value will ultimately reach USD1bn from its Egyptian manufacturing when production capacity of 6mn units is reached, the majority of which will be for 80-85% of the total. Meanwhile, in September 2018 Samsung was selected by the Ministry of Education to supply 1mn tablets for the 2018/2019 school year after beating seven other companies in a tender worth EGP2.4bn over the academic year. The price per tablet will not exceed EGP1400 (USD80).

In terms of the Egyptian devices market, Samsung is the dominant player in the tablet, smartphone and TV set markets. Samsung Egypt's executive vice president reported that it accounted for 43% of total handsets in use in the country in March 2017, and it was aiming to increase this share to 50%. Its performance was expected to be boosted by the Galaxy S8, S8+ and Note launches, because Samsung had more than 60% of smartphone sales at more than USD500 in Egypt in 2016. Meanwhile, in the TV set market, Samsung was also the leader with a 35% share in 2016, and a 60% share of the 55-inch or more screen size market.

In addition to product launches, promotions will play a role after Samsung agreed with Raya, **B.Tech** and Mobile Shop in June 2017

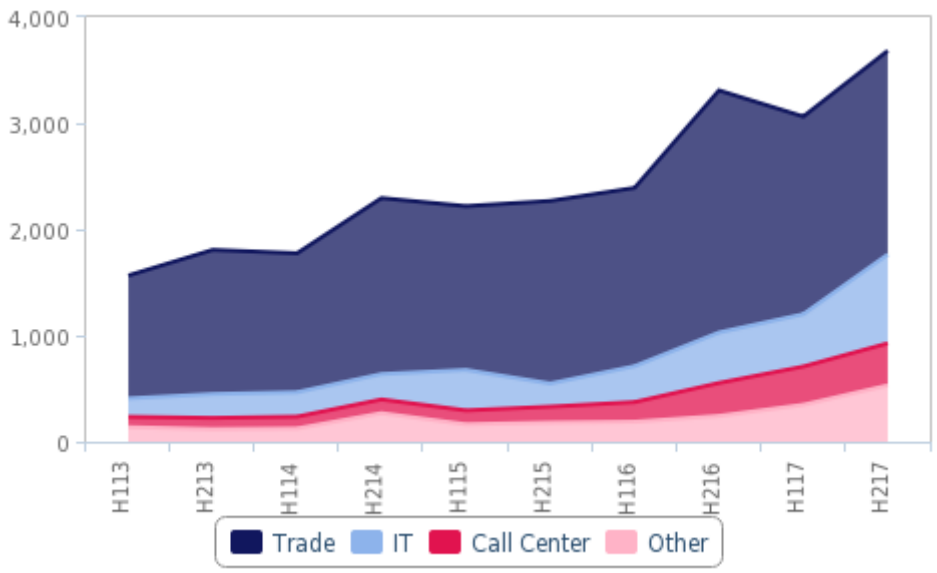
for its handsets to be available via 24-month instalment packages with no down payment or interest. Samsung has also invested in a local retail network that reached 50 stores, including agents, and has established the largest mobile spare parts warehouse in the country, enabling it to provide a higher level of after-sales service than most of its rivals.

Raya Holdings

Raya Holdings is an Egyptian conglomerate with a wide range of operations, including consumer electronics distribution and retail, contact centre services, data centre outsourcing, systems integration, international software services and smart buildings. The core of its business is the Trade division, which includes distribution, retail and maintenance operations. It has a dealer network of 8,500 and 88 retail outlets - as well as 12 Mega stores and 38 Raya stores. The distribution and retail business includes most consumer electronics - mobile phones, laptops, cameras, printers, TV sets as well as home appliances. Its biggest IT product partners in 2016 were **Xerox**, **Fujitsu**, **Microsoft**, **Canon** and **Apple**. Raya is also the sole level 3 **Nokia** maintenance provider in Egypt and services 14 countries in North and East Africa. Raya serviced 314,600 handsets in 2017, a figure that was down 13% y-o-y, while the number of handsets sold declined 50% y-o-y to 1.3mn units in Q417.

Information Technology and Contact Centre services are the other two large divisions responsible for Raya's financial performance. The IT services division recorded strong growth of 63% in 2017, driven by demand from the banking sector that accounted for 86% of sales in Q417, compared to 45% a year earlier. Raya's IT product range includes infrastructure, business solutions and outsourced services - and it is the leading systems integration company in Egypt. The Contact Centre division has a more international focus, with 77% of revenue derived from offshore services in 2016 as it served clients in more than 50 countries. Raya Contact Centre operates eight sites, of which four are in Egypt (Cairo, Alexandria, Hurghada and Assiut), as well as Dubai and Warsaw with a total staff of around 4,500. Raya also operates a data center business that provides co-location, managed hosting, clod computing and disaster recovery services, and in 2017 it was awarded an Advanced Designation for the provision of Cisco Cloud and Managed Services.

Raya Revenue Breakdown (EGPmn)
2013-2017



Source: Raya, Fitch Solutions

Giza Systems

Giza Systems was founded in 1974 and by 2018 employed 1,000 IT professionals offering systems integration services in Egypt and across the region, with offices in Egypt, Saudi Arabia, United Arab Emirates, Qatar, Kenya, Tanzania, Uganda and Nigeria. It offers systems integration, managed services and IT consultancy to clients in the telecoms, oil and gas, utilities, hospitality and real estate verticals that are in more than 40 countries.

Intercom Enterprises

Intercom Enterprises is an Egyptian systems integrator that provides services both in the domestic market and the Middle East and Africa region. It has 200 employees and offers a wide range of hardware and software technology, platform and business solutions to the financial services, public sector, telecoms, oil and gas, and defence verticals. It has strategic partnerships with a range of leading global technology companies including **Cisco**, IBM, **VMware**, **SAP**, **Symantec**, Xerox and **Fortinet**.

ECC Solutions

ECC is an Egyptian data center services provider that was founded in 2001 and provides a range of integrated data outsourcing, hosting, professional services and application management, and is a Cisco, Microsoft, **Oracle** and IBM partner. Its data centre was build with an investment of USD25mn and houses **Hewlett-Packard** technology. It has major clients in Egypt, including: the hosting of core banking application and email services for **Banque Du Caire**, core banking application and back-end application for Egypt Commercial Bank, hosting the **MasterCard** and Visa Switch for **Euronet**, and e-government portals.

International Electrical Products

International Electrical Products (IEP) was founded in 1996 and is based in 6 October City, a satellite town outside Cairo. IEP is an electronics product manufacturer that is part of **Bahgat Group**, an Egyptian conglomerate with interests in real estate, hotels and entertainment, appliance manufacture, healthcare services and nanotechnology. IEP subsidiary **Egy Audio** is one of the largest speaker manufacturers in Egypt, and was founded in 1998. Bahgat also founded systems integrator **NileSoft** in 1997, which provides ICT solutions including consulting, systems integration, software development and training in Egypt, Europe and the Middle East.

IEP manufactures a range of consumer electronics devices, including televisions and audio equipment, as well as printed circuit boards for the local and international markets. It produces devices for the domestic market under the Goldi and New brands, as well as manufacturing for other brands including **Philips**, **Grundig**, **Profilo** and **PEKO**. It also provides after-sales services for products at five Goldi Service centres across Egypt, as well as operating a network of 70 authorised service centres. Egy Audio produces speakers for TVs, cars, stereos, telephones and toys, with production capacity of 2mn speakers a year.

Katron (Benha Electronics)

Katron (Benha Electronics) was founded in 1964 and is headquartered in Benha, which is also the location of a production facility. It is a publicly-backed company and a member of the National Authority for Military Production. Benha Electronics has around 3,000 employees, working across eleven manufacturing, research, sales, support and distribution sites in the country.

Benha Electronics's background is in the production of electronic equipment for the military, including for communications. It has increasingly shifted towards civilian electronics products including PCs and tablets, flat panel TV sets, printed circuit boards, LED lamps and solar panels. Its consumer electronics products (tablets and LED TV sets) carry the Katron brand. Benha Electronics was selected by the government to produce the first local tablet in Egypt under the brand Inar, with shipments beginning in mid-2013.

El Araby Group

El Araby distributes consumer electronics and home appliances in Egypt, as well as across several other markets in Africa and the Middle East. El Araby currently partners with around 2,840 sales centres and has 185 service centres throughout Egypt, with more than 18,000 total employees. It also has two industrial complexes for manufacturing in Benha and in Quesna, established in 1982 and in 2001 respectively. The newer complex includes nine factories and three subsidiary manufacturing plants.

El Araby has partnerships with several consumer electronics vendors, including **Toshiba**, **Sharp**, **Sony**, **TCL**, **Hitachi NEC**, **Philips Seika** and **BenQ**. El Araby originally partnered with Toshiba in 1974 and with Sharp in 2003. Furthermore, in 2011, El Araby and Toshiba set up a joint venture (JV) to establish an LCD TV manufacturing plant in Egypt, with initial production capacity of 600,000 units per year. Toshiba had a 51% share of the JV and El Araby a 49% share, but in late 2015 Toshiba commenced talks to dissolve the JV as part of its group level decision to withdraw from the overseas TV business. In May 2017, Toshiba announced it would increase its focus on B2B PC devices and solutions in the Middle East, including through its distribution agreement with El Araby. Meanwhile, in June 2017 Toshiba El Araby selected **Foxxum** as the smart TV solutions provider to launch a new range of LED TVs in the Middle East, Africa and CIS.

Egabi Solutions

Egabi is a technology services and solution provider that was originally founded as **Banking Systems Development** in 1999 and was only rebranded Egabi in 2007. The rebranding occurred as fresh investment came in and it led to management reorienting the company for regional expansion. Egabi has since expanded and increased export services to more than 65% of turnover with key markets including Saudi Arabia, Sudan, Algeria, UAE, Jordan, Tanzania, Palestine and Kenya. Egabi has a range of partnerships and alliances including global vendors such as Oracle, Microsoft, **Infosys**, **EMC** and **Red Hat**.

Egabi works in a number of areas as a technology services and solutions provider including development services for Microsoft DotNet and Oracle suites of enterprise software including e-business, business intelligence and content management. It also provides implementation services in enterprise performance management, data warehousing and business intelligence, enterprise resource planning (ERP), operational banking solutions and customer relationship management. Other services include software infrastructure, business process management, outsourcing and software testing services. Meanwhile, Egabi also provides education services for a range of Oracle and Microsoft products and solutions.

ITWorx

ITWorx is an Egyptian software professional services vendor with more than 700 employees globally. It was founded in Cairo in 1994, which remains its headquarters even as it expanded to offices in Egypt, the US, Canada, UK, Switzerland, Kuwait, Saudi Arabia, the UAE and Qatar. According to a study by Endeavor Insights, there are 48 spin-off tech companies that came from ITWorx. In 2017 ITWorx entered a partnership with **Ingram Micro Global** for the latter to be an official worldwide distributor of ITWorx Hub, the Office 365 digital workplace. ITWorx Hub extends the functionality of Microsoft's cloud office software suite to integrate with other corporate applications.

Its largest source of customers are the public sector, financial services firms, life sciences, educational institutions, retail, telecoms operators and media companies in North America, Europe and the Middle East. Its largest repeat customers include **United Technologies**, Microsoft, **Vodafone** and **Mellon Bank**. Services provided include the development of e-commerce portals, business intelligence, customer relations management (CRM), correspondence tracking systems, enterprise application integration and application development outsourcing. ITWorx has benefited from demand for portals to better connect employees, customers and business partners. It has worked in partnership with leading global IT vendors including Microsoft, IBM, Oracle, **Informatica** and **Intel**.

Egypt IT Vendors

COMPUTER HARDWARE

Company	HQ	Products	Financial Performance 2017* (USDmn)				
			Group Revenue	Group Operating Profit (loss)	Computer Hardware as % of Group Revenue	EMEA Revenue (group)	Group Employees (year end)
Dell	US	PCs, Monitors, Servers, Storage	78,660	- 3,333	89%	na	145,000
Apple	US	PCs	239,176	64,259	19%	68,922	123,000
HP	US	PCs, Printers, Servers	53,279	3,597	76%	19,447	49,000
Lenovo	China	PCs, Monitors, Servers, Storage	44,290	459	81%	12,482	54,000
Canon	Japan	Printers & Office Equipment	36,384	2,958	57%	9,167	197,673
Ricoh	Japan	Printers & Office Equipment	18,505	475	77%	4,283	105,613
ASUS	Taiwan	PCs	14,268	419	63%	5,136	17,000
Acer	Taiwan	PCs, Monitors	7,801	121	99%	3,042	7,033
Fujitsu	Japan	Servers, Storage, PCs	36,812	900	20%	7,276	140,365
Seiko Epson	Japan	Printers & Office Equipment	9,742	560	67%	2,217	76,391
IBM	US	Servers, storage	79,140	10,680	8%	24,345	366,600
TPV Technology (AOC)	Hong Kong	Monitors	9,585	- 57	51%	2,789	29,014
Microsoft	US	PCs	102,273	30,792	4%	na	124,000
Oracle	US	Servers, storage	39,093	13,072	10%	11,410	138,000
Brother Industries	Japan	Printers & Office Equipment	6,230	586	57%	1,583	36,929
Cisco Systems	US	Servers	47,994	11,972	7%	12,170	72,900
Kyocera	Japan	Printers & Office Equipment	13,846	1,305	24%	2,742	70,153
Lexmark (2015 data)	US	Printers & Office Equipment	3,551	408	81%	na	12,000
Logitech	Switzerland	Peripherals	2,485	227	87%	820	6,400

*Note: *calendarised financials. na = not available. Source: Bloomberg, Company reports, Fitch Solutions*

SOFTWARE

Company	HQ	Products	Financial Performance 2017* (USDmn)				
			Group Revenue	Group Operating Profit (loss)	Software as % of Group Revenue	EMEA Revenue (group)	Group Employees (year end)
Microsoft	US	Applications, systems, consumer	102,273	30,792	62%	na	124,000
Oracle	US	Applications, systems	39,093	13,072	82%	11,410	138,000
IBM	US	Middleware and systems	79,140	10,680	31%	24,345	366,600
SAP	Germany	Applications, systems	26,576	5,593	67%	11,798	88,543
Salesforce.com	US	Applications	10,307	222	93%	1,855	25,000
Adobe	US	Applications	7,434	2,246	92%	2,007	17,973
Intuit	US	Applications	5,384	1,398	95%	na	8,200
Symantec	US	Enterprise applications, systems, consumer	4,739	- 135	95%	na	13,214
CA Technologies	US	Systems	4,164	1,067	93%	na	11,800
Dassault Systemes	France	Applications	3,652	832	89%	1,270	16,140
SAS	US	Applications	3,240	na	95%	1,183	14,185
VMWare	US	Applications, systems	7,312	1,559	40%	na	21,700
Ericsson	Sweden	Applications, systems	23,784	- 4,372	10%	na	100,735
Autodesk	US	Applications	2,032	- 504	95%	805	9,000

*Note: *calendarised financials. na = not available. Source: Bloomberg, Company reports, Fitch Solutions*

CLOUD

Company	HQ	Products	Financial Performance 2017* (USDmn)				
			Group Revenue	Group Operating Profit (loss)	Cloud As % Of Group Revenues	EMEA Revenue (group)	Group Employees (year end)
Microsoft	US	I/P/SaaS	102,273	30,792	29%	na	124,000
Amazon (AWS)	US	I/PaaS	177,866	4,107	10%	na	566,000
IBM	US	I/PaaS	79,140	10,680	21%	24,345	366,600
Salesforce.com	US	SaaS	10,307	222	93%	1,855	25,000
Oracle	US	I/P/SaaS	39,093	13,072	14%	11,410	138,000
VMWare	US	P/SaaS	7,312	1,559	60%	na	21,700
SAP	Germany	SaaS	26,576	5,593	16%	11,798	88,543
Adobe	US	SaaS	7,434	2,246	40%	2,007	17,973
Google	US	I/PaaS	110,855	26,146	3%	na	80,110
Alibaba	China	I/PaaS	11,257	3,490	4%	na	63,809

*Note: *calendarised financials. na = not available. Source: Bloomberg, Company reports, Fitch Solutions*

IT SERVICES							
Company	**HQ**	**Products**	**Financial Performance 2017* (USDmn)**				
			Group Revenue	**Group Operating Profit (loss)**	**IT Services as % of Group Revenue**	**EMEA Revenue (group)**	**Group Employees (year end)**
IBM	US	Development, consulting, infrastructure, outsourcing, maintenance	79,140	10,680	58%	24,345	366,600
Accenture	US	Consulting, analytics, infrastructure	38,249	4,835	100%	13,097	425,000
HPE**	US	Development, maintenance, outsourcing	30,045	3,356	88%	10,516	66,000
DXC Technology	US	Infrastructure, consulting, development	24,766	1,353	100%	8,866	150,000
Fujitsu	Japan	Development, infrastructure, outsourcing	36,812	900	63%	7,459	140,365
Tata Consultancy Services	India	Development, outsourcing, infrastructure	18,720	4,679	100%	5,186	387,223
NTT Data	Japan	Consulting, outsourcing, development, infrastructure	18,616	1,110	100%	na	111,664
Hitachi	Japan	Consulting, infrastructure, maintenance	83,041	5,540	20%	8,304	303,887
Cognizant	US	Consulting, outsourcing	14,810	2,481	100%	2,398	260,000
CapGemini	France	Consulting, outsourcing, infrastructure	14,450	1,341	100%	8,204	199,698
Atos	France	Consulting, infrastructure, managed services	14,341	999	88%	7,887	97,267
Infosys	India	Development, outsourcing, infrastructure	10,758	2,625	100%	2,550	200,364
CGI Group	Canada	Infrastructure, consulting, outsourcing	8,465	1,115	100%	4,390	71,000
Wipro	India	Development, outsourcing, consulting, infrastructure	8,391	1,299	95%	2,458	181,482
HCL Technologies	India	Development, outsourcing, infrastructure	7,652	1,517	100%	2,095	115,973

*Note: *calendarised financials. na = not available. Source: Bloomberg, Company reports, Fitch Solutions*

Retailers

Electronics

Hypermarkets and department stores in Egypt offer streamlined ranges of consumer electronics brown and white goods. The country's largest specialist consumer electronics retail chain is B.Tech, a home-grown retailer with a genuine nationwide presence.

Egypt's consumer electronics sector is expected to show strong growth across the forecast period, with retailers attracted by an underpenetrated market, and the growing demand for PCs, smartphones and tablets from a youthful consumer base. Other Egyptian consumer electronics retailers include: **Appliance Egypt** (which was founded in 1998 and specialises in computing and telecommunications equipment sales), and **Cairo Sales Stores** (a retailer of consumer electronics brown and white goods). Both of these retailers now provide online shopping services. US-based **RadioShack** is another major player in Egypt, with operations across the country, franchised by the local **Delta RS** Group. **Sharaf DG**, a UAE-based electronics retailer is the latest major player to announce entry into Egypt with the opening of its first store in the Mall of Egypt in 2016.

SELECTED ELECTRONICS RETAILERS

Company	Parent/Ownership	Sub-Sector	Revenues	Employees	Stores	Notes
Appliance	Appliance Egypt	Electronics	na	na	6	Present in three largest cities.
B.Tech	B.Tech	Electronics	EGP1.45bn (2014)	2,000	63	The largest retail in the segment.
Radio Shack	Delta RS	Electronics	na	na	39	Franchised by Delta RS Corporation.

Note: na = not available. Source: Company information, Fitch Solutions

E-commerce And Online Marketplaces

E-commerce still accounts for a small fraction of Egypt's total retail sales. Low bank account and credit card ownership rates, poor computer literacy and insufficient internet penetration rates were among the key factors inhibiting e-commerce growth in the country during the past five years. In 2017, only 5% and 8% of Egyptian internet users purchased something online, underscoring the long-term opportunity for e-commerce players

However, the situation is improving and by the end of 2015, the country boasted about 450 e-commerce websites serving around 30mn customers (the largest number in the Arab world). The increase in e-commerce comes from rising internet penetration rates, driven by the younger generation that is more familiar with technology. A number of international and domestic firms, such as **Jumia** and UAE-based **Souq.com**, are already active in Egypt's market, operating large online stores and selling clothing, electronics and household items.

SELECTED ONLINE RETAILERS

Company	Parent/Ownership	Sub-Sector	Revenues	Employees	Stores	Notes
Jumia	Africa Internet Group	Online, Clothing, Homeware.	na	na	na	A branch of international online stores.
Souq.com	Jabbar Internet Group	Online, Clothing, Homeware.	na	na	na	A branch of UAE-based Souq.com.
nefsak	Web Technology Company	Online, Clothing, Footwear.	na	na	na	

Note: na = not available/applicable. Source: Company information, Fitch Solutions

Regional Overview

Datacentres A Focus For Middle East IT Expansion

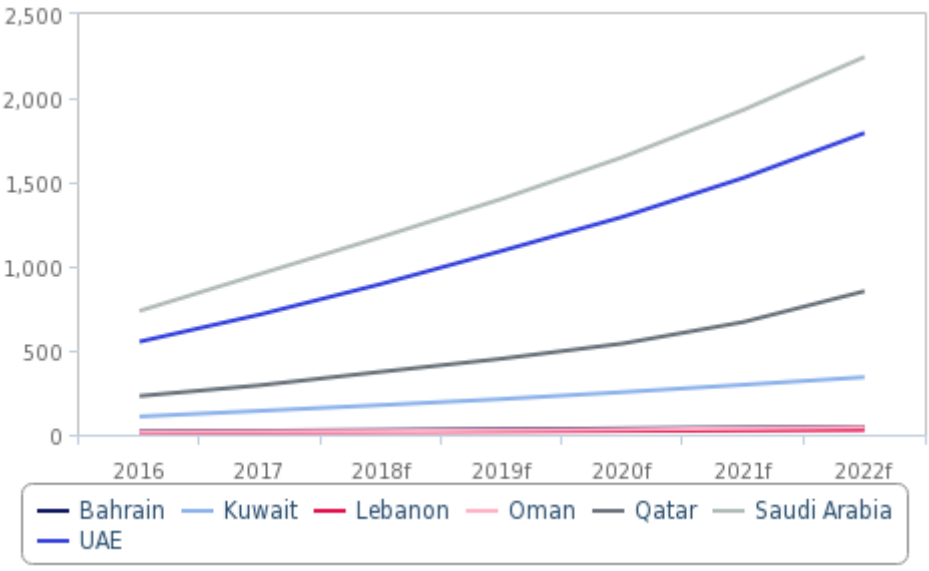
***Key View**: Over the next three years, global technology companies will be focusing on the Middle East as they race to extend their cloud computing, big data and Internet of Things applications and services into new markets. Although the region is well served by local next-generation access (NGA) infrastructure and international connectivity, localisation of data requires large-scale datacentre assets, and existing resources are not up to the challenge. Therefore, we expect industry service and application-orientated heavyweights such as Microsoft, IBM and Amazon Web Services to become entrenched very quickly, leaving other players - especially local companies - struggling to compete as service providers gravitate to the better-resourced newcomers.*

In July 2018, **Equinix** announced a partnership with **Oman Telecommunications Company** (Omantel) to build a new 18,600 square feet datacentre in Muscat. Equipped with a 250-cabinet capacity, the new facility will be able to offer carrier-neutral hosting and cloud computing services from the second quarter of 2019. Although Equinix already operates datacentres in the United Arab Emirates (UAE), the company has been relatively slow to build its presence in the Middle East, despite growing demand amongst governments and businesses for advanced data storage and processing facilities as well as rising usage of latency-critical consumer services such as video streaming and e-sports. USD20mn is to be invested in the facility, which will take advantage of Omantel's access to six of the region's principal international submarine cables.

Oman will be one of the smallest markets for cloud services to 2022, according to our regional forecasts. The country's USD45mn annual spending on cloud services will be dwarfed by Saudi Arabia (USD2.2bn) and the UAE (USD1.8bn) by 2022 and, with datacentre investments being focused on these markets by larger service- and applications-focused players such as **Microsoft**, **IBM** and **Amazon Web Services** (AWS), it is easy to see why the more narrowly-focused Equinix has chosen Oman for its latest expansionary move.

Saudi Arabia And UAE Best Suited To Datacentre Investment

Cloud Computing Spending By Market (USDmn)



f = Fitch Solutions forecast. Source: Fitch Solutions

The recent collapse in global oil prices shocked governments across the Middle East into looking beyond hydrocarbons for economic security and the technology sector has been almost universally identified as a means of aiding that diversification. We

have long believed that, by accelerating the digital transformation of both countries and companies, cloud computing can become a strategic part of regional economic diversification and development plans. Therefore, we tend to take a favourable view with regards to technology partnerships between telecoms operators and flagship state- or privately-owned enterprises that involve technology companies.

Cloud services will be most attractive for local small and medium-sized enterprises (SMEs) and entrepreneurs who may lack the infrastructure and economic resources for effective data management. While cybersecurity threats, inefficient cloud access and scaling, and data sovereignty concerns could limit uptake, we believe these will be mitigated with datacentres located within the region.

In 2017, AWS said it would open its first Middle East AWS Region facility in Bahrain, but subsequently progressed into opening discussions with the Saudi government regarding the establishment of bigger facilities there, as well. It was prompted to fast-track its expansion plans after Google initiated talks with the Saudi government and is known to be working with Aramco, the country's principal oil and gas producer, to develop cloud, data analytics and artificial intelligence (AI)-powered productivity solutions.

AWS, in turn, has spurred Microsoft to announce plans to build data centres in Abu Dhabi and Dubai by 2019, superseding earlier plans to serve the Middle East from afar using facilities in South Africa. Microsoft's new regional facilities will improve access to its cloud computing service, Azure, for local customers. Azure allows enterprise customers to access a variety of computing processes online, from storage to server space and more. Microsoft's cloud customers in the region already include **Emirates Group**, **Etihad Airways**, **Majid Al Futtaim**, **Jumeirah Hotels** and **Resorts and Landmark Group**, among others. For 2017, Microsoft reported that the Middle East and Africa was one of the fastest growing regions in the world for its cloud computing business, although it did not reveal specific figures and growth is, in any case, coming from a low base.

With **Oracle**, IBM and **Alibaba** also expanding their presence in the region, it is clear that a greater proportion of IT spending will be directed towards cloud-based infrastructure, service and application offerings. This is reflected in our forecasts, but our expectations are also informed by analysis of local governments' openness towards accepting international investment and making the requisite change to supporting legislation such as amended planning laws, profit repatriation rules, usage of local and migrant labour forces and - crucially - data protection and cybersecurity protocols. In this regard, Saudi Arabia and the UAE are well-equipped to deal with new wave digital businesses, but regulations are far from robust and will be subject to change and re-interpretation as the tech sector becomes more important to these countries' diversification strategies.

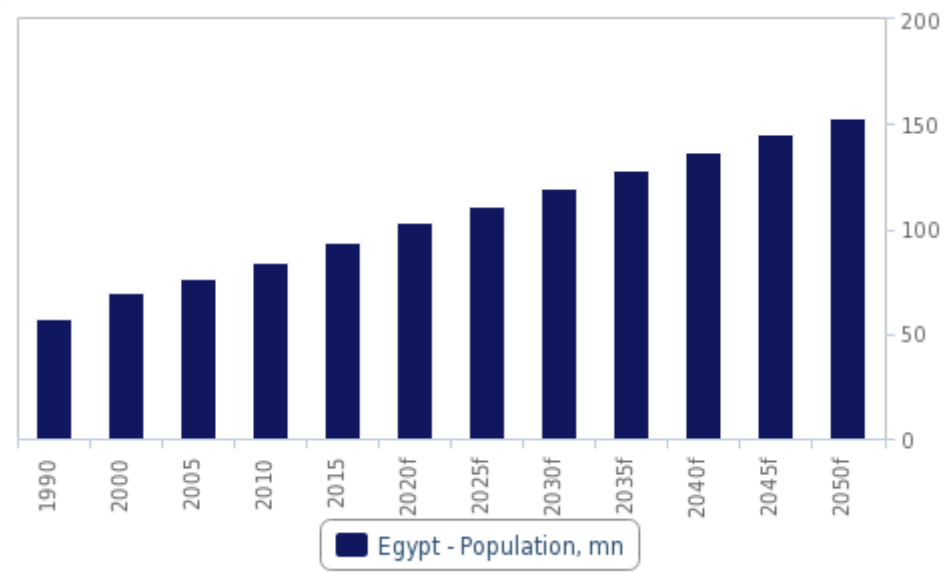
In that regard, Equinix's relatively low-key move into Oman brings with it a more manageable risk profile and access to a market that, while not likely to achieve scale, will at least deliver acceptable returns on investment.

Egypt Demographic Outlook

Demographic analysis is a key pillar of our macroeconomic and industry forecasting model. Not only is the total population of a country a key variable in consumer demand, but an understanding of the demographic profile is essential to understanding issues ranging from future population trends to productivity growth and government spending requirements.

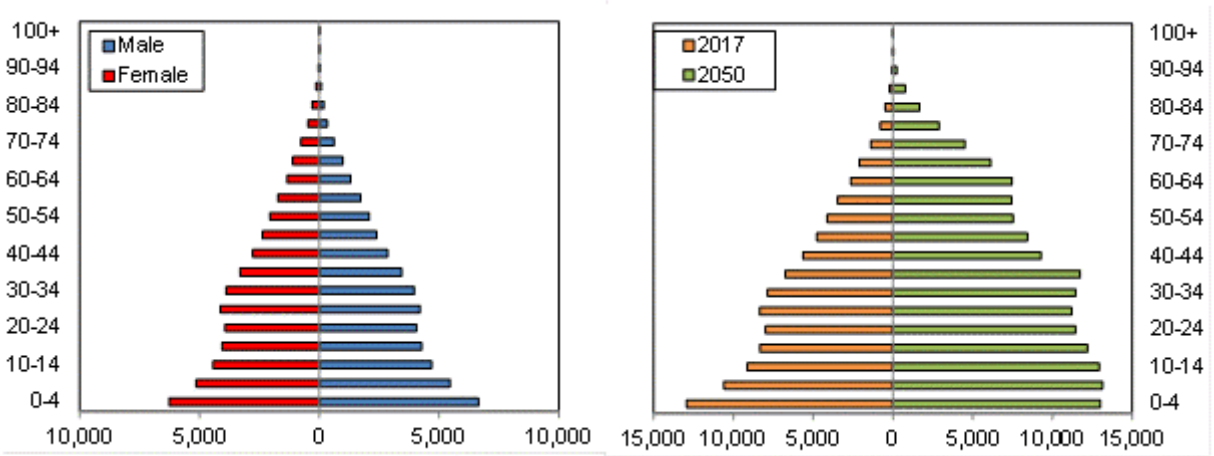
The accompanying charts detail the population pyramid for 2017, the change in the structure of the population between 2017 and 2050 and the total population between 1990 and 2050. The tables show indicators from all of these charts, in addition to key metrics such as population ratios, the urban/rural split and life expectancy.

Population
Egypt (1990-2050)



f = Fitch Solutions forecast. Source: World Bank, UN, Fitch Solutions

Egypt Population Pyramid
2017 (LHS) & 2017 Versus 2050 (RHS)



Source: World Bank, UN, Fitch Solutions

POPULATION HEADLINE INDICATORS (EGYPT 1990-2025)							
Indicator	**1990**	**2000**	**2005**	**2010**	**2015**	**2020f**	**2025f**
Population, total, '000	57,412.2	69,906.0	76,778.1	84,107.6	93,778.2	102,941.5	111,470.9
Population, % y-o-y		1.86	1.85	1.99	2.14	1.75	1.52
Population, total, male, '000	28,822.4	35,164.3	38,706.6	42,466.0	47,408.9	52,045.8	56,328.9
Population, total, female, '000	28,589.8	34,741.7	38,071.5	41,641.6	46,369.2	50,895.7	55,142.0
Population ratio, male/female	1.01	1.01	1.02	1.02	1.02	1.02	1.02

f = Fitch Solutions forecast. Source: World Bank, UN, Fitch Solutions

KEY POPULATION RATIOS (EGYPT 1990-2025)							
Indicator	**1990**	**2000**	**2005**	**2010**	**2015**	**2020f**	**2025f**
Active population, total, '000	31,281.9	40,922.9	47,429.1	53,104.5	57,954.8	63,320.2	68,959.6
Active population, % of total population	54.5	58.5	61.8	63.1	61.8	61.5	61.9
Dependent population, total, '000	26,130.3	28,983.1	29,349.1	31,003.1	35,823.3	39,621.3	42,511.4
Dependent ratio, % of total working age	83.5	70.8	61.9	58.4	61.8	62.6	61.6
Youth population, total, '000	23,542.7	25,553.4	25,604.9	26,988.9	31,075.1	34,135.7	35,948.1
Youth population, % of total working age	75.3	62.4	54.0	50.8	53.6	53.9	52.1
Pensionable population, '000	2,587.6	3,429.7	3,744.1	4,014.2	4,748.2	5,485.6	6,563.3
Pensionable population, % of total working age	8.3	8.4	7.9	7.6	8.2	8.7	9.5

f = Fitch Solutions forecast. Source: World Bank, UN, Fitch Solutions

URBAN/RURAL POPULATION & LIFE EXPECTANCY (EGYPT 1990-2025)							
Indicator	**1990**	**2000**	**2005**	**2010**	**2015**	**2020f**	**2025f**
Urban population, '000	24,961.7	29,917.7	33,035.3	36,182.3	40,451.2	45,070.9	50,121.8
Urban population, % of total	43.5	42.8	43.0	43.0	43.1	43.8	45.0
Rural population, '000	32,450.5	39,988.3	43,742.8	47,925.4	53,327.0	57,870.6	61,349.1
Rural population, % of total	56.5	57.2	57.0	57.0	56.9	56.2	55.0
Life expectancy at birth, male, years	62.2	66.2	67.1	68.2	69.1	69.9	70.6
Life expectancy at birth, female, years	67.0	71.1	71.8	72.6	73.6	74.6	75.5
Life expectancy at birth, average, years	64.6	68.6	69.4	70.4	71.3	72.2	73.0

f = Fitch Solutions forecast. Source: World Bank, UN, Fitch Solutions

POPULATION BY AGE GROUP (EGYPT 1990-2025)							
Indicator	**1990**	**2000**	**2005**	**2010**	**2015**	**2020f**	**2025f**
Population, 0-4 yrs, total, '000	9,041.1	8,272.6	9,000.9	9,868.7	12,374.4	12,071.6	11,678.5
Population, 5-9 yrs, total, '000	7,855.5	8,425.5	8,209.0	8,940.2	9,797.3	12,302.0	12,005.3
Population, 10-14 yrs, total, '000	6,646.0	8,855.3	8,394.9	8,180.1	8,903.4	9,762.1	12,264.2
Population, 15-19 yrs, total, '000	5,580.0	7,781.1	8,822.7	8,357.4	8,137.2	8,861.8	9,720.1
Population, 20-24 yrs, total, '000	4,877.1	6,482.2	7,729.7	8,696.6	8,206.0	7,990.3	8,713.8
Population, 25-29 yrs, total, '000	4,212.2	5,236.6	6,404.2	7,550.6	8,431.6	7,948.0	7,734.5
Population, 30-34 yrs, total, '000	3,659.1	4,577.0	5,176.4	6,302.6	7,389.9	8,271.5	7,792.2
Population, 35-39 yrs, total, '000	3,055.6	4,123.0	4,553.8	5,146.2	6,316.8	7,402.0	8,280.1
Population, 40-44 yrs, total, '000	2,857.8	3,624.2	4,100.9	4,530.3	5,214.7	6,379.3	7,457.7
Population, 45-49 yrs, total, '000	2,041.6	2,975.1	3,572.8	4,047.4	4,567.5	5,246.8	6,397.7

Indicator	1990	2000	2005	2010	2015	2020f	2025f
Population, 50-54 yrs, total, '000	1,868.1	2,694.7	2,864.6	3,451.6	3,956.9	4,469.7	5,138.3
Population, 55-59 yrs, total, '000	1,696.2	1,832.2	2,528.0	2,698.5	3,256.3	3,746.1	4,249.0
Population, 60-64 yrs, total, '000	1,434.2	1,596.7	1,675.9	2,323.3	2,477.9	3,004.8	3,476.1
Population, 65-69 yrs, total, '000	1,060.2	1,354.7	1,395.3	1,470.1	2,036.9	2,183.3	2,671.8
Population, 70-74 yrs, total, '000	732.2	1,012.7	1,096.8	1,133.5	1,193.7	1,669.4	1,810.6
Population, 75-79 yrs, total, '000	452.9	607.4	719.8	781.9	809.3	863.5	1,232.0
Population, 80-84 yrs, total, '000	231.7	301.8	355.3	421.3	460.7	485.5	532.9
Population, 85-89 yrs, total, '000	86.3	116.3	134.2	157.9	188.8	211.6	230.8
Population, 90-94 yrs, total, '000	21.0	31.2	36.1	41.7	49.6	61.0	71.0
Population, 95-99 yrs, total, '000	3.0	5.1	6.1	7.1	8.4	10.3	13.1
Population, 100+ yrs, total, '000	0.2	0.4	0.6	0.7	0.8	1.0	1.2

f = Fitch Solutions forecast. Source: World Bank, UN, Fitch Solutions

POPULATION BY AGE GROUP % (EGYPT 1990-2025)

Indicator	1990	2000	2005	2010	2015	2020f	2025f
Population, 0-4 yrs, % total	15.75	11.83	11.72	11.73	13.20	11.73	10.48
Population, 5-9 yrs, % total	13.68	12.05	10.69	10.63	10.45	11.95	10.77
Population, 10-14 yrs, % total	11.58	12.67	10.93	9.73	9.49	9.48	11.00
Population, 15-19 yrs, % total	9.72	11.13	11.49	9.94	8.68	8.61	8.72
Population, 20-24 yrs, % total	8.49	9.27	10.07	10.34	8.75	7.76	7.82
Population, 25-29 yrs, % total	7.34	7.49	8.34	8.98	8.99	7.72	6.94
Population, 30-34 yrs, % total	6.37	6.55	6.74	7.49	7.88	8.04	6.99
Population, 35-39 yrs, % total	5.32	5.90	5.93	6.12	6.74	7.19	7.43
Population, 40-44 yrs, % total	4.98	5.18	5.34	5.39	5.56	6.20	6.69
Population, 45-49 yrs, % total	3.56	4.26	4.65	4.81	4.87	5.10	5.74
Population, 50-54 yrs, % total	3.25	3.85	3.73	4.10	4.22	4.34	4.61
Population, 55-59 yrs, % total	2.95	2.62	3.29	3.21	3.47	3.64	3.81
Population, 60-64 yrs, % total	2.50	2.28	2.18	2.76	2.64	2.92	3.12
Population, 65-69 yrs, % total	1.85	1.94	1.82	1.75	2.17	2.12	2.40
Population, 70-74 yrs, % total	1.28	1.45	1.43	1.35	1.27	1.62	1.62
Population, 75-79 yrs, % total	0.79	0.87	0.94	0.93	0.86	0.84	1.11
Population, 80-84 yrs, % total	0.40	0.43	0.46	0.50	0.49	0.47	0.48
Population, 85-89 yrs, % total	0.15	0.17	0.17	0.19	0.20	0.21	0.21
Population, 90-94 yrs, % total	0.04	0.04	0.05	0.05	0.05	0.06	0.06
Population, 95-99 yrs, % total	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Population, 100+ yrs, % total	0.00	0.00	0.00	0.00	0.00	0.00	0.00

f = Fitch Solutions forecast. Source: World Bank, UN, Fitch Solutions

Information Technology Methodology

Industry Forecast Methodology

Fitch Solutions' industry forecasts are generated using the best-practice techniques of time-series modelling and causal/ econometric modelling. The precise form of model we use varies from industry to industry, in each case being determined, as per standard practice, by the prevailing features of the industry data being examined.

Common to our analysis of every industry is the use of vector autoregressions. They allow us to forecast a variable using more than its own history as explanatory information. For example, when forecasting oil prices, we can include information about oil consumption, supply and capacity.

When forecasting for some of our industry sub-component variables, however, using a variable's own history is often the most desirable method of analysis. Such single-variable analysis is called univariate modelling. We use the most common and versatile form of univariate models: the autoregressive moving average model (ARMA).

In some cases, ARMA techniques are inappropriate because there is insufficient historic data or data quality is poor. In such cases we use either traditional decomposition methods or smoothing methods as a basis for analysis and forecasting.

We mainly use OLS estimators, and in order to avoid relying on subjective views and encourage the use of objective views, Fitch Solutions uses a 'general-to-specific' method. We mainly use a linear model, but simple non-linear models, such as the log-linear model, are used when necessary. During periods of 'industry shock' (for example, poor weather conditions impeding agricultural output), dummy variables are used to determine the level of impact.

Effective forecasting depends on appropriately selected regression models. Fitch Solutions selects the best model according to various different criteria and tests, including but not exclusive to:

- R2 tests explanatory power; adjusted R2 takes degree of freedom into account
- Testing the directional movement and magnitude of coefficients
- Hypothesis testing to ensure coefficients are significant (normally t-test and/or P-value)
- All results are assessed to alleviate issues related to auto-correlation and multi-collinearity

Fitch Solutions uses the selected best model to perform forecasting.

Human intervention plays a necessary and desirable role in all of Fitch Solutions' industry forecasting. Experience, expertise and knowledge of industry data and trends ensure analysts spot structural breaks, anomalous data, turning points and seasonal features where a purely mechanical forecasting process would not.

Sector-Specific Methodology

A number of criteria drive our forecasts for each IT variable.

IT forecasting is complicated due to the fragmented nature of the market, with little transparency of vendor data and low apparent agreement between many sets of figures in terms of market definition, base and methodology. In addition, forecasts are affected by consideration of a variety of internal and external political and economic factors.

Within best-practice techniques of time-series modelling, our quarterly updated forecasts are improved substantially by intimate knowledge of the prevailing features of each local market.

Risk/Reward Index Methodology

Individual variables taken into account in creating each forecast include:

- Overall economic context, and GDP and demographic trends
- Underlying 'information society' trends
- Projected GDP share of industry
- Maturity of market structure
- Regulatory developments and government policies
- Developments in key client sectors such as telecommunications, banking and e-government
- Technological developments and diffusion rates
- Exogenous events

Estimates are calculated using our own macroeconomic and demographic forecasts.

Sources

Additional sources used in IT reports include national ministries and ICT regulatory bodies, national industry associations, and international industry organisations such as the International Telecommunication Union (ITU), officially released company results and figures, and international and national industry news agencies.

Fitch Solutions' proprietary Risk/Reward Index (RRI) provides a comparative regional ranking system evaluating the ease of doing business and the industry-specific opportunities and limitations for potential investors in a given market. The RRI system divides into two distinct areas:

Rewards: Evaluation of sector's size and growth potential in each state, and also broader industry/state characteristics that may inhibit its development. This is further broken down into two sub-categories:

Industry Rewards (an industry-specific category taking into account current industry size and growth forecasts, the openness of market to new entrants and foreign investors, to provide an overall score for potential returns for investors).

Country Rewards (a country-specific category, factoring in favourable political and economic conditions for the industry).

Risks: Evaluation of industry-specific dangers and those emanating from the state's political/economic profile that call into question the likelihood of anticipated returns being realised over the assessed time period. This is broken down into two sub categories:

Industry Risks (an industry-specific category whose score covers potential operational risks to investors, regulatory issues inhibiting the industry and the relative maturity of a market).

Country Risks (a country-specific category in which political and economic instability, unfavourable legislation and a poor overall business environment are evaluated to provide an overall score).

We take a weighted average, combining industry and country risks, or industry and country rewards. These two results in turn provide an overall Risk/Reward Score, which is used to create our regional ranking system for the risks and rewards of involvement in a specific industry in a particular country.

For each category and sub-category, each state is scored out of 100 (100 being the best), with the overall Risk/Reward Score a weighted average of the total score. As most of the countries and territories evaluated are considered by Fitch Solutions to be 'emerging markets', our score is revised on a quarterly basis. This ensures the score draws on the latest information and data across

our broad range of sources, and the expertise of our analysts.

Sector-Specific Methodology

In constructing these indices, the following indicators have been used. Almost all indicators are objectively based.

IT RISK/REWARD INDEX INDICATORS	
	Rationale
Rewards	
Industry	
IT market value, USDbn	Denotes breadth of IT market. Large markets score higher than smaller ones.
Sector value growth, % y-o-y	Denotes sector dynamism. Scores based on annual average growth over five-year forecast period.
Government initiatives and spending	Denotes spending boost provided by public sector, which can be a crucial determinant of sector development.
Hardware, % of total sales	Denotes maturity of market. A high proportion of hardware sales, compared to services/software, indicates that the overall IT market is immature.
Country	
Urban-rural split	Urbanisation is used as a proxy for development. Mainly rural states score lower.
GDP per capita, USD	A high GDP per capita supports long-term industry prospects.
Overall score for *Country Rewards* is also affected by the coverage of the power transmission network across the state.	
Risks	
Industry	
Intellectual property (IP) laws	Markets with fair and enforced IP regulations score higher than those with endemic counterfeiting.
ICT policy	Subjective evaluation of official policy towards IT development, as enshrined in statute and tax code.
Country	
Short-term external risk	Score from Fitch Solutions' Country Risk Index (CRI). It evaluates the vulnerability to external shock, which is the principal cause of economic crises. Such a crisis would cut investment.
Short-term financial risk	Score from CRI, to denote risk of currency crisis and stability of banking sector. The former would hit revenues in hard currency, while the latter would curtail investment funding.
Trade bureaucracy	Score from CRI to denote ease of trading with the state.
Legal framework	Score from CRI denotes the strength of legal institutions in each state - security of investment can be a key risk in some emerging markets.
Bureaucracy	Score from CRI denotes ease of conducting business in the state.
Corruption	Score from CRI denotes the risk of additional illegal costs/possibility of opacity in tendering/ business operations affecting companies' ability to compete.

Source: Fitch Solutions

Weighting

Given the number of indicators/datasets used, it would be wholly inappropriate to give all sub-components equal weight. The following weighting has been adopted:

WEIGHTING OF COMPONENTS

Component	Weighting, %
Rewards	70, of which
- Industry	65
- Country	35
Risks	30, of which
- Industry	40
- Country	60

Source: Fitch Solutions

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