



International
Labour
Organization

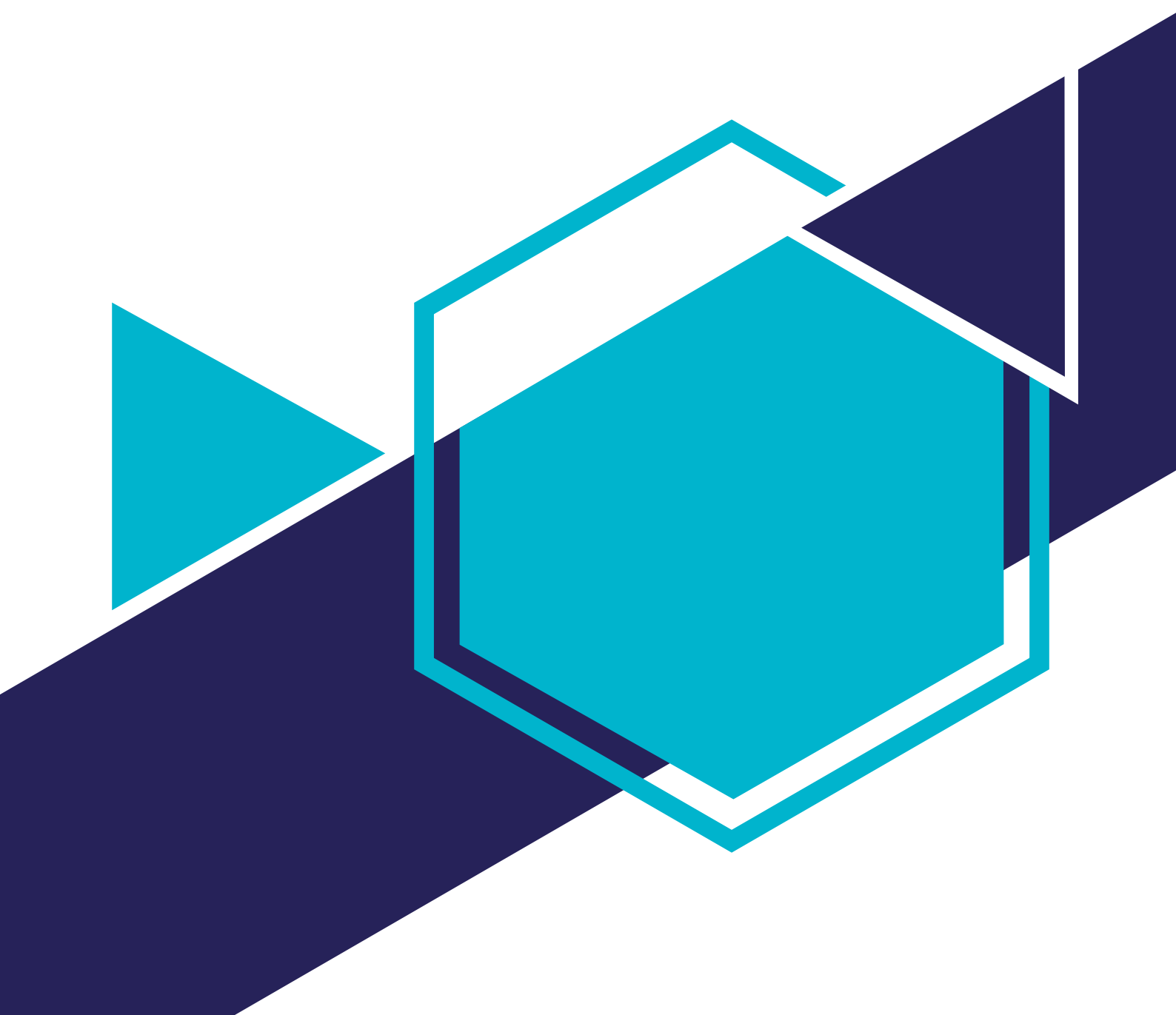


ADWA'
Advancing the Decent Work
Agenda in North Africa >>>



Analysis of the Supply Chain of the Telecommunication Sector in Egypt

from an Interrelation Perspective
with Focus on Labour and Working Conditions



Copyright © International Labour Organization 2021

First published 2021

Publications of the International Labour Office enjoy copyright under Protocol 2 of the Universal Copyright Convention. Nevertheless, short excerpts from them may be reproduced without authorization, on condition that the source is indicated. For rights of reproduction or translation, application should be made to ILO Publishing (Rights and Licensing), International Labour Office, CH-1211 Geneva 22, Switzerland, or by email: rights@ilo.org. The International Labour Office welcomes such applications.

Libraries, institutions and other users registered with a reproduction rights organization may make copies in accordance with the licences issued to them for this purpose. Visit www.ifrro.org to find the reproduction rights organization in your country.

Assessment to Inform a Capacity Building Programme on Working Conditions including occupational safety and health (osh) and decent work within the telecommunication sector in Egypt, International Labour Office – Cairo: ILO, 2021

ISBN: 9789220362419 (web pdf)

ISBN: 9789220362402 (print)

Also available in Arabic:

تحليل سلسلة إمداد قطاع الاتصالات في مصر من منظور ترابطي، مع التركيز على العمالة وظروف العمل

ISBN: 9789220362433 (web pdf), Cairo, 2021.

ISBN: 9789220362426 (print)

The designations employed in ILO publications, which are in conformity with United Nations practice, and the presentation of material therein do not imply the expression of any opinion whatsoever on the part of the International Labour Office concerning the legal status of any country, area or territory or of its authorities, or concerning the delimitation of its frontiers.

The responsibility for opinions expressed in signed articles, studies and other contributions rests solely with their authors, and publication does not constitute an endorsement by the International Labour Office of the opinions expressed in them.

Reference to names of firms and commercial products and processes does not imply their endorsement by the International Labour Office, and any failure to mention a particular firm, commercial product or process is not a sign of disapproval.

Information on ILO publications and digital products can be found at: www.ilo.org/publns.

This publication was produced with the financial support of the European Union. Its contents are the sole responsibility of the ILO and do not necessarily reflect the views of the European Union.

For ILO publications in Cairo:

9 Dr. Taha Hussein St., Zamalek, Cairo, Egypt

Tel: (+202) 27350123

Visit our website: www.ilo.org/cairo

Printed in Egypt



List of Abbreviations

ILO	International Labour Organization
ICT	Information, Communication and Technology
MNO	Mobile Network Operator
OSH	Occupational Safety and Health
CAPMAS	Central Agency for Mobilization and Statistics
CAGR	Compounded annual growth rate
ITU	International Telecommunications Union
IFC	International Finance Corporation
3G	Third Generation
4G	Fourth Generation
CBE	Central Bank of Egypt
TSP	Telecom Service Provider
OEM	Original Equipment Manufacturer
NTRA	National Telecommunication Regulatory Authority



Contents

List of Abbreviations	2
Contents	4
Figures	5
Tables	5
Executive Summary	6
>> 1. Background and Methodology	7
1.1. Background and Context of the Study	7
1.2. Methodology and Data Sources	7
>> 2. Telecommunication Sector Overview	9
2.1. Defining Telecommunication Sector	9
2.2. Economic Snapshot	10
2.3. Key Trends in the Egyptian Telecommunication Sector	10
2.4. Evolving Industry Drivers	14
>> 3. The Telecommunication Sector Infrastructure	18
3.1. Telecom Infrastructure Market Overview	18
3.2. Telecom Supply Chain Analysis	22
>> 4. Employment and Working Conditions	26
4.1. Job Creation	26
4.2. Composition of the Workforce	27
4.3. Awareness of the principles of the MNE	29
4.4. General Policies	30
4.5. Employment	30
4.6. Working Conditions	33
4.7. Wages and Benefits	36
4.8. Training and Development	38
4.9. Labour Relations and Social Dialogue	40
>> 5. Conclusion	42
REFERENCES	44
>> ANNEXES	45
5.1. Annex I: List of Experts and Focus Groups	45
5.2. Annex II: Expert Discussion Guide	46



Figures

Figure 2-1. Contribution to Employment Growth (2010-2018)	13
Figure 3-1. Telecom Sector Key Stakeholders	18
Figure 3-2. Value Chain for Telecommunication Services	19
Figure 3-3. Telecommunication Service Provider Segments	19
Figure 3-4. Tower Ownership by Egypt's MNOs	20
Figure 3-5. Active and passive equipment on a typical tower site	21
Figure 3-6. Classification of Managed Services	22
Figure 3-7. Managed Services Outsourcing Model	23
Figure 3-8. Overall Telecom Infrastructure Supply Chain Interrelations	25
Figure 4-1. Contribution to Employment Growth (2010-2018)	27
Figure 4-2. Telecommunication Employees by Occupation	28
Figure 4-3. Actual Snapshot of Rooftop Site build up operations	33
Figure 4-4. Telecommunications Employees by Education	39

Tables

Table 2-1. ICT Sector Breakdown (ITU Segmentation)	9
Table 2-2. ICT Infrastructure Indicators	11
Table 2-3. Segmentation of ICT Companies by Size	13
Table 2-5. Sample of National Smart Projects	16
Table 3-1. Tower Industry Business Models	22
Table 4-1. Interviewees' Segmentation by stakeholder role	26
Table 4-2. Areas covered by the MNE Declarations	29
Table 4-3. PPE Matrix provided by a main contractor	35
Table 4-4. Indications for field worker wage levels	38



Executive summary

Over the last few decades, information and communication technology (ICT) has become one of the key economic sectors in Egypt. Paired with accelerated demand growth, ICT at large and telecommunications industry, in particular, have experienced a cycle of evolution and maturity at different levels.

National Digital initiatives and projects have significantly contributed to demand for expanding the telecommunication infrastructure across Egypt in addition to a huge telecommunication penetration across population.

The need for telecommunication Infrastructure also crossed beyond the boundaries of mobile operators to include: utilities, railways and transportation fields; large national projects with advanced technologies leading to structural industry changes and inclusion of many new entrants across the supply chain. Demand acceleration stimulated the need for new players to contribute to the Telecommunication Supply Chain driven by mobile network operators (MNOs) and vendors.

The study examined the important role of MNOs and vendors in advancing the human capital practices along the infrastructure supply chain, influencing the market towards decent work conditions. Furthermore, the study reflects on the role of the government and other stakeholders with focus on the telecommunication infrastructure supply chain. The infrastructure industry has significantly evolved in the past ten years, whereby

local providers have invested in their internal systems, human capital and health and safety practices providing a tier of high maturity local companies. These companies act as a flagship for other contractors and other demand markets.

The telecommunication workforce has proved to be one of the most advanced in terms of education, training and development and wage levels. Given the special nature of the industry and the continuous need for compliance with international standards driven by MNOs and vendors, this has provided growth opportunities for a large segment of vocational workers and technical supervisors to raise their market value.

From an employee relations and social dialogue perspective, the whole supply chain is still evolving. The majority of stakeholders adopt good human capital practices, allowing for two-way communication. However, formation of workers' organizations and collective bargaining are still at a low maturity state except for large publicly owned corporations (namely: Telecom Egypt which is the only public mobile network operator).

In summary, MNOs and multinational enterprises will continue to play a significant role in advancing employment and operational standards through continued supplier development and ongoing development of human capital and labour relations practices to match international standards.



1. Background and Methodology

>>> 1.1. Background and Context of the Study

The 'Advancing the Decent Work Agenda in North Africa' (ADWA) project is a partnership between the Government of Sweden and the International Labour Organization (ILO) to advance the Decent Work Agenda in North Africa (2018-2023). In Egypt, the project aims to engage actively with the private sector to promote the effective implementation of the Decent Work Agenda, in the telecommunication sector, with focus on promoting

Occupational Safety and Health (OSH) and road safety throughout the supply chain. In this context, the ADWA project has commissioned a study to analyze the supply chain of the telecommunication sector in Egypt, and identify challenges and opportunity for the realization of decent work in the sector. The main objectives of the study are defined in the following key points:

- Clear mapping of the telecommunication supply chain.
- Sizing the potential of job creation in the telecommunication sector.
- Assessing the different factors which affect employability in the sector.
- Understanding the maturity of occupational safety and health practices across the supply chain within the scope of the study.
- Understanding aspects of human capital related business practices with reference to the MNE Declaration.
- Reflecting insights related to labour relations within the telecommunication sector.

In this regard, this report concludes the analysis of the supply chain of the Telecommunication Sector in Egypt from an interrelation perspective, with Focus on labour and working conditions. The study was prepared by PractiQ Digital for the International Labour Organization (ILO).

Though the purpose of this study was to analyze the supply chain of the Telecommunication Sector in Egypt

from an interrelation perspective, one research aim is to analyze whether and in which way the evolution of the sector has had an impact on the labour relations and social dialogue. Accordingly, the study can provide a good foundation to support the ILO in supporting and encouraging decent working conditions.

>>> 1.2. Methodology and Data Sources

This section presents key elements of the methodology employed in this study and highlights its limitations.

A methodology including the following elements has been used:

- Desk research consisting of literature review and statistical data gathering;
- Field study consisting of expert interviews and focus groups.

>> 1.2.1. Desk Research

Literature Review

The contribution from literature was particularly valuable for defining the boundaries of the telecommunication sector within the ICT sectors and identifying the contribution of the telecommunication in the economy

as well as the key drivers and growth initiatives affecting the sector. The literature review was also valuable in identifying the key stakeholders in the telecommunication supply chain and the different business models of

interrelation between stakeholders. Relevant literature was identified through trusted official sources and

credible databases. The list of references is included in References section.

Statistical Data

The study is based on data gathered at national level from CAPMAS. We have based our interpretation on data extracted from the Egyptian Labour Force Survey. However, information from CAPMAS is only available on a sectoral level (ex: Telecommunication) without reflection

of subsector level (ex: call centers, contractors, vendors ... etc.). This means that the breakdown required to further dissect and define the telecommunications sector could not be obtained.

>> 1.2.2 Field Research

Expert Interviews

The objective of the field research is to provide input to answer the study questions. The field research is meant to illustrate the development in different segments of the telecommunication supply chain. The experts have been selected from enterprises, governmental bodies and employers' organizations in order to provide a clear

and credible perspective of the telecommunication infrastructure supply chain. Accordingly, the experts' selection criteria involved addressing leading positions in the enterprise in addition to high exposure and market experience. The expert profile can be summarized in the following points:

- Leadership position within the entity.
- Significant years of experience within the telecommunication sector (more than 10 years).
- Multi-discipline exposure.
- Experience with technical and field caliber.

Additionally, it has contributed to obtaining the views of stakeholders on different aspects, including market outlook, impact on business and employees as well as working conditions.

The selection of interviewees was based on a clustering exercise outlined in the methodology.

The interviews serve to inform the analysis both with regard to the company cluster and direct supply chain partners. An interview guide was developed based on a gap analysis of information gathered in the first

phase of the study. The interview guide is structured according to the key aspects of the study mentioned earlier in section 1.1, taking into account the guidance offered by the ILO Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy (MNE Declaration).

Sixteen stakeholders were contacted and interviewed. The list of interviewees is enclosed in Annex I: List of Experts.

Focus Groups

Additionally, two focus groups have been conducted with two groups of workers (3 workers in each group) within two mobile operator companies. The workers were

selected from Upper Egypt and Lower Egypt, with both permanent and limited contracts and from a variation of field operations.



2. Telecommunications Sector Overview

>>> 2.1. Defining Telecommunications Sector

It is important to initially establish the boundaries of the telecommunication sector within the ICT sectors. This study follows the definition as provided by the International Telecommunications Union (ITU) in 2012.

production of goods, networks and services shall be primarily intended to fulfil or enable the function of information processing and communication by electronic or optical means.”

This definition states that “The ICT sector represents economic activities including industries of which

The table below illustrates the breakdown of the ICT sector and boundaries of the telecommunications sector.

► **Table 2-1.** ICT Sector Breakdown (ITU Segmentation)

ICT manufacturing industries	
261	Manufacture of electronic components and boards
262	Manufacture of computers and peripheral equipment
263	Manufacture of communication equipment
264	Manufacture of consumer electronics
268	Manufacture of magnetic and optical media
ICT trade industries	
4651	Wholesale of computers, computer peripheral equipment and software
4652	Wholesale of electronic and telecommunications equipment and parts
ICT services industries	
582	Software publishing
6110	Wired telecommunications activities
6120	Wireless telecommunications activities
6130	Satellite telecommunications activities
6190	Other telecommunications activities
6201	Computer programming activities
6202	Computer consultancy activities
6203	Computer facilities management activities
6209	Other information technology and computer service activities
6311	Data processing, hosting and related activities
6312	Web portals
9511	Repair of computers and peripheral equipment
9512	Repair of communication equipment

According to the ITU classification, the Telecommunications industry delivers telephone, television, Internet, and other services to customers,

providing the primary means of communication to virtually all businesses, households, and individuals.

The telecommunications industry is divided into four main segments:

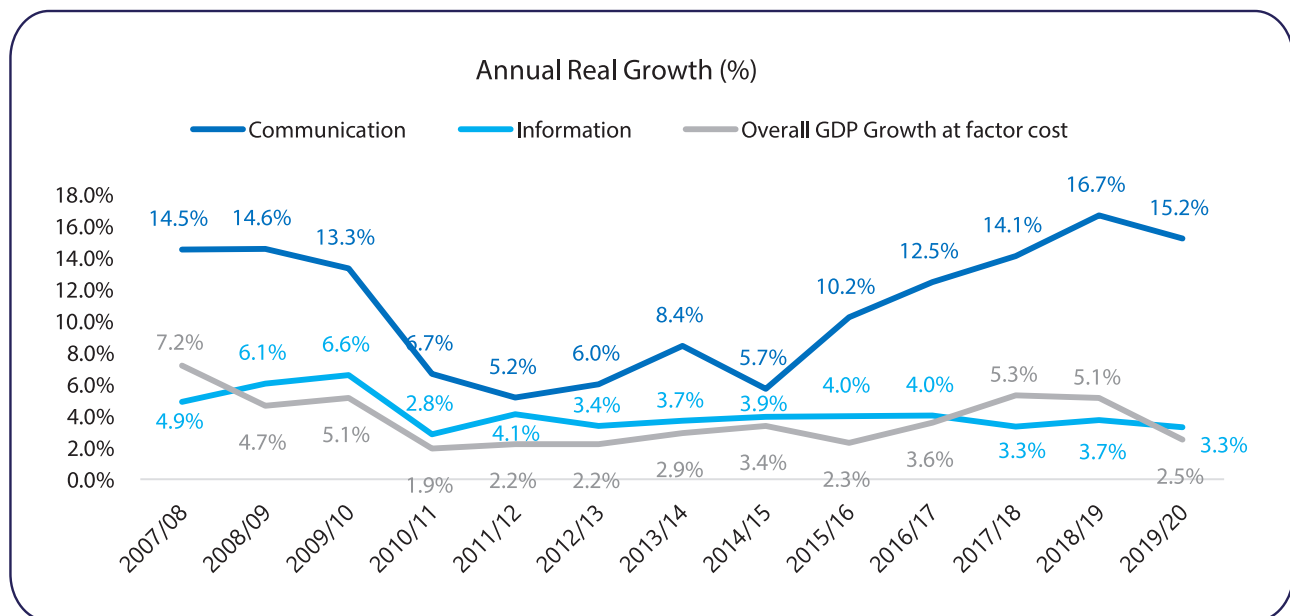
- Wired telecommunications carriers which represent the largest segment
- Wireless telecommunications carriers
- Satellite telecommunications
- Other sectors

>>> 2.2. Economic Snapshot

The shares of communications and information sectors¹ in total GDP represent 2.8% and 0.3%, respectively, as per FY 2019/20 figures.

However, during the ten-year period (2010/11-2019/20), the communications sector recorded the highest average

growth among all sectors (11%). The sector has been on an upward trajectory starting FY 2015/16 in line with the country's digital transformation and has shown robust performance in FY 2019/20, albeit at a slightly slower pace to grow by 15.2% compared to 16.7% in 2018/19.



>>> 2.3. Key Trends in the Egyptian Telecommunications Sector

Over the past decade, the telecommunications industry has grown significantly in Egypt. Mobile penetration across Egypt reached 94 percent of the population by the end of 2020. Mobile internet subscriptions exceeded 50 million while fixed internet subscribers exceeded 10

million. Services, such as mobile payment, have grown by as much as 10 percent in the past few years. These services and connectivity in general have opened up business and employment opportunities and improved access to services.²

>> 2.3.1 Growing Subscriber Base

The sector has witnessed exponential growth over the last few years, primarily driven by affordable tariffs, wider availability, roll out of mobile number portability (MNP),

3G and 4G, evolving consumption patterns of subscribers and a conducive regulatory environment.

¹ According to the International Standard Industrial Classification of All Economic Activities (ISIC) which Egypt adopts, the communications sector includes the activities of providing telecommunications and related service activities, i.e. transmitting voice, data, text, sound and video; while information services include the activities of web search portals, data processing and hosting activities, as well as other activities that primarily supply information.

² MCIT Infrastructure Statistics, 2020, <https://mcit.gov.eg/en/Indicators>

► **Table 2-2. ICT Infrastructure Indicators³**

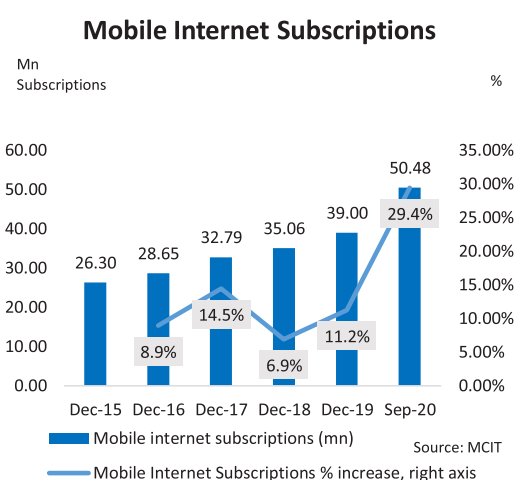
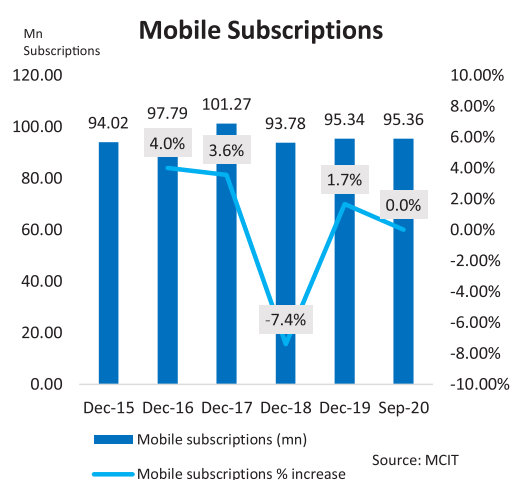
		Dec-15	Dec-16	Dec-17	Dec-18	Dec-19	Sep-20
Mobile subscriptions	Million	94.02	97.79	101.27	93.78	95.34	95.36
Mobile penetration	%	107.41	109.73	111.64	101.62	95.38	94.09
Fixed line subscriptions	Million	6.24	6.12	6.60	7.87	8.76	9.15
Fixed line penetration	%	7.23	7.19	6.90	7.59	7.70	7.70
Mobile internet subscriptions	Million	26.30	28.65	32.79	35.06	39.00	50.48
Mobile internet subscriptions as % of mobile subscriptions	%	28.0%	29.3%	32.4%	37.4%	40.9%	52.9%
USB modem subscriptions	Million	3.82	3.28	3.26	3.21	3.60	3.28
ADSL subscribers	Million	3.79	4.44	5.20	6.53	7.30	8.45
ADSL subscriptions as % of fixed line subscriptions	%	60.7%	72.5%	78.8%	83.0%	83.3%	92.3%

Source: MCIT Infrastructure Statistics, 2020, <https://mcit.gov.eg/en/Indicators>

Note: Penetration rates are calculated as a % from total population inside Egypt.

As shown in Table 2-2, the percentage of mobile internet subscriptions from total mobile subscriptions has increased significantly from 40.9% in December 2019 (pre-COVID) to 52.9% in September 2020 (latest). Similarly,

the percentage of ADSL subscriptions from total fixed line subscriptions has increased from 83.3% in December 2019 to 92.3% in September 2020.



As shown in the charts, the number of mobile internet subscriptions alone has grown by 29%, between December 2019 and September 2020 (latest).

The telecom industry has seen a paradigm shift from a voice-centric market to a data-centric market. While voice

business still contributes a large chunk towards operator revenues, data revenues have shown an exponential growth trajectory over the last few years which makes the data a key driver for growth.

³ MCIT Infrastructure Statistics, 2020, <https://mcit.gov.eg/en/Indicators>

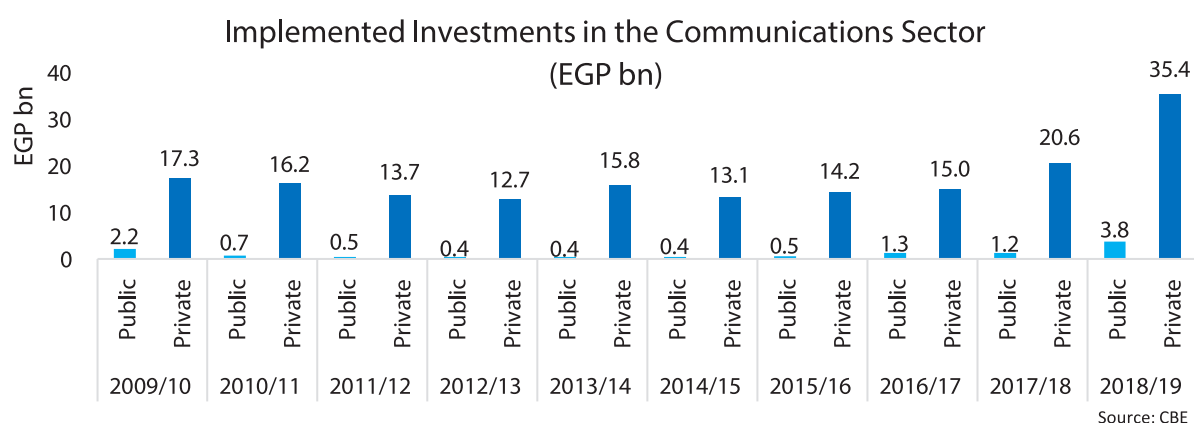
» 2.3.2 Continued Investment in the Sector

Implemented private investments in the communications sector has increased by 136% in nominal terms in the three fiscal years ending 2018/19. More recently, according to the State Information Service⁴, implemented investments in the ICT sector have increased by 35% in 2019/20 to record EGP 48.1 bn. The nation's four mobile telecoms providers (Telecom Egypt, Vodafone, Orange and Etisalat) are seen to be investing heavily in network expansion and infrastructure upgrades, aiming to provide a better quality of services.

In October 2019, government-owned carrier, Telecom Egypt, revealed plans to install optical fiber in 20 million homes by 2020, according to Al Masry Al Youm. In September 2019, the government announced that TE

would begin working on a project worth around EGP 40 billion to develop the telecommunications network in the New Administrative Capital.

Moving to Etisalat, they announced that Etisalat had plans to invest EGP 4.5 billion in 2019 including EGP 3 billion to modernize its network. In 2021, Orange eyes investments worth EGP 4 billion on network upgrades. On top of that, Vodafone Egypt announced, during the same month, plans to inject some EGP 5 billion investments in network upgrades in 2020. The operator already invested EGP 9 billion to upgrade the network over the past two years to develop the infrastructure that keeps pace with the launch of the fourth-generation services in Egypt.



It is worth noting that according to the State Information Service, the value of allocating new frequency bands to companies licensed to provide mobile phone services in Egypt amounted to USD 1.17 bn. Operators made these capex investments primarily to deploy new technologies, like 4G, to expand their fiber footprint.

More recently, according to the State Information Service, 1,336 new companies were established in the ICT sector in FY 2019/20 with a capital of EGP 1.34 bil. (breakdown not available).

However, based on CAPMAS latest Economic Census (2017/18), 64% of the establishments working in the ICT and 90% of the establishments working in the telecommunications sector have less than 5 employees⁵. Available data show some differences in company size between subsectors. Traditionally, companies in telecommunications were large public companies with many employees. However, more recently, many small telecommunications companies have seen the light of the day.

⁴ Source: State Information Service (SIS)

⁵ Source: CAPMAS

► **Table 2-3.** Segmentation of ICT Companies by Size

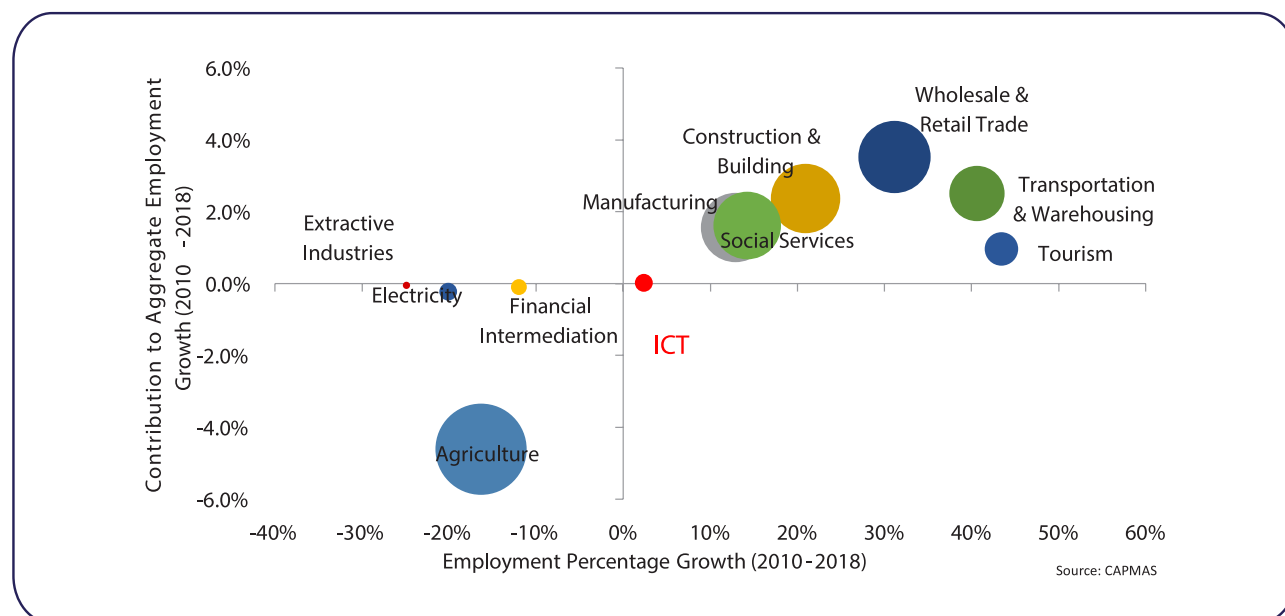
ICT Segmentation	Number of Employees						Total No. of Establishments
	+100	-50	-20	-10	-5	1	
ICT, of which:	155	98	320	336	803	3,101	4,813
Publishing activities	36	19	60	55	131	37	337
Video & TV production, sound recording and music publishing	8	15	65	99	165	157	509
Programming and broadcasting activities	12	3	12	7	25	49	107
Telecommunications	59	19	35	41	136	2,722	3,013
Computer programming, consultancy and related activities	41	43	140	132	343	107	805
Information service activities	0	0	6	3	4	29	42

Source: CAPMAS Economic Census (2017/2018)

» 2.3.3 Employment in the Telecom Sector

The ICT sector employs only 0.5% of the total number of employees in Egypt by the end of FY 2019/20⁶

► **Figure 2-1.** Contribution to Employment Growth (2010-2018)



Note: Size of the bubble represents the sector's share in total employment in 2018.

Between 2010 and 2018, employment in the ICT sector has grown by 2.4%.

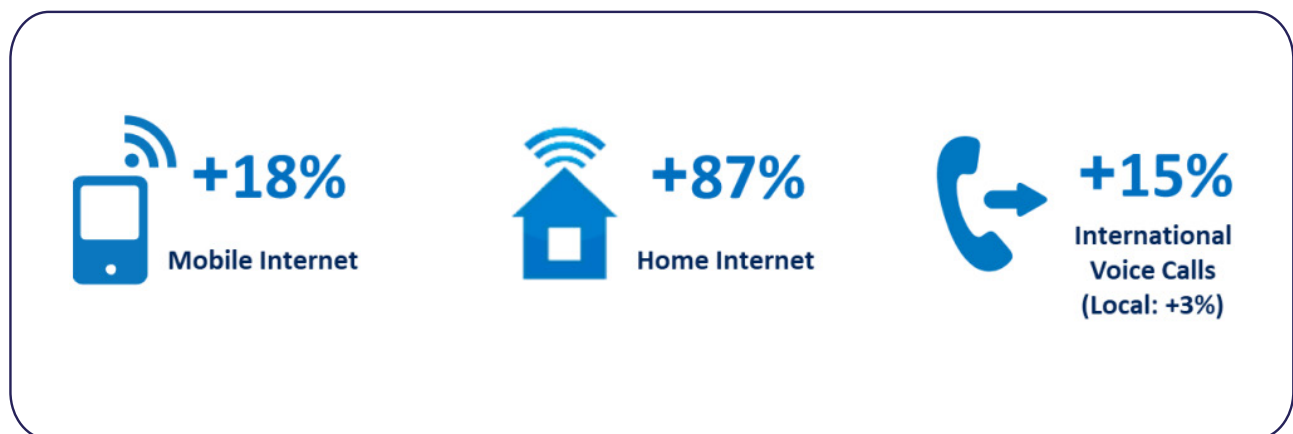
⁶ Source: CAPMAS economic census (2017/2018)

>> 2.3.4 Covid-19 implications on the sector

Globally, according to the International Finance Corporation (IFC)⁷, many telecom players—from broadband to mobile to data center operators—have benefitted from a surge in the traffic of data and voice. As a result, the telecom sector is performing well compared to other infrastructure sub-sectors. Some telecom companies have been strengthened by the short-term spike in data traffic and increased use of broadband services, as more people are working from home and rely on video conferencing to hold meetings. Traffic growth has, in fact, demonstrated increased reliance on connectivity and digital services.

In Egypt, the pandemic has driven adoption and increased usage of many ICT services that have enabled consumers to build a new normal underpinned by connectivity. The mobile industry has largely risen to the challenge of keeping individuals and businesses connected during the lockdowns. The massive disruption caused by the pandemic has demonstrated the criticality of the network in today's society.

As discussed earlier, the communications sector in Egypt has shown robust performance in FY 2019/20, albeit at a slightly slower pace to grow by 15.2% compared to 16.7% in 2018/19⁸.



Source: NTRA (comparing the second week of April 2020 to the same period in March 2020)

>>> 2.4. Evolving Industry Drivers

The growth of the Egyptian telecommunications market has been driven by exponential data growth, advanced

technology rollout, new customer segments and most importantly, government-driven digitalization initiatives.

>> 2.4.1. Market Drivers

On the long term, mobile traffic growth is predicted to accelerate, driven by both the rising number of smartphone subscriptions exceeding 27 million

subscriptions⁹ and an increasing average data volume per subscription that is fueled primarily by more viewing of video content.

>> 2.4.2. Technological Drivers

Network upgrades and roll-out of data technology (3G and 4G) have significantly contributed to industry growth. The telecommunications sector has seen tremendous technological advances over the past few years, with mobility, broadband, and internet services growing in capability and reach.

Since the launch of commercial 4G LTE (Long term Evolution) licenses in late 2017, the country's four mobile operators – Orange Egypt, Vodafone Egypt, Etisalat Misr and Telecom Egypt's WE – have rolled out LTE services in most urban areas. This has been a driver for upgrading existing infrastructure.

⁷ Source: IFC, COVID-19's Impact on the global telecommunications industry.

⁸ Source : MCIT Infrastructure Statistics, 2020, <https://mcit.gov.eg/en/Indicators>

⁹ Source : MCIT

» 2.4.3. Political Drivers

In alignment with Egypt Vision 2030, and Egypt's digital transformation strategy, the country launched "Digital Egypt" initiative¹⁰ which is an all-encompassing vision and

- Digital Transformation
- Digital Skills and Jobs
- Digital Innovation

In this regard, all public services are to be provided to citizens digitally nationwide. Egyptian citizens, anywhere in the country, will be able to receive these services in a digital format. Several methods of online payment of service fees were made available during the past few years, including availing post offices as a channel for government services¹¹. The Digital Egypt initiative was accelerated by COVID-19 driving more citizens to use government digital services as well as driving more governmental entities to continue their digital transformation journey.

In 2019, the Ministry of Communications started to implement a plan to upgrade the efficiency of the internet network at a total cost of 30 billion pounds. So far, the plan has helped Egypt move from the 40th position with 6.5 MW/second in January 2019 up to the fourth position with 34.9 MW/second in December 2020 where landline internet speed in Africa is concerned.

» 2.4.4. National Digitalization Projects

National digitalization projects are largely contributing to building a partnership network with national and international companies. Additionally, it is becoming clear that the use of advanced technologies and integrated systems within smart cities will be the ideal solution for

plan, laying the foundations for the transformation of Egypt into a digital society. The initiative is built on three main planks:

Additionally, a new network of fiber optic cables is being established to connect 32,500 government buildings across the nation within the fiber optic network.

In June 2020, the Egyptian government announced a plan to improve the infrastructure for internet services by increasing the average internet speed to 20 Mbps in 2020 and 40 Mbps in 2021, compared to 15.5 Mbps in 2019.

Moreover, the Central Bank of Egypt (CBE) launched in May 2020 an initiative to increase the electronic payments and reduce the need for cash. The CBE announced that it would bear the cost of deploying 100 thousand Points of Sale devices as well as 200,000 QR Code generators nationwide till December.

Thus, developing the digital infrastructure is one of the bases upon which the three main pillars of Digital Egypt are built.

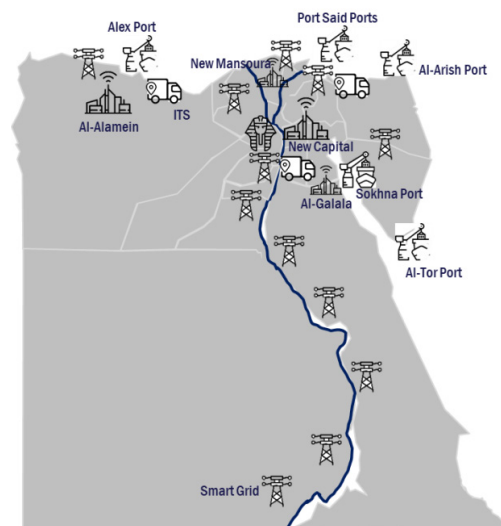
sustainable urban development. The table below displays a snapshot of diverse national digitalization projects.

According to Minister of Finance, Mohamed Maait, Egypt has allocated EGP 12.7 billion (\$797 million) for gradual digital transformation in the FY 2020/21 budget¹².

¹⁰ Source : https://mcit.gov.eg/en/Digital_Egypt.

¹¹ Source: Ahram Online, Business, Digital Egypt Project, 15 Aug 2020.

¹² Source: Newzoo's 2018 Global Mobile Market Report



Source: Egypt IoT Report (2020)-Mapping Egypt Smart Projects

► **Table 2-5.** Sample of National Smart Projects

National Project		Description
	Egypt Smart Grid	A large-scale project to build and roll-over smart meters as part of the energy efficiency national plan. The government's energy efficiency plan includes the introduction and roll-out of smart meters to all customers within a 5-year period (30 million meters).
	Intelligent Transport System	The intelligent transportation system consists of a network of sensors and wireless devices that provide real-time traffic and weather information to drivers, enabling them to make better decisions and improving road safety ¹³ .
	Smart Port Systems	The Egyptian Maritime Transport Strategy issued in 2018 aims to establish and develop infra and super structure of seaports according to international standards as one of its strategic objectives towards achieving 2030 vision ¹⁴ .
	Smart Cities	The new administrative capital will be Egypt's first smart city as the first pilot for smart city vision. The government has already launched several requests for proposals (RFPs) for constructing the Smart City infrastructure. Other smart city development projects include: New Al Alamain City, Al Galala City, New Mansoura ¹⁵ .

Digital Egypt initiative also includes a plan for the digital transformation of core government services in the

following areas: education, healthcare, and government services.

» 2.4.5. New Customer Segments

Although around 70% of the telecommunications infrastructure is driven by organic growth of telecom subscriber base and some critical governmental segments, a significant 30% (according to expert interviews) is currently driven by new business segments.

The adoption of the Digital Transformation Strategy by the Egyptian government has led to quick developments in various segments expanding the telecommunications infrastructure.

¹³ Source: State Information Service (SIS).

¹⁴ Source: Maritime Transport Sector. (2018, July). The Egyptian Maritime Transport Strategy, Development and Increasing Competitiveness of Ports.

¹⁵ Source: New Urban Communities Authority. (2019). New Cities.

These segments have been significantly increasing in the past few years including:

- Post Office
- Public Education
- Utilities Sector (Smart Electricity Grid)
- Railways (Intelligent signaling and communication)
- Oil and Gas
- Satellite communication
- River transport



3. The Telecommunications Sector Infrastructure

In order to understand Egypt's Telecom Sector, it is important to develop a common understanding regarding the sector segmentation. It is worth noting that the telecommunications sector spans a multitude

of supply chains, given its nature as a backbone serving most industries. However, this study explores the telecommunications infrastructure supply chain in more detail and the key players influencing this chain.

>>> 3.1. Telecom Infrastructure Market Overview

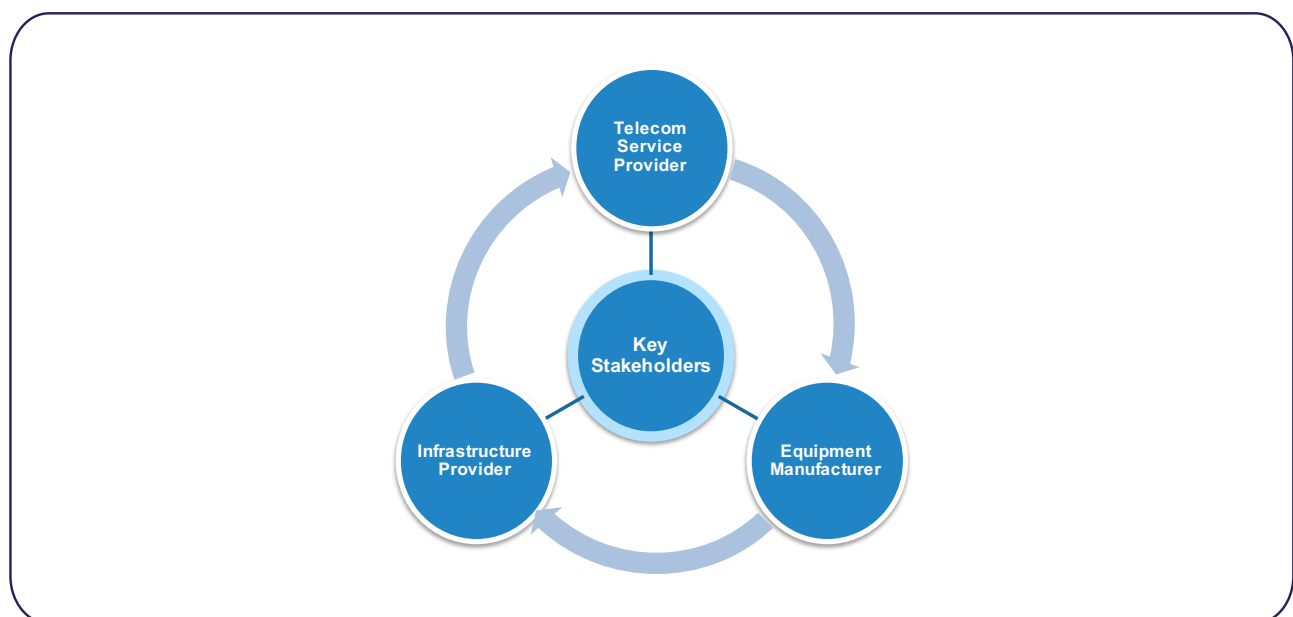
>> 3.1.1. Main Players

Experts identified three parties as the main stakeholders in the Telecom Infrastructure market. These parties are the Telecom Service provider (TSP), the Telecom Equipment Manufacturer (OEM) and the Infrastructure Provider.

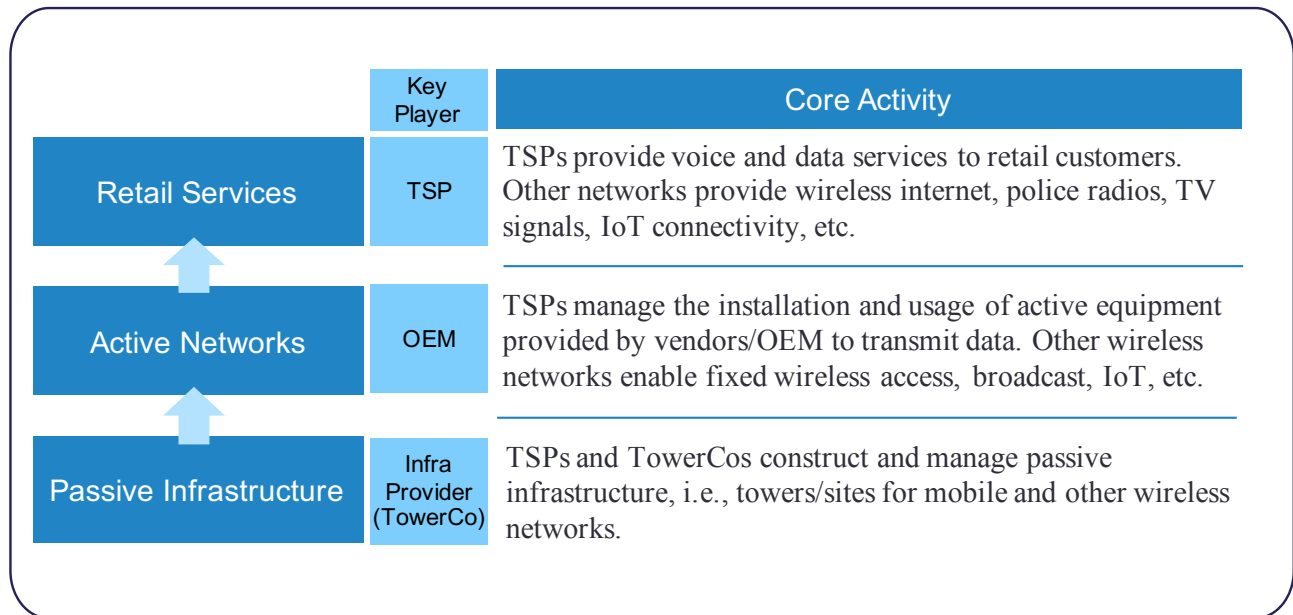
Each party operates under a different license and has different interrelations with other parties.

However, given that the Telecom Service Provider represents the customer to both the Equipment Manufacturer and Infrastructure Provider, this gives it more power over the chain and the underlying practices.

► **Figure 3-1.** Telecom Sector Key Stakeholders



► **Figure 3-2.** Telecom Sector Key Stakeholders



As depicted in Figure 3-2, the TSP acts as a key driver in the value chain, and therefore can be considered a major driver for mandating the practices involved in

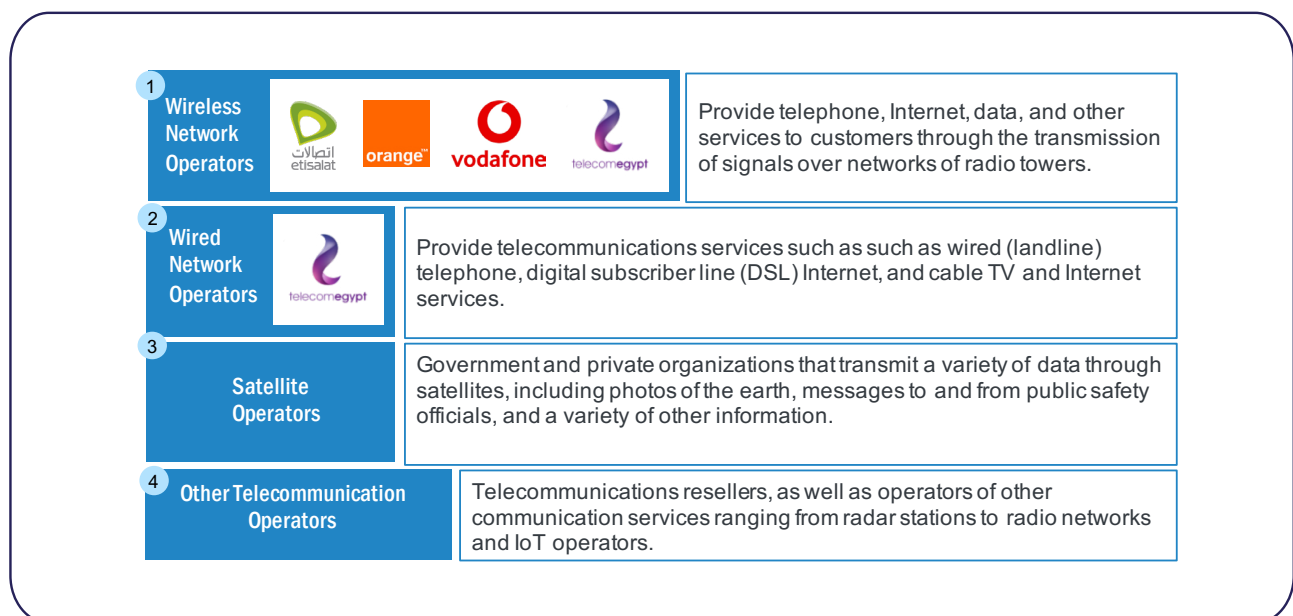
the infrastructure layers. Such note has been confirmed by most interviewed experts, however, with different degrees according to the nature of the TSP.

» 3.1.2. Telecom Service Providers (TSP)

Telecom service providers (TSPs) play a vital role in providing major support services required for swift growth and transformation of multiple sectors. The

telecommunications industry is divided into four main sectors: wired, wireless, satellite, and other telecommunications establishments.

► **Figure 3-3.** Telecommunication Service Provider Segments



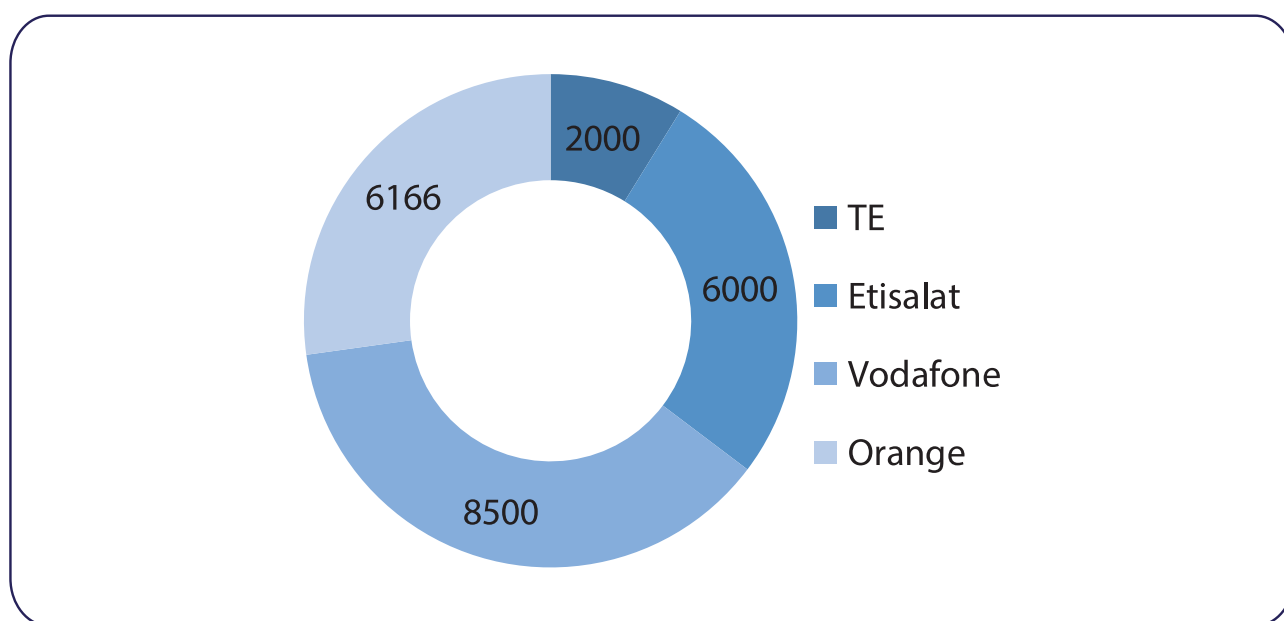
The telecom market is divided among several operators:

- Telecom Egypt (TE, incumbent) had a monopoly in terrestrial infrastructure (fiber-optic backbone and copper access network), however recently Etisalat acquired the fiber license.
- Four mobile network operators (MNOs): Orange, Etisalat, and Vodafone (each with 4G licenses) with Telecom Egypt joining Vodafone, Etisalat and Orange after having obtained a license in 2017.
- Satellite operators: represented by governmental and private entities such as The Egyptian Satellite Company (NILESAT) S.A.E.
- Other telecom operators include radar stations (e.g. Egyptian company for space applications and remote sensing), radio networks and IoT operators (TAYF).

As explained in Chapter 2, the mobile telecommunication growth has been the core driver of the sector growth at large. Therefore, the four MNOs represent the main driving force of the telecom infrastructure industry and more specifically, the wireless infrastructure.

The wireless infrastructure (towers) provide an important element for the operations of wireless network services. With over 22,000 towers, Egypt is one of the MENA's largest tower markets but with 95 mn subscribers significant new build is still required¹⁶.

► **Figure 3-4.** Tower Ownership by Egypt's MNOs



Tower ownership is fairly evenly split amongst the three established MNOs with new market entrant, Telecom Egypt, lagging behind with just 2000 towers.

Infrastructure sharing between the MNOs is relatively widespread, with Orange reporting that over a third of the towers they use are shared with other operators. In early 2018, Telecom Egypt reached a wholesale agreement with

Vodafone to utilize its transmission and infrastructure services for a three-year period whilst it establishes its network.

Collectively, Orange, Vodafone and Etisalat are understood to be adding 300-500 new towers per year, whilst Telecom Egypt has initiated the next phase of their network rollout, requiring the addition of 1,000 new sites.

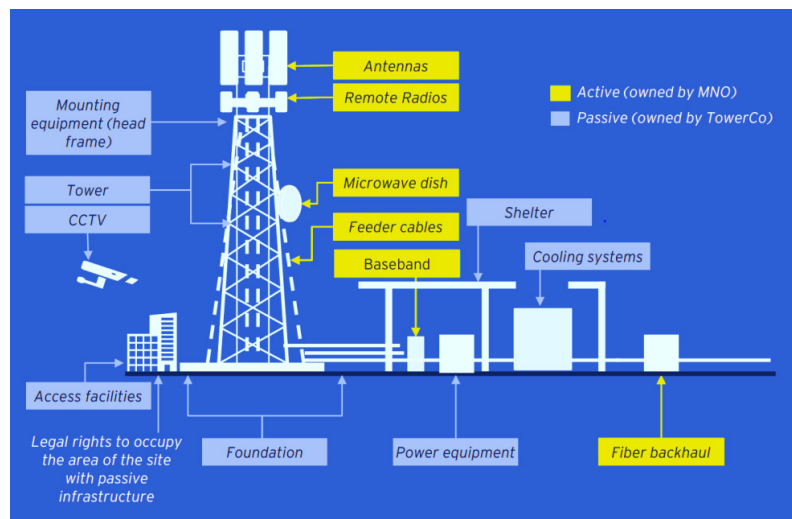
» 3.1.3. Active Equipment Manufacturers (Vendors)

To understand the interrelated roles in the telecommunications infrastructure supply chain, it is important to understand the different elements of a telecom site (focusing on wireless infrastructure), whereby the distinction between active and passive infrastructure

can be explained. Figure 3-5 provides a simple illustration of a typical tower site highlighting Active Equipment components. Such equipment is provided by the main vendor or original equipment manufacturer (OEM) which is contracted by the MNO.

¹⁶ Source: TowerXchange MENA Dossier 2019

► **Figure 3-5.** Active and passive equipment on a typical tower site¹⁷



Active Equipment Manufacturers refer to vendors of active telecom equipment supporting the site. As depicted

in the diagram, there are three-way interactions between MNOs, vendors and passive infrastructure contractors.

» 3.1.4. Passive Infrastructure Providers

Telecom infrastructure providers can be categorized in two main streams:

- Wireless Infrastructure Providers (Telecom Tower Builders and operators)
- Wired Infrastructure Providers (Fiber Infrastructure Providers)

The wireless infrastructure (telecom towers) represent a significant component of the infrastructure and largely serves mobile network operators (MNOs). Passive infrastructure providers operate under license (Infracore license issued by the National Telecommunication Regulatory Authority (NTRA).

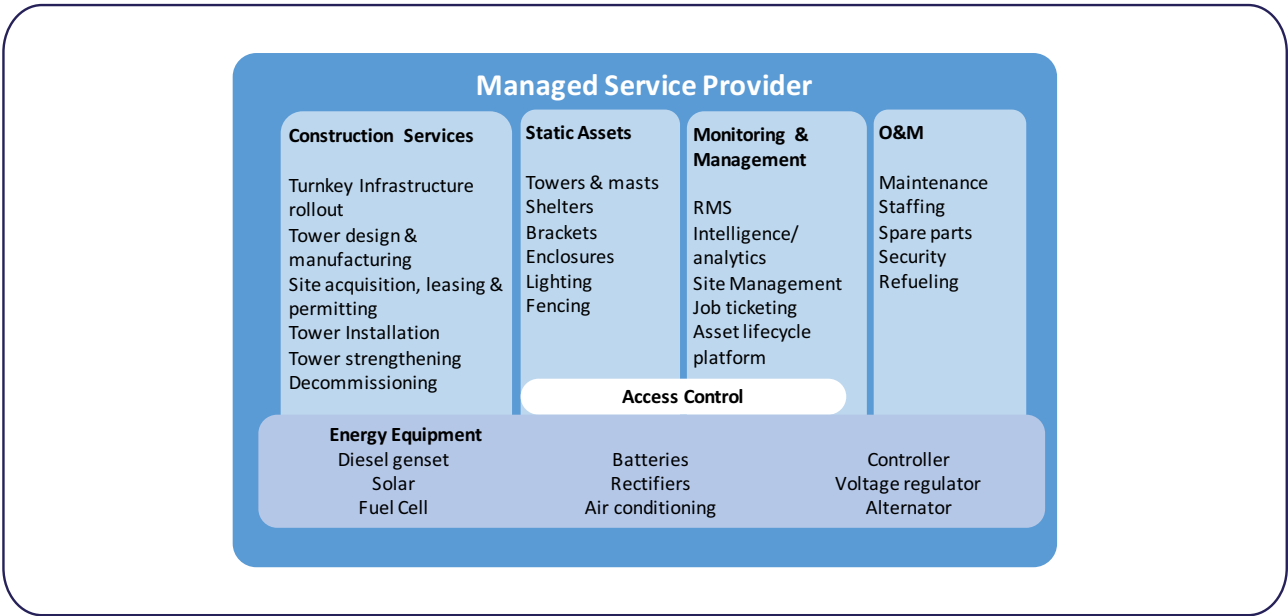
Another categorization of infrastructure of providers can be based on size of these contractors. Infrastructure providers vary in size of operations starting from mega-scale providers such as ALKAN, Mobiserv, SkyGroup and EEC, all through small-size providers which are sub-contracted by the main contractor or the vendor.

Recent market developments show that the infrastructure industry was consolidated through large-scale providers, however with accelerated growth new smaller size contractors and infrastructure providers penetrating the market which led to further market fragmentation. This information was confirmed by experts from the MNO side and contractor side.

Infrastructure service providers (specifically wireless infrastructure) provide a set of services depending on the contractual agreement with the MNO. These services may be one or more of the following:

- Site Acquisition and Roll-out Management
- Asset Lifecycle Management
- Energy Management
- Site Monitoring and Maintenance

► **Figure 3-6.** Classification of Managed Services



It is worth noting that the market is dominated by local infrastructure providers, whereby MNOs and OEMs promote the development of these providers towards

higher standards and human capital practices which have been evolving during the past decade. This has been confirmed by interviewed contractors and vendors.

»»» **3.2. Telecom Supply Chain Analysis**

The telecommunications infrastructure consists of three key elements: passive infrastructure, active networks and retail/connectivity services. Understanding the

interrelation between the different layers and market actors is considered to be a necessary primer for analyzing in greater detail the developments of the telecommunications infrastructure supply chain.

» **3.2.1. Tower Industry Business Models**

There are multiple business models defining the relationship between the MNO and the infrastructure

provider. Table 3-1 explains the different models in the Egyptian market.

► **Table 3-1.** Tower Industry Business Models

Business Model	Captive MNO Infrastructure	MNO-controlled TowerCo	Independent TowerCo.
Ownership	MNO owns tower site	MNO owns and manages site	Completely owned by Tower Co.
Infrastructure Provider Role	• Build-to-Suit • Managed Services	Manage with license to lease to other MNO	Acquire and lease to all MNOs
Utilization	Exclusive infrastructure	Shared infrastructure model	Shared infrastructure model
	Site Development Project Managers handle every step of the project to build a site specific to an operator's requirements and then manage that site.	While more sharing with rival MNOs can be observed, the parents tend to retain a veto right, in particular for strategic sites.	Independent Tower Cos own passive infrastructure on a site and lease space on it to MNOs to host their active equipment.

Egyptian Market	Prevailing model in Egypt.	Telecom Egypt uses this model to use other MNO infrastructure in uncovered areas.	ABRAG Misr Model has not yet taken effect.
-----------------	----------------------------	---	---

The prevailing model with MNO ownership maintains the supply chain highly controlled by the operator starting

from selection of vendors and contractors, procurement cycle all through operations.

» 3.2.2. Procurement and Contractual Relationships

Based on expert interviews, most operators adopt two

procurement models for their network infrastructure:

1. Direct outsourcing to Vendors (OEMs)
2. Direct outsourcing to Infrastructure providers (Contractors)

The procurement model evolved in the past ten years where MNOs started with 100% direct outsourcing of managed services to vendors which subcontracted infrastructure providers. According to passive infrastructure providers (expert interviews), recently

most operators adopt both models with a mix of 40% outsourcing to OEM and 60% outsourcing to contractors.

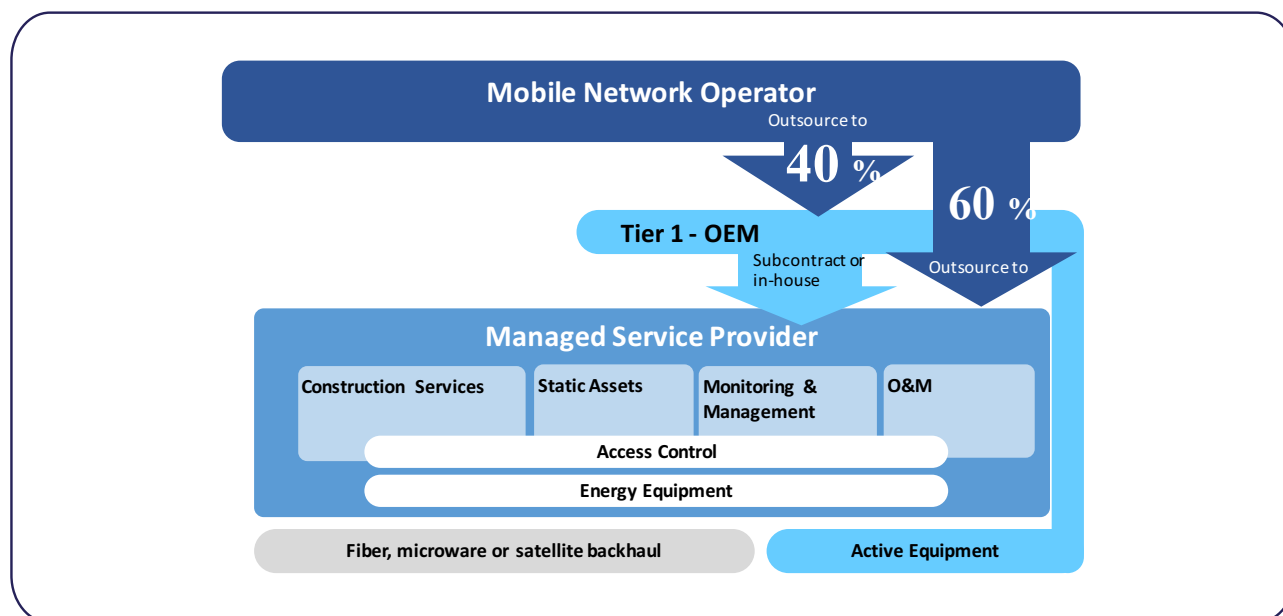
Contractual agreements can be directly between:

- Operator-Contractor (Large projects)
- Vendor-Contractor (small / medium-sized projects)

This mix has helped MNOs maintain balance between competitive contractor pricing and consolidated management of operations through vendors.

Agreement durations vary between short-term (2 years) to long-term (5 year) contracts. However, with the evolution of the procurement process, MNOs and OEMs developed more rigorous criteria for supplier selection.

► **Figure 3-7.** Managed Services Outsourcing Model



Vodafone has been the market pioneer in supplier selection and promotion with detailed procurement processes. However, as the market evolved other MNOs and vendors further developed their procurement

process to ensure the compliance of passive infrastructure providers with varying degrees. The procurement process covers a diverse criterion including the following aspects:

- **Legal requirements** (operational license, regulatory compliance)
- **Internal organizational requirements** (structure, project management, size and qualification of the workforce, specialized training)

- **Operational requirements** (operational process, geographical coverage, operating manuals)
- **OSH requirements** (site safety, HSE organization, HSE strategy, general HSE planning, road safety procedures... etc.)

Expert interviews (specifically with MNOs and Contractors) reflected that procurement standards imposed by MNOs and vendors were able to advance the practices of infrastructure providers to a significant degree. However, it is worth noting that such procurement standards vary

between MNOs with Vodafone considered a pioneer in advancing these practices.

Experts mentioned that these standards are continuously monitored and managed by MNOs and supporting partners in order to ensure continuous compliance.

>> 3.2.3. Supporting Partners

In addition to the supply chain key stakeholders, there are other supporting partners with significant roles throughout the lifecycle of the infrastructure project.

- **Engineering Consultants:** MNOs and vendors work collaboratively with consultants who mandate specific technical requirements for the site and consequently authorize and approve different steps in the buildup process in case of new site acquisition or identify technical needs for existing sites as part of the maintenance activities. Consultants play a pivotal role in facilitating the clearance for the site building activities during the operation of the infrastructure provider (contractor) and provide acceptance for civil, mechanical and electrical milestones.
- **Smart city consultants:** Play a catalyst role in the procurement and audit process for smart infrastructure projects capitalizing on new technologies. They act as a catalyst in identifying and registering new suppliers as well as advancing the technical and operational requirements for national projects which are dependent on telecommunications infrastructure.
- **Authorized Audit Entities:** Most MNOs partner with auditing centers which assist in the continuous evaluation of contracting and managed services executed by the contractors. These auditors provide regular reporting to ensure compliance of the contractor and sub-contractor to the agreed standards including operational, organizational and OSH standards.
- **Training centers:** Authorized training centers play a key role in qualifying the passive infrastructure workforce as well as key parties within the vendor and operator organization to comply with the required standards. The workforce training certifications are mandated by the Operator and/or vendor for all field working teams.

It is worth noting that due to the contracting and engineering nature of the supply chain, training certifications of the workforce are required to be renewed regularly over short periods including OSH,

risk management, working at heights, and safe driving. This will be further clarified in the following Chapter: Employment and Working Conditions.

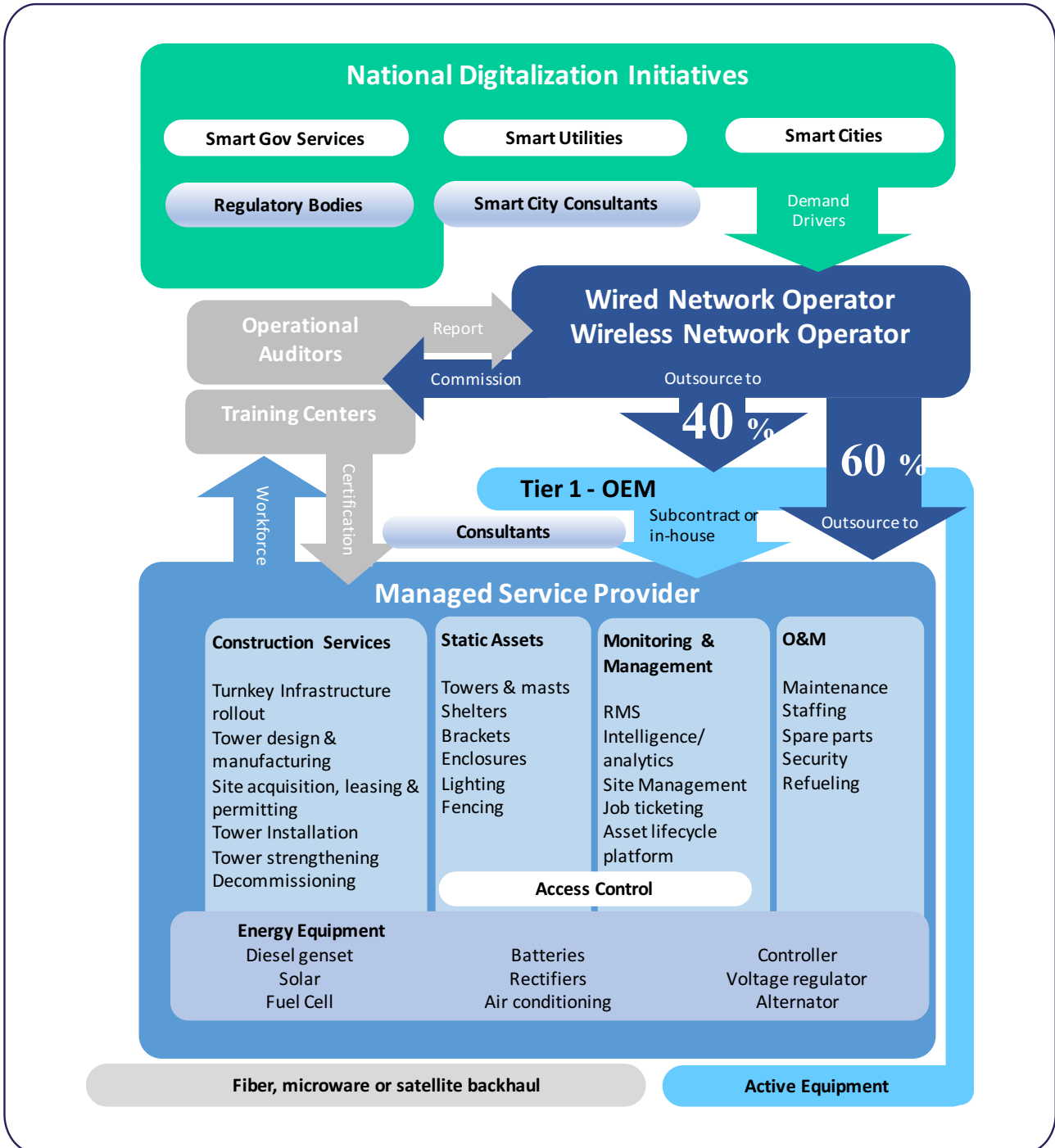
>> 3.2.4. Regulatory Authorities

- **Municipalities:** A core component of the site preparation process is related to obtaining clearance from regulatory authorities including municipality clearance, environmental clearance, and signaling authorization.
- **National Telecommunications Regulatory Authority (NTRA):** The NTRA is the main regulator for the telecommunications sector at large issuing regulatory frameworks that regulate new telecom services to ensure the development and deployment of telecom services in a way that keeps abreast of new technologies. According to the Head of the Legislation Committee at the Ministry of Communications and Information Technology (MCIT), NTRA also sets standards for telecommunications equipment ensuring compliance with OSH standards.

By compiling the answers gathered from stakeholders regarding the different interrelations, the following diagram can be concluded, summarizing the supply chain

drivers, stakeholders, supporting parties and supply chain lifecycle.

► **Figure 3-8.** Overall Telecom Infrastructure Supply Chain Interrelations





4. Employment and Working Conditions

This chapter provides an overview of the characteristics of the working conditions in the telecommunications sector with focus on the telecom infrastructure industry and discusses how the different stakeholders and market dynamics have influenced the working conditions across the sector. This overview is based on the analysis of interview results conducted with government officials, private sector and publicly owned enterprises.

PractiQ has not verified the universality of the information provided across the target population, and thus mention of particular measures and practices by respondents does not entail its applicability across all entities within the same business cluster.

The study was conducted through a series of expert interviews and focus group discussions starting January 2021 through a mix of online and physical interviews spanning 14 entities.

In total, responses were received from 23 participants in 14 entities: 2 of which representing governmental entities, 2 of which representing mobile network operators, 6 representing workers in mobile network operators, 5 representing contractors, 3 representing vendors and 3 representing other operators, integrators and consultants.

► **Table 4-1.** Interviewees’ segmentation by stakeholder role

Number of	Government Entity	Network Operator	Vendor	System Integrator & IoT Operator	Contractor	Consultant
Respondents	2	8	3	4	5	2
Entities	2	3	2	3	3	2

The study used the guidance of the Tripartite Declaration of Principles concerning Multinational Enterprises and

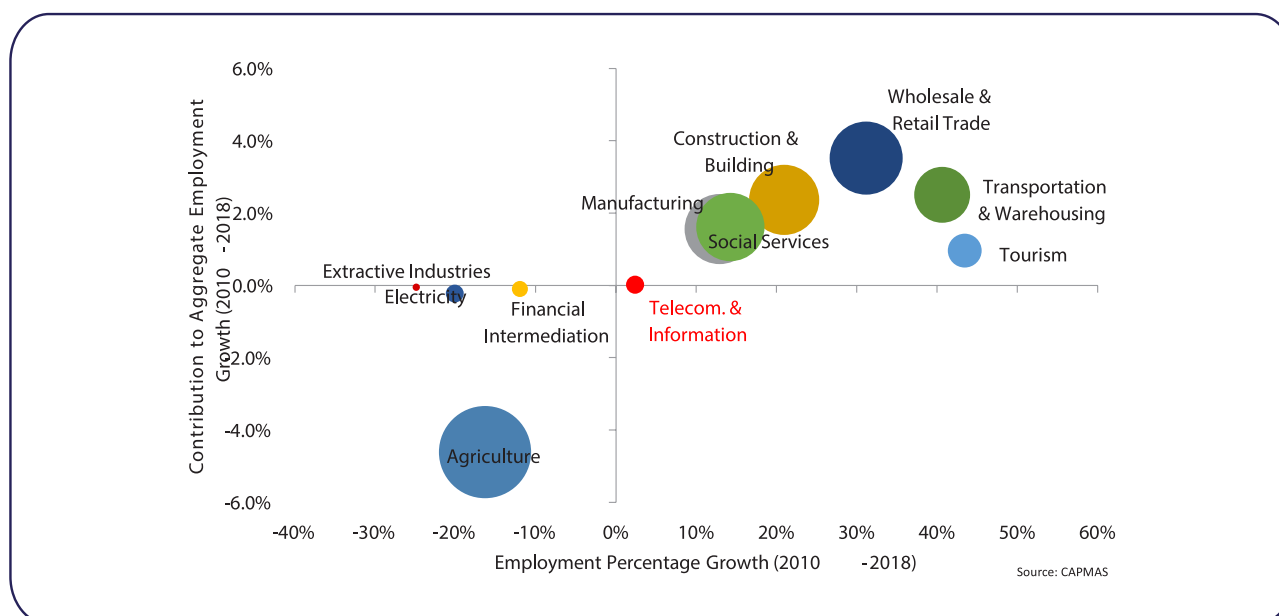
Social Policy (Short: MNE Declaration) to analyze the employment practices and working conditions.

>>> 4.1. Job Creation

According to CAPMAS, the ICT sector employs only 0.5% of the total number of employees in Egypt by the end of

FY 2019/20 with a total of around 87,000 Jobs.

► **Figure 4-1.** Contribution to Employment Growth (2010-2018)



Note: Size of the bubble represents the sector's share in total employment in 2018.

Most economic sectors have experienced an increase in employment. Between 2010 and 2018, employment in the ICT¹⁸ sector has grown by 2.4% CAGR.

attributed to the effect of digitalization and technological development. However, the respondents do not provide hard evidence for the indication.

The interviewed respondents confirm that they have experienced some growth, and that this may be

>>> 4.2. Composition of the Workforce

The ICT and telecommunications industry workers can be clustered in the following categories as per the interviews

conducted with key stakeholders.

Management, business, and financial occupations

- General and operations managers
- Management analysts

Professional and related occupations

- Computer software engineers
- Computer support specialists
- Computer systems analysts
- Engineers

Sales and related occupations

- Supervisors, sales workers
- Retail salespersons
- Sales representatives, services, all other

¹⁸ According to the International Standard Industrial Classification of All Economic Activities (ISIC) which Egypt adopts, the information and communications sector includes the production and distribution of information and cultural products, the provision of means to transmit or distribute these products, as well as data or communications, information technology activities and the processing of data and other information service activities.

Office and administrative support occupations

- Telephone operators
- Financial clerks
- Customer service representatives

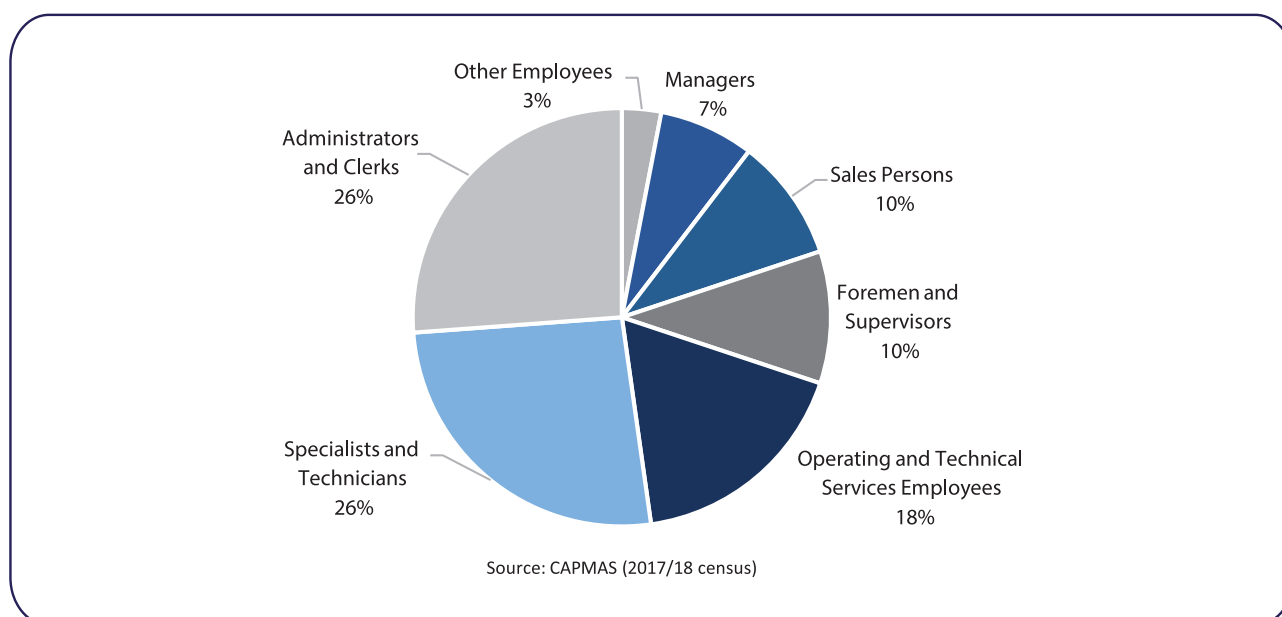
Installation, maintenance, and repair occupations

- Telecommunications equipment installers and repairers, except line installers
- Telecommunications line installers and repairers

Although the industry employs workers in many different occupations, 26% specialists and technicians and 10% foremen and supervisors of all telecommunications

workers are employed in either installation, maintenance, and repair occupations, while another 18% are employed as operating employees and technical services¹⁹.

► **Figure 4-2.** Telecommunication Employees by Occupation



It is worth noting that telecommunications jobs are found in almost every part of Egypt, but most employees work in cities that have large concentrations of industrial and business establishments.

“Are there certain geographical areas where you source employees from? Does the job requirement (especially for vocational jobs) mandate sourcing from certain geographies?”

As indicated by contractors (7 interviewees), due to the fact that telecom sites are widely dispersed, operational activities highly depend on commuting and local travel, which means that the workforce includes drivers and technicians based in operational hubs across Egypt. The bulk of these workers are operated through the infrastructure service provider and outsourced by vendors.

“Ten years ago, we had to depend on technicians and tower workers from certain areas, but as the market grew and the network evolved, workers are sourced from all over Egypt and located near to high traffic hubs.” – One of the major contractors-

These findings were also confirmed by the focus groups

conducted with technicians from Upper and Lower Egypt.

¹⁹ Source: CAPMAS, economic census (2017/2018).

>>> 4.3. Awareness of the principles of the MNE Declaration

“The Advancing the Decent Work Agenda in North Africa’ (ADWA)’ project aims to advance the Decent Work Agenda in North Africa (2012-2023). In Egypt, the project aims to engage actively with the private sector to promote the effective implementation of the Decent Work Agenda. Inter alia, through the promotion of the MNE Declaration in the telecommunications sector.

“Are you as an enterprise aware of the MNE Declaration and its recommendations for Decent Work Agenda?”

This question was directed to 6 interviewees representing Operators, Vendors and Contractors following the introduction of the project.

The interviewees were probed to check their awareness regarding the MNE Declaration. The areas covered by the MNE Declaration are shown in Table 4-2. With the exception of a Vendor (Ericsson), all interviewees did not show awareness of the MNE Declaration and the included areas of focus. Nevertheless, by digging into the details of each aspect, 100% of interviewees indicated significance of most of these aspects within their work practices.

The areas which were least relevant to the supply chain under study were those related to compulsory labour and child labour. These sections were deemed irrelevant to the sector based on the pilot interviews with ILO constituents and private sector representatives, and hence not included in the discussion guides.

Detailed responses are further explained in the following sections.

► **Table 4-2.** Areas covered by the MNE Declaration

Dimension	Areas
General Policies	Observance of national laws and regulations
	Promotion of respect for human rights
	Promotion of good social practices
Employment	Employment promotion
	Social security
	Elimination of forced or compulsory labour
	Effective abolition of child labour
	Equal opportunity
	Security of employment
Training	Training
Work Conditions	Wages, benefits and conditions of work
	Safety and health
Industrial Relations	Freedom of association
	Collective bargaining
	Consultation
	Access to remedy and examination of grievances
	Settlement of industrial disputes

The subsections below present examples of the interviewees’ responses, organized in accordance with the MNE Declaration sections. Some quotes have been

selected to show a prevailing view among different responding clusters; in other cases, they illustrate issues that respondents highlighted as important.

>>> 4.4. General Policies

Interviewees were requested to provide information related to general policies of enterprises in relation to work practices in the telecommunications infrastructure supply chain.

“Considering the different business models of engagement in this supply chain, how do you evaluate the level of compliance with national policies and regulations across the chain?”

In this regard, most respondents noted the maturity of the sector in terms of compliance with national labour policies. Several respondents (contractors and consultants) noted the positive impact of MNEs in playing an active role in enforcing compliance across the chain not only within the enterprise but as a criterion for supplier selection.

“Evidently Vodafone played an active role in advancing the whole chain as a pioneer in the market.” -As per one of the largest main contractors in the market-

Main contractors and subcontractors consider that the telecommunications infrastructure supply chain is rigorously managed and monitored by several parties including the operator which has dedicated officers to monitor progress and act as site auditors. Additionally,

- The study explored national legislative and regulatory requirements through feedback from interviewees regarding the regulatory environment. The interviewees identified the following laws and regulations as the legislative foundation for their field of work: Labour Law No. 12 of 2003.
- Environment Law No. 9 of 2009 and Law No. 4 of 1994.
- (Sanitary Drainage) Law no. 48 of 1982.
- (Traffic) and Laws nos. 121 of 2008, 155 of 1999 and 66 of 1973.
- (Fire extinguishers); Standard Specifications Law no. 734 of 2006.

In addition to certifications mandated by the operator

external consultants are involved in the process of certifying contractors and approving project milestones (such as approving tower location, approving the civil work prior to electromechanical, certifying sample of the tower base and other technical details related to the progress of the project).

Accordingly, contractors are required to submit full documentation concerning workers on site, whereby the sector development can be viewed as driven by key stakeholders (mainly MNOs); however, less stringent enforcement can be evidenced in Tier-3 subcontractors (civil work contractors) that may employ seasonal workers without contractual agreements.

Regarding national laws, a number of respondents highlighted general national initiatives to strengthen the legislative framework such as the enforcement of the new social insurance law and prospect linkage between tax authority and social solidarity entities which has pushed a large number of small and medium-sized companies (small subcontractors) to take action towards compliance.

By compiling respondent answers with regard to general policies and given the formal nature of the sector, the analysis indicates a high degree of compliance with general labour policies mandated by the national labour law and social insurance law especially by large enterprises.

and/or vendor such as OHSAS 45001 instead of OHSAS 18001-2015.

>>> 4.5. Employment

The employment section of the MNE Declaration includes principles on employment promotion, security of employment, elimination of forced or compulsory labour, effective abolition of child labour, and equality of opportunity and treatment.

The interviews focused on investigating the areas related to all sections except for the child labour as mentioned

earlier as it was found irrelevant to the sector which requires minimum age, educational level and in some cases certification.

This section of the report looks at the findings of enterprise practices with regard to employment.

>> 4.5.1. Employment Promotion

“As an enterprise, what is the percentage of nationals in your workforce? Are there internal policies supporting employment promotion of locals?”

Most interviewed enterprises indicated employment promotion of national employees as part of their national employment strategy. Only 2 enterprises (from vendors) indicated limited assignment of foreign resources in the cases of specialized or regional expertise requirement. A couple of interviewees (consultants) also

indicated employment promotion cases of nationals to international/global posts in some cases.

“With the level of qualification of local resources, sourcing foreign employees and/or suppliers is not a priority.” – Former employee of a vendor

Employment promotion was highly relevant to specific stakeholders which are multinational enterprises, including operators and vendors. This aspect was not highly relevant to local entities representing the rest of the telecommunications supply chain. However, all interviewees noted their dependence on local suppliers.

>> 4.5.2. Security of Employment

As explained earlier the telecommunications and ICT sector has changed over the last decades, moving from large public enterprises with permanent work contracts to a largely fragmented privatized market even at the level of the infrastructure supply chain. Such structural changes influence the contractual situation of the workforce significantly moving towards more short-term contracts and more economic flexibility for the enterprise.

“What is the percentage of permanent workers versus outsourced workers in your workforce? What are the different contractual agreement types?”

Based on the expert interviews and desk research, all four MNOs acquired a total of seven internet service providers (ISPs) in the early 2000s in order to serve the internet retail market. Through this acquisition, the MNOs maintained the long-term contractual situation for transferred employees, including technicians and maintenance workers. The expert interviews with two operators that are not publicly owned indicated that MNOs adopted partial outsourcing contractual models with company growth leading to having 50% of the workforce with long-term contracts and almost 50% outsourced contracts.

These findings were also confirmed by one of the focus groups with the workers of an operator, which indicated that almost 50% of the technician workforce are outsourced (legal contracts with contractors) yet the team is almost fixed.

“I have been leading a team of technicians for 23 years, 12 members of the team are outsourced employees, but the team has had minimal turnover for more than 10 years. It's just a different contract.” – Feedback from a technical supervisor-

By examining the vendor enterprises (3 interviewees from vendor and contractor side), it was indicated that most vendors operate with stable contracts with white collar

workforce and mostly outsourcing agreements for field workers and technicians.

“We have developed partnerships with large and medium-sized outsourcing companies which facilitate the sourcing and mobilization of field workers. Such arrangement is necessary in light of medium-term agreements with operators.” – Vendor feedback-

“How does your enterprise work towards providing stable employment relationships to limit the use of non-regular employment (temporary employment, contract workers, part-time workers, etc.)?”

Two contractors indicated that new entrants in the market compete on the same resources (field workers), so once a contractor is selected workers may willingly choose to move to other contractors with less job security and higher income.

“The demanding nature of the industry to maintain and update the skills and qualification of workers has led the companies to invest in the workforce at all levels to maintain competitiveness. Hence, workers are generally able to maintain their jobs for long-term periods even with flexible contractual arrangements.” – Feedback from large contractor-

On the other hand, 2 main contractors (infrastructure providers) indicated that the changing market structure led to varying contractual agreements range from long-term to limited contracts based on size and ability to maintain long-term contracts with MNOs and vendors.

“Who are the key stakeholders involved in enforcing the contractual terms (workforce and non-workforce) related?”

Interviewees indicated different levels and approaches of enforcement for contractual terms between workforce and employer. Interviews with operators and vendors (specifically HR partners) indicated that contractual terms are mandated by corporate policy where they have to comply with local legislation as well as opt to the corporate international standard for HR practices.

Based on two MNE interviews, they consider the international corporate as main driver for enforcement of contractual terms; however, they also indicated audits by Labour Office as the official national body for labour relations.

When interviewees (excluding operators and vendors) were asked regarding contractual terms with workers, they implied that some operators played a role in enforcing some workforce related practices, organizational mandates, and workers' qualifications as part of the selection criteria.

Based on Service Provider interviews, both HR and Business Partners indicated that operators and vendors mandate providing evidence for having contractual agreements, specifically social and health insurance for Full Time Workers (FTEs) expected to be on site. Having these requirements as part of the supplier registration

and selection process drives many service providers to comply with national legislations in terms of labour relations.

In addition, most service providers indicated that some audits are conducted by the labour office to ensure compliance with the labour law. One Personnel interviewee indicated that with the current executive regulation of the social insurance law and the upcoming connection between social insurance and the tax authority, they are trying to avoid any discrepancies between actual pay levels, and officially reported figures to avoid any penalties.

On the other hand, as per the focus groups, field workers and technicians can secure their positions for long periods. The focus group members were a mix of workers with permanent and project-based contracts. None of the participants mentioned any cases of forced layoff or unresolved grievances. Members of both focus groups indicated their awareness of their rights and capability to address labour office in case the employer breaches such rights.

In conclusion, all the interviewees indicated that the labour office is the main official entity for enforcing contractual agreements between employer and workforce.

>> 4.5.3. Equality of Opportunity and Treatment

Gender Differences

According to CAPMAS statistics, female workers represent around 51% of the registered workforce in the telecommunications market (note: occupation breakdown by gender is not available). However, based on the expert interviews, these figures largely contradict reality when it comes to the telecommunications infrastructure supply chain. This chain is dominated by field jobs, including technicians, maintenance and repair operators, as well as other infrastructure related occupations, which are largely occupied by men. Such jobs require special working conditions in terms of dealing with civil work, on-demand site maintenance, commuting to remote areas and handling technical maintenance. Accordingly, the nature of the jobs in the infrastructure supply chain presents a challenge for female workers based on senior interviews (specifically contractors).

Excluding contractor responses, interviewees indicated evidence of equal opportunity as part of their workforce policy and reflected in different functional activities where both males and females are treated equally. These jobs are mainly white-collar jobs including engineering and call center functions.

Most interviewees (excluding consultants) involved in infrastructure related activities indicated there are significant gender differences in the field activities due to the work conditions of these occupations. The gender differences increase further down the supply chain. Two infrastructure providers indicated a ratio of 3-5% female representation.

"Female workers may assume different technical and non-technical as well as technical supervisory roles with limited need for travel. We already have female supervisory engineers as part of the operation center, but when it comes to the field, it's 100% male dominated."- Contractor Response-

As an enterprise, do you have an equal opportunity policy? How is this reflected on the workforce composition? How has this affected gender inclusion? "

Interviewees from operators' side indicated that a large portion of females is employed in customer engagement

and support roles (call centers), which might explain why female workers represent 51% of registered workforce as per CAPMAS statistics.

>>> 4.6. Working Conditions

>> 4.6.1. Conditions of Work

Different respondents indicated different percentages of field jobs versus office jobs according to their role in the supply chain.

Most interviewees (15 interviewees) indicated more administrative workers, engineering and professional

jobs on the operator and vendor side (excluding the public Operator WE). Such jobs work in clean, comfortable offices and customer service representatives often work in call centers.

► **Figure 4-3.** Actual Snapshot of rooftop site buildup operations



Most interviewees (15 interviewees) indicated that individuals in installation, maintenance, and repair occupations (representing the bulk of the workforce) work in a variety of settings, both indoors and outdoors. They often work in high places, such as rooftops and towers. Tower heights range from 3-16m high.

The percentage of technician/field jobs is up to 85% of the workforce at the contractor end as per 3 interviewees representing large contractors.

One of the interesting findings related to tower builders was the fact that Beni Suef governorate (confirmed by 2 respondents from 2 different contractors), used to be one of the key sourcing channels for tower builders due to the fact that the governorate is one of the main locations for palm tree production in Egypt and many of its youth are palm tree climbers.

"A few years ago Beni Suef was a sourcing location for Tower builders, but with the growth of the market and evolution of training practices, builders are currently sourced from all over Egypt."

Based on main contractor interviews, today workers are sourced from all over Egypt and provided with adequate training according to their role in the chain, whether it is "working at heights", "driving" or "installation". These development practices have developed significantly in the past years with a complete ecosystem of service providers /training centers, certification parties and different stakeholders to monitor these practices. Most importantly, the economic viability of the process whereby service providers can invest in workforce and still be able to achieve their financial targets.

In the same context, some interviewees indicated the importance of business formalization for subcontractor lower tiers to improve working conditions of workers. Based on interviewees with vendors and contractors, they clarified that part of the infrastructure activities in setting up the site involve civil work, which is covered through outsourced lower-tier subcontractors. As the business size of the subcontractor is smaller, they mainly employ casual workers who do not have contractual agreements. Additionally, the working conditions of these workers do not match the exact same standards as the contractor in terms of safety; however, they are motivated to improve

through more audits and controls by consultants during the preliminary buildup and site setup phase.

“Civil work is mainly handled by subcontractors on a need basis. We do have obligations for contractor insurance against building risks. However, it is difficult to impose the same standards on these workers, they are mostly casual workers with limited training and onboarding. Workforce development requires stability, and stability requires contracts which is not the case for these subcontractors.”

>> 4.6.2. Occupational Safety and Health (OSH)

To understand the OSH practices along the telecommunications supply chain, the study explored OSH management practices operated by the entities within the infrastructure supply chain.

The expert interviews with the three Mobile Network Operators (MNOs), the vendors and contractors indicated that OSH is a core criterion for procurement and on-going operation.

“Occupational health and safety standards are a core component of the procurement process.” – Vendor Interview-

Although MNOs vary in their requirements and OSH standards, having vendors and contractors spanning all four MNO projects obliged many contractors to meet the highest OSH standards.

“Can you provide sample criteria/conditions for selection and supplier registration? What are the OSH measures involved in the selection process of partners?”

Adding to this, two enterprises (consultants) interviews indicated that currently OSH standards are mandated for awarding and operating any large infrastructure projects including telecommunications infrastructure.

Several interviewees reflected on OSH as one of the core requirements in supplier selection. Among the interviewees, 2 respondents from the contractor side explained in detail the general OSH requirements for large contracts with MNOs. The following section further clarifies these elements as provided by the contractor.

Subcontractor’s selection criteria:

- Comply with applicable laws on H&S.
- Obtain any necessary permits, licenses or insurances needed.
- Obtain certification to OHSAS 18001 for relevant High Risk Activities from a recognized external certification body related to the specific country, market, region or project (or alternative equivalent certification approved for this purpose by Customer in writing).
- Ensure that the supplier personnel have access to appropriate levels of expert HS advice.
- Ensure equipment is designed, manufactured, installed, constructed, tested and certified in accordance with the Applicable Law and industry standards.
- Continually monitor and review HS performance and compliance with this VPC Supplier Policy through programs of inspections, testing and audits.
- Regularly submit HS performance data to customer, attend meetings and participate in audits as reasonably required by Customer.
- Ensure that appropriate systems and processes are in place (and adequately resourced) to identify and address HS risks associated with the Customer Procurement Agreement.
- Have in place mechanisms to ensure that Supplier and Supplier personnel comply with this VPC Supplier Policy and any Customer local market HSE requirements communicated from time to time; and
- Have in place mechanisms to ensure risk management of specific hazards associated with its obligations under the relevant Customer Procurement Agreement in line with the Applicable Law and industry standards.

By exploring the OSH standards specifically related to telecommunications infrastructure managed services, experts (consultants and OSH experts on the contractor

side) listed a number of elements which highly affect their OSH compliance according to contractual agreements. Among these factors are:

Protective Personal Equipment (PPE)

According to vendors (2 interviews), workers (focus groups) and operators (2 interviews), sites under construction and installation are exposed to additional safety hazards making safety gear a must when entering

these sites. The following list of procedures were provided by a contractor as a sample for PPE risk management measures:

- All PPE should be checked prior to use to ensure they are still in good working order, maintained and clean.
- Have at least one certified from Customer approved training provider in the PPE & Gear inspection, who shall be responsible for the inspection of all PPE & Gears used on sites (either for in-house or one-tier subcontractors). They are inspected at least quarterly by him, and annually by approved training provider; however, in case that the supplier failed to assign a person for this task, then the supplier shall ensure a semi-annual inspection for all PPE & Gears by customer-approved training providers. Alkan / Customer 2020-2021
- PPE's inspection to be recorded and documented for audit purpose as per HSW 22 –Rev 8. All PPE used shall comply with EN Standards and purchased from approved supplier.
- Standards:
 - PPE FOR WORKING AT HEIGHTS; EN 397 Construction industry safety helmets
 - EN 566 or EN 795B or EN 1492-2 for rigging slings/ Slings (man-made fiber)
 - BS 1290 Wire Slings
 - FALL ARREST EQUIPMENT STANDARDS;
 - EN 361 EN 358, EN 813 Harness for fall arrest
 - EN 354/ EN 355 Lanyards/ Energy (shock) absorbers for industrial use
 - EN 360 Retractable line fall arrestors
 - EN 362 Connectors (karabiners) for industrial use
 - EN 363 Complete fall arrest systems
 - EN 353-1 Fall arrestors on a rigid anchorage line/rail
 - EN 353-2 Fall arrestors on a flexible rigid anchorage line/rope
 - EN 795 Anchors for fall arrest, Types A, B, C, and D
 - WORK POSITIONING EQUIPMENT:
 - EN 358 Sit harnesses
 - EN 358 Lanyards for work positioning (pole straps, etc.)
 - EN 341 Descenders
 - EN 567 Rope clamps (ascenders, etc.)
 - EN 12278 Pulleys
 - EN 1891 Ropes for “industrial” rope access and climbing
 - PPE FOR ELECTRICAL WORK;
 - EN/IEC 60903 Live working - Gloves of insulating material and insulated tools
 - EN166 and EN170 Arc flash face shield

► **Table 4-3.** PPE Matrix Provided by a main contractor

PPEs for Work Activities		Head Protection	Foot Protection	Full Body Harness	Electrical Gloves	Arc Flash Face Shield	Face and eye protection	Reflective Vest
Activities	Working at heights	X	X	X				X
	Rigging	X	X	X				
	Electrical work (ELV)	X	X		X	X	X	
	Cutting and welding (if any)	X	X			X	X	

OSH Enforcement

“How do you ensure the enforcement of OSH practices? How does this criterion affect the partners to change their workforce practices (scale, geographical distribution, qualification, training, ...? other)?”

As noted by vendors and contractors, maintaining and operating the infrastructure involves a lot of commuting between operational hubs and operation sites. This involves aspects related to road safety, whereby risks of the journey are assessed and journey risk management plans are set in place with a clear schedule of work, geographical areas of responsibility and duration of time on the road.

“Technical field jobs put workers into proximity with electrical wires and circuits, which makes health and safety of ultimate importance. Travel and commuting across sites also make road safety a key component of the work practices.” – Contractor-

According to contractors and operators, all site transportation vehicles are equipped with tracking devices enabling MNOs or vendors to monitor compliance with safety standards and cases of incidents.

“In case safety incidents occur, work must be stopped immediately when risks are not controlled and until

“How does your enterprise make special hazard and related protective measures associated with new products and processes known?”

corrective measures are in place and effective. As a contractor, we can incur penalties for non-compliance.”

Among these safety measures, workers with jobs involving long durations of driving should work no more than 12 hours per shift and have a maximum of 8 hours continuous work. Based on interviews with contractors, OSH-related practices are driven by their clients (operators and vendors).

“Do health and safety procedures in your enterprise take into account the experience of the enterprise in other countries of operation?”

Does your enterprise regularly provide information on good practices observed in other countries??”

According to expert interviews with two MNOs and two vendors, the health and safety procedures are regularly updated to match the international standards while considering market maturity in terms of advancing the practices. This finding was also confirmed from the service provider side.

Based on interviews with vendors and contractors, they clarified that all new changes related to process or product changes are induced in their regular quarterly training programs ensuring that every worker is informed.

>>> 4.7. Wages and Benefits

Salary levels in a sector should provide an indication of the supply of the demanded workforce in the sector. High salary levels indicate that there is demand for specific skills with limited availability. On the other hand, low wages indicate that skills requirements are fairly low and access to labour with the right skills is abundant.

“Does your enterprise regularly compare wages, benefits and conditions offered with other comparable employers?
How do you rank your enterprise in terms of wages, benefits and conditions in comparison to competition?”

“Regarding wages, there is high discrepancy between the wage of workers and the wage of engineers which is not justified in our opinion.” – Workers’ Focus Group-

Workers were probed regarding the available channels to communicate their concerns and requests.

“We have very strong ties with the management, not formal though. There is an open communication channel between employees and the management.” – Workers’ Focus Group-

On the other hand, all interviewees representing managerial positions (excluding consultants) were probed regarding wage levels and their position against market. Interviewees provided an indication of overall wages and benefits for vocational jobs clarifying that technical and field jobs in the telecommunications sector are fairly paid.

“We use regular market salary surveys to maintain our wage position in the market. We even depend on

Several respondents – mostly workers – highlighted a number of issues related to wages, in some operators.

sector-specific surveys. Matching and exceeding the market in some levels was part of our human resources strategy.” – Former HR Director for a multinational operator-

Two interviewees (representing HR roles in Operators) explained that salary levels in call centers are generally fairly low, whereas it can be expected that specialized IT engineers or programmers are in the higher end of the salary spectrum based on market data.

The study also highlighted the perspective of a sample of field workers regarding benefits provided by their respective companies. Both focus group members confirmed that their companies covered basic benefits such as medical and social insurance. Other benefits varied by company and depended on the type of contract, whether it is direct or outsourced.

► **Table 4-4.** Indications for field workers' wage levels

Segment	Compensation Indicator provided by respondents	Rationale provided by respondents
Mobile Network Operator (Public Sector)	Lowest salary levels yet with permanent contracts Medical and social insurance benefits	High retention attributed to job security
Mobile Network Operator (Private Sector)	High salary levels leading telecommunications market. Mature HR practices in terms of market analysis and matching. Balanced benefits across all job categories.	High retention Slow growth workforce Job creation is more on the vendor and contractor side
Equipment Vendor	Adequate salary levels complying with market standards. Advanced human capital practices in salary management and leveling against market. Balanced benefits across all job categories.	High retention Slow growth workforce Job creation through outsourcing
Main Contractor / Infrastructure provider	Matching market salary levels with more focus on benefits (medical and social insurance, training and development, employee relations, corporate culture and job security).	Medium retention due to salary competitiveness of smaller contractors with market growth.
Subcontractor	Limited contracts with high salaries and limited benefits for technical workers.	High attraction of caliber on project basis

Overall conclusion from the interviews and focus groups indicate high value for vocational jobs with high opportunity for mobility between subcontractors and main contracts with decent wages and benefits.

"It is not uncommon in the industry to transfer whole departments of technicians from one contractor to another when the services contracts are not renewed. In this situation, employers (the contractor) negotiate bulk deals for workers to secure their transfer to

another contractor with decent pay and benefits." – Responses from 2 contractors-

Vendors and contractors (4 interviews) concluded that this is due to high demand on experienced workers with updated qualifications and geographical proximity to dispersed sites. Hence, once a worker is provided with the training certifications required, it is highly likely that he maintains his job and can easily be recruited by other contractors in case his contract terminated.

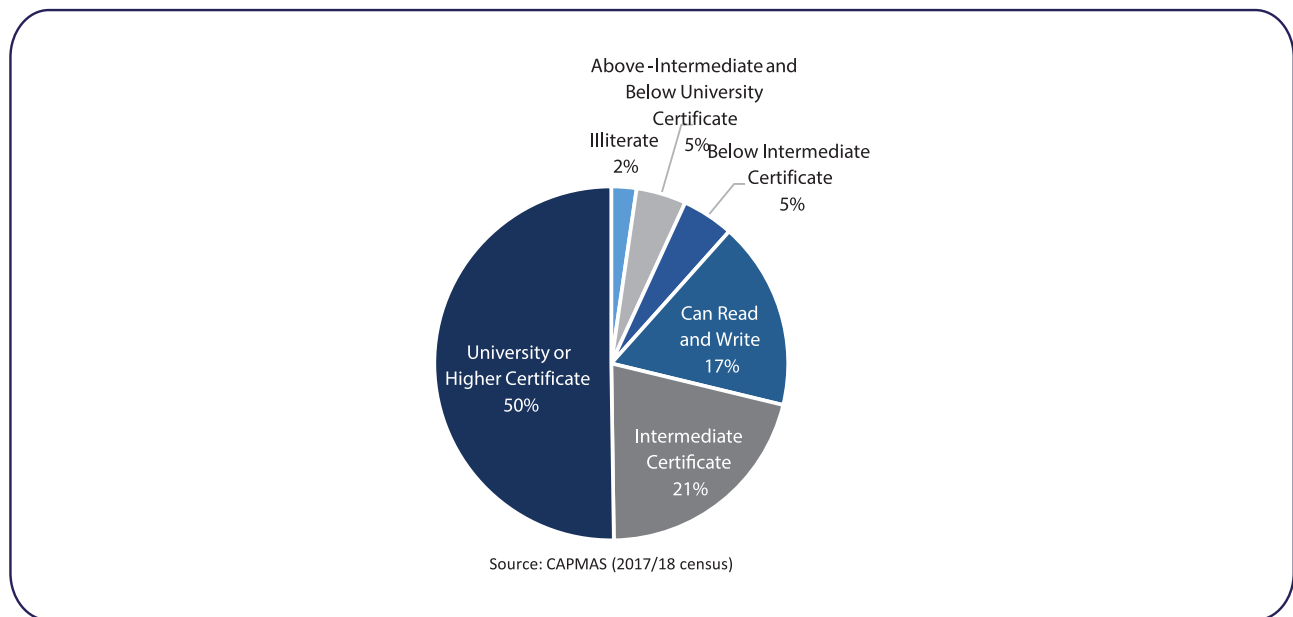
››› 4.8. Training and Development

›› 4.8.1. Education and Required Skills

Knowledge and learning are an important driver of the telecommunications society. Generally, the telecommunications and ICT sectors are characterized by

workers with higher level of education compared to the average workforce.

► **Figure 4-4. Telecommunications Employees by Education**



The share of employees with low education levels is generally below that of the average workforce. Training and skill requirements in the telecommunications industry vary by occupation. Many jobs require at least a high school diploma in addition to on-the-job training. In addition, many positions require pre-employment testing to determine a candidate's aptitude for technical or customer service roles.

Because of the rapid growth of the telecom infrastructure allowing telecom infrastructure providers and the rest of the chain actors to sustain and develop a large workforce, particularly workers related to the Telecom Infrastructure, they must stay abreast of new practices covering technical installation guidelines, health and safety, risk management, and specialized training programs.

» 4.8.2. Training

The increasing requirements to be qualified raise the issue of competitiveness in the telecommunications sectors, in which it is difficult to determine the evolution of technologies and the adequate themes to focus on training for technically advanced jobs and engineering.

Recently with the launch of "Digital Egypt" initiative, MCIT has promoted a number of advanced skills

Discussing the training practices across the infrastructure supply chain yielded different findings. As per the interviews with MNOs and vendors, they explained that there are different collaboration programs with the government regarding skill development but they do not touch on this specific supply chain. Training and skill development are mainly driven and funded by business need.

"As a multinational organization, training is a natural HR practice and core component of our operations. It is provided to different levels to support the business need and talent promotion, but we do guarantee there is a training program for every tier."

Going down the chain, interviewees indicated that training opportunities are provided to ensure continuous compliance with training requirements mandated by vendors and MNOs. Additionally, they do have training programs for executive and managerial tiers.

programs supported by the government, in addition to Tech employment programs such as WazeefaTech. On the other hand, MCIT does not directly support training programs for vocational jobs.

"Has your enterprise participated in or contributed to training programs encouraged by Egyptian government?"

Has your enterprise offered training opportunities to local management to broaden their experience and support this development?"

Based on expert interviews, vocational jobs related to technicians, installation and maintenance operators require continuous training (both classroom and on-the-job) to maintain their certifications which are a pre-requisite for field operations.

The expert interviews and focus groups confirmed that most of the workers related to the Infrastructure Supply Chain need to have regular training as mandated by the MNO, which is in line with the guidance offered by the MNE Declaration. Many of the interviews reflected the impact of MNEs in driving skill development yet with varying degrees.

Having a rigorous procurement and monitoring cycle, the MNO is able to advance and develop suppliers and their training practices through a certified set of

- Occupational Safety and Health (OSHA) training
- First-aid training
- Firefighting training
- Working at heights
- Risk Management
- Vendor-specific training
- Specialized technical training
- Safe driving (drivers)
- On-the-job training

According to the focus groups, technicians conduct their trainings every 3 months according to their role and certification expiry. Such training and development

training providers. These trainings and certifications are prerequisites for commissioning and operations, which include:

programs ensure keeping many of the lower-tier workers qualified and potential for other positions in the market.

4.9. Labor Relations and Social Dialogue

4.9.1. Industrial Relations

This section covers the areas of freedom of association and the right to organize, collective bargaining, consultation, examination of grievances and access to remedy, and settlement of industrial disputes.

The telecommunications sector evolved from consolidated large publicly owned corporations to more fragmented private enterprises. One of these public entities is (Telecom Egypt) which remained in the market and was examined from the workers' perspective. The focus group explored that the oldest entity in the market has internal policies supporting the freedom of association and there is an active internal syndicate with leading representatives who are elected by fellow workers given the fact that the enterprise employs more than 30,000 workers.

"I am a member of Telecom Egypt syndicate, so are most technicians and field workers. Our representatives channel our concerns especially in cases of restructuring or potential layoffs". – Workers' Focus Group-

When probed regarding cases of bargaining and negotiations, a member of the focus group indicated two incidents he was aware of whereby the workers' organization requested a formal meeting with the management to raise the concerns regarding phasing out a business line and its implication. The workers' organization was able to negotiate another alternative with the management.

On the other side, some respondents within private and multinational enterprises asserted that the reluctance or resistance of freedom of association were commonplace, as highlighted by two workers.

Through discussing the topic from the enterprise perspective, 3 interviewees (MNO representative and vendor) indicated that the enterprise supports the freedom of association; however, none of the interviewees highlighted any active role for workers' organization.

A couple of interviewees (contractor side), indicated the low awareness in the industry regarding workers' organization. This can be attributed to the maturity of the industry and its different nature in comparison to manufacturing industries.

A former HR Director for an MNO indicated that human resources practices ensure presence of formal and informal channels for communication with the management. These channels provide a medium for workers to discuss workforce issues and understand the management's perspective. These worker-management conversations are not bound by a collective agreement, but in some cases may result in management decisions guided by workers' feedback. The interviews with HR Partners highlighted that these conversations are mainly related to compensation.

Government interviewees (FEI representative and CIT member) pinpointed the reluctance or resistance of enterprises in general to act as a contributing factor for workers' right to organize. Another perspective highlighted by one of the interviewees (CIT member) was the fact that the technology industry in general is dominated by small entities which lack the maturity and awareness to support freedom of association to workers' organization.

The term collective bargaining agreement was considered uncommon in the industry and there was limited awareness regarding the subject. Several interviewees indicated that most workers consider informal and formal channels in communicating their concerns or collective issues instead.

Going down the chain, 5 interviewees highlighted even lower maturity with regards to labour relations to the point of discouraging accession to organizations.

Several interviewees (as employers) noted the need to raise awareness and build capacity on ILO principles and standards, as well as negotiation skills. One worker recommended initiatives to raise awareness among workers about their rights and support them in reporting any violations.

Some interviewees (contractors) drew attention to the limited capacity of casual workers or workers in micro-enterprises, such as civil subcontractors, to participate in negotiations.

None of the interviewees on the executive level indicated that they have a clear policy to promote the right to



"How relevant/effective do you find these labour associations to the mass of the telecommunications workforce?"

Does your enterprise have a policy in place promoting the right to organize throughout its operations?



organize, yet two of the companies had clauses in their personnel policies related to the right to organize.



5. Conclusion

The telecommunications sector growth has accelerated in a short span of time. With more subscribers and segments using faster access technologies, data consumption has consequently grown faster. This was additionally fueled by several national initiatives in the past few years spanning the whole country.

In addition to an overall positive industry growth, telecommunications sector has also witnessed changing market dynamics throughout the past few years resulting in significant fragmentation along the supply chain. These are not only triggered by fast-growing demand but an increasingly competitive landscape.

The primary research was conducted through a series of expert interviews starting January 2021 through a mix of online and physical interviews with employers, consultants and two workers' focus groups spanning 14 entities. The interviewed sample poses a limitation to generalize the results of the study to fragmented segments of the value chain, specifically those related to contractors and subcontractors.

Most of the interviews and responses indicated that the telecommunications infrastructure supply chain can be considered evolving in terms of general policies, work conditions, employment practices and workforce development capitalizing on MNE practices which have been a core driver in introducing and enforcing better working conditions for directly related parties.

Despite the presence of government support, laws and regulations related to working conditions, MNOs and multinational enterprises will continue to play a significant role in advancing employment and operational standards through continued supplier development and continued development of human capital and labour relations practices to match international standards. It is worth noting that supplier development to meet standards becomes economical in cases of long-term agreements which further allow suppliers and stakeholders to invest in their workforce. On the other hand, market pressures posed by price competition may allow some suppliers to override some of these practices if the chain is not highly controlled by audit activities.

By analyzing the Telecom infrastructure supply chain with reflection on the MNE Declaration aspects we can draw a set of conclusions.

In terms of employment, the high rate of market growth mandated dependence on local workforce leading to providing huge employment promotion opportunities within MNEs. Another noticeable trend is that many MNOs have reverted to outsourcing their workforce through contractors to reduce their risks and costs. This has resulted in expanding the percentage of workers under temporary contracts. On the other hand, the stable growth enabled different supply chain actors to stabilize their presence and hence, provide and enhance contractual agreements with their workforce even through non-permanent contracts. Nevertheless, there is still room for improvement especially for second and third-tier contractors. Research shows that several government legislative frameworks are also slowly expanding enforcement which further improves job security and minimum wages.

The study highlighted high domination of male workforce versus female, given the job nature and requirements of the telecommunications infrastructure supply chain. However, looking at other non-field jobs, it was clear that females are growing in different disciplines, especially in call centers.

Several interviewees indicated that infrastructure supply chains in general have advanced in Egypt in terms of working conditions and occupational health and safety. However, these improvements are mainly driven by business need rather than regulatory requirements. This highlights the need for regulatory legislations that can further improve working conditions and more enforcement mechanisms related to health and safety.

From the perspective of wages and benefits, the telecommunications sector growth and prosperity have facilitated the fair advancement of wages within telecommunications companies (especially MNOs and vendors). However, the rest of the supply chain remains at lower levels from MNO workers which is slightly mitigated with benefits.

MNO and vendor requirements to select service providers provided a strong driver for training and skill development to ensure compliance and secure more business with operators. However, there is room for public-private collaboration to provide training programs which can

drive down training costs and allow more subcontractors to benefit from these programs.

From an employee relations and social dialogue perspective, the whole supply chain is still evolving. The majority of stakeholders adopt good human capital practices allowing for two-way communication. However, formation of workers' associations and collective bargaining are still at a low maturity state except for

large publicly owned corporations (namely, Telecom Egypt). Labour relations in the telecommunications sector is still at a low maturity stage. This can be attributed to the diversity of the workforce and fragmentation of the market. However, there is room for large companies to understand and introduce these practices and promote workforce organization to further enhance working conditions.



REFERENCES

- Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy (Fifth Edition - March 2017)
- Guidelines on occupational safety and health management systems (ILO-OSH 2001)
- ILO. Sectoral Policies Department. Global Dialogue Forum on Employment Relationships in Telecommunications Services and in the Call Centre Industry
- Audit Matrix for the ILO Guidelines on Occupational Safety and Health Management Systems (ILO-OSH 2001)
- TowerXchange MENA Dossier 2019
- MCIT yearbook 2020
- National Telecom Regulatory Authority. (2020). Telecom equipment regulatory rules.
- State Information Service.
- New Urban Communities Authority. (2019). New Cities. Retrieved from www.newcities.gov.eg/know_cities
- Ernst & Young LLP, April 2019, The economic contribution of the European tower sector.
- KPMG, August 2017, Accelerating growth and ease of doing business.
- ILO house style manual, 2020, Sixth edition.



APPENDIX

>>> 5.1. Annex I: List of Experts and Focus Groups

>> 5.1.1. Expert Interviews

#	Stakeholder	Role in the Chain
1	FEI Federation of Egyptian Industries	Public-Private Dialogue
2	ITIDA Information Technology Industry Development Agency	Government agency responsible for IT industry Development
3	WE (Telecom Egypt)	Fixed and Mobile Network Operator
4	Orange	Mobile Network Operator
5	Ericsson	Vendor
7	EcoSys	Contactor
	Ex-Huwawi	Ex-Vendor
8	Alkan Telecom	Main Contractor
12	AAECC Advanced Engineering Consulting Center	Towers Consultant
13	ECG	Smart Cities Consultant
14	Mandour Group	Consultant System Integrator
15	TAYF	IoT Operator
16	Sky Group	Main Contractor
17	Protec	HSE Consultant

>> 5.1.2 Focus Groups

Group	Entity	Role in the Chain	Demographics
1	Etisalat 4 March 2021	Mobile Operator	Technician Field 15-20 years of experience Limited /Permanent Contracts Profession Scope 1: - ISP Deployment - Power Installation - Cabling and Transmission - Site Deployment Scope 2: - Last Mile transmission
2	WE 18 March 2021	Mobile Operator	Technician Field 18-20 years of experience Permanent Contracts Profession - ISP Deployment - Power Installation - Cabling and Transmission - Site Deployment

>>> 5.2. Annex II: Expert Discussion Guide

>> 5.2.1. Discussion Guide (1): Telecom Sector Operator/ Vendor (Business Partner)

Meeting Objectives

- Understand the Telecommunications Supply Chain from the enterprise perspective;
- Understand the core processes involved in developing this chain;
- Assess the impact of the Telecom Operator and Vendor in influencing changes within the Supply Chain;
- Identify the different business models within this supply chain;
- Identify the role of the stakeholders;
- Map existing practices vendors and operators' practices related to employment and labour policy.

Question

Industry Overview

Can you please describe the current status of the telecommunications market in Egypt in terms of business growth and future outlook of contribution?

How do you see the technology advancement affecting the telecommunications sector (e.g. 5G)? How can this affect the infrastructure supply chain?

Tower Building Supply Chain

How do you see the Tower Building supply chain in Egypt? Who are the key players ?

What is the basis of competition in this industry? How can you describe the market (consolidated, fragmented, oligopoly)... and how is that different in other countries?

What are the support services involved in this supply chain?

What are the different business models of engagement in this supply chain? What is the most prevailing model in Egypt? Is it operator-specific or evolving across all operators?

What are the parties with direct contractual relations?

Engagement Model and Interrelations

How does your enterprise select its business partners? Can you provide sample criteria/conditions for selection and supplier registration?

Does your purchasing policy include criteria to favour local suppliers? Please clarify.

What are the OSH measures involved in the selection process of partners? How do you ensure their enforcement?

How do these criteria affect the partners to change their workforce practices (scale, geographical distribution, qualification, training, ...? other) ?

Who are the key stakeholders involved in enforcing the contractual terms (workforce and non-workforce) related?

What are the regulatory initiatives promoting good business practices in the sector? Example: legal and policy frameworks as well as CSR initiatives.

How do you promote transfer of knowledge, skills and technology to local suppliers or subcontractors? Do you provide suppliers training?

Business practices

What is the percentage of nationals in your workforce?

Has your enterprise cooperated with the national authorities, employers' and workers' organizations and the competent institutions in the area of training and skills development?

Has your enterprise participated in or contributed to training programs encouraged by Egyptian government aimed at encouraging skill formation, lifelong learning and providing vocational guidance? Please describe.

Has your enterprise offered training opportunities to local management to broaden their experience and support this development?

Do health and safety procedures in your enterprise take into account the experience of the enterprise in other countries of operation? Does your enterprise regularly provide information on good practices observed in other countries?

How does your enterprise make special hazard and related protective measures associated with new products and processes known?

Does your enterprise have established health and safety objectives?

What are the practices in place to contribute to establish a preventive safety and health culture?

Is your enterprise playing a leading role in the examination of causes of industrial safety and hazards?

Is your enterprise cooperating with the competent safety and health authorities on health and safety matters?

Is your enterprise cooperating with workers' and their organizations on health and safety matters? Are there regular cooperation mechanisms in place?

Does your enterprise have a policy in place promoting the right to organize throughout its operations?

Does your enterprise have a policy for its business partners to remedy shortcomings related to International labor standards?

How does your enterprise work towards providing stable employment relationships to limit the use of non-regular employment (temporary employment, contract workers, part-time workers, etc.)?

Does your enterprise organization regularly compare wages, benefits and conditions offered with other comparable employers? its compensation systems with other market players? How regular?

How do you rank your enterprise in terms of wages, benefits and conditions in comparison to competition?

Evolution of the Industry

From your own perspective, what measures have been taken to contribute to the development of technology in Egypt?

Do you know how many direct and indirect jobs were created thanks to the activities of your enterprise in Egypt? Do you have any statistics that you can share?

Over the next five years, how likely are you to make investments to strengthen your operations in Egypt?

How do you see the employment trends evolving in the telecommunications sector? Will technological advancement affect these trends?

From your own perspective, how has the industry, specifically the Infrastructure Supply Chain, evolved in the past few years in terms of scale of work, business practices, job creation and skill requirements?

What are the trends fueling this growth/decline?

>> 5.2.2. Discussion Guide (2): Contractor/Sub-contractor (Business Partner)

Meeting Objectives

- Understand the Telecommunications Supply Chain from the enterprise perspective;
- Understand the core processes involved in developing this chain;
- Assess the impact of the Telecom Operator and Vendor in influencing changes within the Supply Chain;
- Identify the different business models within this supply chain;
- Identify the role of the stakeholders;
- Map existing contractor practices related to employment and labour policy.

Question

Industry Overview

Can you please describe the current status of the telecommunications market in Egypt in terms of business growth and future outlook of contribution?

How do you see the technology advancement affecting the telecommunications sector (e.g. 5G)? How can this affect the infrastructure supply chain?

Tower Building Supply Chain

How do you see the Tower Building supply chain in Egypt? Who are the key players ?

What is the basis of competition in this industry? How can you describe the market (consolidated, fragmented, oligopoly)... and how is that different in other countries?

What are the support services involved in this supply chain?

What are the different business models of engagement in this supply chain? What is the most prevailing model in Egypt? Is it operator-specific or evolving across all operators?

What are the parties with direct contractual relations?

Business Relationships

How does your enterprise select its business partners? Can you provide sample criteria/conditions for selection and supplier registration?

Does your purchasing policy include criteria to favour local suppliers? Please clarify.

What are the OSH measures involved in the selection process of partners? How do you ensure their enforcement?

How do these criteria affect the partners to change their workforce practices (scale, geographical distribution, qualification, training, ...? other) ?

Who are the key stakeholders involved in enforcing the contractual terms (workforce and non-workforce) related?

What are the regulatory initiatives promoting good business practices in the sector? Example: legal and policy frameworks as well as CSR initiatives.

How do you promote transfer of knowledge, skills and technology to local suppliers or subcontractors? Do you provide suppliers training?

Business practices

What is the percentage of nationals in your workforce?

Has your enterprise cooperated with the national authorities, employers' and workers' organizations and the competent institutions in the area of training and skills development?

Has your enterprise participated in or contributed to training programs encouraged by Egyptian government aimed at encouraging skill formation, lifelong learning and providing vocational guidance? Please describe.

Has your enterprise offered training opportunities to local management to broaden their experience and support this development?

Do health and safety procedures in your enterprise take into account the experience of the enterprise in other countries of operation? Does your enterprise regularly provide information on good practices observed in other countries?

How does your enterprise make special hazard and related protective measures associated with new products and processes known?

Has your enterprise established health and safety objectives?

What are the practices in place to contribute to establish a preventive safety and health culture?

Is your enterprise playing a leading role in the examination of causes of industrial safety and hazards?

Is your enterprise cooperating with the competent safety and health authorities on health and safety matters?

Is your enterprise cooperating with workers' and their organizations on health and safety matters? Are there regular cooperation mechanisms in place?

Does your enterprise have a policy in place promoting the right to organize throughout its operations?

Does your enterprise have a policy for its business partners to remedy shortcomings related to International labor standards?

How does your enterprise work towards providing stable employment relationships to limit the use of non-regular employment (temporary employment, contract workers, part-time workers, etc.)?

Does your enterprise organization regularly compare wages, benefits and conditions offered with other comparable employers? its compensation systems with other market players? How regular?

How do you rank your enterprise in terms of wages, benefits and conditions in comparison to competition?

Evolution of the Industry

From your own perspective, what measures have been taken to contribute to the development of technology in Egypt?

Do you know how many direct and indirect jobs were created thanks to the activities of your enterprise in Egypt? Do you have any statistics that you can share?

Over the next five years, how likely are you to make investments to strengthen your operations in Egypt?

How do you see the employment trends evolving in the telecommunications sector? Will technological advancement affect these trends?

From your own perspective, how has the industry, specifically the Infrastructure Supply Chain, evolved in the past few years in terms of scale of work, business practices, job creation and skill requirements?

What are the trends fueling this growth/decline?

>> 5.2.3. Discussion Guide (3): Chamber of Information Technology (CIT)

Meeting Objectives

- Understand the role of the Telecommunications Division within CIT and how it affects the sector growth, regulatory changes, business practices.
- Understand the role of CIT in developing sector-related business practices.
- Understand the role of CIT in promoting social dialogue and the key efforts in this regard.

Question

Stakeholder Role

Can you please describe the current status of the telecommunications market in Egypt in terms of growth and contribution to the economy? How does the CIT contribute to this growth?

Can you elaborate regarding the priorities of the CIT with regards to the telecommunications sector?

How do you see the technology advancement affecting the infrastructure supply chain? What is the role of the CIT with regards to new technology introductions? How does this affect the Telecommunications Division agenda?

How are the national priorities in terms of digitalization reflected on the telecommunications sector?

Infrastructure Supply Chain

What is the role of CIT in capitalizing on these initiatives? How are these initiatives affecting the national telecom infrastructure?

How does the CIT serve/interact with the Supply Chain Infrastructure stakeholders?

What are the common challenges raised with regards to the telecom Infrastructure Supply Chain? And on the other side, what are the key advancements/opportunities provided by CIT serving the chain?

How does the CIT governance mechanism serve the inclusion of telecom infrastructure providers? How does this mechanism serve to enhance interrelation, partnerships and profiling within the sector?

Business Practices

Does the CIT play a role in fostering certain business practices which can promote decent work conditions across the sector? Can you clarify with examples.

What are the activities within CIT which continuously serve the decent work agenda? Is the CIT working towards a certain standard? How do you evaluate the adoption of these practices?

What are the challenges or barriers which hinder the adoption of new practices within member companies? Does the CIT provide incentives with respect to its goals?

Social Dialogue

How far do you see the raised issues to be included within CIT agenda driven by company business goals versus labour-focused issues?

What are the labour associations which are highly relevant to CIT and represent a key stakeholder in public-private dialogue context?

How relevant/effective do you find these labour associations to the mass of the telecommunications workforce?



Acknowledgements

This report is funded by the Swedish International Development Cooperation Agency (Sida), in collaboration with the International Labour Organisation's (ILO), and the project Advancing the Decent Work Agenda in North Africa – ADWA' Project.

