

Telecommunications Sector

SKILLS REPORT
2021-2022

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Abbreviation	Full Name
AI	Artificial Intelligence
API	Application Program Interface
APPs	Software Applications
AR	Augmented Reality
AWS	Amazon Web Services
BaaS	Banking as a Service
B2B	Business to Business
B2C	Business to Customer
Batelco	Bahrain Telecommunications Company
BIBF	Bahrain Institute of Banking and Finance
BPO	Business Process Outsourcing
BQA	Bahrain Qualification Authority
CBB	Central Bank of Bahrain
EDB	Economic Development Board
ESG	Environmental, Social and Governance
FDI	Foreign Direct Investment
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
HEC	Higher Education Council
ICT	Information and Communications Technology
IoT	Internet of Things
KPI	Key Performance Indicator
LMRA	Labour Market Regulatory Authority
LMS	Learning Management System
M&A	Mergers and Acquisitions
MoE	Ministry of Education
MoICT	Ministry of Industry and Commerce and Tourism
MOLSD	Ministry of Labour and Social Development
NaaS	Network as a Service
NOS	National Occupational Standards
NQF	National Qualification Framework
QA	Quality Assurance
ROI	Return on Investment
RPA	Robotic Process Automisation
SDG	Sustainable Development Goals

SIO	Social Insurance Organisation
SMEs	Small and Medium Size Enterprises
SaaS	Software as a Service
STC	Saudi Telecommunications Company
TAP	Tertiary Action Plan
TPPs	Third Party Provider
TRA	Telecommunications Regulatory Authority
TWS	Training and Wage Support Program - Tamkeen
UI	User Interface
UX	User Experience
VC	Venture Capital
VR	Virtual Reality
WEF	World Economic Forum

Acknowledgement Page

This report was conducted with the cooperation of several organizations and supporting bodies in the country. We would like to express our gratitude to the Steering Committee Members and the partners who were engaged in the research and data collection, as this report would not have been possible without their involvement, participation, and expertise.

Steering Committee Members:

- Bahrain Chamber of Commerce and Industry (BCCI)
- Bahrain Economic Development Board (EDB)
- Education and Training Quality Authority (BQA)
- Ministry of Education
- Ministry of Labor
- Ministry of Social Development
- Telecommunications Regulatory Authority (TRA)
- Batelco (Bahrain Telecommunication Company)
- STC Bahrain
- Zain Bahrain





Chief Executive Foreword

We launched Skills Bahrain with the purpose of supplying the labor market with skilled Bahraini talent prepared to drive growth and productivity within the organizations they work in, and helping Bahrainis build rewarding careers through successful enterprises in the Kingdom.

Skills Bahrain will achieve that by establishing professional standards for vocations and professions in Bahrain, to meet the rising demand for qualified talent across all economic sectors. At Skills Bahrain we aim to facilitate a smooth transition from education to employment opportunities for Bahrainis by providing the tools needed to support career guidance towards the skills and professions that are highly in demand by the labor market.

To fulfill Skills Bahrain's purpose and objectives we have undertaken a comprehensive sector-level research initiative that will scan the labor market and provide in-depth analysis of the skills required to future-proof specific sectors and ensure their sustainable development. Furthermore, our sector reports will provide an understanding of the labor and skills landscape for each sector, studying the challenges that face them, informing labor market policies, channeling skill development in the right direction, and overall contributing to enhancing Bahrainisation levels across all sectors.

This report is focused on Bahrain's telecommunications sector, which has been a key driver of change and development in the Kingdom since the establishment of the first national telecommunications company in 1981. Telecommunications is a highly competitive and rapidly changing sector in Bahrain, where innovation is pivotal for the productivity and sustainability of companies. The sector has been under the regulation and oversight of the Telecommunications Regulatory Authority (TRA) since 2002, which opened the market to competition that facilitated innovation and growth in the telecommunications landscape in Bahrain.

H.E. Maha Abdulhameed Mofeez
Chief Executive - Tamkeen



General Director Foreword

With one of the most liberal telecommunications sectors in the world, Bahrain is an important launchpad for technology businesses wishing to do business in the Middle East. We have seen examples of this time and time again, from the start-ups populating our incubation centres, to global technology innovators choosing Bahrain as a regional base for satellite and internet services.

The telecoms sector underpins almost every industry in the Kingdom, providing the infrastructure for an advanced and highly connected society. Developing an environment where digital technologies can thrive is dependent on robust learning & development policies, as shown by the findings of this inaugural telecommunications sector report by Skills Bahrain.

The report highlights important gaps, including room for further training of locals, and the availability of the skills sets that will have the most impact. Bahraini telecoms employees currently stand at just over 62%, so clearly, there is room for improvement to our homegrown talent pool. Apart from technical skills, the report also identifies leadership, management, strategic, and critical thinking skills that are required for continued success. It offers solutions, including a blueprint for a coordinated effort by educational institutions, training providers, and prospective employers, aimed at delivering effective and lasting results.

As you read this report, bear in mind that the path towards success will be fraught with challenges. The sector's rapid pace

of development means that there may be jobs in the future that we cannot even imagine today, requiring skills we haven't yet conceived of. Conversely, some of today's advanced technical skills won't exist in the future. We can tackle this by creating a learning culture that ensures skills remain relevant as the industry continues to evolve.

The telecoms industry is undergoing a rapid transformation across the world. Bahrain's National Telecommunications Plan is designed to keep Bahrain at the forefront of innovation. We welcome this important report, which complements our efforts to help the Kingdom continue its role in shaping the future of the telecoms industry.

Philip Marnick

General Director
Telecommunications Regulatory Authority

Introduction

Globally, as digitalisation and COVID-19 have brought about rapid change in the world of work, reskilling the current workforce and creating digital jobs is at the heart of most government strategies. Education and labour market reforms around the world are focusing on how to prepare citizens for the changes digital transformation is bringing to all areas of work and skills. The World Economic Forum (WEF) stated that 50% of employees will need reskilling by 2025, with 40% of these needing urgent reskilling¹.

Bahrain is actively moving towards increasing the economy's share of 'digital jobs', as outlined in the Bahrain's Digital Strategy 2022 produced by Bahrain Economic Development Board (EDB). When benchmarked internationally, the Gulf Cooperation Council (GCC) still has fewer digital jobs within its economies. While the actual numbers of new digital jobs advertised is still relatively low in Bahrain compared with traditional jobs, they are rapidly increasing². Preparations to ensure current and future employees have the skills to take these jobs is a national imperative.

Along with its GCC neighbours, the Kingdom of Bahrain has been taking proactive measures to ensure the country is ready to transition into a digital economy. Led by Bahrain's progressive liberal Telecommunications regulations, these measures include Bahrain adopting cloud as the mainstream infrastructure across the country, the roll out of 5G, the economic development strategies to attract technology related Foreign Direct Investment (FDI), and the advanced regulatory frameworks that support digital businesses and the application of emerging technology.

The Telecommunications sector is rapidly changing from the delivery of telephony to a technology solutions-based industry, resulting in significant impact on jobs and skills. It has been at the heart of the country's impressive economic growth over the last 50 years, and this is expected to continue. As the sector addresses new challenges, such as Cybersecurity, there has never been a more important time to identify the learning needed to prepare the workforce for the transformation of the sector.

The 2018 Human Capital Report outlined areas of improvement in the education and labour market system in Bahrain³. Main weaknesses identified were: the education to employment challenges; lack of engagement between industry and academia; lack of embedding core job-ready skills into curricula for education and training, and lack of coordination within the system to develop education to employment pathways. Bahrain is not alone with these challenges; most governments around the world are grappling with the same system-related challenges as the need for new skills in the labour market becomes pressing.

Research shows that well-functioning labour markets rely on well-informed labour market intelligence and insights to ensure that education and training supply matches the demand for

jobs. This Telecommunications Sector Skills Report, prepared by Skills Bahrain, follows international best practice in data collection and research methodology to provide a comprehensive picture of the drivers of change and the upskilling needs of the Telecommunications sector in Bahrain. Against a rapid pace of change, the report lays the foundation to develop a response and solutions based on evidence-based planning for the future of the sector's workforce. This is essential to support its productivity, resilience, and long-term future. A sound understanding of the skills that are needed for the short and longer terms should inform skills and labour market policies. Once a shared understanding is reached, Bahrain will be well placed to:

- Support the development of skills that maximise the application of innovative technologies and ways of working to improve productivity and efficiency across the sector
- Strengthen the training and development offer, thereby ensuring that new entrants and existing workers have the right skills to succeed
- Contribute to the further Bahrainisation of the Telecommunications sector

Skills Bahrain

Bahrain has a proud history of firsts within the region. The first public school system, the first to provide many women's rights initiatives, and the first dedicated labour market development fund. In addition to these, Bahrain can now be proud of leading the region with a dedicated skills development initiative that integrates the voice of employers with the policies and planning for education and training. Initiated in August 2021, Skills Bahrain is an employer-led skills initiative for Bahrain designed to support Bahrain's Applied Learning Strategy by improving links between education and training and employment to drive positive outcomes for learners and employers.

Skills Bahrain's role is to:

- Support employers and investors to build a pipeline of skills and talent, allowing them to drive innovation and improve productivity
- Ensure that Bahraini nationals and employees benefit from the success of businesses in Bahrain and build rewarding careers and livelihoods

This is achieved by providing evidence-based insights to support the skills ecosystem in Bahrain. Skills Bahrain undertakes extensive primary and secondary research to collate, validate and synthesise information on skills, occupations, and the labour market. This information is disseminated to a target audience of employers, employees, students, teachers, parents, and career advisors. Qualitative research and quantitative data are combined to develop a range of products, including

Labour Market Intelligence, Sector Skills Report, and associated Workforce Development Plans. Skills Bahrain also designs tools and templates to promote greater transparency and shared understanding of labour market issues among stakeholders, and to enable individuals to take greater ownership over their career progression.

The Telecommunications Sector Skills Report is one of two to be produced as part of the pilot phase of the initial setup of Skills Bahrain; the other is the Financial Services Skills Report. The reports represent proof of concept, tested for their value to the sectors by feedback from employers.

The Sector Skills Report (this document)

This document is the result of extensive research conducted in Bahrain and internationally, which:

- Explains the drivers of change affecting the sector and the impact on jobs and skills
- Profiles the Telecommunications workforce and maps the jobs within it showing the new skill sets required
- Examines the skills of new entrants recruited into the sector
- Sets out the focus and impact of investment in training to date
- Analyses the skills gaps across the sector, identifies core and future skills needs and presents a new standards-based approach to skills development
- Assesses the readiness of the skills ecosystem in Bahrain to respond to changing skill demands in Telecommunications
- Proposes training solutions to ensure skill needs can be met in workplace settings

- Suggests a way forward to address the challenges and implement change to support business growth.

Linked to this report, a number of practical tools are under development based on its findings. These are designed to assist policy makers and practitioners to visualise and implement the changes proposed. These are additional publications supplementing this report.

- Job Maps for Telecommunications outlining the existing jobs in the sector grouped into Job Families
- A Core Skills and Behaviours framework containing skills required across all jobs in the sector
- National Occupational Standards (NOS) describing what a person needs to be able to do to be competent in each job, including the knowledge, skills and behaviours required
- Career pathways that show progression routes in the sector and the qualifications and training required to get there

Research Methodology

The findings in this document are based on a robust research methodology. Data was collected from many sources to inform the findings outlined throughout. Extensive secondary research has informed the benchmarking in the document and provided background for it; all references can be found at the end of this report. Primary research was collected through three sector surveys of the approximately 3,000 employees across the sector. The surveys were aimed at Human Resources Managers, Line Managers and Employees as shown in the table below.

Survey Recipient	Responses	Margin of Error and Confidence ²
Human Resource Managers	16	17% and 95%
Line Managers	63	12% and 95%
Employees	417	4.5% and 95%

Table 1 - Survey responses and confidence level*

Additionally, over 30 interviews and 3 focus groups were conducted to complement the survey findings. The qualitative research used thematic analysis to categorise findings. This report outlines the synthesis of the national administrative data, survey

findings, secondary research, interviews and focus groups. The following summarises the full research and consultation that informed this document.

Sources of Information for this report	
Administrative data	SIO, LMRA, MoICT MoE
Tamkeen data	Training and funding insights
Surveys	HR, Employees, Line Managers
Interviews	30 interviews with Regulator, CEOs, Line Managers and HR Managers in the sector
Focus groups	3 Focus Groups with HR, Line Managers and CEOs

Table 2 - Sources of information for this report

Workforce Development Plan

This document is supported by a Workforce Development Plan (WDP) that addresses some of the shortfalls identified in this report and proposes solutions. Based on the research findings, the WDP focuses on the specific areas for skills development and associated delivery mechanisms. Building on applied learning principles, the WDP is designed to support professionals and training practitioners to design and deliver talent development solutions that are directly aligned to employer needs, relevant to the workplace, and with high impact to ensure the outcomes of development meet business objectives. The WDP is based on principles of apprenticeship and standards-based skill development that has been successfully utilised in the Telecommunications sectors internationally.

Limitations of the report

The triangulation of the primary research and international benchmarking conducted for this report provides clear insights into the future skills needs of the sector. However, it would have been enhanced by more detailed national administration data to enable deeper analysis into the nature of employment and the characteristics of occupations and career progression in the Telecommunications sector. Access to such data was limited, but this document provides a starter for conversation which should create a desire for more evidence-based analysis. Regular, robust analysis will enable comparisons over time to support accurate monitoring of progress and forward planning, which in turn will support the successful development of the sector.



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Executive Summary



INTRODUCTION

Bahrain's Telecommunications sector has been a pivotal enabler of the rapid economic growth seen in the country over the past few decades. The national telecommunications company, Batelco, was founded in 1981 and has witnessed the development of the sector from telephone networks to the sophisticated 5G and fibre networks of today. To ensure sufficient oversight and regulation of the sector, Bahrain established the Telecommunications Regulatory Authority (TRA) in 2002 and opened the market to competition. Zain Bahrain entered the market in 2003 and STC joined in 2010. Currently, Bahrain enjoys one of the most liberal telecommunications markets in Middle East and North Africa.

As with many Telecommunications sectors globally, the COVID-19 pandemic saw a sharp increase in demand as remote working and home-based entertainment instigated by lockdowns became standard. Consumer demand for better digital services from operators accelerated digitalisation plans. Telecommunications is an industry in transition as traditional operators move from telephony to technology. The rapid pace of change necessitates learning new skills, and the upgrading of old skills to move the sector forward. A convergence of job roles is leading to a focus on broader skill sets rather than narrow job descriptions.

The Sector Skills Report

This report is the result of extensive research conducted in Bahrain and internationally. It provides a comprehensive assessment of the skills needed to make the Telecommunications sector fit for the future. A sound understanding of skills in demand should inform skills and labour market policies. Reaching a shared understanding will enable Bahrain to:

- Support the development of skills that maximise the application of innovative technologies to improve productivity and efficiency across the sector
- Strengthen the training and development offer, thereby ensuring that new entrants and existing workers have the right skills to succeed
- Contribute to the further Bahrainisation of the Telecommunications sector

Linked to the report, Skills Bahrain is developing a number of practical tools based on its findings. These are designed to assist policy makers and practitioners to visualise and implement the changes proposed.

Drivers of Change

Bahrain's Telecommunications market is small and mobile subscriptions saturated. Operators need to diversify their business models from telephony operators to service providers of technology. Customer demands are at the core of these changes.

Digital service channels and the use of Artificial Intelligence (AI) powered service tools can offer more tailored products and services to customers by utilising data insights to map consumer behaviour and focus on further individualisation of offerings.

In Bahrain, open banking and the progressive approach by the Central Bank of Bahrain (CBB) has enabled Telecommunications operators to utilise their subscriber base to provide mobile financial solutions, leading to some convergence with the Financial Services sector. Batelco recently announced a number of new business lines, including a Financial Services business offering payment, remittance and integrated banking features.

New business models and activities require skills beyond the traditional requirements for the sector. Skills are now required in areas like software and APP development, machine learning, AI, cyber and network security, data science, and cloud computing. There is a need for rapid upskilling of the existing workforce, and potential new entrants to the sector should have these skills embedded within Higher Education programmes.

Emerging Jobs and Implications for Skills

The Telecommunications sector in Bahrain employs 3,200 people of which 67% are male and 33% are female. Of the total employees, 62.6% are Bahraini and the remainder expatriate. Jobs in the sector have changed as new technologies have been adopted. The adoption of cloud-based infrastructure has reduced the number of classical network engineers. There has been a 23% increase in sales and marketing jobs since 2013 and a 7% increase in technology and network jobs. The number of outsourced jobs in the sector seems to have reduced.

In the course of assessing the sector, Skills Bahrain created a Telecommunications job map where jobs are grouped into families with similar skill sets. There are seven Job Families in the Telecommunications sector; each contains an analysis of the key skills and behaviours required to be successful in each job. Every job in the sector is backed by an Occupational Standard that sets out the details of the job, the skills and behaviours required, the career pathways to move in and out of the job, and the qualifications and training needed. The job map has value beyond this research. It will help employers and Human Resource (HR) professionals plan their recruitment, identify skills gaps, and develop structured learning journeys for their employees linked to performance management. With the job map, training professionals gain an insight into up-to-date industry requirements and can then enhance their programmes. Careers advisors can use the map to support individuals to make informed choices about career pathways.

Skills Gaps and Hard-to-Fill Vacancies

In order to determine skills gaps across the sector, it was important first to agree on a common taxonomy for skills and

behaviours for the research, so that survey groups were clear on what they meant and what they looked like as evidenced on the job and at different levels of proficiency. Skills Bahrain therefore developed the Core Skills and Behaviours Framework. Based on

international benchmarks and local consultation with Bahraini stakeholders, the Framework identifies the core skills required by all jobs across the sector at five levels of proficiency to help support an agreed understanding of competency.

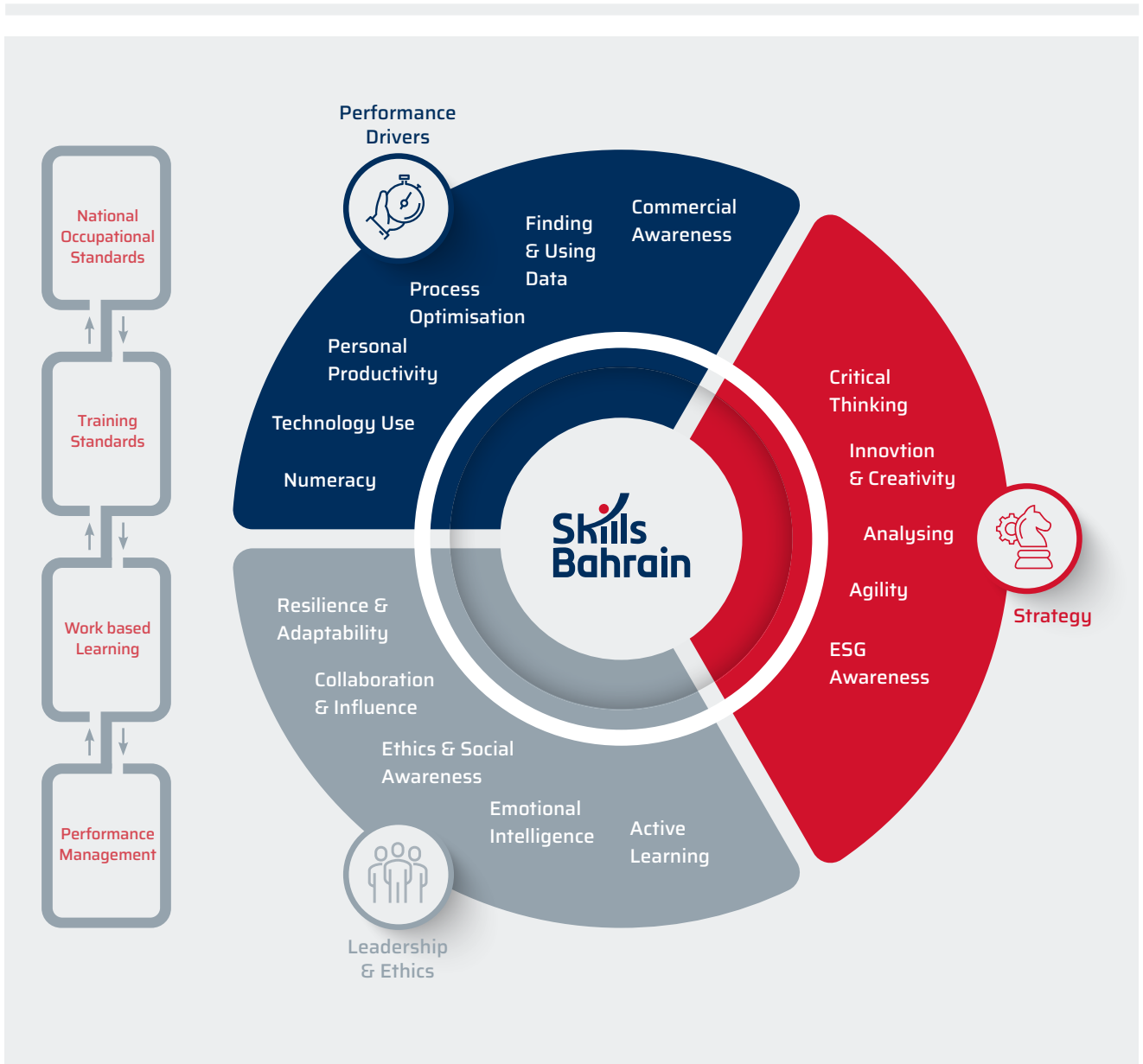


Figure 1 - The Skills Bahrain Core Skills and Behaviours Framework

Research for this report revealed a clear skills gap in core skills and behaviours required by the sector. The following shows the

top 5 skills that were most in need of development by the sector, according to the survey of Line Managers.

Need Skills Development

Top 5 skills that can be developed in the employees of the Sector:



Figure 2 - Top 5 skills in need of development now according to line managers (left to right) Source: Skills Bahrain Line Manager Survey 2021

In addition to these, the sector was asked what technical skills they consider as the most important in the next 5 years. The

following outlines the top 5 skills that the sector identified as per the survey conducted with Line Managers.

Future Skills

The most important technical skills for the sector in the next 5 years are:



Figure 3 - Skills in need of development in the next 5 years, all responses (left to right) Source: Skills Bahrain Line Manager, Human Resource and Employee Survey 2021

Line Managers and Employees stated that the skill of interpreting and reporting on data was more in demand as a skill for the next 5 years than data analytics - technical programming for data science work. The Human Resource survey group was the only one which mentioned demand for data analytics - technical programming. Additionally, the Human Resource group added risk management in their top 5 skills. Employees felt process optimisation was a future skill needed in the sector along with using technology. In line with international research, the integration of technical

and higher order thinking skills, such as critical thinking, needs to be part of any skills-based solutions. The survey findings identified some job roles that were considered hard-to-fill or had high turnover. The majority of hard-to-fill vacancies are in the customer service, sales and relationship management areas of the business. These areas are rapidly changing and converging because of digitalisation and also have high staff turnover.

Challenges in Developing Future Skills and Work Based Learning

An analysis of the readiness of Bahrain's training landscape indicates gaps in the funding and provision of training for the future needs of the sector. More than 50% of funding from Tamkeen to the sector is spent on soft skills and leadership training with little evidenced impact. While some training providers have updated courses, including areas such as digital transformation and cybersecurity, uptake in these is far lower than soft skills and leadership courses. There are also challenges with the work readiness of graduates entering the sector from Higher Education, particularly with regard to core skills.

Perhaps the biggest challenge is the readiness of organisations to move human capital development in the sector to a skills-based approach built on sector-agreed training standards. Internationally, trends are shifting to small pieces of targeted, online learning that build on each other to create credentials that are verified by evidence of new skills. 58% of employees surveyed said they had undertaken some type of online or nano learning in the past year. Of this number, only 9% said they used their organisation's Learning Management System (LMS) for their online report. Analysis indicated that many performance management systems are often not well aligned to business strategy or competency frameworks, indicating a gap in the ability to measure skill development in organisations and therefore, impact of training. There is an opportunity for Human Resource (HR) professionals and people managers in the sector to be developed and play a central role in supporting a skills based approach for their employees.

The skills required to assess and support workplace learning need to be developed among all the training providers who serve the sector. Additionally, a competency standards-based approach to designing and assessing learning requires traditional 'trainers' to become on the job learning 'coaches' who have the pedagogical skills to coach and assess learning in the context of work.

In addition to the capacity building required in the education and training sector, the supporting infrastructure in the skills ecosystem needs strengthening to help the sector move forward. There is scope for an employer representative group to provide an employer voice in the skills system for the sector, and to play a lead role in standard setting and skill development. A national career guidance system is required that makes use of the labour market intelligence and tools produced by Skills Bahrain to support education leavers and those working in the Telecommunications sector. Employers could proactively work with education and training institutions to support this. Bahrain Qualifications Authority (BQA) should consider how it might further strengthen QA processes to encourage closer alignment of education and training provision to employer demand and how to measure the quality of work-based learning within their systems.

Conclusion and Next Steps

There is a significant need to upskill and transform the skills set of the Telecommunications workforce across all Job Families, and there is recognition among operators that alignment between skills and the business objectives of organisations is critical. To successfully develop the Telecommunications workforce for the future, a number of actions should be taken forward:

- The sector needs to address the technical skills gaps in specific areas identified in the research. This includes focusing on the sector wide development of data analytics skills integrated with commercial awareness skills to ensure employees are ready for sector convergence
- Alternative pathways into the sector from high school, including degree level apprenticeships need to be developed
- The sector needs to move to a skills-based approach to development and performance management based on sector agreed standards
- The learning and development approach for the sector needs to be a structured integrated work-based learning journey, rather than isolated training events
- Learning and development are designed against actual business outcomes and job requirements
- Skills and Behaviours progression is evidenced on the job for workplace impact
- Training providers' roles change from classroom-based delivery only to supporting work-based learning as learning and assessment coaches through many different learning modalities
- People Managers in the sector need upskilling to effectively mentor their employees through work-based learning
- Human Resource professionals in the sector need upskilling on the practices and principles of work-based learning and how to design skill based integrated learning journeys
- Formal education needs to integrate sector agreed skills and behaviours standards into curricula to ensure alignment to employer needs
- Support the agencies responsible for career guidance in Bahrain with sector information, data, advice, career pathways, and standards
- Work across agencies in Bahrain, including BQA and Higher Education Council (HEC), to ensure work-based learning models are formally recognised and quality assured



01

The Telecommunications Sector Drivers of Change and Skills Implications



Within the context of the economic growth aspirations of Bahrain, the Telecommunications industry is vulnerable to many changes. While Telecommunications is a technology driven sector, the convergence between Telecommunications, Financial Services and the introduction of new technology will lead to demand for a new range of skills. Additionally, as the Telecommunications sector becomes more digital, new digital skills will become essential. This Chapter examines the drivers of change affecting working practices, jobs and skills in the Telecommunications sector.

1.1 Overview

The Telecommunications industry has always been at the forefront of change as it has dealt with a rapidly shifting business and technology landscape while also managing increasingly high customer expectations. Increased proliferation of smartphones and internet-based applications, the 5G revolution, and the emergence of new traffic patterns due to Internet of Things (IoT) and machine-to-machine connectivity have been some of the most obvious disruptors.

Exponential growth in demand is making broadband and mobile services essential to the extent that Telecommunications companies are often considered to be strategic utilities. They are often subject to strong waves of regulation and anti-monopoly constraints and sometimes feature high on the political agenda. When combined with an intense growth in demand for dynamic bandwidth (driven by video streaming) and new services on the fly, flattening revenues and an intense need to cut costs, service providers have no choice but to transform their networks and operations to encompass the developing trends.

To grow, companies need to pursue mergers and acquisitions (M&As), which has led to a significant increase in M&A spending

across the region. This trend is expected to continue as technology pulls down barriers between sectors, and new companies emerge. But companies also need to accelerate their strategies for bundling services on top of their assets. Some may target already competitive and crowded segments such as content, sports and media and others may take a shot at the new connected consumer worlds such as the connected-cars or smart homes. Some companies will focus on serving businesses through Industry 4.0 initiatives and multiple experimentations in a wide range of domains, including moves into adjacent industries such as Payments, Banking, Utilities, Gaming, Cloud and maybe IT services.

Pure connectivity will probably no longer be a very profitable business model by itself. So, value will mostly come from bundled high-value services or from resulting data monetisation streams across a wide range of use cases. This will require strong harmonisation and consolidation initiatives to build highly standardised, automated, open and intelligent digital platforms based on SDN (Software Defined Networking) and NFV (Network Function Virtualization). On these platforms, the real value will come from the way data will be leveraged to streamline customer experience, operations and create new monetization models.

1.2 Drivers of Change

Major trends and technologies that have been driving growth and innovation in the Telecommunications sector are outlined below. It is also interesting to note that the new technologies impacting the sector are closely connected and therefore complement each other well. The sector has enjoyed clear growth over the past 10 years worldwide. According to data from the USA, the sector is anticipated to keep growing at a rapid rate, while the distinction between the Telecommunications sector and other sectors, such as Financial Services will become blurred.

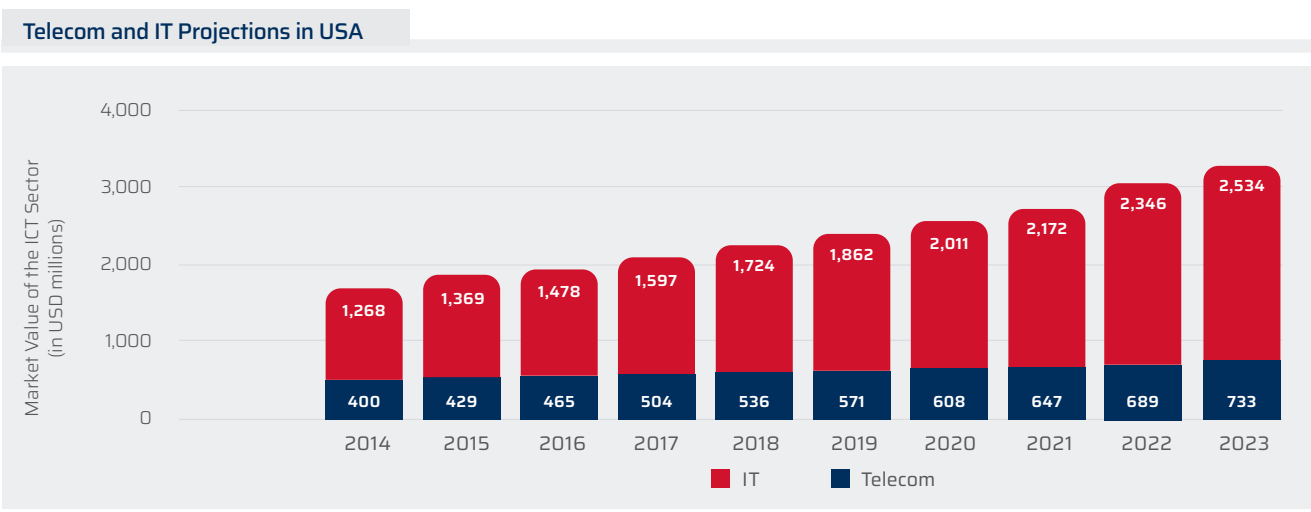


Figure 4 - Projected growth of the sector in USA

It is also anticipated that the sector will change significantly as new technologies impact products, services and business models.

According to IBM research, a number of potential applications, supported by 5G, can change the nature of many different sectors⁴.

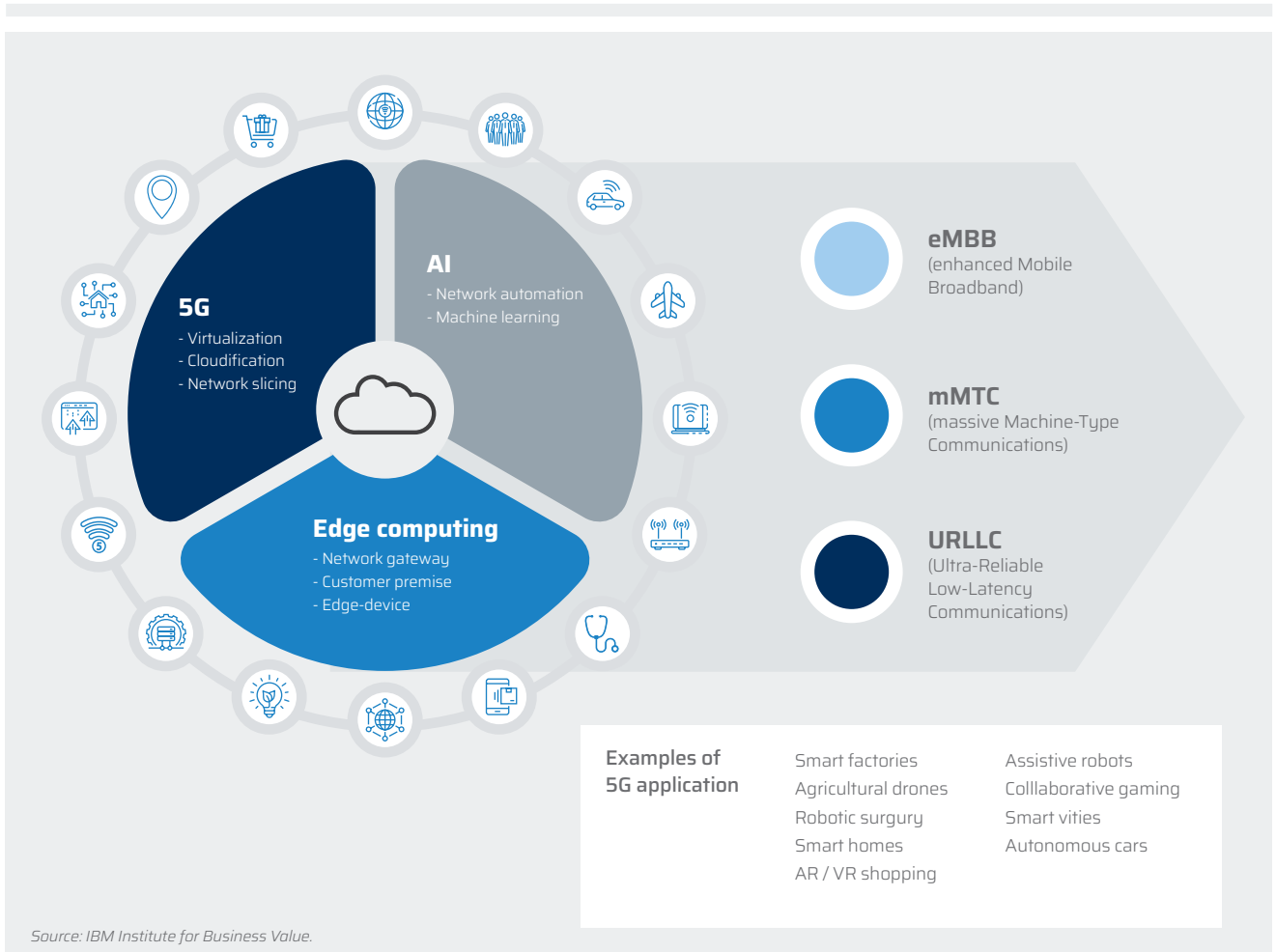


Figure 5 - New technologies impacting Telecommunications and their inter-relationships (Source: International Business Machines Cooperation)

1.3 Digital Transformation of Existing Infrastructure

5G is fast becoming the norm around the world and promises to offer the data requirements for an increasingly connected society and industrial environment. Low latency, ultra-fast connection speeds and high bandwidth are just a few of the benefits 5G will bring to global commerce in the coming years⁸.

Adoption of 5G will also provide a boost to industrial automation, powering machine-to-machine and demand-driven supply chains. In essence, 5G would lay the digital backbone for every industry to boost productivity and innovation. In mobility, vehicles will communicate with infrastructure, other vehicles, and networks, improving safety and traffic flow. In healthcare, connectivity-enabled innovations can make it possible to monitor patients remotely, use AI-powered tools for more accurate diagnoses, and automate many tasks so that doctors and nurses can spend more time with patients.

Manufacturers and other industrial companies can run highly precise, high-output, and largely automated operations using low-latency commercial and private 5G networks. Retailers can offer a more seamless and personalised in-store experience while making inventory management and warehouse operations more efficient. Many of these cases would utilise Telecommunications networks and therefore would translate into more revenue for Telecommunications companies¹¹.

Finally, the Telecommunications companies that provide these mobile networks will directly benefit from 5G too. This will enable them to expand and provide better digital services. Augmented Reality (AR), Virtual Reality (VR) and the Metaverse are examples that will benefit greatly from the increased performance and efficiency. Vodafone in the UK has already experimented with 5G VR/AR technologies such as holographic telephone calls.

With Bahrain's extensive 5G roll out, these types of service could also be possible here.

1.4 Increasing Adoption of AI & ML

Telecommunications service providers are facing increasing demands for higher quality services and better customer experience. They are capitalising on these opportunities by leveraging the vast amounts of data collected from devices, networks, mobile applications, geolocation, detailed customer profiles, service usage and billing and financial transactions. AI helps process and analyse huge volumes of data in order to extract actionable insights, improve operations and customer service, and increase revenue through new products and services. Some common applications include:

- **Network Optimisation** is an important application of AI as it helps service providers to build self-organising networks (SONs) which continually adapt and reconfigure based on network traffic. Since such networks can self-analyse and self-optimize, they are more efficient at providing consistent service¹².
- **Predictive maintenance** enabled by AI is an essential albeit more behind-the-scenes use of AI and machine learning that also improves customer satisfaction. Data-driven insights help companies learn from historical information, monitor equipment performance, anticipate failures based on patterns, and proactively fix it.
- **Virtual assistants and chatbots** are being widely used to automate and scale responses to a range of support requests and raise customer queries/complaints, which can result in significant cost savings and improved customer satisfaction. For instance, Vodafone saw a 68% improvement in customer satisfaction after introducing its chatbot TOB.
- **Fraud detection** is another common application where ML algorithms are instrumental in spotting anomalies from enormous datasets much quicker than human analysts can to provide nearly a real-time response to activity that needs to be investigated.
- **Robotic process automation (RPA)** allows Telecommunications service providers to manage their back-office operations and large volumes of repetitive and rules-based actions. By streamlining the execution of complex, labour-intensive and time-consuming processes such as billing, data entry, workforce management and order fulfilment, companies can significantly reduce error rates, improve data quality, boost customer service, and improve operational efficiency.



1.5 Growing Mobile Ecosystem, Edge Computing and IoT

The mobile ecosystem is already much larger than the personal computing one and is rapidly expanding. Powerful mobile devices running engaging apps are being enabled by cloud and edge computing and they are feeding into the IoT.

The idea behind Edge Computing is that by storing/accessing data and performing high demand processing tasks closer to the network edge, that is closer to the end-users and devices, network congestion and latency are significantly reduced. These reductions are crucial for latency-critical applications dependent on continuous corrective actions.

The IoT describes the network of physical objects, 'things,' that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet. These devices range from ordinary household objects to sophisticated industrial tools. According to a recent IDC estimate, there could be up to 42 billion people connected IoT devices by 2025.

IoT has matured to support the Telecommunications industry by becoming an integral part of concepts like autonomous vehicles and industrial IoT. The Telecommunications industry is amongst the biggest players in the IoT globally.

Key IoT use cases in Telecommunications include asset management and remote system monitoring, supporting the smart city value chain in various functions, functioning and control of smart homes and buildings, and connected vehicles and autonomous driving.

1.6 Increased interest in the Metaverse becoming a mainstream tool

Interest in the Metaverse and its application exploded late 2021 and early 2022. According to the WEF, the Metaverse 'is a network of always-on virtual environments in which many people can interact with one another and digital objects while operating

virtual representations or avatars of themselves'¹⁵. This is similar to operating an avatar of yourself in a gaming environment with opportunity to virtually interact with others, do activities and tasks and be fully immersed in an interactive environment. VR headsets have been used for many purposes in the past, and the prohibitive cost of both the headsets and building VR content has been coming down rapidly as technology increases, making the Metaverse a more accessible concept.

The Metaverse is anticipated to change the world of work at a rapid pace over the next few years with meetings and group tasks moving from virtual meeting platforms to the more engaging and interactive virtual office of a Metaverse environment. There are also significant opportunities for immersive customer experiences for any business, from trying on clothes in a virtual store to having a virtual banking experience.

Other key applications for the Metaverse can be found in education and training where the immersive experience has shown to increase learner retention and offers a wide range of technical work-based skill development with simulated environments being possible for learners to practice on. There has been global interest by Governments to look at how virtual cities and Metaverse related learning could become part of mainstream business and education. Dubai announced plans to develop a Metaverse strategy for the city¹⁶ and China has installed VR headsets across public schools to bring VR as a key part of their national education plans. The Metaverse will put significant demand on data usage. With Bahrain's 5G and fiber infrastructure, Bahrain is well positioned to leverage opportunities to host Metaverse related business.

1.7 The Emergence of New Business Models and Working Patterns and their Impact on Jobs and Skills

New Business models

Many factors and future uncertainties are pushing Telecommunications companies to consider new business models and to envision their strategies and operations for the next decade

“Due to COVID-19 and the closing of some physical Telecom branches, we moved some front-line employees to the back-office operations which gave them exposure to new things; they were trained on new tasks.”

- Executive

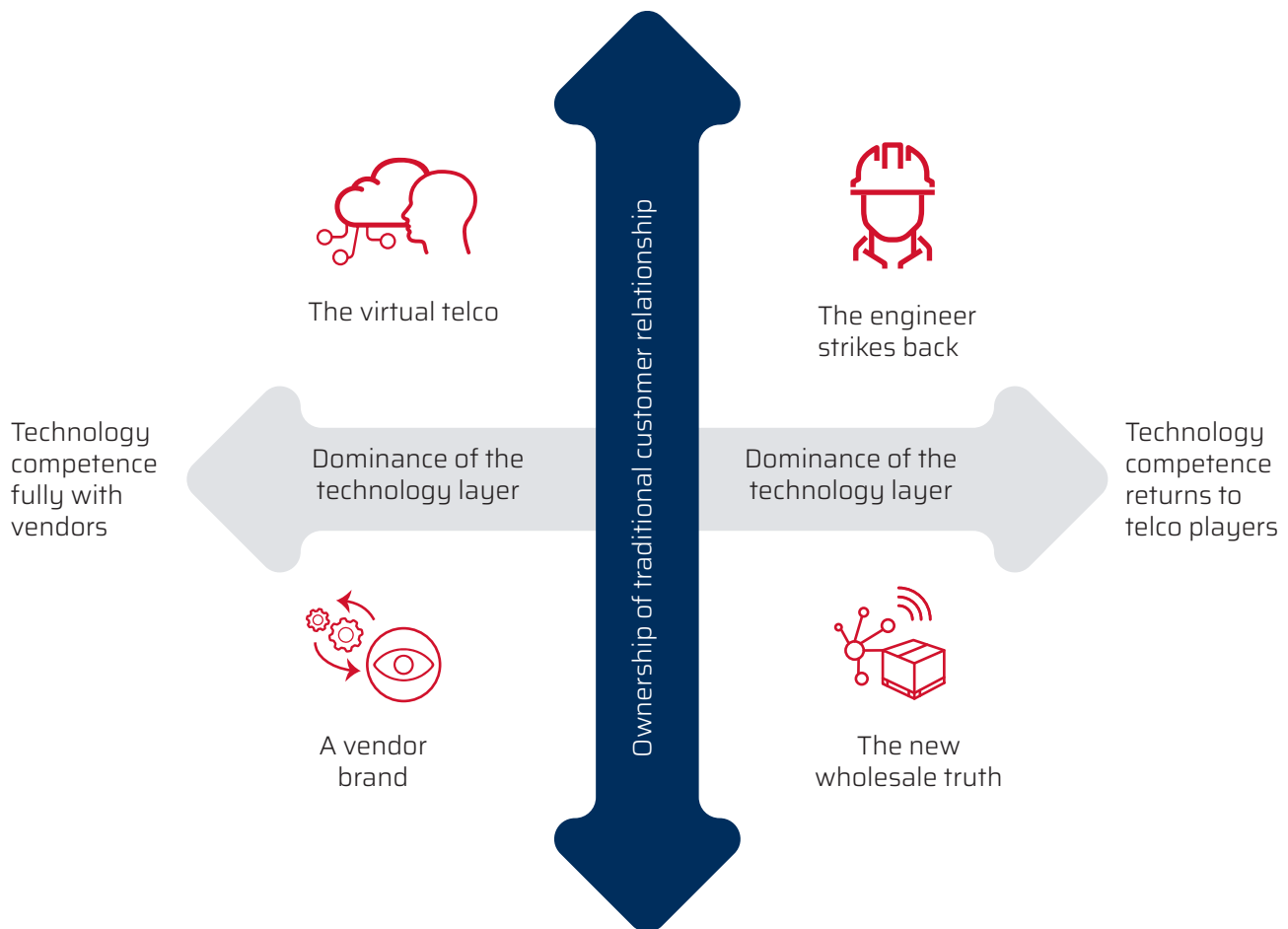


Figure 6 - Future telecommunications business models (Source: Deloitte, 2021)

Deloitte, in a recent study, attempted to illustrate four scenarios for the Telecoms industry in 2030. The approach does not aim to predict the most likely outcome, but to illustrate what could plausibly happen in the industry and how the market players might deal with the many uncertainties⁵.

As shown in Figure 6 above, the two critical 'uncertainties' identified are:

1. The extent to which the Telecommunications companies will own new technology and drive innovation and
2. The extent to which Telecommunications companies can provide value adding services and continue to own the traditional customer relationship

The hunt for new growth areas has been pushing Telecommunications companies to offer Information and Communication Technology (ICT) services in the past 15 years, however, this push has expanded to development of ICT offerings being outsourced to them being insourced and the strategic decision to build core competencies around ICT and FinTech capability. Apart from financial growth, mobile financial solutions increase customer loyalty and satisfaction scores, therefore making it the obvious area for Telecommunications companies to build on. As a result, Telecommunications operators and service providers across regions and markets are applying for banking licenses and launching digital banking services.

“Ideation from our employees is everywhere, we need to enable a process of testing and prototyping to make big strides forward and accept that failure is a natural part of progression.”

- HR Manager

Changing Working Patterns: Agile as a Concept

Remote working has drastically impacted working patterns across Bahrain, including in the Telecommunications sector. According to McKinsey & Co., the remote working patterns adopted during COVID-19 have paved the way for potential agile working practices to become the ‘new normal’⁶. Agile as a concept is broader than just flexible working patterns. One of the core principles of agile is that empowered flat structured teams, tribes, or networks of people from within the organisation work cross functionally⁷, based on the skills they offer. This sees organisations moving from rigid job description-driven organisations to skill-based agile teams for specific organisational outputs or goals. The pandemic prompted this kind of working arrangement as jobs were redefined due to branch closures, department shifts or automation of tasks. People were redeployed into different areas of the business.

Other principles of agile can be seen as core emerging patterns of working. The emphasis on Customer Experience and Customer Journey Mapping is an agile principle to view problem solving by beginning development with the end user needs and working backwards. Many Bahrain Telecommunications providers adopt this agile approach to serving customers.

Agile principles take a different approach to trial and error in new product development. One key concept of agile is the push to produce working prototypes to the market for continuous feedback and development cycles over lengthy development processes. While new product development in Telecoms is required to ensure regulatory compliance, there is evidence of a new culture of this more agile ‘trial and error’ approach in the sector.

The Telecommunications sector can utilise controlled environments to test new product prototypes while also using analytics to create scenarios and predictive data insights to inform the feedback cycles of development. This need for entrepreneurship and risk taking was highlighted as necessary skills for the sector many times during the research.

While the broad adoption of agile principles is unlikely in the regulated core Telecommunications sector, there is significant scope for agile principles in new business areas which, as of today, are not regulated. As companies develop a culture of innovation, some of these principles are likely to continue and grow. Research has shown that skills based cross functional teams offer excellent upskilling opportunities for the adoption of new data and digital skills in an organisation.

Convergence with ICT and Fintech

In December 2021, Bahrain’s national Telecommunications company, Batelco, launched its new company BEYON Money. Described as a ‘super money APP’, BEYON money was developed through a partnership with the Silicon Valley based company, i2c Inc, which offers Banking as a Service (BaaS) along with other embedded payment services. The partnership with Batelco allowed the new BEYON Money platform to ‘plug and play’ the precoding product platforms offered by i2c Inc and offer integrated payment and banking-like services, including integrated products to customers including Visa Prepaid Cards, value wallet, categorisation of expenses and financial insights and digital remittance⁸. In a press conference on January 20, 2022⁹, Batelco added to their portfolio with the announcement of the three new companies as global players in different aspects of digital business. The three companies are outlined as follows:

- BEYON Cyber – an end-to-end cybersecurity solution company providing management services and advisory in cybersecurity
- BEYON Solutions - Utilising Batelco’s ICT partner across the world, this company will offer solutions to a range of companies to help them scale and integrate digital solutions
- BEYON Connect – A focus on Software as a Service (SaaS) to public and private sector companies

Another local example of this convergence potential is the expansion of Infinios. Originally formed in 2014 under the name of NEC Payments, Infinios is a licensed ancillary service provider of payment services, BaaS a card processor. Infinios have a number of banking partners regionally, including the Commercial Bank of Dubai¹⁰. With their BaaS and payment services, Infinios is a natural partner for Telecoms wishing to utilise platform banking. In 2019, Infinios signed a deal with a Bahrain based Saudi Telecom Company to explore payment and embedded banking initiatives. In 2020 Infinios supported the launch of products for a Saudi based Telecom company adding to the sector convergence¹¹. These examples show an aggressive response to the drivers of change for Telecoms in Bahrain and the start of a move by operators from Telecommunications to FinTech and ICT companies.

The implication for skills is significant, with the need to rapidly secure high-tech skills to support this transition. To address this, most Telecom companies are sourcing these skills through vendor arrangements while the Bahrain talent pool is catching up.

1.8 Competition

Globally there has been tremendous growth in M&A and Venture Capital (VC) investment. According to consulting group PricewaterhouseCoopers (PWC), the first half of 2021 saw record levels of M&A in the Telecommunications sector, and this is only expected to continue¹². This significant investment in inorganic growth is driven by a number of factors.

1. As discussed previously, the boundaries of different industries are converging and narrowing all the time. Telecommunications and financial services are a good example of this in Bahrain.
2. New technologies such as 5G are forcing companies to heavily invest and experiment with new technologies.
3. Growth of new companies that are providing disruptive solutions to core businesses. Many industries have already felt the impact of this technology. The automotive industry has been severely disrupted by new players such as TESLA, and new models such as car sharing and alternative transport.

The industry's quest to monetise low latency and superior throughput characteristics of the latest technologies such as 5G continues, leading to more partnerships, business models, and trials. Verizon in the US is already using the company moniker Network as a Service (Naas) as it establishes itself as a player on the IoT and edge computing, targeting large white space(s) in the commercial, industrial, and government end-markets. Similarly, in South Korea and Japan, early success in consumer-oriented gaming and virtual/augmented reality (VR/AR) applications is leading to more innovation and new experiments.

This requires developing a strong capability in analysing customer behaviour data to make better business decisions. Customer insights and industry analytics play a key role in maintaining the market share but also creates larger mindshare by addressing the market needs quicker than the competitors.

Further, Telecommunications companies must build better capabilities to identify and address the needs of different customer segments starting with mapping products to various customer segments and then effectively using new marketing channels to tap the customers. This in turn may depend on how well the management is able to utilise technology-driven processes for analysing data and extracting actionable insights. At the same time, using process automation by leveraging machine learning to improve productivity is key to respond faster to customer needs and take new products to the market.

According to PWC, Telecommunications operators in the Middle East region are investing in excess of 50% of their M&A budgets outside of their core areas¹³. This trend is driven by the fact that

core businesses are saturated. New technologies are squeezing margins and providing customers with alternative solutions. The advance in new technologies, including 5G, is also giving Telcos the opportunity and demand to diversify.

In Bahrain, Kalaam Telecom has completed the acquisition of Kuwait ISP and ICT service company Zajil. This will allow Kalaam to offer a one stop shop range of services allowing them to access a wider range of sectors and expand into new markets. With a workforce of over 400 people¹⁴.

Bahrain sits in an interesting position within the Middle East, as they are the only liberal market. This provides opportunities for development but also potential challenges. Bahrain is able to attract international providers, like Amazon Web Services (AWS), as it provides a transparent open market which is less risky than closed markets. However, Bahrain is also squeezed by its neighbours as data flows from one market to another. Price points are fixed across the Middle East and therefore Bahrain's providers are not able to negotiate prices.

As identified already in the previous section, the Telecommunications sector is undergoing rapid technological changes which makes the sector one of the top spenders on the upgradation of digital infrastructure and networks. Facing unprecedented industry transformation and emerging competitive threats, many Telecommunications companies are turning to M&A to add new capabilities and evolve their businesses for the next era.

“Innovative thinking will enable the future, and this is true from top to bottom of an organisation.”

- Line Manager

Telecommunications sector M&A activity (in USD Billions)

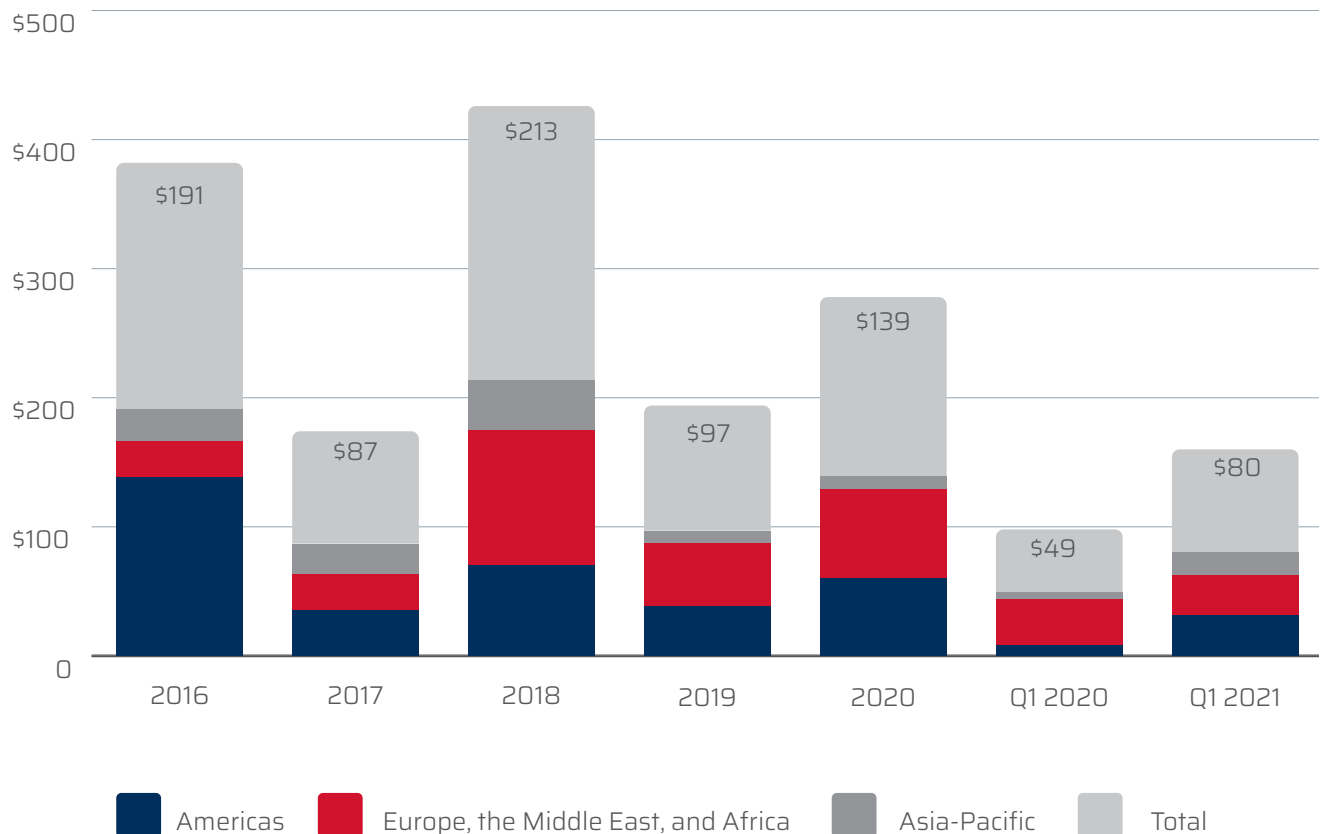


Figure 7 - Global Telecommunications sector M&A activity (Source: Bain & Co, 2021)

The Telecommunications industry generated US\$80 billion in deal value in the first half of the year, a 65% increase compared with the same period last year (Figure 7, right side). Most of the deal value continues to come from the Americas and Europe, the Middle East, and Africa, although Asia-Pacific's share of total deal value increased by 10 percentage points year over year¹⁵.

1.9 Innovation and Vendor Relationships

Bahrain Telecommunications companies have been forced to change their way of thinking, be more innovative and take more risks. These were discussed by the Bahrain sector in the survey and focus groups. Respondents mentioned the importance of innovation, entrepreneurship and risk taking in the sector. Line Managers and Executives clearly outlined the importance and

need for more innovative mindsets to challenge existing business models and develop new products and services. There came across a clear understanding of the importance of innovation for product development and operating models to remain competitive.

How innovation is integrated into the business is commercially sensitive and therefore, it is difficult to draw conclusions of exactly how this is structured for operators in Bahrain. However, the research indicates that operators are investing both directly and indirectly into innovation. Executives from the operators outlined the value provided by start-ups and incubators in disrupting the market, but also outlined the importance of developing in-house innovation and new product and service development.

“There is often a disconnect between employees, management and executive leadership when it comes to the value and strategic opportunity of new technology.”

- Executive

The new investment in the Fintech domain by the Telecommunications operators is a good example of this. There has been a mixed strategy of partnership with third parties, and in-house development. The ongoing operation of these new businesses is managed in a cross functional manner with both insourcing and outsourcing of staff. From an exploration perspective, the Telecommunications operators tend to partner with Third Party Provider (TPP) vendors to explore opportunities made possible by the integration of third-party Application Programme Interfaces (APIs) into their systems for a variety of different platform-based services.

During the research, some companies talked about how they work with vendors for this purpose but highlighted the product and institutional expertise needed to make this work. The skills to work with and manage vendors was mentioned as a barrier to effective innovation partnerships. This was mentioned particularly in the context of Senior Management not understanding the nature of VC that drives the valuation of TPPs.

The role of knowledge transfer through vendor partnerships was discussed in both positive and negative terms by respondents. Some respondents said the relationship worked well as the vendor partner was brought into the business to integrate closer with business needs, resulting in better outputs as the vendor's output is well aligned to the business needs. On the downside, when the vendors left the business, the capability to continue the development in their absence was lacking. The need to manage vendor relationships differently from a capacity building point of view was mentioned by one of the Line Managers.

1.10 Spectrum Re-Farming

Spectrum re-farming is the repurposing of spectrum bands to more efficient technologies or new services. It means freeing up space on frequency bands that may have been allocated for 2G mobile services. This repurposing allows for a more efficient use of radio frequencies (spectrums) to ensure optimal utilisation.

According to the Global System for Mobile Association (GSMA), an industry organisation that represents the Telecommunications sector globally, the additional spectrum required for LTE and 5G has meant higher costs. This has driven the need to repurpose spectrum. Many mobile operators have switched off their 2G networks for permanent repurposing, and others have re-farmed their licensed spectrum to use it for 4G and 5G networks. This creates opportunity for highly efficient spectrum management and both the commercial and technical skills to support this.

1.11 Risks and Challenges

It is important to keep in mind the challenges that the Telecommunications industry faces in the short and medium term which may impact the growth prospects and eventually the demand for skills. First and foremost, while new technologies are the obvious driver, their impact must not be overstated. As stated by one sector leader *‘while 5G is gaining momentum, it’s not a game changer yet’*. 5G is generally seen as the next big growth area for Telecommunications providers.

Early 5G adopters such as South Korea, China, and Japan have seen a moderate 1% monthly increase in 5G penetration since they launched in 2019, but with only modest gains in overall average revenue per user (ARPU). While many other markets, including the U.S., have deployed 5G services, adoption remains lacklustre and wireless spectrum deployment strategies vary for each carrier, impacting availability. One reason could be that commercially ready 5G use cases remain elusive and distant. The availability of the wider 5G spectrum and advanced 5G devices would support the adoption of 5G wireless services, which may take some time.

Bahrain now has 5G completely rolled out, however the ability to leverage this advancement for economic and business development in Bahrain is still being realised. The benefit for digital business is a key focus of the national Digital Strategy and the work of EDB to attract FDI of businesses who can utilise Bahrain's 5G infrastructure. This has seen a rise in interest for potential FinTech, gaming and ICT related businesses to relocate to Bahrain, in addition to start ups within Bahrain. This has an impact on the demand for technical related skills that are required to build these industries around opportunities that 5G offers.

Increasing competition with aggressive pricing and new entrants

This is very relevant in some regions and markets. For instance, in Asia Pacific, competition remains intense with deepening cuts in wireless tariff pricing or aggressive marketing in countries such as Malaysia, Singapore, and Thailand. Furthermore, following government initiatives to promote competition, new operators have also entered or plan to enter the markets of Japan, Singapore, and Philippines.

Regulatory risks are mixed across markets and regions

While pro-consumer regulatory policies have helped shape the competitive dynamics for the Telecommunications sector in most markets, pandemic-related lessons have the potential to slightly shift policies to accommodate sustained network investment to support network resilience and greater broadband access. The pandemic has forced governments to accelerate programmes that support low-income households and broaden affordable broadband availability to rural and remote communities.

“If you want to see where we have challenges with recruitment and skills, look at where we bring in expatriate talent and consultants. Data analysis and data science are primary examples of this.”

- CEO

Prolonged recession cannot be ruled out

Although benefitting from utility-like demand characteristics, deeper economic recession with reduced spending on Telecommunications services (both consumer and small and medium enterprises) and rising bad debt could dent the revenue prospects for Telecommunications companies.

Cybersecurity and network threats

Cybersecurity and network threats are increasing and making network outages more common. 24/7 availability of networks is important for customer satisfaction as well as revenue growth. Critical Telecommunications Infrastructure (CTI) plays a significant role in ensuring communication is solid and services are provided efficiently. CTI needs to be protected in order to serve as a competitive factor in the national economy.

1.12. Analysing Main Productivity Drivers

According to the Telecommunications Global Market Report

2021: COVID-19 Impact and Recovery to 2030, the global Telecommunications market is expected to grow from US\$2,555.45 billion in 2020 to US\$2,713.53 billion in 2021 at a compound annual growth rate (CAGR) of 6.2%¹⁶. The market is expected to reach US\$3,461.03 billion in 2025 at a CAGR of 6%. Accounting for 34% of the market, Asia Pacific was the largest region in the global Telecommunications market followed by North America with 32% market share.

Table 3 captures revenue per employee (RPE) generated by listed Telecommunications companies in 2019, by region (in million US dollars). The Middle East has the highest median revenue per employee at US\$460,000, significantly more than the global median of US\$320,000. In the coming years, this would need to be further enhanced as increased competition and pressure on profitability would require better efficiencies. The following outlines each region and revenue per employee by USD 1 million¹⁷.

Characteristic	Revenue per employee in million U.S. dollars
APAC	0.25
Europe	0.33
Africa	0.34
North America	0.36
Central and South America	0.39
Middle East	0.46

Table 3 - Telecommunications sector revenue per employee by region 2022 (Source: Statista, 2021)

1.13 Impact on Companies

The Telecommunications sector is not the largest employer in Bahrain, but it plays a critical role, both in terms of employment and critical infrastructure that drives the digitalisation strategies of all industries across the country. The Bahrain Telecommunication Regulatory Authority (TRA) has been pivotal in opening up and regulating the sector. This has enabled new competition to enter the market, and in doing so, raise standards and regional competitiveness. The opening up of the Bahrain Telecommunications market, and the subsequent increase in competition, has driven significant change. This has dramatically spurred growth and innovation into new business areas, and businesses and operational models across the sector are changing.

The core mobile operator and landline service portfolio is saturated in Bahrain, with a mobile penetration rate of over 1.5 mobile contracts per person. This saturation is forcing operators to find growth in new, adjacent areas, like FinTech for example. The speed of technological advancement has undoubtedly played a major role in this development. The pandemic has only increased the speed of digitalisation strategies in Bahrain in response to customers' needs, remote working conditions and the need for an increase in online services prompted by lockdowns. This market saturation and progressive change of core services have significantly changed the operating models of many businesses and the nature of competition and job roles in Telecoms. As automation, and in particular the implementation of AI and RPA,

drive efficiencies, the responsibility for streamlining end-to-end processes has been decentralised to process owners. Although Project Management Offices are often still responsible for the overall implementation of new systems, the engagement across the digital landscape of an organisation has shifted operational models from traditional hierarchies to more agile operating models.

1.14 Business Strategy and the Role of Big Data

The ongoing transformation of the Telecommunications industry is driven by Data Analytics. Every user provides thousands of data points that provide valuable insights into user behaviour. As companies start to understand the value of data, there is a scramble to find the right resources to source, read and act on data. Today, the request for data insights is often initiated by the management of the business as they have an overarching understanding of the value of data and how it can support optimisation and improve performance. Where they go to gain these insights depends on the institution's operating model. Based on the research, there are four levels of integration of data in the Bahrain Telecommunications sector:

1. Data as an Outsourced Service – Business units recognise the potential use for data insights. They outsource the mining, extraction, cleansing, structuring and initial analysis of their data to a data specialist company or individual who may be based offshore. The nature of this relationship is purely transactional, and the data insights are passed to the business unit without any significant knowledge transfer.
2. Data as an Internal Consultant – Organisations hire a Data Scientist to work as an internal consultant to the business units to teach them how to extract, clean, structure and use data insights. The knowledge transfer and capacity building aspect of this relationship is a core part of the engagement. The consultant may act as an internal mentor for developing the capacity.
3. Data as an Internal Service Model - Business units understand what data insights will help their business and they work with a Data Scientist or specialist in their organisation to extract and interpret acquired insights. A Data Scientist is an employee of the organisation and works as a 'service' department across all business units. A Data Scientist may or may not have prior experience working in the Telecommunications sector and therefore, the communication of business needs into data outputs can sometimes be 'lost in translation' as the business unit and the Data Scientist work together to extract useful insights. The Data Scientist services may be purely transactional or utilised for capacity building and knowledge sharing. The manner in which knowledge is transferred in the process will depend on a number of institutional factors.
4. Data Expertise Embedded in Business Units – The ideal

model for data in Telecommunications is to have the data extraction, cleaning, structuring and analysing expertise within the job role of a person in the business unit, ensuring a closer alignment of business needs with data outputs. This requires a significant amount of upskilling for those in the business units.

1.15 Conclusion: Drivers of Change and Skills Implications

It is clear that the Telecommunications sector is grappling with the adoption of new technologies, changing customer expectations and needs, competitive pressures and changing business models. This has implications for the types of skills and competencies required but also the way these skills need to be identified and imparted to the employees. The core service portfolios that have served Telecommunications operators so well for the past 20 years are changing. Growth in fixed line, mobile and broadband services has flatlined as new technologies and disruptive business models become the focus.

Network operators, installation technicians, & Telecommunications engineers are currently hard to come by and often require extensive on-the-job training. Sales and customer success representatives are also in short demand, leading to challenges in meeting service targets. Looking into the very near future and beyond, demand for many new skills will drastically increase. The operators will look to use new technology to optimise their existing business, while developing new business. Skills in this outlook include:

- Data Analysts
- Business Analysts
- Cyber and Network Security Specialists
- AI and IoT professionals
- RPA Specialists
- 5G Network Engineers and others
- Spectrum Planning Engineers

The skills needed for these roles are hard to 'upskill' and require a core baseline technical skill set that is not often available within companies today.

As an open and competitive market, skills will become the differentiating factor across the sector. Those who can source, train, and retain talent will distinguish themselves from the competition. As a small domestic market, this competition also leads to challenges, as the need to invest in and upskill talent will be costly and time consuming. At the same time the Telecommunications sector in the region, as well as globally, is also going through a similar transition of skills requirements. This exponential growth in demand will also provide opportunities for highly skilled Bahrainis to find high-paying jobs abroad.



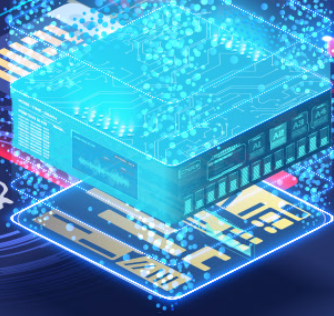
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02

The Telecommunications Sector

The Telecommunications Workforce
and the Changing Nature of Jobs



This chapter provides an overview of employment in the Telecommunications sector. It includes a profile of the workforce and their views on career progression within the sector.

2.1 The Structure of Work in the Sector

As per 2021 data, the Telecommunications sector in Bahrain consists of 3,204 employees with an overall Bahrainisation rate

of 62.6%. Females represent 33% of employees in the sector. From 2013 - 2020, the sector employment reached a peak in 2016 (3,230) and was at its lowest in 2019 (2,741). Employment is rebounding and likely to rise in the coming years. The percentage of female workers in the Telecommunications sector has steadily increased from 27% in 2013 to 33% in 2020. This is comparable to the gender ratio in other sectors such as Financial Services¹⁸.

Number of employees working in the Telecommunications sector in Bahrain

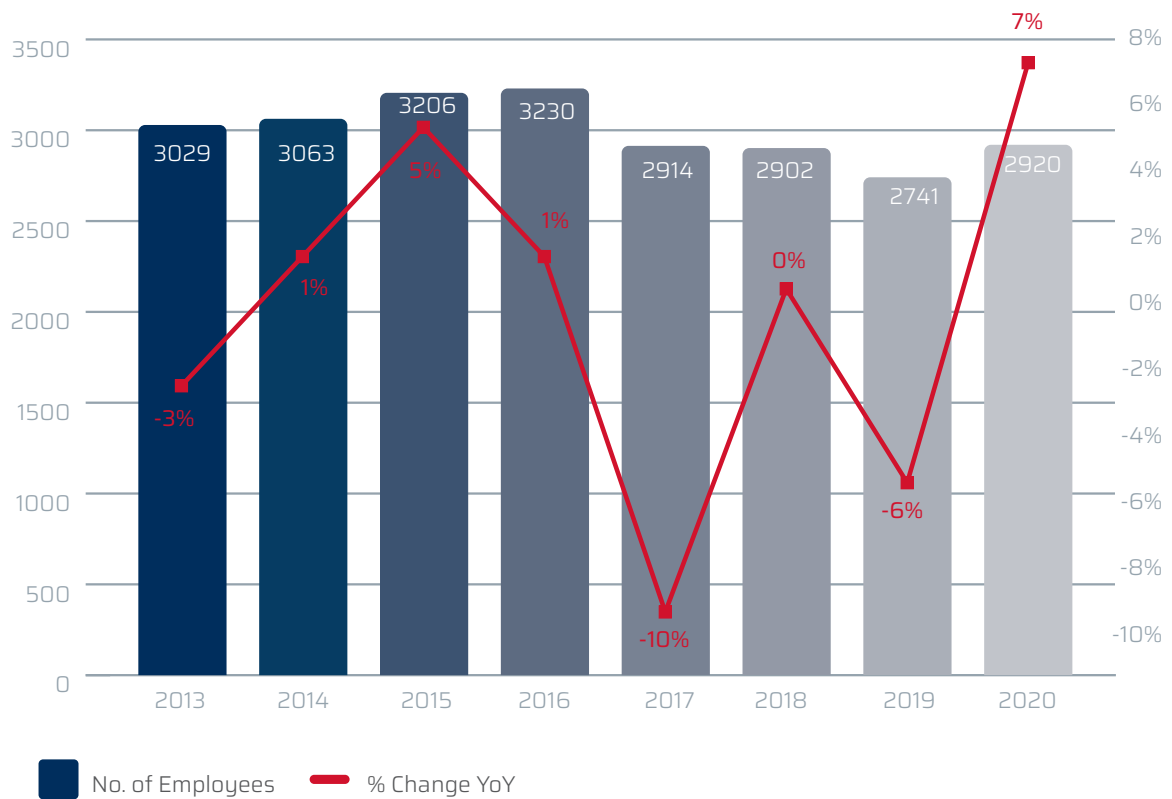


Figure 8 - Number of people working in Bahrain's Telecommunications sector (Source: TRA, 2021)

Comparing the 2009 - 2013 and 2013 - 2016 period, it is clear that operators are now hiring more Bahraini employees. Over the past few years, jobs in core functions such as 'sales & marketing' and 'technology & network' have been on the rise. As per employment analysis conducted by KPMG in 2017, there was a net increase of 7% in technology & network related roles and a 23% increase in sales & marketing related roles from 2013 - 2016²⁰.

Outsourced/Contracted Jobs

As part of the sector value chain, several companies work with the operators to supply services and expertise. A 2017 KPMG skills study shows that the sector still heavily relies on contractors for their business, especially for network and enterprise services.

Approximately 95% of the contractors worked in core functions and about half of the contracting jobs were supplied by firms such as Huawei and Ericsson, which mainly provide network related services that use technical skills that are difficult to find. These key skills include radio frequency, 5G technology, cloud and virtualization, IoT / big data, IT and digital. Bahrainisation in these jobs is quite low. The KPMG report did not provide details on how many technical contracting jobs were in the niche technical areas of IoT and Big Data/AI etc., however, it is apparent that many of these skills are sourced through vendor relationships, rather than recruitment.

The other half of outsourced/contracted work includes roles such as customer care and finance, which are outsourced to Business Process Outsourcing (BPO) companies. The Bahrainisation rate in this group is much higher due to the nature of jobs. The number of people working for BPOs servicing the sector has reduced over the last 5 years as some large operators took their call centre in-house.

Sector Productivity

When comparing the productivity of the Telecommunications sector in Bahrain with other countries, based on average revenue per employee, it is apparent that Bahrain is performing well. The last 5 years have seen significant growth and cost management across the sector in Bahrain. This stark improvement is evident when compared to global benchmarks. In 2016, Bahrain was well behind the global average; however, in 2020 it was performing very well against established global competition.

Revenue Per Employee 2020 US\$

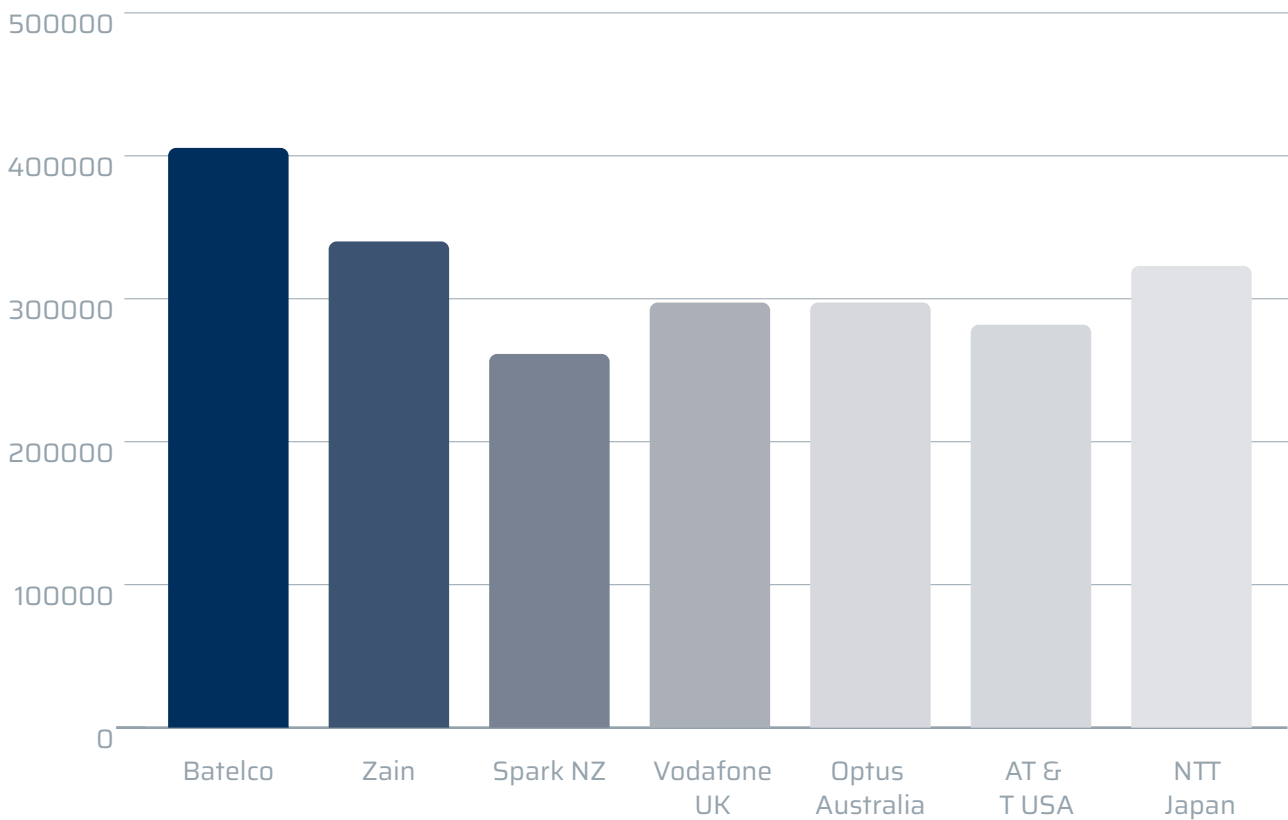


Figure 9 - Benchmark of average annual revenue per employee. (source: company annual reports & financial statements 2020)

According to Research firm Statista, in 2020 the median productivity per employee in the Telecommunications sector was US\$320,000. In Africa, this number drops to US\$190,000. This again outlines the progress made by the telecoms sector in Bahrain¹⁷. The optimisation of services, splitting of BNET and Batelco, and efficiencies gained from training and development are key to this development. It is important to note that the significant numbers of outsourced services in the Bahraini Telecommunications sector play a part in the overall positive outcome. Therefore, as roles are insourced, the revenue per employee will see an impact.

Characteristics of those currently working in the sector

The Employee Survey conducted for this report shows an approximately 70% (male) - 30% (female) gender split among the respondents, which is in line with the TRA Telecommunications Market indicators for the sector with about 33% female workers. 67% of the respondents fell in the age bracket of 25 - 40 years old, which suggests the sector attracts early and mid-career professionals who typically join with a few years of work experience. Those with work experience had previously served in IT, Financial Services, and Retail.

The survey confirms this as a third of the employees who responded had between 10 and 20 years of experience and another third of the employees had between 4 and 10 years of experience. Moreover, 41% of the respondents had worked with their current employer for at least 4 years and up to 15 years. Only 13% of employees reported that they had been with their employer for less than a year. This shows that, in general, the sector has experienced employees with stable employment prospects.

Careers in the sector

Graduates with technical backgrounds find preference for a range of job roles. Even service providers consistently look for a technical background when hiring for certain divisions, such as network planning and equipment sales. However, many managers with non-technical backgrounds are also in demand. Candidates without technical experience, but with strong functional and managerial skills, are becoming highly desirable within these companies. For example, Telecommunications companies are beginning to value the brand-management approach to their consumer products. As a marketer, you might not be a technical expert on the systems you manage, but an understanding of these systems will help you on the job. Telecommunications is a specialty category of the high-tech field which requires people who are very interested in technology and can react quickly to constant changes. It is a field in which marketing is taking on an entirely new meaning as competition, new product development, and product line proliferation increases at a rapid rate. Other in-demand functional areas within Telecommunications include finance, operations, and business development.

An understanding of the regulatory, legal and policy landscape is also increasingly important to plan new products and features. Thus, senior technology leaders must have these skills too. Cybersecurity is another emerging job category that is becoming prominent given the increased vulnerability and threats to Telecommunications networks from cyber-attacks.

To understand this in the context of Bahrain jobs and skills, a map of jobs in the sector was created. This was to create transparency about the jobs, levels of hierarchy, career progression and skills and qualifications required by the sector. Understanding the jobs and progression allows for sector standards to be agreed across companies and provide a foundation for training and development to be aligned to specific skill requirements, both current and emerging.

2.2 The Development of Career Maps and National Occupational Standards for Bahrain

One of the key aspects of this Sector Skills Report is to identify the specific jobs across the sector and analyse how they are changing in nature. For this purpose, a sector career map was created that groups jobs by Job Family* and job title. The Telecommunications Sector Career Pathway Maps are intended to represent the current and future jobs in the sector in Bahrain, not an organisational hierarchy, with the aim to capture as many jobs as possible as they relate to different categories in the sector.

This section is complemented by the supplementary publication 'Telecommunications Sector Career Pathway Maps'.

The Value of Job Mapping

Developing a comprehensive mapping of jobs across the sector enables employers, HR, training and career guidance professionals, as well as individuals to see the skill sets needed at each level within a given Job Family, and where upskilling is required – both in terms of core and technical skills. Individuals from outside the sector can see from the map what it takes to enter the sector. Those already working in the sector can see what their career progression pathway could look like and plan their learning and development accordingly. Career maps help employers and HR professional plan their recruitment, identify skills gaps, and develop structured learning journeys for their employees linked to performance management. Training professionals gain an insight into up-to-date industry requirements from career maps and can therefore enhance their programmes. Careers advisors can use the maps to support individuals to make informed choices about career pathways.

Development process

To create the sector career pathway maps for Bahrain, several of international benchmarks, including the Singapore Telecommunications sector were used to provide baseline information on jobs in the sector. Singapore also has a particularly well-established skills system with well researched documentation, drawn from aspects of the United Kingdom, USA and other well-established economies.

* Job Family* is a group of jobs within the same occupation. This is part of the job analysis aspect of job design and helps to identify the groups of skills and knowledge needed for a specific group of jobs. (Source: www.shr.com)

The process of building the Bahrain version of the maps is outlined below:



Figure 10 - Development process for Bahrain version of career pathway maps for telecommunications sector

To align the maps more closely to Bahrain, it was reviewed by several Bahrain sector representatives. The Career Maps would be represented by 3 or 4 levels of job hierarchy, which may be amended as the sector grows in Bahrain.



Example of a Skills Bahrain Occupational Standard

National Occupational Standards

For each of the jobs on the map, a NOS has been developed to provide an overview of the nature of the job and the core skills and behaviours required to do it well.

JOB FAMILY: Cyber Security

JOB TITLE: Associate Security Analyst

ALSO CALLED: ICT security Technician, ICT security Administrator.

Job description:

The Associate Security Analyst provides support to cyber security systems administration, monitoring and maintenance. They oversee security alerts and address security breaches. They document and collect information related to security advisory, security breach incidents, and escalate the incidents to be validated and rectified. They have the knowledge and the capability to implement cyber security tools and the techniques to monitor those tools and resolve incidents when they occur. They are familiar with the Cyber Security Policy of Kingdom of Bahrain and Law No. 60 of 2014 concerning Information Technology Crimes.

Job Outcome
Perform Cyber security monitoring activity to track and react to alerts and system violations and threats.
Assist in implementation of changes in cybersecurity systems, maintenance of the systems and in establishing the new systems.
Document all activities carried out related to cybersecurity system management, upgrade, tests, and maintenance.
Support in responding to cybersecurity breaches by investigating reasons of threats and resolutions of those threats.
Educate users and monitor their compliance with organisational cyber security policies and procedures and standards, and their adherence to them.
Support piloting, testing and installation of new cyber security systems for optimisation purposes. In addition to documenting all the activities in the optimisation process.

Technical Skills	Level
Business Needs Analysis	2
Cyber and Data Breach Incident Management	2
Cyber Forensics	2
Infrastructure Support	3
Network Administration and Maintenance	1 & 2
Security Administration	2
Security Assessment and Testing	2
Security Education and Awareness	3
Security Programme Management	3
Stakeholder Management	2
Threat Analysis and Defence	3
Threat Intelligence and Detection	2

Key Skills and Behaviours	Level
Process optimisation	2
Critical Thinking	1
Process optimisation	2
Agility	2
Finding and Using Data	1
Process optimisation	1
Critical Thinking	1
Analysing	1
Effective Collaboration	2
Agility	2
Commercial Awareness	1
Technology Use	2

Figure 11 - Example of a National Occupational Standard

The National Occupational Standard for each job was measured against local and international benchmarks to ensure it describes the job requirements for Bahrain. It also includes information on the job entry requirements, career pathways, and the qualification and training needed to develop on the job. The final draft of the National Occupational Standards will be refined by Managers in the sector. These core skills and behaviours are outlined on the Core Future Skills and Behaviour Framework, which outlines 16 core skills required for all employees in the Telecommunications sector.

2.3 Overview of the Telecoms Job Families

There are seven Job Families in the Telecommunications sector, each of which is impacted differently by the changes in the sector. It is anticipated that the Sales and Marketing Job Family will be the most likely to reduce in the future. As mentioned previously, this Job Family has grown in the past five years, however, it is anticipated to reduce between 30-80% in size depending on which international benchmark are applied.

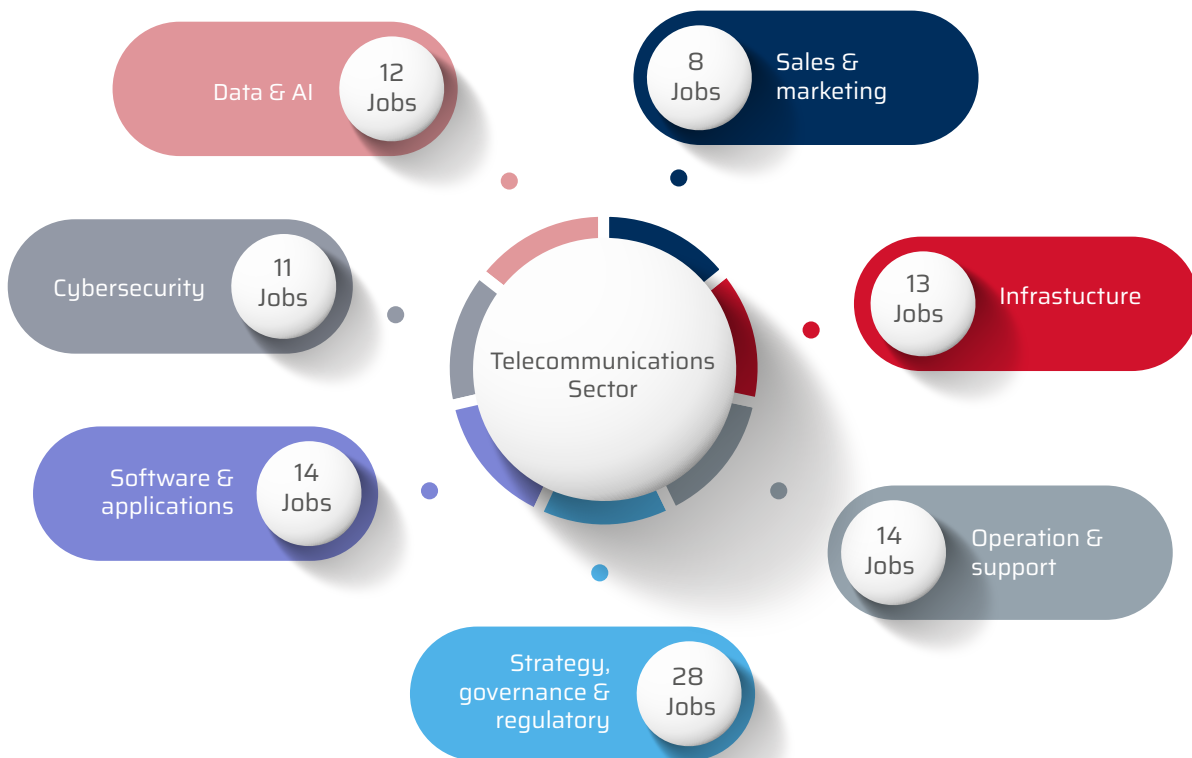


Figure 12 - The seven job families of the telecom career map

How to Read the Career Pathway Maps

The Telecommunications Sector Career Pathway Maps are intended to represent current and future jobs in the sector in Bahrain, not an organisational hierarchy. The final draft includes seven different Job Families, each with a variety of different roles within it - approximately 200 jobs. This number will change as this map evolves. It will require ongoing consultation to ensure it remains aligned with the changing nature of the sector.

“We do not need Cybersecurity experts who can write policy documents, we need experts who can protect our systems and act on data.”

- Executive Manager

The following provides a brief overview of each Job Family. For a more detailed view, *please see the supplement ‘Telecommunications Sector Career Pathway Maps’.*

2.4 Growing Job Families

Data and AI

There are 12 jobs in this Job Family, all of which are future jobs that are anticipated to grow. The drivers of change across the sector are creating significant demand for data and AI experts. These jobs are highly technical roles that support a range of data

and automation demands. The jobs are generally filled by ICT graduates with a specialisation in data and AI. However, as the rise in demand for these roles has increased globally, many data jobs are being filled by individuals who are self-taught or built their skills using non formal education credentials. The advanced data science and AI roles usually come with years of data and programming experience, which is more important as an entry into these positions than a formal education in most countries. Bahrain has seen a rise in demand for these job roles, particularly in the Telecommunications sector.

Risk of Disruption

No Risk -All jobs in this family are in demand and growing

Cybersecurity

There are 11 different jobs in the cybersecurity Job Family. This job family is in high demand and one of the key roles experiencing a global shortage of talent. While niche cybersecurity jobs focusing on different area of cybersecurity are not yet part of many organisations in Bahrain, it is anticipated that cybersecurity will need to be developed into niche areas of expertise in the future. Therefore, this Job Family has various jobs that are not currently

specialist roles but are anticipated to be so in the future. As AI and Machine Learning evolve, this Job Family will move from manual fraud detection to AI driven risk assessment, real-time monitoring and intrusion detection reports. The Government of Bahrain has implemented several initiatives to get more Bahrainis into cybersecurity roles with a Key Performance Indicator (KPI) of training 20,000 people as part of the national recovery plan for ICT and telecommunications.

Risk of Disruption

No Risk - All jobs in this family are in demand and growing

Software and Applications

There are 14 jobs in this Job Family, which is responsible for development, testing, and deployment of various software tools and solutions related to different aspects of network operations. Many Telecommunications companies have ramped up their software and applications divisions to create consumer-facing APPs and develop tools for managing and monitoring internal processes and network functions. The digital transformation and virtualisation of Telecommunications networks has created a huge demand of smart and autonomous network management and optimisation tools, which are critical for the work of network infrastructure engineers featured in the previous Job Family.

Telecommunications software development typically includes creation of custom software, including Operations Support Systems (OSS), Business Support Systems (BSS), Network Functions Virtualisation (NFV), Software-Defined Networking (SDN), Web & Video Conferencing platforms, and network management applications for both on-site and cloud-based IT infrastructure, among others. Network management software helps manage front-end and back-end, Telecommunications network functions including configuration & provisioning, inventory management, order management, CRM, charging & billing systems etc.

Risk of Disruption

No Risk - All jobs in this family are in demand and growing

Strategy Governance and Regulatory

The Strategy, Governance and Regulatory Job Family combines enterprise solutions, product development and management, quality assurance, and data protection as well as regulatory and compliance jobs. This Job Family is responsible for integrating business solutions and product development needs with data

safety alongside regulatory and legal requirements. There are 28 jobs in this family. Depending on the business model of different companies in the sector, some of these jobs may be outsourced to expert vendors while others may be embedded within the business units.

This Job Family includes emerging jobs focused on risk and compliance that are now required as Telecommunications converge with Financial Services and are also regulated by the CBB. Additionally, Environment, Sustainability and Governance (ESG) reporting is now of greater importance as companies look to support Bahrain's contribution to the United Nation's Sustainable Development Goals (SDG) and minimise the environmental and social impact of businesses in the sector .

Product development and management are significant areas for disruption in this Job Family. Product development relies on customer insights and deep analytics to tailor products and sales to customers' needs. Accordingly, the demand for data skills is a key area of skill development within this Job Family.

Risk of Disruption

Medium - Some areas of this Job Family will be disrupted. In particular, the compliance, risk, and regulatory functions as RegTech and automation streamline detection and reporting processes.

Other areas of the Job Family, including Product Development, will be impacted by the increased use of data for customer insights.

2.5 Changing Job Families

Operations and Support

This Job Family has 14 different jobs that are primarily responsible for providing back-office support for different functions, typically part of Telecommunications sector company operations. The job roles contained in the Job Family help provide on-going support to various functions such as network infrastructure, data storage and security, customer service and applications support etc.

Digital transformation is combining various business, technology, and network functions in the Telecommunications sector to enable the integration of RPA, AI, and other digital tools that streamline processes for greater efficiency.

Risk of Disruption

Medium - Risk of digitalisation creating better efficiencies and automation meaning some of the manual tasks previously done by people will be automated.

Infrastructure

This Job Family has 13 different jobs that are primarily responsible for overseeing the performance of Telecommunications networks, including all physical and software assets that regulate, automate, and monitor various network functions.

Job roles include the strategic planning and design of Telecommunications infrastructure and/or network components, analysing the short-term and long-term network capacity needs for current and future network requirements, and technology planning across multiple layers aimed at introducing new technologies into the network for the role out of new services and better network efficiency.

Risk of Disruption

Medium - AI and Machine Learning are enabling predictive maintenance in the Telecommunications sector by identifying patterns in historical data through algorithms and predicting possible hardware failures

Sales and Marketing

This Job Family has 8 different jobs that span various sales and marketing roles, based on the business model and type of customers. While only a small number of jobs are represented on this map, these account for almost a third of the jobs in the sector. These retail and wholesale jobs are customer-facing, Automation and AI have already impacted these jobs significantly with most Telco's reducing the number and size of retail branches and adding digital kiosks instead of customer service representatives.

now being done by digital kiosks and chatbots. Likewise, sales are moving towards more focused data-driven insights with product development and sales converging. This Job Family is seeing a convergence of roles from sales, customer service, and customer experience merging into agents who apply higher levels of customer insights based on data and product knowledge to meet tailored customer demands. This 'super-agent' will require different skills including 'finding and using data' and higher levels of 'commercial awareness'.

While the human touch will always be helpful in relationship management, much of the manual work of sales and service are

Risk of Disruption

High - As AI and digital becomes more sophisticated in serving customers, focus will move towards offering data driven customer insights for tailored products and services.

It is anticipated that this Job Family could decrease in size by 50-80%.

2.6 Telecommunications Jobs - Emerging Trends

The increasing use of data and rapid digitalisation are two overarching trends affecting all Job Families (and consequently

all job roles) in the Telecommunications sector. The sector is also expanding into adjacent sectors, including finance and healthcare as it looks for new growth areas.

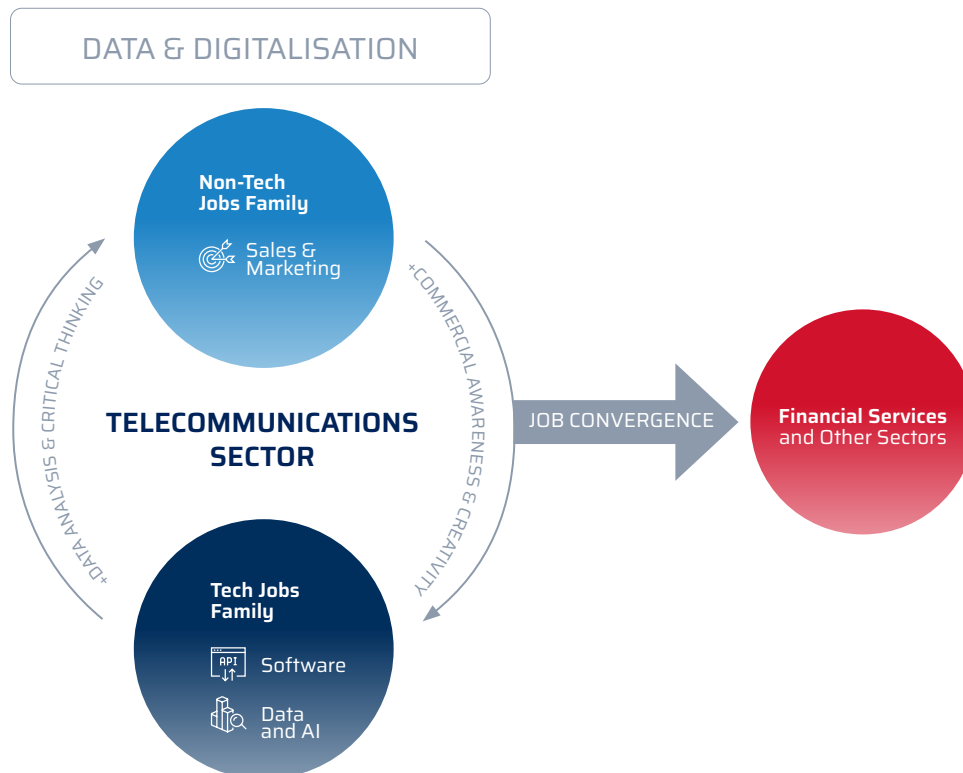


Figure 13 - Figure convergence of skill requirements across job families and industry

Job Families such as Operations Support and Sales and Marketing are not deemed to be technical by nature, however, they are moving to embed skills such as critical thinking and finding and using data. This is due to increased automation and use of Data Analytics and other related technologies in these Job Families. At the same time, some job families such as Software and Applications, which are already highly technical, are trying to impart skills like commercial awareness and innovation & creativity to cope with future requirements. This is because job holders need to focus on providing complex solutions by understanding customers' needs. For this, they need a higher level of soft skills and business understanding. In summary, when we see the big picture i.e., a system wide view, we find that the non-technical job roles are becoming more technical and analysis oriented, and the highly technical roles are becoming more soft skills oriented.

This highlights that business models demand overarching digital, and customer centric skill sets, and skills development must reflect the increasingly cross-functional nature of the sector. These baseline skills must be bolstered with specific technical skills that drive future business growth, continuity, and security. Addressing this challenge requires a multi-pronged strategy with deep commitment and involvement of Telecommunications sector employers.

2.7 Conclusion: Changing Nature of the Workforce and Skills

The changing nature of all Job Families in the sector is apparent. The changes in each job will depend on the specific business model of organisations, an increased awareness of the sourcing and use of data will be essential across all jobs. Additionally, the pandemic has changed customer demands for products and services. These require employees in the sector to respond quickly and offer data-driven customer experiences through

new or configured product offers, or completely new business units that converge beyond traditional sector borders, such as financial services.

The 'reskilling, upskilling, new skilling' challenge is easier to define with an understanding of the nature of jobs in the sector. The Skills Bahrain National Occupational Standards and the core and job-specific skills and behaviours standards outline the skills needed for current and future jobs in the sector. These will evolve

as jobs change and form the basis for quality career guidance for those considering entering the sector.

With many jobs expected to converge, and the sector becoming technology based, awareness of the specific skills needed for jobs provides a more transparent skill-based approach to talent management and development. In preparation for agile, skill-based teams, understanding the nature of the workforce from a skills perspective is essential.



03

The Telecommunications Sector Investment in Education and Training in the Sector



“The nature of the job requires a skillset rather than a degree.”

- Line Manager

This chapter analyses the education and training ecosystem in Bahrain in the context of how it supports the entry and development of talent for the Telecommunications sector.

Focus group participants talked positively about the previous apprenticeships in the sector that allowed young people to enter Batelco from high school. While it is unknown why these alternative pathways were stopped, the preference towards a Bachelor's Degree for entry into the sector is apparent. Participants shared concerns about the quality of graduates' work readiness and mentioned the need to retrain them to contribute effectively to the workplace. This was emphasised when talking about soft skills.

This skills gap will be discussed in more detail in the next chapter, but with most people entering the sector from Higher Education, the role of education in preparing new entrants is important.

3.1 Higher Education and Entry to the Sector

In terms of their qualifications, 60% of respondents indicated that they hold bachelor's degrees, 24% said they possess Master level qualifications, and 11% had high school level qualifications. This shows that the sector attracts mainly graduates with advanced qualifications.

Qualification Level of Survey Respondents

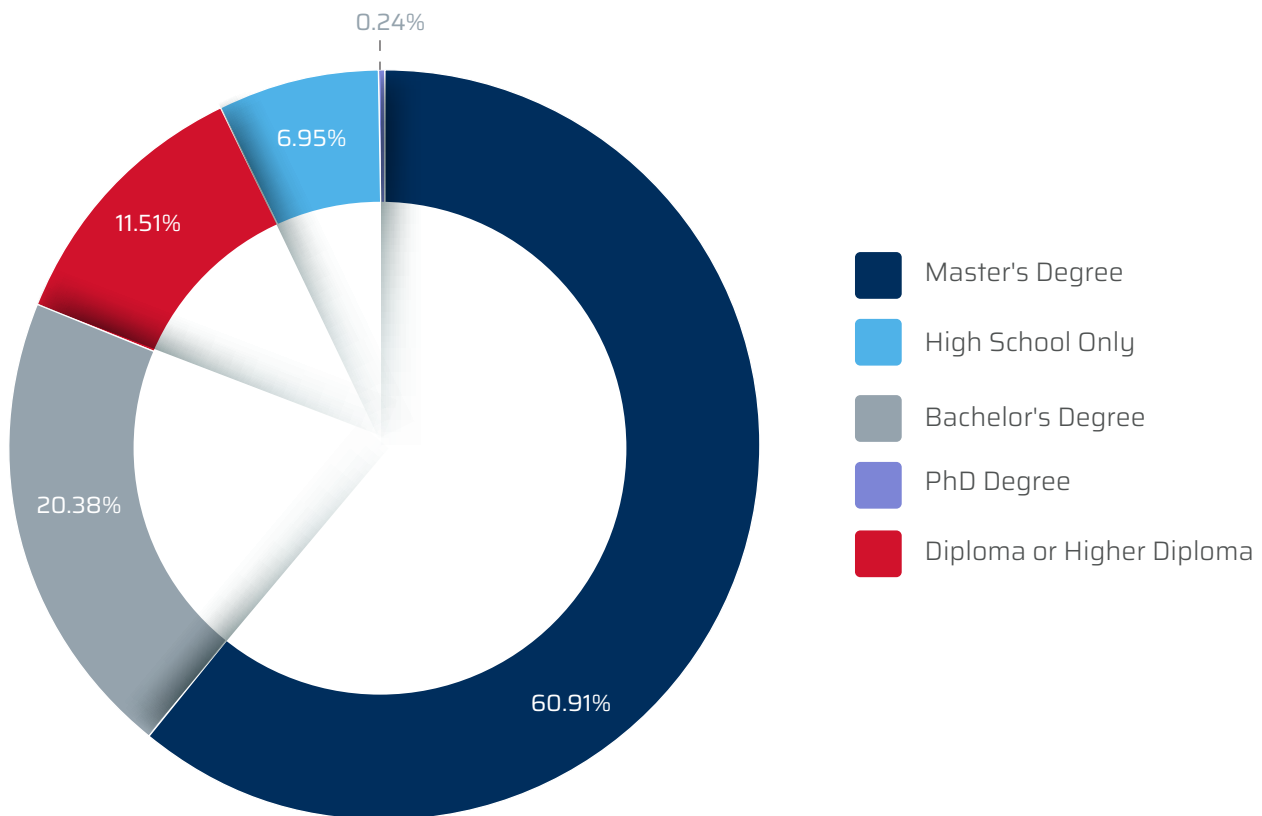


Figure 14 - Qualification level of survey respondents (Source: Skills Bahrain Employee Survey, 2021)

Most employees graduated from 'overseas' institutions in Europe, India, Bangladesh, Pakistan, the UK, the USA, and elsewhere. The countries of graduation were aligned to the countries of those who said they were expatriates. Bahraini graduates entered the

sector from a range of Higher Education institutions. The level and quality of these institutions varies, according to BQA, the quality assurance agency responsible for education.

Bachelor's Degree Institutions

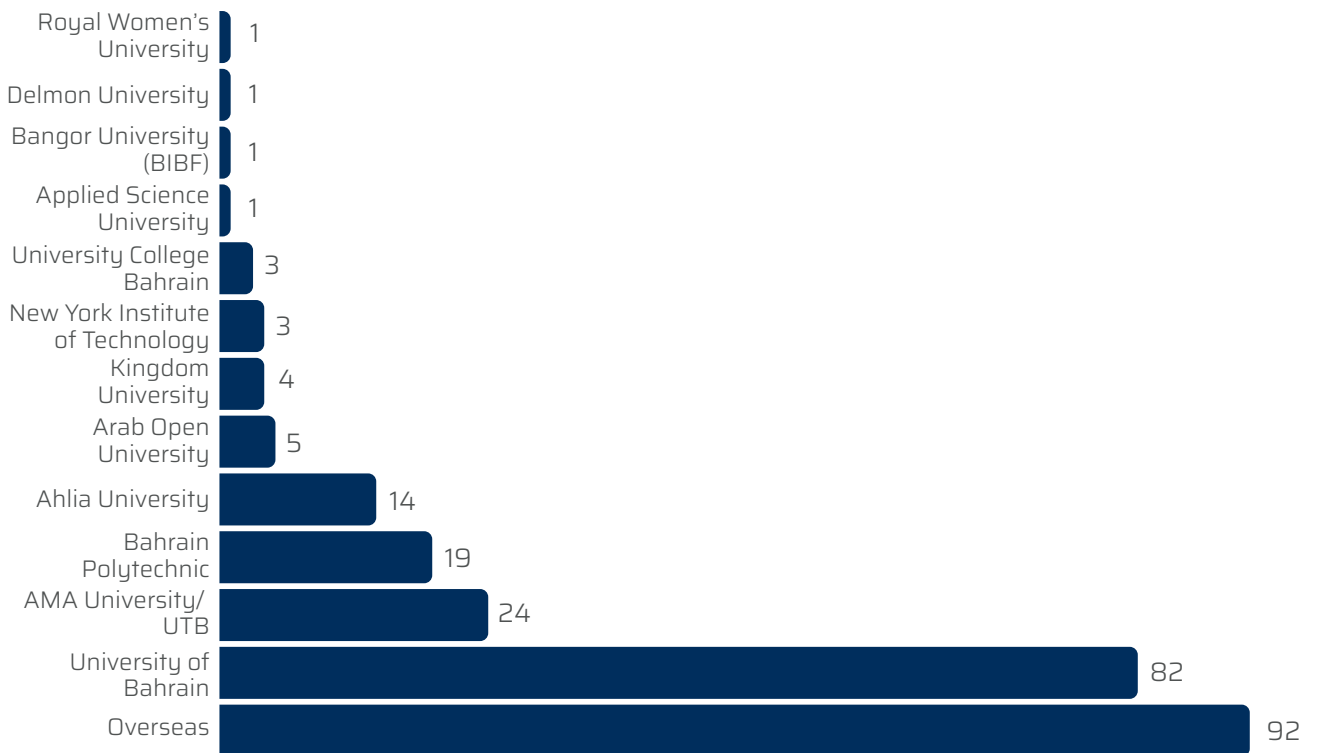


Figure 15 - University of graduation for employees with a bachelor's degree (Source: Skills Bahrain Employee Survey, 2021)

The BQA reviews Bahrain Universities for the quality of their programmes across several indicators. Overseas Universities are not included in BQA ratings. Most employees studied overseas, followed by the University of Bahrain, however, 12.5% of employees working in the Telecommunications sector graduated from universities that were rated as 'Does not meet QA requirements' by BQA. Some of these institutions include AMA University, Kingdom University, and the New York Institute of Technology (NYIT).

3.2 Choice of Study Programme

The selection of Higher Education programmes for entry into the sector remain critical until effective applied learning routes open-up beyond formal Higher Education. For young people and parents, selecting the right programme is important, but the

right information about each degree programme for employers is also crucial. The labour market continues to face an oversupply of Business Administration graduates, although the share in the Telecommunications sector is slightly lower than the national average. In the Telecommunications sector, 40% have studied Business Administration, 35% have studied ICT, and 17% have studied Engineering.

Over 45% respondents of the employee survey reported that they did not have a good understanding of career opportunities in the Telecommunications sector before starting their first job in the sector. In addition, over 65% of respondents indicated that their Higher Education did not prepare them well for the workplace.

“I asked someone who has a Master’s in Business Administration, but zero experience or hands-on training: “Why did you spend two years on top of your Bachelor’s to get a Master’s instead of getting a job? Did anyone advise you that there are Professional Certificates you could spend more time in getting, or that you could start your career and obtain a Professional Certificate?”

Line Manager - Describing a recent recruit

Reasons for Wanting to Change Study Choice if they could start over

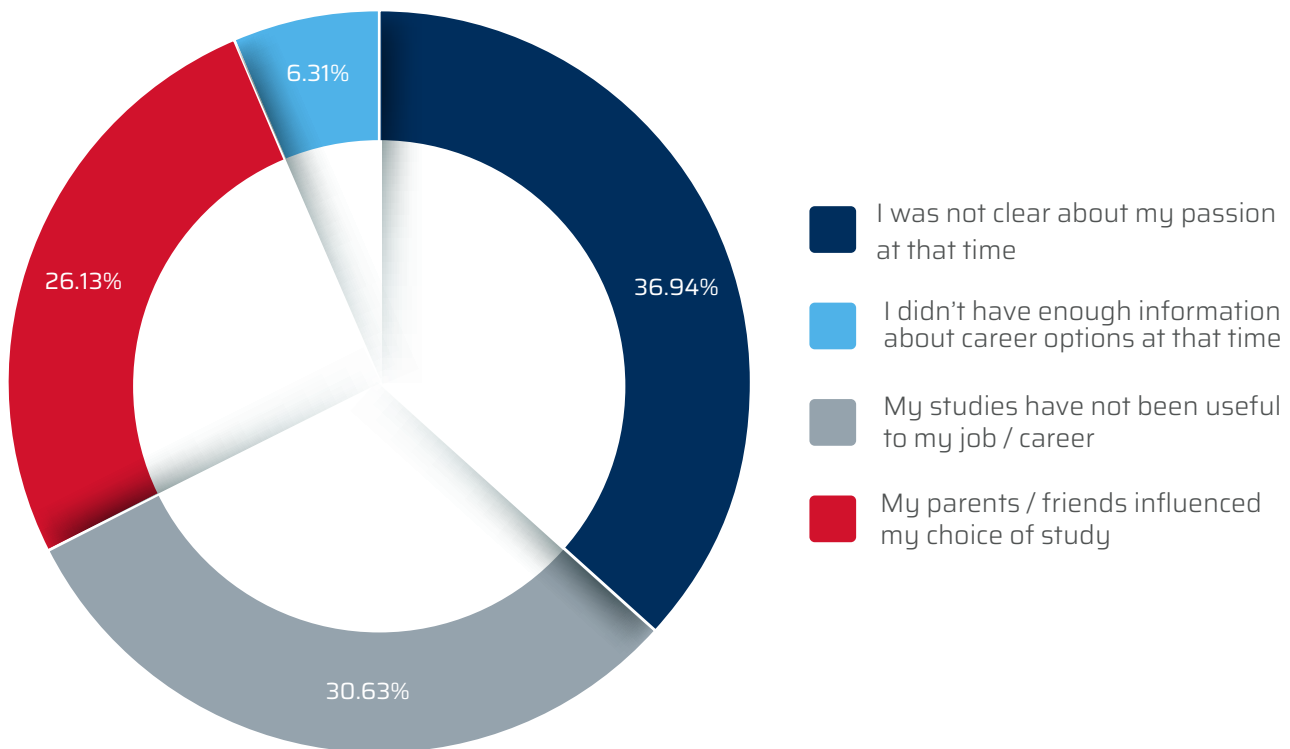


Figure 16 - Reasons for wanting to change study choice if they could start over (of those who responded that they would change their career) - (Source: Skills Bahrain Employee Survey, 2021)

The survey respondents made it clear they want to stay in the sector with over 80% saying they intend to remain there for the next 10 years. When asked what their career goals are in the next five years, the responses were almost equal between ‘get promoted to a better position within my company’, ‘upgrade my skills and knowledge within my current role’, and ‘increase my salary’.

3.3 Entry into the Sector - Call Center's BPOs

Internationally, BPO companies, such as call centers, are a common entry point to a first job for school leavers or students. Many of the call center, customer service and sales jobs in the Telecommunications sector in Bahrain are outsourced to BPO companies based either locally or abroad. Bahrain's three largest call centers employ nearly 850 people with employment levels fluctuating depending on the organisations' contractual arrangements.

“We must ensure that fundamental skills and characteristics are developed from an early age. From school, home and then work.”

-Line Manager

According to a survey with employees in the three largest call centre companies, 32% came straight into a BPO company out of High School (no bachelor's degree) and a quarter of all responded that their current BPO employer was their first job. Moreover, 11% of employees had worked in retail and 8% had worked in financial services before their current job, and 25% of the employees surveyed work servicing a client contract for the Telecommunications sector, either as call centre agents or sales agents. This indicates a level of expertise in the products and services offered by the sector.

While specific data on the volume of people leaving BPO's to join Telecommunications is not routinely collected, it could be argued that the work experience and training received by young people who come into BPO's for call centre employment provides a good level of foundation skills for entry into Customer Service and Sales jobs in the Telecommunications sector. International experiences would confirm the role of call centres as 'skills incubators' for numerous sectors. The generic core skills training and the product knowledge gained during employment in BPOs makes call centre employees attractive recruits for the sector.

BPO SURVEY FINDINGS

- 69% of employees are under 30
- 67% worked with the same employer for 1-7 years
- 85% are Bahraini nationals
- 33% have a Bachelor's degree, 32% have high school qualifications
- 11% were unemployed before their current jobs

3.4 Alternative Pathways into the Sector from High School

Only 11% of those entering the sector came directly from high school. This is at odds with international data, which shows that alternative pathways are key channels to get young people to employment in the sector. In 2022, British Telecom (BT) announced that they intended to recruit over 600 people into the sector as apprentices from high school. This is across all business areas include technical areas such as cybersecurity, network systems, as well as business areas such as HR and procurement. Currently, Bahrain does not offer any alternative pathways into the sector directly from high school and the Bachelor's Degree programme is seen as the industry entry standard.

In the past, Batelco offered apprenticeship programmes that were praised during the Skills Bahrain focus groups with some of the graduates from these pathways now in senior roles. In addressing future skill challenges, the sector needs to consider supporting alternative pathways to allow for more practical alignment between learning and the workplace.

3.5 Tamkeen's Investment in the Sector

Tamkeen is the main agency tasked with addressing skills gaps in the private sector and a critical contributor to skill reform in the Kingdom. Tamkeen was established in 2006 under Law Number (57) as part of Bahrain's national reform initiatives to make the private sector a key driver of economic development. During the COVID-19 pandemic in 2020, most of Tamkeen's schemes stopped to focus efforts and funds on business recovery. Tamkeen has subsequently undertaken an extensive reform of its offerings and services. The new direction focuses on on-the-job training to address changes in the labour market.

Over the past five years, Tamkeen has provided various enterprise support to the Telecommunication and ICT sectors. Analysis reveals that wage support commitments (those supported through the Training and Wage Support (TWS) Program and the National Employment Programme) amounted to 62% of the total commitment while training in the sector accounted for 8%.

Tamkeen's Commitments to the Information and Communication Sector

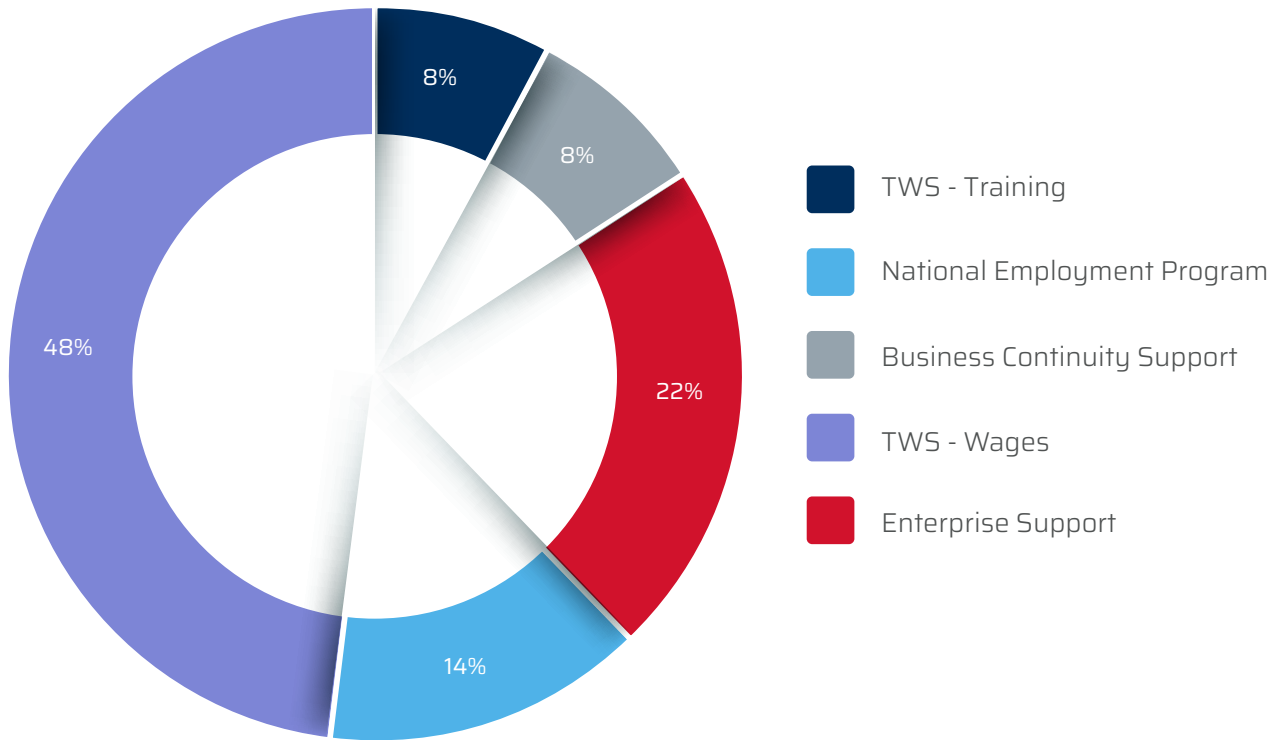


Figure 17 - Tamkeen's Commitments to the Information and Communication Sector Between 2017 and Jul 2021

Within Enterprise Training support, the total commitment towards the 'Information & Communication sector is ranked ninth among the top 10 sectors, with Financial Services at number one. However, at least two of the prominent Telcom employers, namely Batelco and Zain Bahrain, are among the list of top companies receiving Tamkeen Training Support.

Soft Skills over Technical Skills

Further analysis of the Training Programmes/Certificates supported through the TWS Scheme for companies in the Information & Communication sector, sorted by Number of Training Providers, Total Enrolment, and Total Commitment, shows that the 80% of training programmes relate to Soft Skills and Leadership Development. Among the themes covered under technical training programmes, most courses are focused on Microsoft Office and Excel training. Very few courses target future technical skills such as AI, Cloud, Big Data, etc. Of the top 30 certificates offered, based on total enrolments (2017 - Jul 2021), only six are directly related to ICT/digital skills.

3.6 Current training in the sector

Primary research shows that most companies in the Telecommunications sector are actively engaged in training their employees. Smaller companies are upskilling their own talent, and, where possible, working towards increasing the skills and capacity of Bahrainis. This is evident in value chain service providers such as Teleserve and Horizon.

Across the sector, companies deliver in-house training to develop talent. The formal programmes offered by companies are largely geared towards interns, graduates, and leadership development. All three Telecom operators have training programmes catering to these target groups. Additionally, the operators all work with LMS to deliver training to employees. These LMS systems often cover core compliance and regulatory topics as well as personal development and technical training. Most LMS training is provided through partners, including OpenEdEx, Coursera, and LinkedIn Learning.

The following provides an overview of the training investment of the top three companies in the Telecommunications sector.

BATELCO - Learning & Development (L&D)

Batelco has invested heavily in its employees and the wider Bahraini community in recent years. The company recently announced a partnership with London Business School (LBS) to offer a talent development programme to aspiring leaders in Batelco. Batelco runs a LMS and provides training digitally across the company. Batelco actively supports and recruits graduates through youth programmes, internships, and graduate programmes. Their structured internship programme delivers work experience to university students for 1-2 months. Additionally, Batelco offers an elaborate graduate programme that includes specialised training to prepare graduates for various jobs within Batelco. The year-long training is highly practical and integrated through a formal performance and appraisal system.

Batelco's most recent initiative to support youth development, 'Elevator to Success,' was launched in collaboration with INJAZ Bahrain, Brinc, and Clever Play to prepare students for the labour market. The programme is aimed at students in Grade 12 and focuses on entrepreneurial and IoT skills, providing mentorship, professional certification, and on-the-job training.

Batelco's recently launched companies; Beyon Money, Beyon Cyber, and Beyon Connect have specific technical skills requirements, including advanced Cybersecurity, Fintech and Data Science and various ICT skills. These businesses are pioneers for a new strategic direction for the Telecommunications sector in Bahrain and are actively working with local education and training providers to help ensure the supply of skills are well aligned to the needs of these businesses. However, in the short-term, they face a challenge to bring in Bahrainis with advanced technical skills that can support the businesses and rely on vendor relationships and expatriate expertise, while they develop local talent.

Saudi Telecommunications Company (STC) - L&D

STC has various in-house training initiatives to develop and support young talent in the local market. In addition, STC uses LMS training platforms to deliver training, and aligns with the Group's Head Office in the Kingdom of Saudi Arabia for further training courses and partners. With the advantage of an elaborate Learning and Development system at the Head Office, STC Bahrain has access to L&D resources that support their Bahrain programmes.

STC Bahrain's internship programmes are part of their CSR activities, and the company offers work placements to help students complete their field experience for graduation. Interns are given practical experience linked to their areas of study and offered mentorship sessions as well as access to STC's online learning as part of their experience. University graduates are offered the chance to apply to the STC Bahrain Graduate Training Programme, where they are recruited through a robust

assessment process that includes a phone interview with a senior member of staff.

STC's in-house Leadership programmes include the STC High Potential Employees Programme, STC Specialists Programme, and STC Talent Incubator Programme. These year-long programmes offer participants rotation across different departments and receive coaching and mentoring. STC works with partners for specific areas of training, including technology training with Informa, Huawei, and AWS, leadership and soft skills training with Bahrain Institute of Banking and Finance (BIBF), and finance training with CFA and CMA.

Zain Bahrain - L&D

Tamkeen data suggests Zain Bahrain have a good understanding of the skills gap. In line with this, the company introduced a Training Needs Analysis (TNA) system, which is approved by the Ministry of Labour and Social Development (MOLSD). Zain Bahrain undertakes a special programme for the empowerment of women and persons with disabilities. During the pandemic, Zain Bahrain resumed its "Girls for Tech" programme virtually. This initiative was launched in collaboration with the Supreme Council for Women and powered by Clever Play with the aim of teaching 1,000 girls between the ages of eight and 14 years old how to code and nurture their interest in technology. Zain Bahrain is on the advisory board in the GSMA's global effort 'Principles for Driving the Digital Inclusion of Persons with Disabilities'.

Candidates for the Zain Bahrain internship programme undergo a thorough assessment process. Zain Bahrain takes 50-80 candidates as interns each year with the average duration of the programme being 1.5 years. Zain Bahrain's Career Development programme for university graduates takes about 10-15 graduates annually, recruited through formal assessment processes, and offers them an extensive training and development programme exposing them to different business units across the business. Zain Bahrain's Leadership programme targets existing 'high potential' employees with extra support in the form of training, mentoring, coaching etc. The programmes are designed as part of a succession planning system and are customised to each manager's learning and growth needs. The programme also features 360-degree assessments and serves 30-50 managers per annum.

3.7 Training Preferences and Priorities

The survey provided some insights from Line Managers, HR Managers, and Employees about training. When asked if they are able to find the training they need in Bahrain, the three groups of respondents gave slightly different answers. Fewer Line Managers responded positively to this question than HR or Employees. When asked why, the main reason given was 'quality of training available'.

HR Managers	Line Managers	Employees
86%	63%	84%

Table 4 - Those Who Answered 'Yes' to Survey Question 'Are you able to find the training you need in Bahrain' (Source: Skills Bahrain Surveys, 2021)

The most popular reason for training, according to HR Managers, was to 'improve productivity'. Employees stated their preferred method of training is 'on the job guidance and training such as mentoring'.

3.8 In House L&D Capability

HR Managers reported that 50% of their organisations did not have qualified Learning and Development Professionals in their workplace. Additionally, 87% of HR Managers said it was 'important' or 'very important' to have a local or international awarding or accreditation body to recognise their training.

3.9 New Forms of Learning - Micro Credentials and Nano Learning

UNESCO's education division highlights the importance of capturing nano, or micro, learning as part of formal skill systems - noting it is essential to support the skills needed to enter the 4th Industrial Revolution

According to UNESCO a micro credential:

- is a record of focused learning achievement verifying what the learner knows, understands or can do;
- includes assessment based on clearly defined standards and awarded by a trusted provider;

- has stand-alone value and may also contribute to or complement other micro or macro-credentials, including through recognition of prior learning; and
- meets the standards required by relevant quality assurance¹⁹.

For the purposes of the survey, Nano learning was described as "short specific online learning that is usually structured programmes focused on a specific learning area through platforms such as edX, Udemy, Coursea, LinkedIn Learning, Udacity, Intuition, and Linda.com."

Volume of Nano Learning undertaken in the past year

According to the surveys and focus group discussions, 32% of employees had taken some form of nano learning over the past year, with the majority (68%) stating that nano learning was formally recognised by their companies. This is in contrast to HR Managers, with only 31% saying that their companies have formalised micro and nano learning strategies within their organisations. Of the employees who had completed nano learning, 9% said they took this type of learning on their organisations LMS while another 49% completed theirs on LinkedIn Learning.

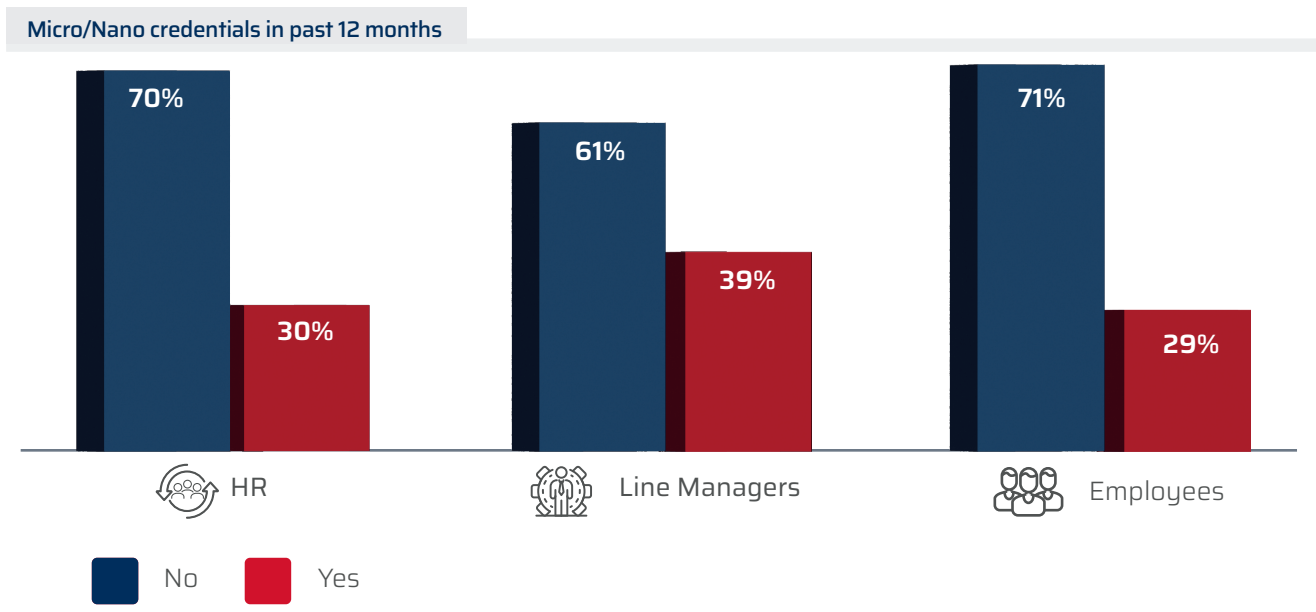


Figure 18 - Micro/nano credentials in past 12 months UNESCO, 2021. Towards a Common Understanding of Micro Credentials Report

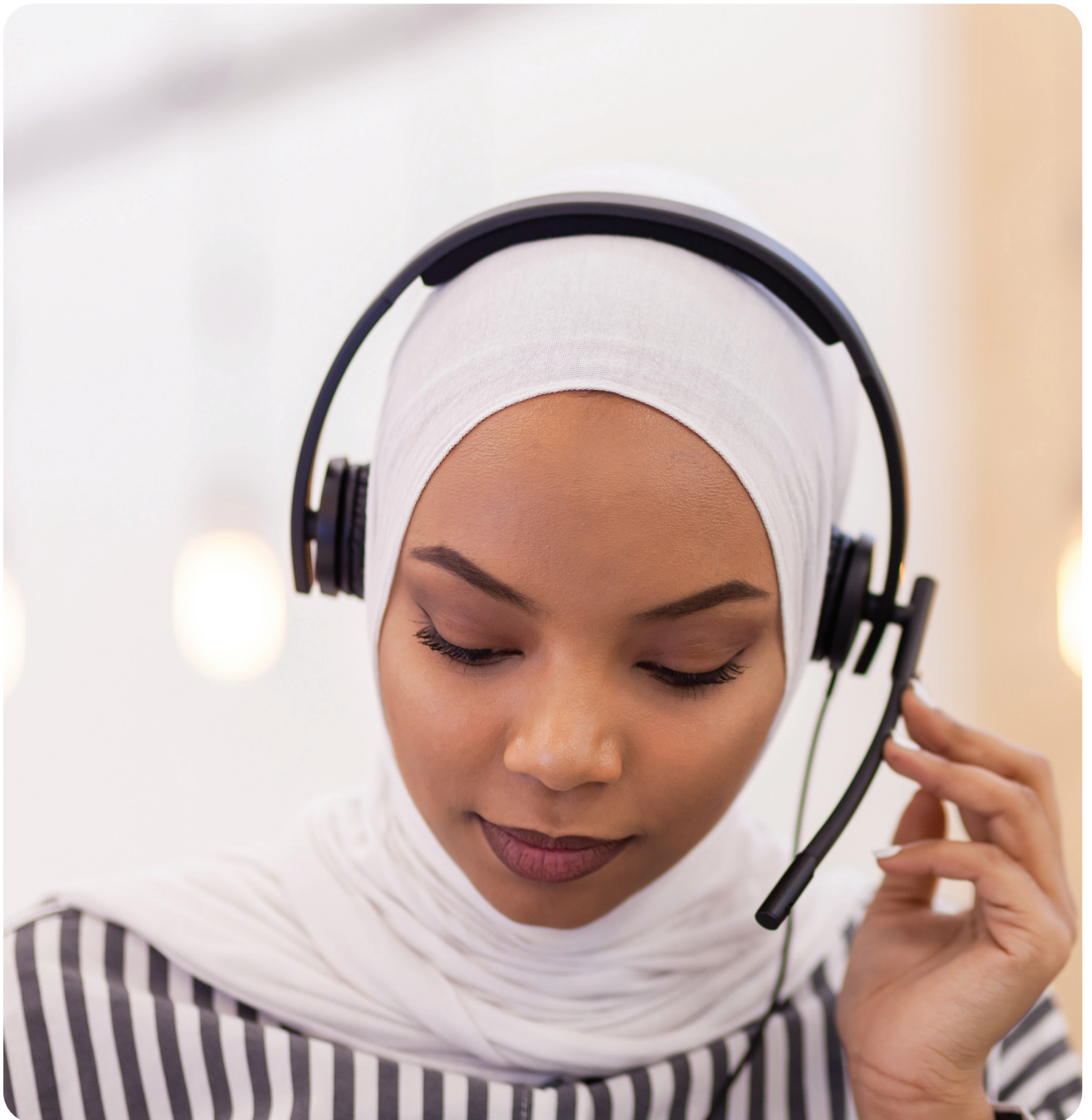
Recognition of Nano Learning by Employers

Interestingly, there was a disconnect between whether this type of learning was formally recognised by employers. 63% of Line Managers and 64% of Employee's believed nano learning was formally recognised in their organisation, whereas only 30% of HR Managers stated that they are formally recognised. The reasons for non-recognition given were 'it doesn't offer a formal qualification' (25%) and 'I can't show how it relates to my job (25%)'.

Relevance to Jobs

Of the employees who completed nano learning, 83% felt it was

an effective way to learn and 77% said they have applied their learning to their job. When asked how they believe nano learning supported them on the job, 15% said it helped them deal with people better, 13% said 'the course helped them learn a skill that can make them more efficient in their job', 11% said 'the course improved my critical thinking or problem solving skills', 11% said 'the course helped me to be more open minded to new ways of working', and 8% 'the course improved my emotional intelligence'. The following graph outlines the subject areas studied for nano learning.



The subject areas studied for nano learning

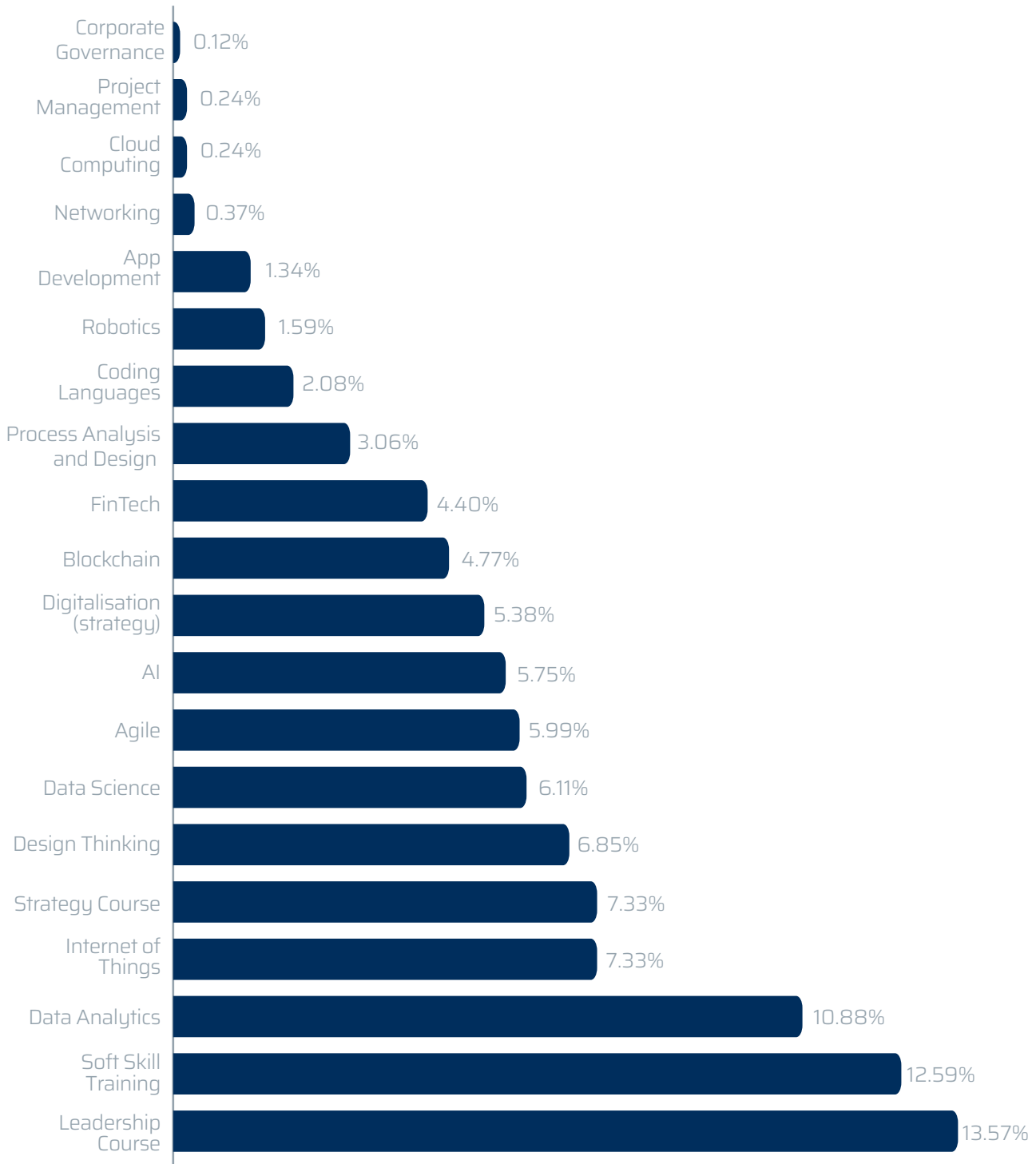


Figure 19 - The subject areas studied for nano learning (Source: Skills Bahrain Employee Survey, 2021)

“We get far more data now that we use our LMS extensively.”

HR Manager

The findings here indicate that nano learning has been well utilised as a development tool for upskilling in technical skills. With over 73% of training being in areas such as Data Analytics, IoT, AI, Blockchain, Robotics etc., this type of learning is being used at the initiative of employees to upskill themselves in emerging technology used in the sector. This is a positive finding and indicates the potential for a more formal use of online nano learning as part of formal technical learning and development on the job. Additionally, most employees who completed nano learning stated it was an effective way to learn and that they applied their learning to their job, indicating satisfaction with nano as a learning tool.

Digital Learning - Executive Perspective

During the Executive focus group, it was apparent that CEOs felt more could be done to develop concrete digital learning strategies that meet the needs of the business and develop relevant skills. As part of this strategy, it is also important to differentiate between skills that can be trained for online, and those that benefit from in person training. Soft skills, collaboration, and communication are good examples of this. It is clear that the sector could benefit from structured digital learning as a part of a development journey.

3.10 Conclusion: Investment in Education and Training in the Sector

The survey responses indicate that those entering the sector would have benefit from more effective career guidance system in high school to better inform their study and career choices. Internationally, alternative vocational pathways from high school have been a key tool for recruiting people into the sector across various jobs ranging from technical to professional roles. Currently, this is not an option in Bahrain for entry into the sector from high school and the bachelor's degree is seen as the key entry requirements in the sector. With employees stating that their preferred method of learning is 'on-the-job guidance and training such as mentoring', it is essential to consider alternative pathways to the traditional Bachelor's Degree as entry points into the sector.

With the majority of those entering the sector having a degree in Business Administration, and the most significant areas of investment by Tamkeen being in leadership and soft skills training, there is a clear need to upskill many people in the sector in technical skills.

Employees in the sector largely indicated self-motivation in addressing technical skills gaps, stating that they completed online nano learning within the past year. The majority of this online nano learning was in specific areas of technical skills. Although the extent to which these courses teach 'awareness' versus actual technical skills depends on the specific course, it is still a positive trend. The HR Managers in the sector indicated that their organisations have LMS systems that they encourage employees to use for this purpose. However, evidence from the focus group suggests these systems are not always well integrated into performance management and formal learning and development.

04

The Telecommunications Sector

The Current and Future Skill Needs
of the Telecommunications Sector



This chapter takes a detailed look at skills gaps in the sector and at its future skills needs based on the Skills Bahrain survey and previous research in Bahrain.

4.1 Background to Previous Skills Gap Research

In 2017, the TRA commissioned KPMG to conduct an extensive study of the Telecommunications sector in Bahrain. The report's key findings were that the sector needs to invest in upskilling to meet the future demand for new technology-based skills. The report also highlighted a number of technical skills that needed developing in emerging business areas such as: Digital Payments, Internet of Things, Artificial Intelligence (AI), robotic process automation, business intelligence, strategic marketing, customer value strategy, customer analytics, and innovation. The

report's key recommendation was to launch a Skills Taskforce to oversee the initiation of a Technology Academy to serve the Telecommunications sector to develop skills for these emerging areas²⁰.

In 2020, the EDB undertook a study into the skills gaps across a number of sectors. It identified the key skills needed in Telecommunications under the categories of soft skills and technical skills. This study was smaller in scope and sample size than intended but provides a snapshot of skills in the sector²¹. The skills that were highlighted as missing in the sector are outlined below:

Soft Skills	Technical Skills
Product and company knowledge	IT sales specialisation
Presentation and public speaking	Cloud architecture
Bilingual abilities	Robotic process specialisation
Career focus	ERP experience
Working under pressure	

Table 5 - The Missing Skills in Telecommunications (Source: EDB, 2020)

Employers stated that the majority of upskilling of employees happens through in-house training and On-the-job training.

One of the key limitations of these previous studies is a lack of a common understanding of the definition of specific skills. Asking a wide audience of business professionals, most of whom have English as a second language, if specific skills are missing is a flawed approach, as a common understanding of the definition of the skill cannot be assumed. This report attempts to address this by using a documented definition, and a skills and behaviour taxonomy to define how these skills and behaviours look on the job. These are elaborated on later in this chapter.

4.2 Current Skills Gap - What the Survey Said

This section presents the Skills Bahrain survey findings on priority skills for the sector. To ensure meaningful results, the survey tool offered a definition for each skill and behaviour so that respondents had a clear understanding of what was meant by the skill or behaviour in the context of this report.

Which Skills Need Developing?

75% of Line Managers and 69% of HR Managers said that a *"lack of skills hinders business growth."* This is a serious finding and justifies the focus the Bahrain's Government places on skill development.

The sector has outlined that the Bahraini workforce needs to develop core skills to help maintain competitiveness and drive performance in an ever-changing market. Technical skills are also

a challenge, however, focus group participants stated that these specific technical skills can be taught over time. In the short-term, critical technical skills gaps can be filled with expatriates or short-term consultancy support.

There is a general consensus across Line Managers and HR Managers that the following core skills and characteristics need to be developed across the majority of Telecommunications organisations in Bahrain.

- Critical Thinking
- Time Management
- Innovation & Creativity
- Process Optimisation
- Using Technology

“It is important to have graduates with the right attitude and professional character in the workplace.”

- Line Manager

The table below shows how each group of survey respondents rated the top five skills.

Line Manager	HR Manager	Employee
Time Management	Time Management	Time Management
Innovation and Creativity	Innovation and Creativity	Innovation and Creativity
Critical Thinking	Critical Thinking	Critical Thinking
Using Technology	Using Technology	Analysing
English Language	Process Optimisation	English language

Table 6 - survey - top 5 skills or characteristics that are important to do their job well

The top five skills were selected by most survey respondents from an extensive list. They indicate the need to adapt, innovate, and optimise existing processes and business models to manage the rapidly changing sector. As core skills, these need to be built up over time, and continually developed in the workplace and beyond.

Interestingly, English language skills were seen by employees and Line Managers as an important skill, however, HR Managers did not. There is an obvious disconnect in the perception of the English language skills of employers between the managers when looking at the findings. As Line Managers are closer to the employees, it could be argued that their view on the employee's skill gap in English is a more likely reflection of reality than the HR Managers understanding of language ability.

The skills identified as important were similar for both expatriate and Bahraini Line Managers, indicating an agreement about what skills are key to the industry. For both Line Managers and Employees, the top 10 responses were the same for both genders, with a slightly different order of importance.

The findings of the skills that need developing are complimented by the findings through the survey 'scenario' questions that identified how these skills in need of developing actually manifest in the workplace. These will be discussed within the context of the impact on the business and the core skills and behaviour framework. The following outlines this framework.

4.3 The Rationale for a Core Skills and Behaviours Framework **A need for a common language for skills**

From previous studies into sector skills gaps, and the research conducted for this report, it is apparent that one of the main challenges in understanding gaps with a view to remedying them is the lack of a common language around skills in the sector. What

'critical thinking' looks like to one manager is different to another. Therefore, when various terminologies are used to describe competencies or behaviours, they can be lost in translation between HR Managers, training providers, etc. Accordingly, it was important to agree a common taxonomy for skills and behaviours before beginning the survey so that everyone was clear on what they meant, and more importantly, what they looked like as evidenced on the job, and at different levels of proficiency. For this reason, the Core Skills and Behaviours Framework was designed to aid the research. In turn, the process of undertaking the research served to refine and validate the core skills and behaviours in the Framework.

The Basis of the Framework

The Bahrain Core Skills and Behaviour Framework is built on the WEF Skills Taxonomy Framework²². This globally benchmarked framework was due to its emphasis on the future skills needed to support the rapid changes in the Telecommunications sector.

- **Strategy** - This pillar addresses what is needed to drive change and move the sector into the future.
- **Leadership & Ethics** - This pillar addresses the personal characteristics expected from those working in the sector with a strong emphasis on ethics and Islamic work values.
- **Performance Drivers** - This pillar focuses on the technical and job-related ability to improve competitiveness and performance outcomes for the sector.

Within each of these pillars are several core skills and behaviours that are designed to address what is needed across all jobs in the

sector for it to move into the future. There are 16 different skills and behaviours under the pillars as shown below.

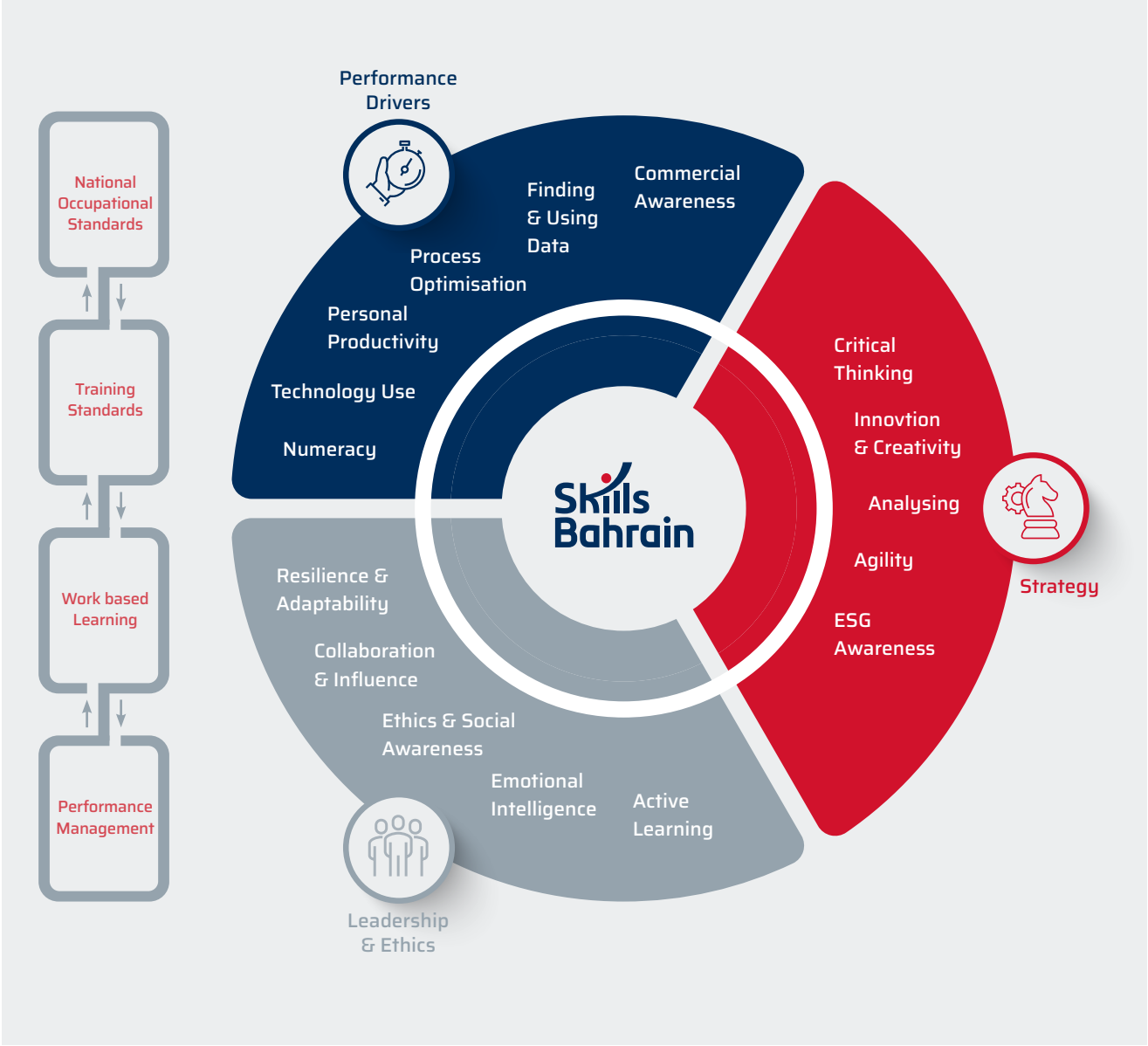


Figure 20 - Skills Bahrain core skills and behaviour framework

Each of these skills and behaviours can expand to more specific sub-skills. For example, emotional intelligence includes the skills of communication and active listening. The Framework is dynamic and the sub-skills within it will evolve alongside the Framework for the sector.

The Core Skills and Behaviours Level Descriptors

For each skill and behaviour, there is a Core Skills and Behaviours Level Descriptor (there are five levels of proficiency) that outlines a description of the skill or behaviour required at each of level, the knowledge required, and the abilities that are expected to be demonstrated at each level on the job. In addition to the core skills for the sector, several of technical skills have been outlined in Technical Skills Descriptors. These are based on and benchmarked against the Singapore Telecommunications Technical Skills Framework. It covers a wide range of specific technical tasks unique to the Telecommunications sector.

The first two levels of the Framework allow for the transition from high school or Higher education to the workplace and the integration between high school and higher education, allowing for specific on the job skills and behaviours to be developed while in formal education.

The Foundation for a Standards-Based Approach to Training, Assessment and Performance Management

As well as providing common definitions on which to base the Skills Bahrain survey, frameworks like the one developed for Bahrain are used internationally as the foundation for training standards and to inform what 'good' looks like on the job. Apprenticeship Standards in the United Kingdom, for example, are designed around the technical and core skills that each sector feels are important. The Core Skills and Behaviours Framework, aims to support the sector with an agreed taxonomy of skills and behaviours, especially in regard to Digital Skills. It is subject to validation by the sector and designed to be used in several ways, including:

- To form as a basis for core standards to be used to outline training and development programmes
- To support organisation of performance indicators for evidence of skills and behaviours at each level
- To allow the assessment of workplace learning to be aligned to an agreed standard based on Bahrain NQFs
- To be used by training providers and education institutions as the bases for Learning Outcomes to closer match education and training with industry needs
- To complement existing organisational competency frameworks where desired
- To allow those who work in the sector to collect a portfolio of evidence of skills and behaviours that is understood by the sector for ease of the movement of talent
- To be used as a basis for the regular assessment of skill across the sector
- To allow the development of National Occupational Standards that include details of the generic skills and behaviours required at each level for jobs across the sector.

4.4 How Employers' Skills Priorities Relate to the Three Pillars of the Framework

The following sections explore how the employers' views of the sector's priority skills and development needs, relate to the three pillars identified as core areas for development.

Strategy Pillar

Line Managers were asked to respond to a number of scenarios and the extent to which they felt the scenario represented their employees. Three of the top five skills outlined as needing development were critical thinking, analysing, and innovation and creativity. All three of these skills fall under the skills pillar or category of 'strategy' in the Skills Bahrain Core Skills and Behaviours Framework. The Strategy pillar is defined as the ability to understand the bigger picture and think in a manner that leads to change, creativity, or innovation. Each of the aforementioned skills break down to form a more specific or focused definition. The level descriptors of the skills and behaviours further outline how each of these skills might look at different levels within the organisation or at different levels of expertise.

Analysing was defined to survey participants as 'the ability to examine something in more detail'. The Skills Bahrain Framework defines the skills of critical thinking as the skills required to analyse, evaluate, and interpret ideas and information to form judgement or solve problems. This definition also suggests the ability to look holistically at something to better understand its different components and how they work together. Critical Thinking is less about breaking down complexity and more about evaluating something holistically to form an opinion.

“Problem solving skills are needed. Challenges will arise in every job you have.”

- Line Manager

The identified Innovation and Creativity as core skills for the future of jobs²³. They were defined in the survey as ‘challenging the status quo and thinking of new or alternative approaches’ and ‘transforming new ideas into reality through ideation and entrepreneurship’. The World Economic Forum (WEF) Skills Taxonomy further defines Innovation and Creativity as ‘making connections between different fields and perspectives’.

The application of these skills in the workplace is further elaborated upon the Line Manager responses in the analysis of a number of scenario-based questions where Line Managers are asked to respond to the statement ‘for employees I supervise in the sector, I feel they demonstrate...’ followed by a number of statements. There are a number of scenarios that allow analysis of the Line Managers view on the skills of critical thinking, analysing and innovation & creativity.

When asked to comment on whether or not employees consider the bigger picture when undertaking tasks and making decisions’, 41% of Line Managers in Bahrain Telecommunications companies answered either ‘seldom or ‘sometimes’ or ‘never’. Only 22% felt their employees always consider the bigger picture and 37% responded that employees ‘often but not always’ consider the bigger picture. According to academia, critical thinking skills are

essential in the Telecommunications industry and have been outlined as a skill set that needs developing across the sector. The high number of Line Managers who answered ‘seldom’ or ‘sometimes’ (40%) consider the bigger picture suggests that application of critical thinking skills is weak among many employees in the sector.

Line Managers’ perception of ‘analysing skills of employees’ is outlined in the following statement: “for employees I supervise in the sector, I feel they demonstrate a strong ability to review and analyse information and apply this knowledge to their job role and tasks as required”. Line Managers responded positively to this statement with 24% agreeing ‘always’ and 41% saying ‘often but not always’ and 35% saying ‘sometimes’ or ‘seldom’.

The analysis of the question ‘for employees I supervise in the sector, I feel they demonstrate, initiative to apply creative solutions to problems’, provides insight into how Line Managers view the skill of ‘innovation and creativity’ on the job. Responses indicate a strong sense of disagreement with this statement with 38% stating that employees ‘sometimes’, ‘seldom’ or ‘never’. 38% stated ‘often but not always’ and 24% stated ‘always’. For a sector that is anticipated to transform through technology and innovation, it would be hoped that this response would be more positive.

Line Manager’s view on Employees Strategy pillar

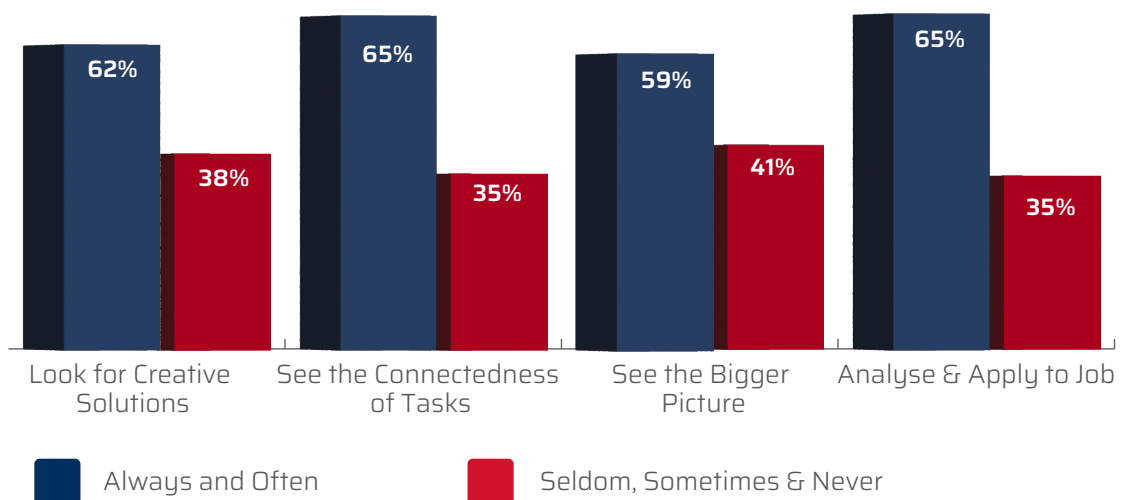


Figure 21 - Line manager's responses to how their employees apply different strategy pillar skills on the job (Source: The Skills Bahrain Line Manager Survey, 2021)

Another indication of these Strategic Pillars of skills is the question 'for employees I supervise in the sector, I feel they demonstrate, an 'understanding of how tasks, projects and activities link and connect together and the consequences of this in their role'. 25% of Line Managers stated 'always', 40% stated 'often but not always' and 35% stated 'sometimes' or 'seldom'. This statement demonstrated strategic thinking, which was viewed as relatively low from the Line Manager's perception.

While some skill descriptions would define understanding of the interconnectedness of tasks as evidence of 'systems thinking', for the purposes of our report, it falls within the skill category of Critical Thinking as 'systems thinking' tended to be confused with ICT systems in the pilot of our survey. This ability to understand how things interrelate is associated with higher order skills and an ability to think strategically.

The Leadership and Ethics Pillar

While the specific skills and behaviours associated with Leadership and Ethics did not appear consistently in the top 10 skills, Human Resource Managers felt 'emotional intelligence' and 'resilience and adaptability' required development and the Line Managers felt active learning required development. These three skills fall within the Leadership and Ethics Pillar on the Skills and Behaviours Framework. This Pillar is about personal characteristics and communication skills that allow individuals to work with others and conduct themselves with integrity. The level descriptors that define how each of these skills are applied at different levels of mastery or seniority, and outline how a Senior Leader in the sector should conduct themselves. The behaviour or characteristic of

emotional intelligence includes communication, self-awareness, self-expression, and emotional self-regulation²⁴. These personal characteristics are fundamental to good interpersonal working relationships and leadership.

Likewise, two key personal characteristics that are important in the future of work are resilience and adaptability and active learning. Both character traits are defined by the WEF as future skills needed to adapt to change, cope, and persevere in difficult circumstances²³.

Line Managers outlined that some of their employees demonstrated emotional intelligence through effective listening by agreeing with the statement 'for employees I supervise in the sector, I feel they ... ask questions to seek clarity and ensure effective communication.' 35% of Line Managers felt their employees 'always' demonstrated effective communication and 30% 'often but not always'. By contrast, 35% of Line Managers responded that their employees 'never', 'seldom' or 'sometimes' asked questions to seek clarity.

Likewise, Line Managers stated that 68% of their employees practice effective communication by ensuring they are understood as outlined in the question 'for employees I supervise in the sector, I feel they... always seeks to be understood by asking questions'. 32% of Line Managers said their employees didn't use questions to seek being understood by responding 'never', 'seldom' or 'sometimes' to this question. The WEF consider the ability to ask questions as evidence of active listening which is a critical skill for communication and working well with others²².



Line Managers' view on Employees Leadership & Ethics pillar

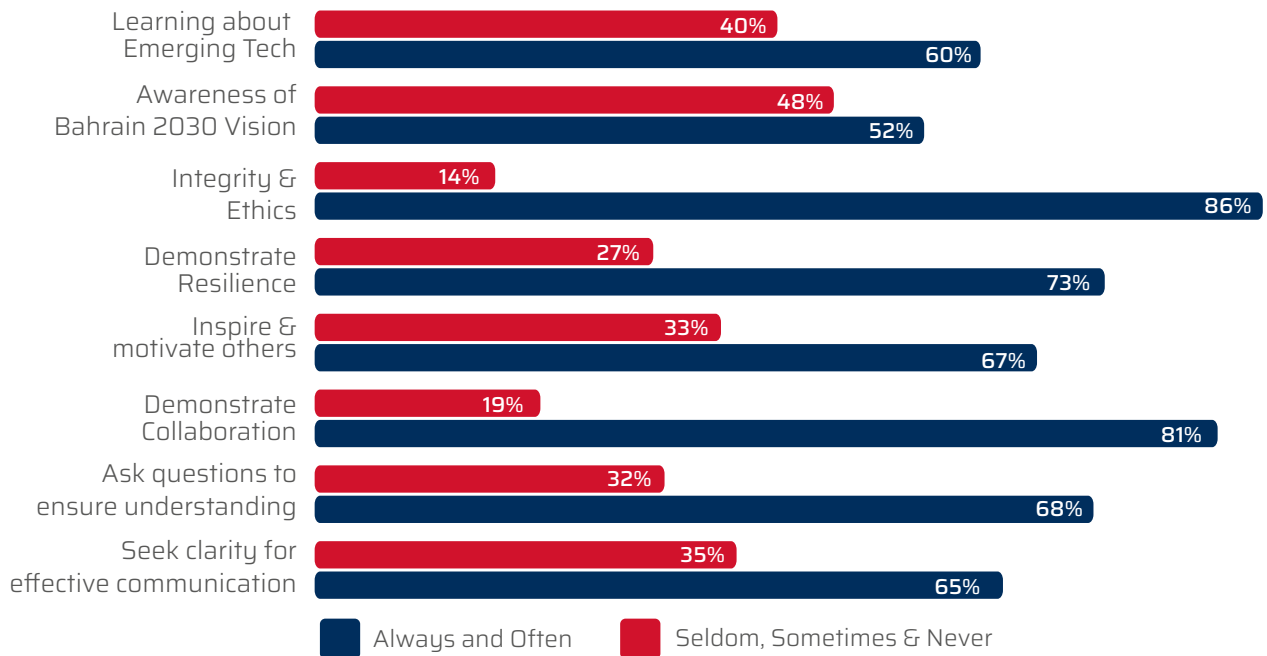


Figure 22 - Line manager's responses to how their employees apply different leadership & ethics pillar skills and behaviour on the job (Source: Skills Bahrain Line Manager Survey, 2021)

81% of Line Managers felt their employees worked well in a team by responding positively to the statement 'for employees I supervise in the sector, I feel they demonstrate... a strong ability to collaborate and work together for department or team outcomes'. Additionally, Line Managers felt 67% of their employees 'always' or 'often but not always' 'inspired and motivated others'. 33% said their employees 'sometimes' inspired and motivated others, but 1% said 'seldom' or 'never'.

These statements are reflections on the behaviour or personal characteristic of collaboration & influence, which was identified by HR Managers as in the top 10 attributes that needed developing among employees. However, the survey findings would indicate Line Managers do not see this behaviour needs developing to the same extent. Employees in Bahrain's Telecommunications sector demonstrate resilience and adaptability according to the Line Managers response to the statement 'for employees I supervise in the sector, I feel they ...bounce back from a setback and get on with the job'. Line Managers responded 27% 'always' and 46% 'often but not always'. The remaining 27% responded 'sometimes', 'seldom' or 'never'. This positive response indicates employees in the sector can respond reasonably well to failure or setbacks.

With a focus on personal ethics and integrity, Line Managers strongly rated their employees in response to 'for employees I supervise in the sector, I feel they ... conduct themselves with

integrity and demonstrate personal ethics'. 86% of Line Managers felt their employee's demonstrated integrity and personal ethics. However, a small percentage (14%) felt their employees only demonstrated personal ethics 'sometimes' or 'seldom'.

Social awareness is defined as the person's ability to consider the perspectives of other individuals, groups or communities and apply that understanding in their interactions. It is composed of empathy, organization awareness and service orientation²⁵. Working in a multinational global sector such as Telecommunications, it is an important to understand the social and cultural context of an individual's role in an organisation, the role of the sector in Bahrain, and the role of Bahrain in a global context. In Bahrain, this also includes awareness of Bahrain's Vision 2030 and the principles outlined for social and economic growth. Line Managers indicated 52% of their employees 'always' or 'often but not always' 'demonstrates an understanding of the social and cultural context of Bahrain and Vision 2030'. Another 32% stated 'sometimes' and 16% said their employees 'seldom' or 'never' demonstrated an understanding of the social and cultural context of Bahrain.

As an indicator of the skill of active learning and employees' interest in the changes in the sector around them, Line Managers were asked to comment on 'for employees I supervise in the sector, I feel they ...request to learn and work closer with emerging

technologies in their job roles'. As a sector that is rapidly changing and with transformation being a core part of all organisations, this question could indicate the active engagement in understanding these changes through learning. Line Managers reported 60% 'always' or 'often but not always', requests to learn and work closer with emerging technology, while 40% said 'seldom' or 'sometimes'. This provides an insight into the changing dynamic of the workforce. It outlines potential challenges related to the different and 'ageing workforce' and addresses the question of how to transition and develop those who have no interest in working with new technologies.

The Performance Drivers Pillar

With a significant contribution to the national Gross Domestic Product (GDP) and infrastructure of Bahrain, the performance of the sector is of national importance. Ensuring that the Telecommunications workforce has strong core skills that lead to improved performance is essential. While some of these may not be seen as traditional core skills, the Performance Drivers cluster of skills and behaviours are what drive the sector's competitiveness, both internationally and locally. Therefore, a minimum standard of these skills and behaviours is essential for the changes and growth in the sector. The Performance Driver skills and behaviours that appear within the top 10 for both Line Managers and Human Resource Managers are 'Time Management, Process Optimisation, Commitment to Task and Using Technology'. In addition, Line Managers included 'Finding and Using Data' in their top 10 skills.

While time management and commitment to task may also be defined as a soft skills or personal characteristic, these have been included within the Performance Drivers part of the framework as the lack of this behaviour can have an impact on organisational productivity. The effective use of time while at work and personal commitment to completing tasks are two key behaviours for personal productivity.

Finding and using data is an additional skill highlighted in the responses by Line Managers. This refers to the rise in data analytics as a mainstream core skill for all employees and progresses in the Skills Bahrain level descriptors to more advanced data science work.

The key difference between the levels of application of this skill is the complexity and structure of data. Highly unstructured and complex data is managed by a data scientist or analyst and would be at the highest level for this skill. At a core foundation level, all employees need to know how to source, reference, and analyse data to draw meaning and insights and present it in a visual format.

Structuring Work

Line Managers state that they feel their employees are 'constantly looking for new ways to improve the efficiency of what they do' with 60% agreeing their employees 'always' or 'often but not always' look for efficiency. 38% responded 'sometimes' and the remaining respondents 'seldom' look for ways of improving efficiency. This question is an indication of the 'process mindset' or 'efficiency mindset' needed to optimise business operations.

In looking closer into personal productivity, 71% of Line Managers responded 'always' or 'often but not always' to the statement 'for employees I supervise in the sector, I feel they... 'structure work in a manner that is methodical and well-structured to help complete tasks' 25% responded 'sometimes' and the remainder 'seldom' or 'never'.

While it did not appear in the top 10 skills and behaviours identified by either HR Managers or Line Managers, the skill of commercial awareness is a key Performance Driver foundation skill for the sector. This skill is defined as a strong understanding of the Telecommunications sector, including business and financial models. This skill is indicated in the survey responses for the statement 'for employees I supervise in the sector, I feel they ...apply an understanding of commercial principles in their role to constantly consider how work impacts the bottom line'. Line Managers said 52% of their employees either 'always' or 'often but not always' demonstrate this while 40% of Line Managers responded, 'sometimes' and the remaining 8% responded 'seldom' or 'never'.

Line Manager's view on employees performance drivers pillar - 'for the employees I supervise...'

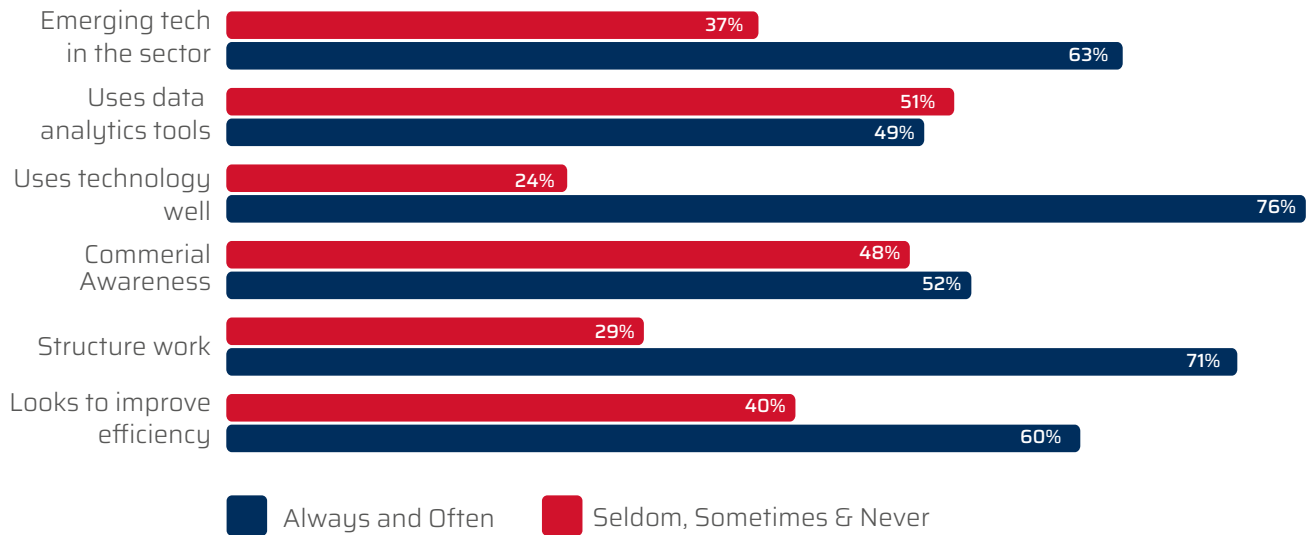


Figure 23 - Line manager's responses to how their employees apply different performance driver skills and behaviour on the job (Source: Skills Bahrain Line Manager Survey, 2021)

Three questions from the survey determined how Line Managers viewed employee's engagement with emerging technology in their job. 76% felt their employees used technology well to help them do their job in their responses to the statement 'for employees I supervise in the sector, I feel they... use technology to help perform their job well'. However, when asked about more advanced technologies and data analysis tools in particular, only 17% responded 'always' and 32% responded 'often but not always'. This indicates the update on use of data analytics is perceived by Line Managers as reasonably low. Additionally, 6% stated 'never', which was one of the highest responses for 'never' in the survey. 27% of Line Managers responded, 'sometimes' and 18% responded 'seldom'. The range of answers may depend on the department the Line Manager represents or the level of digital maturity in the organisation.

The final question in the Performance Drivers section is a general view on how much Line Managers feel their employees understand changes in the sector. In response to the question 'for employees I supervise in the sector, I feel they... demonstrate an understanding of the role emerging technology will play in the future of Telecommunications', 63% responded with 'always' and 'often but not always' to this question, 37% responded either 'sometimes', 'seldom' or 'never'. As the Telecommunications industry is heavily dependent on new technologies, it is unsurprising that most Line Managers believe their employees have a good understanding of the role of technology, however, there are gaps that raise questions around information and communication within the industry.

Focus Group Outcomes on Skills Development Needs

In addition to the sector survey, Skills Bahrain conducted three focus groups to elaborate on key themes from the survey and generate discussion and debate amongst industry leaders. These sessions again outlined a strong need to develop the core skills sets of Bahrainis and focused on the need to start this educational path early.

The general consensus across the focus groups was that the core skills outlined in the survey are very relevant and need to be strategically nurtured and developed from a young age. In principle, there was agreement that the overarching digital literacy of the younger generation is good, however, employability and core skills are lacking. This has only been exacerbated by COVID-19 and a reduction in communication and engagement across the workforce.

Skills for Innovation

Innovation, entrepreneurship, and risk taking were skill sets mentioned regularly. It was agreed that to develop these skill sets, the surrounding culture of organisations needs to change. This concept led to much debate around leadership skills in the Telecommunications industry. The importance of this was confirmed when the skills of innovation & creativity were cited in the top 5 most in need of developing.

Leadership Skills

According to the Executive Management of Telecommunications companies, there is a significant skills gap among the leadership of organisations. Managers need to develop new skill sets to bring

about cultural change within an organisation and, in doing so, foster creativity, innovation, entrepreneurship, and risk taking. This cascading training and development effect will develop a new generation of thinkers who bring good digital literacy to the company, and have a strong interest to challenge the status quo, try new things, and take risks. This can only happen if the organisational environment is conducive to this.

There is also an underlying concern across Line Managers that technology is changing so quickly that employees need to continually strive to learn and gain new skills. Unfortunately, there is a belief that the majority of employees are not self-motivated to learn and upskill. The uptake in nano learning identified in this research indicates this is not necessarily the case. This again feeds back into the notion that core skills development is essential to shape a new generation of driven employees who are interested in learning, innovating, and challenging themselves. These inherent traits can be nurtured and developed but are difficult to teach.

Graduates

Graduates pose a different challenge; a lack of on-the-job experience was evident throughout the primary research. Graduates are not being developed with industry ready skill sets. On-the-job training is essential to ensure value to the sector. The HR focus groups outlined a number of programmes looking to support graduates entering the workforce, however, the impact

of these programmes was often unclear. Most fresh graduates are recruited into call centres and retail shops as a starting point in their career development. Although there is a current demand, there is a concern among Line Managers that these jobs will no longer exist in the future. This is already evident as many branch offices across the Kingdom closed during the COVID-19 pandemic.

4.5 Hard to Fill Vacancies and Recruitment

Data on the areas of the business that have the highest volume of recruitment and areas that are difficult to recruit for provide good insights into the skill gaps and the level of competition for talent.

Current Recruitment

Despite pandemic related business disruptions, there has been growth in employment in the past 12 months. This can be deduced from the fact that 56% respondents said the workforce has increased while just 44% said that there was no change in the workforce. Key drivers for new recruitment or employment were the launch of new products, implementation of digital strategy and process automation. Telecommunications companies are heavily engaged in offering new products and services to their customers due to increased competitive pressures. This calls for the implementation of a 'digital first' strategy and improved processes, which in turn, is pushing the need for new talent as outlined in the following graph.



HR Managers: Reasons for Recruitment

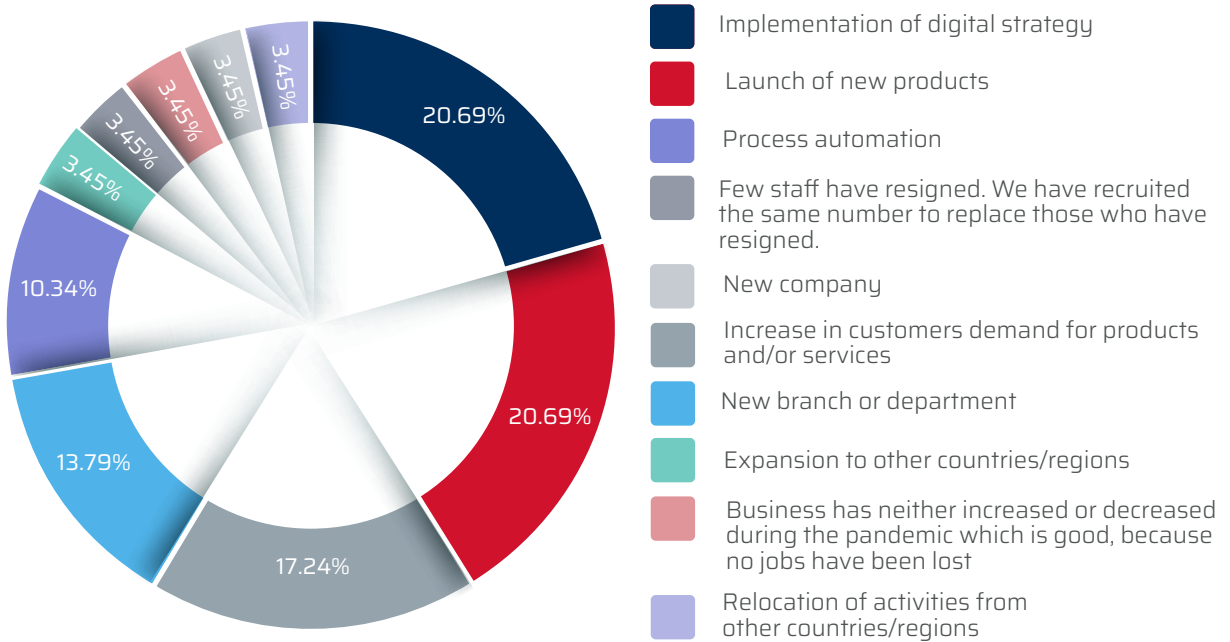


Figure 24 - Reasons for recruitment by HR managers (Source: Skills Bahrain HR Survey, 2021)

Most recruitment was seen in Operations, Sales, Customer Services, and Relationship Management followed by Software & Applications, Product Solutioning, and Management. This is

well aligned to the drivers of recruitment being digital strategy and launch of new products.

HR managers: Areas with most recruitment

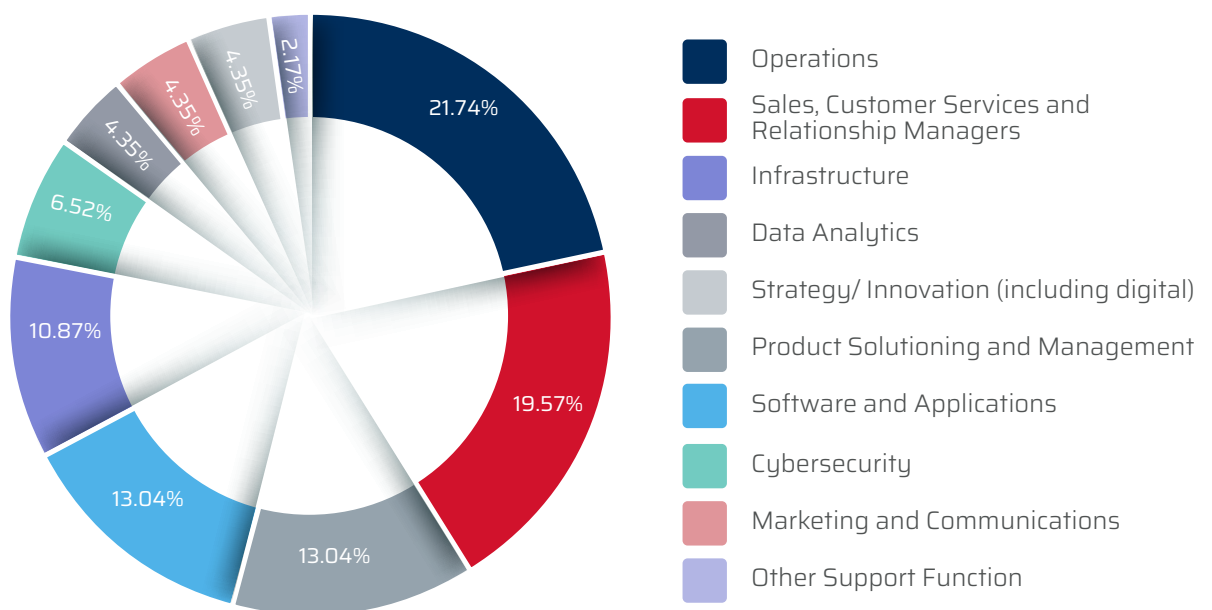


Figure 25 - Areas with most recruitment HR managers (Source: Skills Bahrain HR Survey, 2021)

Hard to fill vacancies

Vacancies that are hard to fill also indicate skill gaps. This emerges as an important challenge for the sector as 44% of HR Managers and 49% of Line Managers said they have difficulty filling vacancies. Sales and Marketing are considered the hardest to fill vacancy area followed by Operations and Cybersecurity (15%).

According to HR and Line Managers, the main reasons why such vacancies are hard to fill are 'Low number of applicants with the required skills' and 'Not enough people interested in doing this job'. This clearly points to the need for better, more targeted skills development programs, and upskilling courses aligned with the business operations of the Telecommunications sector.

HR Managers: Hard to fill vacancies

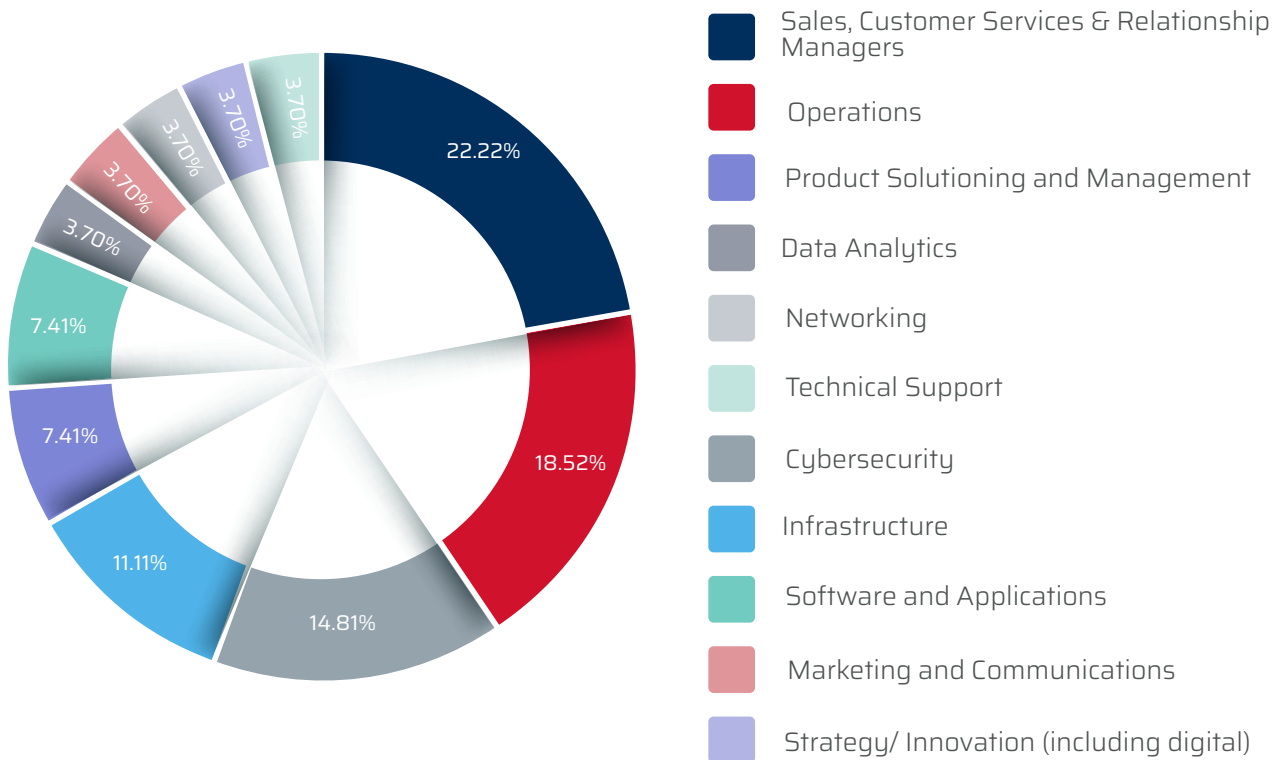


Figure 26 - HR managers hard to fill vacancies (Source: Skills Bahrain HR Survey, 2021)

Within the context of this skills report, it is important to note that the hard to fill vacancies are much less for emerging technology roles than for current standard support roles. Cybersecurity was the main emerging role with 15% of HR Managers saying it was hard to find people. Roles for the 'Software and Applications' Job Family were considered hard to fill by 7.5% of HR Managers while data analytics was 4%.

This finding indicates that despite the need to ensure employees are equipped with an understanding of emerging technologies, these are not high-volume emerging jobs in the sector. This could be related to the maturity of the sector in Bahrain and that this will change in the near future. International research would indicate that these types of technical roles become more important in the sector as digital strategies are implemented and operators move from sourcing external expertise to utilising internally developed expertise. At the moment, operators source skills to ensure a

rapid response to changing business needs. Ideally, these skills would be home-grown in Bahrain, but the time lag means there will continue to be a reliance on contracting vendors or recruiting for many of these roles from outside Bahrain in the short-term.

However, the baseline level of skills in the understanding, awareness, integration, and use of data and digital are required of employees across all Job Families in the sector. According to the research, the application of critical thinking, commercial awareness and innovation & creativity are core to the development of digital and data in the sector.

4.6 Covid Impact on Skills

According to Line Managers, remote working has made them more agile and has led to more authority and autonomy being given to the employees. Personal productivity of Line Managers during COVID-19 increased whereas relationship building and level of

interaction with colleagues severely decreased. Customer service, whether internal or external, remained mostly the same. The Line Managers and HR Managers said that during COVID-19 'outside-the-box thinking to solve problems' and 'initiative and creativity on the job' increased by an average of 43%. This indicates the sector responded well to the abrupt changes brought about by the pandemic. However, remote working has negatively impacted almost all the parameters under study, including the level of interaction with colleagues, relationship building, and personal productivity as well as customer services, initiative, and creativity on-the-job, etc.

4.7 Future Skills - International Research

The World Economic Forum's (WEF) 2020 Future of Jobs Report has identified the top 10 skills needed for 2025 as listed below¹. The WEF also highlights skills that CEOs state as growing. These include Active Learning and Resilience, Stress Tolerance and Flexibility, all skills that are needed to respond to rapid change. According to a PricewaterhouseCoopers (PWC) study on the impact of the pandemic on digital skills, the majority of employees reported feeling the pandemic had advanced their development of digital skills²⁶. The study also highlighted the willingness of GCC employees to upskill themselves, with 56% saying they believe their job will be obsolete in the next 5 years.

The last 10 years has seen significant focus in Bahrain on ensuring 'employability skills' or '21st century skills' are embedded into the education system. Numerous local publications address how this could work more effectively with recommendations stating the need for closer alignment of education and employers. Along with most economies, Bahrain is now looking at how to better equip citizens with the key digital skills that have moved from a general understanding of technology to the ability to interpret and visualise data as a core skill for most people entering employment.

In the Telecommunications sector, it is likely that most companies with competency frameworks outline competencies that could be considered similar to these 21st century skills. However, during the research it was clear that the ability to translate these competencies to meaning, integrated training and performance management was lacking.

Technical skills in Demand for the Future

The speed of change, growth in new adjacent services, and consolidation of exciting sectors is leading to a global shortage of technical talent. This is compounded by the fact that technology skill sets are in high demand across different industries.

World Economic Forum Future Skills

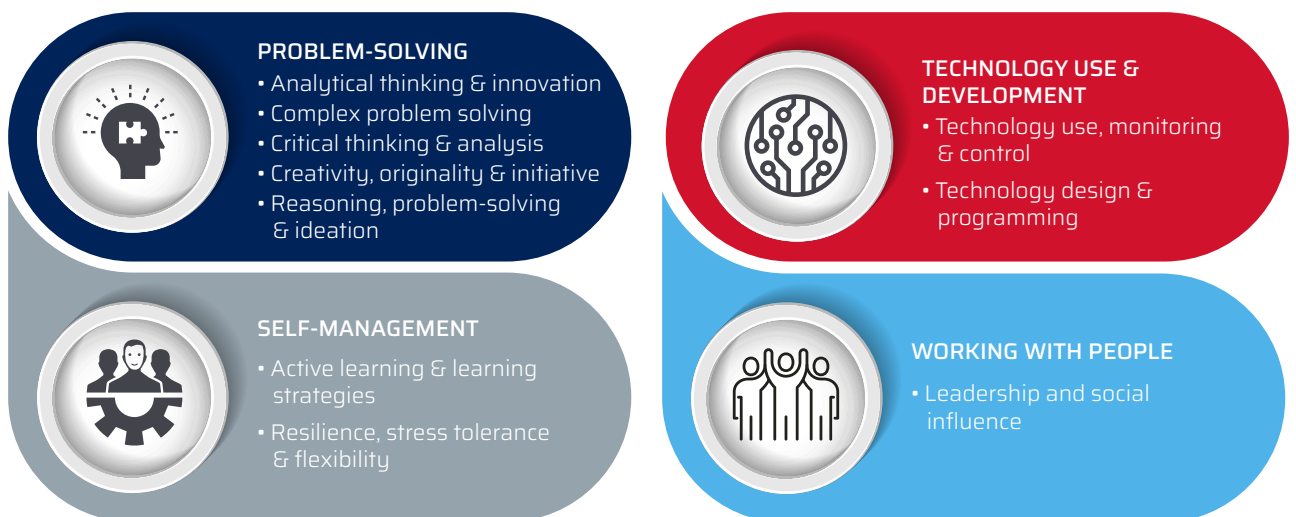


Figure 27 - WEF Future Skills

Many of the skills outlined in the above figure are aligned with the research findings. Critical thinking and problem solving will also become top skills required in the short term. The pandemic and changing ways of working are also pushing the market

to source employees with self-management skills, including resilience, stress, tolerance and flexibility. Interestingly, these are skills which are outlined as current skills gaps in the market in Bahrain. Research from other markets shows similar trends.

Human Resource Analytics company, HR Forecast, outlined in demand technical skills of the future for the Telecommunications sector. The sector in Bahrain identifies many of these skills, both technical and core skills, as limited in the local market today ²⁷. The following are the skills identified.

- **Cloud Computing:** Jobs are on the rise because more and more companies are switching from server infrastructures to cloud solutions. Many AI and machine learning services are also provided by cloud platforms. The most in-demand and highest paying skills in this group are Microsoft Azure, Docker DevOps, and Kubernetes for cybersecurity.
- **Cybersecurity:** This skill has an approximately 30% annual growth rate. Nowadays, data loss risks are highly unexpected and savage, and include hackers, data theft, swarms and viruses. That is why there is a high demand in this area. The most in-demand skills are related to Cybersecurity Information, Security Network, and Security and Vulnerability Assessment.
- **AI and ML:** Knowledge of TensorFlow, Python, Java, R, and Natural Language Processing tops the list of the in-demand skills. Employees who can harness the power of

AI and Machine Learning technologies and tools will help your organisation deliver more relevant, personalised, and innovative products and services.

- **Virtual and Augmented Reality:** Many industries, such as entertainment, education, healthcare, manufacturing, and advertising have already adopted VR and AR technologies. So, in the next few years technicians who have these skills are sure to be in high demand. According to a report by HIREd, it is estimated that '74% of software engineers predict that we will see the full impact of VR and AR technologies in the next five years.'
- **Blockchain:** Blockchain is much more than just cryptocurrency. It enables peer-to-peer payments, crowdfunding file storage, identity management, and digital voting. Thus, developers who understand blockchain and smart contracts, and can build decentralised applications will be in a high demand as well.

It is important to note that technical skills are not a one stop solution to business problems. Without strong core skill sets, businesses will not be able to widely adopt new technologies and challenge the status quo of operations.



HR Forecast Future Skills

Technology

- Cloud computing
- Cybersecurity
- AI and ML
- Big Data Analytics
- VR and AR
- Blockchain
- Video production
- User experience

Digital literacy

- Programming literacy
- Digital literacy
- Data analytics and statistics
- Big Data Analytics
- Computational and algorithmic thinking
- Digital ethics foundations
- Understanding of smart systems
- Cybersecurity
- Tech enablement

Critical Thinking

- Critical thinking
- Ability to understand structured problem
- Search relevant information
- Logical reasoning
- Agile thinking

Self-management

- Understanding own emotions and triggers
- Understanding own strengths
- Self-control
- Self-motivation
- Integrity

Interpersonal skills

Communication skills

- Story telling
- Cybersecurity
- Public speaking
- Synthesizing messages
- Virtual and augmented reality
- Active listening

Mental flexibility

- Adaptability
- Ability to learn
- Creativity
- Ability to adopt different perspectives
- Translating knowledge to various contexts

Building relationships

- Empathy
- Humility
- Sociability
- Inspiring trust

Teamwork effectiveness

- Collaboration
- Resolving conflicts
- Motivating different personalities
- Coaching
- Empowering people
- Fostering inclusiveness

Leadership

- Role modeling
- Crafting an inspiring vision
- Organizational awareness
- Ownership and decisiveness
- Grit and persistence
- Ability to cope with uncertainty

Figure 28 - Future oriented skills (Source: HR Forecast, 2021)

4.8 Future Skills - Survey Findings

Responses to skills needed in the future is a critical part of the survey, with the focus being on technical, rather than soft skills, which were discussed earlier in this chapter. As the survey focused on the specific skill, not the area of application of the skills, skills for coding and programming AI, Machine Learning, AR and VR are covered within the questions about the importance of coding/programming skills. The survey presented 13 future skills with a description of each skill to help differentiate these and ensure a common understanding. For example, Data Analytics

was presented in two parts; 1. Data Analytics - interpreting and reporting on data (using outputs of data); 2. Data analytics - programming and designing (software).

All three groups of respondents selected Data Analytics - interpreting and reporting on data as a key skill in the top 5 with Line Managers saying it was the second most important skill needed in the next 5 years. The programming and designing aspects of data that might be associated with a Data Scientist's job were almost at the bottom of the list.

Line Manager	HR Manager	Employee
Project Management	Data Analytics (finding & interpreting data)	Cloud Computing
Data analytics (finding & interpreting data)	Cloud Computing	Cybersecurity
Cloud Computing	Project Management	Risk Management
Using technology at work	Cybersecurity	Data Analytics (finding & interpreting data)
Process Analysis and Redesign	Process Analysis and Redesign	Project Management

Table 7- The most needed future skills according to the survey (Source: Skills Bahrain Surveys, 2021)

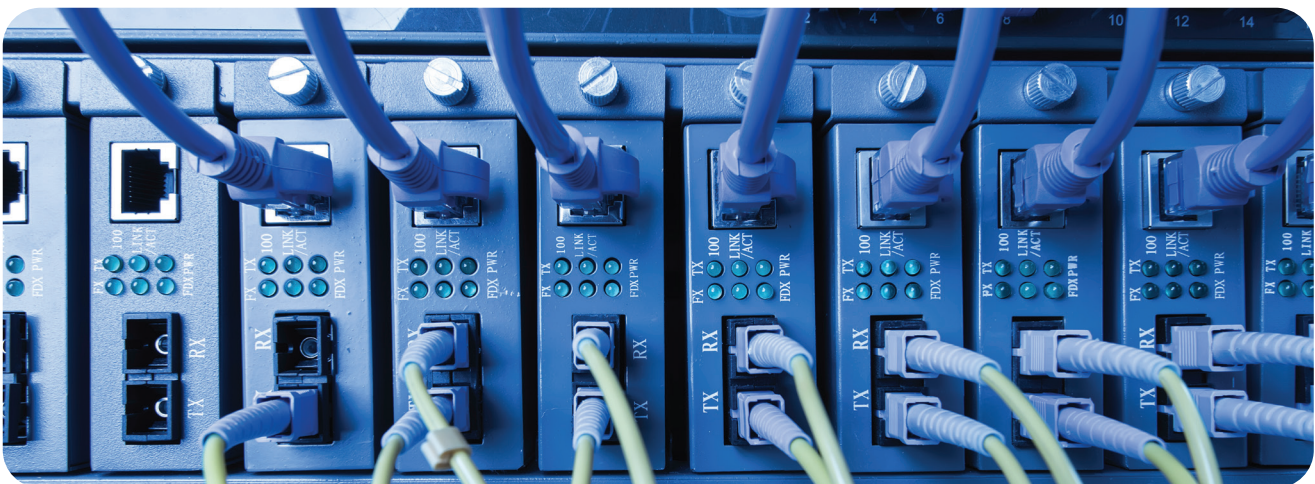
The top five skills selected were consistent across all respondents with a couple of exceptions. Data analytics, cloud computing and project management were common among all respondents. Interestingly, employees and HR Managers gave a higher priority to cybersecurity, indicating perhaps that this is a subject that is not impacting Line Managers daily and is a 'corporate' issue. The other anomaly in the findings is that employees included risk management instead of process analysis and redesign. The level of consistency between all three groups surveyed is encouraging as it outlines that the sector agrees on the skills needed for the next 5 years.

Coding and programming skills were low down on the list, and it seems it was not considered a key skill of importance for many organisations. The definition for coding language skills given in

the survey was 'the ability to apply coding languages in a variety of digital areas including machine learning, data analytics, IoT and blockchain'. Despite this being stated as an important skill for development in the sector in literature and international studies, these skills were not as widely in demand as other skills.

Product Design Skills

The skill of product development is considered an integration of a number of other skills including commercial awareness, data analytics and innovation & creativity. While it was included in the list of future skills, it did not score high in importance. This is possibly because the technical skills, such as data analytics that lead to a product being developed were recognised as more important.



Line Managers: Top Ranked Skills for the Next 5 Years



Figure 29 - Top ranked skills for the next 5 years by line managers (Source: Skills Bahrain Line Manager Survey, 2021)

The majority of survey participants, including employees, outlined the following five technical skills as major gaps in the current skills landscape in Bahrain. These were ranked as: project management, data analytics, cloud computing, processes analysis and design, and Cybersecurity. The following provides a snapshot of the skills and knowledge required and the current approach towards addressing them.

Project Management Skills

Project Management is a key skill that is required for the future development of the sector. A number of providers in Bahrain deliver the Project Management Professional Institute's (PMI), Project Management Professional (PMP) qualification. Digitisation

and the increasing scope and parallel service portfolios of the sector are also leading to increased demand in the skills of project management and also the validation of this skill through project management qualifications.

Project management training is readily available in Bahrain with courses being offered ranging from general project management principles to preparation for PMP certification to Scrum and agile training. As a key facilitator of new business models to support new strategies, agile principles need to be well understood by the sector and not just be a buzz word. This depth of training in agile as part of business strategy does not appear to be available in Bahrain.

“Our work is becoming increasingly project based, and therefore teams need to be skilled in project management tools and methods.”

- CEO

Data Analytics – Interpreting and Reporting on Data

When focus group participants discussed this further, it was apparent that the skill that was being referred to was more about the skills to interpret and report on that data. The other skills that relate to data analytics include the ability to think critically and understand patterns and visualisations in data. When reviewing the training landscape, there are a number of providers offering training in, Power BI or other data visualisation tools, however this training teaches the use of the specific software tool, not the ability to visualise and identify patterns in data. This business analysis type of skill is not addressed at all in any of the data analytics training we reviewed. With the skill of ‘analysing’ being identified as lacking by employers, it is important this skill is considered alongside ‘data analytics’ when considering learning and development programmes.

The higher level of expertise required in data scientist or advanced data analytics is a very technical area of training. The University of Bahrain recently launched a Master’s in data science to help address this. Some employees in the Telecommunications sector, and many in Financial Services, have enrolled for this qualification.

Another way the sector deals with this is to rely heavily on contracted data science expertise. Some of these relationships include the upskilling of the company’s employees, but very often they are there for a short-term assignment and knowledge is not effectively transferred. There are two challenges here. Firstly, limited talent development for core data analysts, as it is outsourced, and second, a poor result as there is a lack of skills to interpret and report on that data.

Line Managers have also highlighted the importance of developing those data analytical skills within the business units instead of having them limited to employees in the information technology team within the organisation. They noted the significance of the collaboration between business users and IT since the business users are responsible for analysing the data and suggesting solutions based on business needs.

Cloud Computing

This was considered the number one future skill by employees in the sector. In Bahrain, the cloud agenda is well established in the Kingdom through the Government’s Cloud First Policy and the relationship with AWS. Cloud training is readily available in Bahrain through AWS, but also training with Azure and other cloud suppliers. Line Managers talked about the importance of cloud computing being part of the core curriculum of ICT graduates and the acknowledgement that they needed to be retrained in this skill once employed. In 2019, Bahrain University announced a

collaboration with AWS Educate to embed AWS certification into a Cloud Degree programme. Additionally, Bahrain Polytechnic hosts the AWS Cloud Innovation centre and embeds AWS certification programmes into its ICT degree. According to Tamkeen data, Cloud computing was one of the most popular technical courses offered to employees in the sector.

Process Analysis and Redesign Skills

As a process-driven sector going through significant automation, the ability to understand and improve end to end processes is of significance. In order for the individuals to have proper process redesign skills they have to have full awareness and understanding of the process. The findings also emphasised the importance of building in-house capacity related to process analysis and redesign as opposed to getting external support.

Line Managers emphasised that process analysis and redesign skills are needed as future skills for the sector to enhance the customer journey. Operational efficiency is one of our most important targets, and for this to be successful we have to ensure the right skills are in place to ensure customer satisfaction and cost optimisation,” the executive commented. The pandemic had a significant impact on processes within organisations. With COVID-19, organisations had to review their processes and introduce improvements for optimal operations.

Cybersecurity

Cybersecurity is one of the top five most important future skills outlined across the user groups of both surveys and focus groups. The majority of respondents, particularly from the Telecommunications operators and BNET, outlined the fact there is not enough talent available in the market. They also mentioned that it was difficult to find the right training programs for core cybersecurity skills.

The BIBF Cybersecurity Academy offers a range of training areas in cybersecurity including Professional Certificates from international awarding bodies in cybersecurity auditing, management, incident investigation and testing. Additionally, they offer awareness as part of their digital transformation courses aimed at all levels of the organisation including Board of Directors. Recently Tamkeen launched a partnership with the prestigious industry Professional Certification awarding body, SANS, to train cybersecurity professionals in Bahrain.

The Bahrain National Cyber Security Centre oversees the development of effective cybersecurity practices across Bahrain and offers standards on the capabilities and skills needed to develop this role in Bahrain. It is possible this organisation will

The current trend is that companies are hiring people with a specific skill set to do a specific job. For example, if one needs a data analyst for a project, they hire a data analyst for a six-month contract, and then there is no further progression.”

- CEO

set the training and qualification regulations for cybersecurity jobs in the future. Currently, the CBB has Cybersecurity senior roles as regulated ‘control functions’ and outline the minimum requirements for the appointment of cybersecurity employees in their rule books. All CBB regulated companies must follow these rules, including Telco operators who are now licensed under the CBB for Financial Services licensing.

4.9 Future Jobs and Future Skills

Chapter two highlighted a number of ways in which jobs in the sector are changing. It also highlighted the new skills required to support the transition of jobs. The primary research outlined a distinct lack of key future skills available locally in Bahrain.

Without local talent available in the market, companies are forced to recruit expatriates, or outsource certain roles, or in some cases

departments, to companies outside Bahrain. As discussed early in this report, the Telecommunications industry’s core businesses are competing in a saturated and competitive market. This means that for companies to grow, adjacent portfolios must be developed. This push for growth puts further pressure on an already scarce talent pool. An outcome of this competition is a high level of poaching of talent from Telecommunications providers. This ‘war’ for talent is based both on skills, but importantly, experience.

A Summary of Future Skills

In addition to the core skills and behaviours outlined in the Skills and Behaviours Framework, when looking specifically at each Job Family and changes to skills in those Job Families, there are some clear consistencies. The following outlines a summary of the in-demand skills identified in each Job Family in Chapter Two and offers insight into each skill.



“Interpreting and understanding the business impact of data is one of the biggest gaps in Bahrain today.”

- Line Manager

Skill and Description	Detail and Application to Telecommunications Services
<p>Project Management</p> <p><i>All Job Families</i></p>	<p>Application will entail initiating, planning, executing, controlling and closing the work of a team to achieve specific goals and meet specific success criteria at the specified time.</p> <p>This skill will be relevant across almost all Job Families in the sector as a key skill to structure working outputs.</p>
<p>Data Analytics Programming and Designing (software)</p> <p><i>All Job Families</i></p>	<p>Data Analytics Programming and Designing skills are in demand as a key future skill. In the next five years, businesses will develop data strategies and empower workers to apply advanced analytics techniques against large volumes of diverse data sets from different sources.</p> <p>Which Job Families the occupation of data analytics is placed will depend on the business model of the organisation. However, internationally this skill is increasingly becoming core to all Job Families.</p>
<p>Cloud Computing</p> <p><i>Infrastructure Job Family</i></p>	<p>As companies are switching from server infrastructures to cloud solutions, the demand for this technical skill which allows organisations to manage and leverage cloud data storage is rising.</p> <p>This skill impacts the infrastructure Job Family.</p>
<p>Process Analysis and Redesign Skills</p> <p><i>All Job Families, particularly Operations & Support</i></p>	<p>As RPA and streamlining processes become central to operational efficiencies, developing a ‘process mindset’ among employees is essential. This means being able to consider all workflows and operations for their effectiveness and rapidly identify any root causes that may slow them down. This also usually means employees are more empowered to adjust processes where necessary to improve service to customers. All Job Families are impacted by this skill, but particularly the Operations & Support Job Families.</p>
<p>Cybersecurity Technical Skills</p> <p><i>Cybersecurity Job Family</i></p>	<p>There is demand for this skill currently and it will continue to rise. Professionals are expected to understand the fundamentals of cybersecurity and how to apply it to protect themselves and their organisations. As this is becoming an increasingly regulated Job Family, it is essential the future skills and qualifications for this job are aligned to regulatory requirements</p>

Table 8 - In Demand Future Skills Aligned to Job Families

“They don’t have the cloud skill set and we need to teach them. They might know python, and that is great, but learning about cloud is vital.”

- Line Manager

Leadership Training to Address Lack in Critical Thinking

With 52% of the training in the sector being on soft skills or leadership, it is possible this is attempting to address this gap, even among employees who had been in the sector for a while. Some of the weak answers under the Strategic Pillar are concerning as the sector looks forward to the future. With critical thinking, analysing and innovation and creativity as core future skills for the sector, this area needs to be addressed and become better aligned to learning and development in the sector. Skills such as critical thinking are core fundamental skills that are usually developed over a longer period of education or through development programmes. Because these are higher order thinking skills, they focus on ‘thinking about thinking’ and tend to come from natural curiosity and questioning during schooling. These higher order skills are generally not developed through training. It is possible that residential leadership programmes expose learners to new ways of seeing things, which could help develop these skills, but they would need to be reinforced, embedded and applied in the learners’ experiences when the residential programme ends.

Technology and its Business Impact

The lack of awareness of emerging technology identified by Line Managers in the survey contradicts to the comments from respondents in the focus groups who stated that the younger generation understand digital and technology very well. It is possible that the understanding of the role of emerging technology is where the gap is, rather than a general understanding of the technology itself. Understanding the role of technology would indicate individuals need to have strategic insight into its application in the sector, more than simply being aware that new technology exists. This requires strategic thinking and commercial awareness.

Data Analytics or Business Analytics?

Employers have clearly stated they need employees who can think critically, problem solve and going forward into the future, understand data visualisation and uses. When this is analysed further, it defines a development programme that includes the use

of data software tools, such as Power BI, but equally importantly, the commercial and strategic understanding of what the data could tell you and what you need to find out. This approach to data will be different depending on the Job Family and potential use of data. A Customer Service Manager may need to source data for analysing foot traffic in a retail outlet for staff planning, whereas the product development team may need to source data to identify usage and consumer habits of an underrepresented market segment. Both these examples start with the core commercial awareness to know what to ask for.

4.10 Conclusion: Current and Future Skills

The skills required to drive the Telecommunications industry forward, and to maintain existing levels of service across core portfolios, are changing. The birth of adjacent service portfolios in areas such as Financial Services are pushing the boundaries of the existing workforce. This change results in the need to upskill and in many cases reskill the existing workforce with new skills that add value.

The skills required from fresh graduates are also changing, with on-the-job experience becoming more important than ever. This is largely because of the fluidity and flexibility of the skill sets required. Similarly, the leadership skills required to manage change, motivate the workforce and inspire the next generation are also lacking in the market. Digital competence plays an important role in the development of the sector and forms the basis for overarching skills development. Digital and data analytics skills are now at the core of every Job Family. Soft skills and other performance driver skills are essential to support digital and data skills in their application on-the-job.

05

The Telecommunications Sector Readiness of the Skills System to Respond to Change



This chapter assesses the readiness of the skills development system in Bahrain to respond to the demands brought about by disruption to the sector, including the priority skill sets required, new ways of working, and culture change. It assesses the preparedness of Bahrain's skills ecosystem to address the sector's Skills Gap, in particular to adopt new approaches to skills development focused on the workplace.

5.1 Current Gaps in Provision of Education for Future Skills

Over 80% of new entrants coming into the Telecommunications sector have completed a bachelor's degree, of which nearly 50% have completed a degree in Business Administration. The research findings indicated some challenges with entry into the sector from Higher Education, with some Line Managers and HR Managers saying people are coming into the sector unprepared for the workplace, lacking the right knowledge and skills. Recent engagements between sector HR professionals and Higher Education providers have seen changes to curricula to better support the sector, with the introduction of master's degrees in Telecommunication Technology and Data Science from two of Bahrain's universities. However, there is still a gap in core skills for those coming from Higher Education in Bahrain, with these skills cited as being essential for the future world of work.

Skills highlighted for development, like critical thinking, need to be built over a period of time and from a young age. Encouraging students to learn to be innovative, entrepreneurial, flexible, agile and willing to learn, are fundamental skills required to change the culture of the future workforce. The Telecommunications industry in Bahrain has pinpointed these skills as lacking. Coupled with this, the need for on-the-job training and work experience is also a critical factor. Graduate recruits are lacking experience and therefore are not able to adapt and adjust to industry requirements and understand career pathways on offer to them. This in turn creates a highly dependent young workforce that requires significant investment before being able to add value.

A review of the key institutions that feed graduates into the sector reveals that there is no consistent approach to embedding future skills into curricula. Some institutions promote that they embed employability skills or 21st century skills into their programmes, but the detail on how this is aligned, assessed and evidenced is weak. BQA programme requirements and the process for being listed on the National Qualification Framework (NQF) aim to address these issues through BQA programme reviews and the NQF listing process. However, programme reviews are infrequent and should be strengthened to ensure that students have a portfolio of evidence of skills development within formal education qualifications. In addition, the requirement to demonstrate that courses are aligned to labour market demand could be made more rigorous and transparent, to help young people, parents and employees make better choices going forward.

5.2 Readiness of Training Providers to Meet the Skills Challenge

The last two years have proven very challenging for the formal training sector in Bahrain. Training companies have been forced to close their doors and, where possible, transition to online learning. An analysis of the readiness of Bahrain's training landscape indicates gaps in the funding and provision of training and the needs of the future. More than 50% of funding from Tamkeen to the sector is spent on soft skills and leadership training with little evidenced impact. While some training providers have updated offerings including areas such as digital transformation and cybersecurity, uptake in these courses is far lower than soft skills and leadership courses.

Training providers do not routinely use industry agreed standards that are aligned to NOS with the exception of those delivering Professional Certificates or Awarding Body qualifications. Internationally, training is aligned to the workplace through an agreed set of skills training standards. These training standards form the basis for curriculum design and are built out of sector agreed National Occupational Standards. This allows impact to be measured in the workplace as training is directly aligned to a job role.

Currently, in Bahrain, the expertise within training providers which are able to design curriculum based on skill standards is not widespread. To support more effective work-aligned learning and development, there is the need for sector agreed skill standards to be fundamental to all training to provide opportunities for better impact assessment.

5.3 Readiness of Organisations to Support Future Skills Development

While larger, more affluent companies may be able to manage upskilling and reskilling well, the majority of companies in the sector are starting to see significant gaps and rely even more on training and development support from Tamkeen. Because graduates are currently not well prepared for the workforce, the majority of training programmes within companies focus on three groups; two of those are interns and graduates, the other is leaders. There is very little other structure learning for upskilling and reskilling for future skills.

Digital Learning

The transition to online learning, accelerated by COVID-19 is a challenge that only a few companies will be able to manage effectively. Companies are being pushed to accelerate digital learning strategies and work with far more online content and solutions. While this has some benefits for companies, there is also a significant lack of integrated digital learning strategies to effectively monitor and strategically develop talent. This is outlined by the fact that nano learning is not recognised by the majority of HR departments as part of formal professional development and performance management.

It is evident from the volume and type of online nano learning

“An entrepreneurial and risk-taking mindset is developed very early in the learning journey and has to be continually challenged and nurtured.”

- CEO

undertaken during the pandemic that employees in the sector are putting in the effort to upskill themselves. 32% of employees said they had undertaken some type of online or nano learning in the past year. Of this number, only 9% said they used their organisations' online learning management systems for online study. The majority of the online or nano learning was in technical areas such as Data Analytics, IoT, AI and Blockchain. This is an encouraging trend as it shows those working in the industry are self-motivated to upskill and move their skill set into the future but indicates in-house LMS systems could be better utilised.

Managing Digital Learning

When discussing the impact of nano learning, HR Managers referred to the LMS dashboard as an excellent tool to measure the development of employees. LMS dashboards give HR an excellent opportunity to integrate learning and performance. However, it would appear from the focus groups that not many of them do this. The consensus in the workshops felt that the flexibility of learning and the ability to keep track of learners' progress was beneficial.

Mentoring

In discussions with the Line Managers, some described their roles as mentors in skills development. This was always in the context of Line Managers with technical related jobs, some of whom had come into the organisation through an apprenticeship route themselves. These Line Managers demonstrated an understanding of how training standards are used for on-the-job evidence of learning and were able to articulate this well in the discussion. This was less well described for the 'professional' or service-oriented jobs in the organisations. Line Managers who are able to mentor skills development are critical for the development of future skills in the workplace.

Skills and Training Standards

Organisations in the sector in Bahrain do not routinely use a skills-based approach to recruitment and development. Likewise, the use of standards and competency proficiency descriptors are not often embedded in performance management and assessment of skills on the job. Without this experience it is unlikely that organisations can support substantial and meaningful work-based learning. National Occupational Standards outline the core and job specific technical skills and behaviours needed to do a job in the sector. Linked to the career maps, the National Occupational Standards outline the skills needed, the pathways to move in and out of jobs and the qualifications and training needed for each level. Organisations in the sector could benefit

from using these tools to create better clarity about the specific skills needed for each job and the required level of proficiency.

Skill gaps in the sector have traditionally been filled through formal training, and more recently by digital training that in many cases is not measured and does not create any transparent sector-wide learning outcomes. A harmonised approach, based on defined career pathways and job standards and aligned to skill-based training standards will ensure that relevant skills are recognised, developed and assessed. This requires the learning and development professionals in organisations to upskill in their understanding of the use of standards to support professional development and performance management and move away from Line Manager opinion as the key source of assessment.

Performance Management in Supporting Skills Development

In the Telecommunications industry, appraising employee performance is generally a function of human resource planning, which combines subjective (qualitative) measures with the objective (quantitative). The majority of HR Managers in the sector stated that their performance appraisal process is annual (63%), with 31% saying their organisation undertakes performance appraisals twice a year. 6% said they do not have a performance appraisal system. Analysis indicated the appraisal systems are often not well aligned to training outcomes, nor competency or standards frameworks.

During the focus groups, questions on how organisations embed their training into their performance management were not well received or answered. It was apparent that this concept was either not well understood or the HR Managers did not want to expose this information in front of each other. Likewise, when talking about the measures of training impact, the discussion did not lend itself to confidence that the impact of training is regularly assessed and monitored as part of HR systems.

There also seemed to be limited awareness among HR Managers as to the nature of skills-based job roles, versus job description prescriptive job roles. As the sector is converging and skills sets are being utilised for agile project-based operations, a focus on evidencing of skills is essential. There are concerns about the capability of some of the HR teams in the sector to lead this type of shift from job roles based to skills-based work.

Thoughts on the role of the traditional annual performance appraisal are changing. Experts state that in today's rapidly changing work environment, once a year is not frequent enough

“How do I define future skills? I can only see 18 months in advance, as the market is changing so quickly, and I don’t know what skills may be required in 5 years.”

- HR Manager

to identify skills gaps and have performance conversations with employees. This view was supported with comments by the majority of HR managers from the Telecommunications focus group, who stated that it is about the quality of the performance appraisal, not just the frequency. With employees in the survey responding that on-the-job mentoring is their preferred method of learning and development, the regular ‘check in’ approach to performance appraisals, would be more relevant.

In-House Learning Management Strategies

Companies acknowledge the importance of evaluating their talent development strategies against that of business strategies. High performance businesses tend to have strong talent development strategies, particularly in digitally focused industries. There is an overarching understanding that in order to manage a successful learning strategy, it must be built with the right capacity and resources. In the Telecommunications sector, 50% of HR Managers said they do not have Learning and Development staff who are certified as in-house on-the-job assessors and only 25% of Employers said they have an in-house learning management system.

The pandemic has clearly highlighted that businesses need greater support in targeting the right development strategies and ensuring they have the right people and systems to realise a greater impact and return on investment. Globally, there are hundreds of Learning Management and Learning Experience (LX) platforms that support companies on their Learning and Development journeys.

5.4 Gaps in Leadership for Transformation

Rapid Pace of Change

The speed of change brought about through digitisation is putting tremendous strain on organisations to adapt and evolve. The speed of change does not allow organisations the time to prepare a workforce hiring and training strategy. Talent strategy is at the heart of this process but is often one of the last areas to gain attention.

This outlines a challenge that has a profound impact on the culture of organisations. Companies need to embrace change and turn it into a competitive advantage. This is only possible with a revolutionary shift in company culture. The need for organisation-wide culture shifts was highlighted, particularly by HR Managers who are often at the centre of this disconnect. They talked about the natural change in culture that digitalisation has brought about as well as the recruitment of youth into the sector.

Businesses mentioned the dichotomy of a culture shift in a

standardised sector that is now required to behave more like a tech start-up, in some departments. This mismatch, combined with a lack of digital expertise at the Executive level can hinder the implementation of a digital strategy. One area that has helped with this has been the focus on productivity rather than attendance to the workplace. The recognition that employees can be productive working remotely, and in some cases even more productive, has provided Executive Management with the evidence to support new working models as part of the culture change.

Digital and Leadership

The gap in understanding around digital and Senior Leadership was mentioned many times. Some businesses described a cultural battle between the old ways of doing things and the new. The weakness of governance was also discussed in this context where some respondents mentioned the quality of the Boards of Directors and the lack of understanding of digital at the board level. This feeds into the previous discussion around culture. A common theme throughout the research was a disconnect by management levels within organisations.

The analysis of the programmes delivered by the top employers indicates a gap in the area of Middle Management development. The gap between Executive Leadership and Middle Management was also identified as an issue by those interviewed. The Executive Leadership disconnect was also highlighted when discussing generational differences and the younger staff members.

The data has shown that while graduate recruits are more digitally literate and comfortable with the use of technology, the sector is still lacking in many of the technical skills needed to compete with regional and global Telecommunications operators. Many graduates in the sector lack on-the-job experience and require significant investment to develop them into value adding employees. The youth of the Telecommunications sector lack in-depth strategic understanding of business strategies and are often unable to react efficiently to change. These strategic decisions are made at the Board of Director or Executive Level. This presents an interesting conundrum, whereby the youth that are tech savvy and understand the application of technology often rely on a Board of Directors to develop strategy. In many cases, existing Boards don’t have an in-depth understanding of the technology. This often creates a governance and innovation dilemma for moving the sector forward.

Culture Change - Leadership and Generation Z

All the Telecommunications operators in Bahrain have been aggressively recruiting people into their organisations to support future digital strategies. Employment in core operator services is

“If you look at CEOs, you can see there is a gap between them and middle management. The need of having leadership programs to develop middle management skills is definitely important for the business.”

- HR Manager

stagnant and expected to decrease slightly in the coming years. However, all three operators have seen significant growth in employee numbers in emerging business areas such as cloud computing, edge networks, Fintech and others. According to our survey respondents, 27% are under the age of 30 years. As the new roles attract a tech savvy, youthful Millennial and now GenZ workforce, the culture and nature of work in the sector is changing. This trend in Bahrain mimics similar trends in the sector internationally where research suggests the new ‘digital natives’ coming into the sector have different expectations from their work and are impacting the culture of the sector and the way people work ²⁸.

Millennials are defined as those born 1980-1995 and entered adulthood around the millennium, GenZ are those born around 2000 and are starting to enter adulthood now. The key significance of these two generations is their natural propensity to technology. Growing up with the internet and smartphones has shaped how these young people interact and embrace technology. The deliberate recruitment and integration of these tech savvy young is seen as an important part of the future of the sector in Bahrain.

5.5 Women in the Telecommunications Workforce

The gender balance in Bahrain’s Telecommunications sector is apparent with women making up 33% of the workforce in 2020²⁹. Women are woefully underrepresented in leadership positions in the Telecommunication sector around the globe. According to Spencer Stuart, in 2020 they were only able to identify a handful of female group CEOs worldwide. The industry as a whole is not even close to Gender parity at any level. For example, a 2020 Global Leaders Forum survey ³⁰ found that in 70% of telco organisations, fewer than 30% of technical roles are held by women. Only one telco board (Vodafone) has more than 40% female directors. As for the next generation, the European Commission’s 2019 report ‘Women in Digital’ found that only one in three STEM graduates is a woman. As mentioned previously, 28% of those responding to the employee survey were Female and 16% of those responding to the Line Manager survey were Female. Of those who responded to the Line Manager survey, the following represents their proportion of representation across the different levels of the hierarchy of the organisation.

“Fresh graduates are more digitally literate; however, this does not translate directly to digital skills.”

- Executive

Male & female distribution across telecom sector

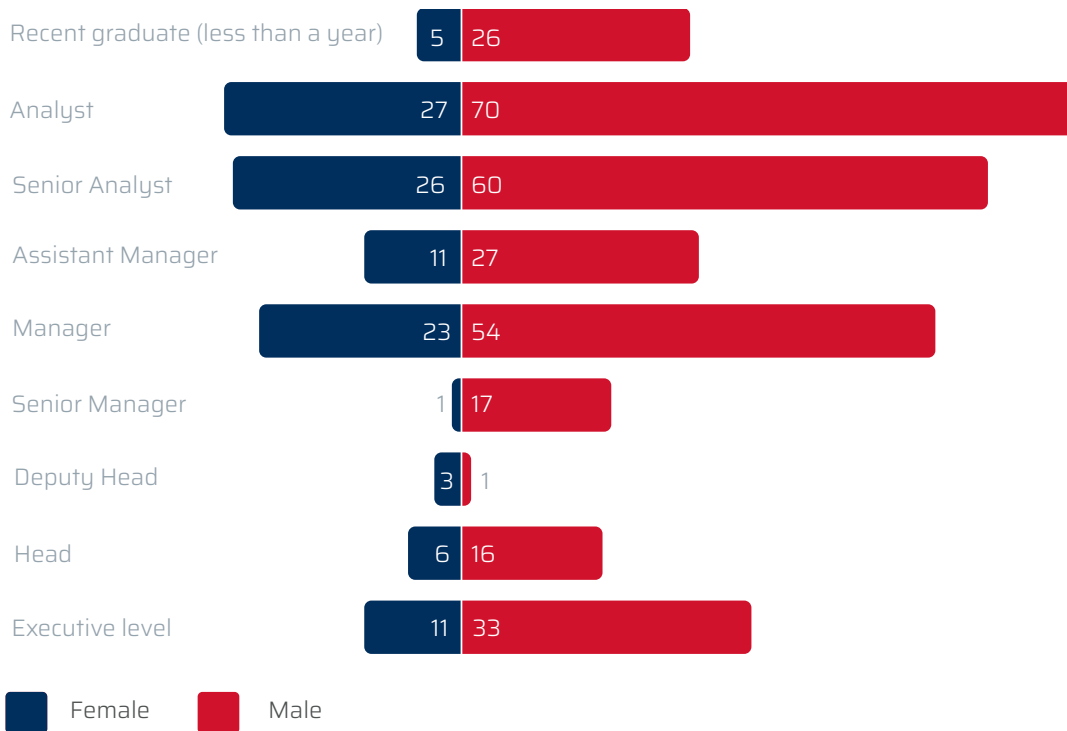


Figure 30 - Female Employees at Different Levels of the Organisation in Bahrain (Source: Skills Bahrain Employee Survey, 2021)

5.6 Conclusions: Readiness of the Skills System to Respond to Change

The skills needed within education and training providers and HR professionals to meet the future skill development demands of the sector are different from those required in the past. The key competence needed by training professionals is the ability to align sector agreed Professionals Standards with training standards and turn this into curricula, qualifications, programmes and pathways that are closely matched to business outcomes.

This requires education and training professionals to understand how to translate National Occupational Standards into training standards and then how to assess and measure impact in the context of the workplace. They also need skills in designing work-based or work integrated learning curricula and assessments.

Organisations' HR and Learning and Development professionals also need to learn how to design integrated development programmes that are linked to business outcomes and based on

sector agreed skills standards. They need to lead a culture of skills-based learning and development and support Line Managers in systems to identify, mentor and assess skills development. Line Managers need to apply a skills standards-based approach to recognising evidence of learning on the job to support their teams' development.

The education and training system and HR professionals have a major role to play in supporting the transition of the Telecommunications sector, but individuals and employers are also responsible. We have seen how individuals have been willing to invest in their own training during the pandemic. The Skills Bahrain research shows that employers are aware that skills needs are changing, and they are facing challenges filling certain vacancies. Employers are willing to upskill their people but could benefit from some coordination and a representative voice within the system. For effective transition to happen, supporting policies and agencies also need to play their part, including in the areas of quality assurance and career guidance.



06

The Telecommunications Sector The Development of Future Skills for the Sector



6.1. The New World of Skills for Bahrain's Telecommunications Sector

As industries and jobs become more complex, so too does the development of skills to address this complexity. Despite this, models for how people learn on-the-job are as relevant today as they have ever been. Bloom's taxonomy, created in 1956, is an explanation of learning that is still relevant today to define the stages and hierarchy of learning. This model explains how people absorb learning from superficial learning to deep learning. The first stage of learning is the ability to remember something through to the final stage, which sees the evaluation and synthesis of learning to form new insights and create new ideas³¹. Models such as this help us to understand how to develop innovative thinking across the sector and what is needed to reskill and upskill.

The Telecommunications sector is experiencing significant changes in the way that skills are recognised in an organisation. Digitalisation is changing business models, and with this change comes a different valuation of skill sets within an organisation. For example, a highly skilled data analyst with less than five years' experience can bring far more commercial value to a company than a senior manager with 15+ years in the company. This changing model is impacting how HR professionals assess and manage performance within the organisation. The traditional model of increasing salary in line with company hierarchy is beginning to change.

6.2. Evidencing Skills Through Work Based Learning Competencies and Skills

The terms competencies and skills are often used interchangeably. There are, however, important differences between the two. computer programming is a good example of a hard skill, whereas

time management is an example of a soft skill. Competencies on the other hand are knowledge or behaviours that set you apart from others. As an example, you may have three people with a qualification in data analytics. They all possess the same skill but may have different levels of effectiveness in the organisation based on their different competencies.

Digitalisation of companies is increasing the need for a skilled workforce rather than a knowledgeable one. As discussed earlier, the changing nature of work, and the increasing specificity of skills is leading to disruptive changes. Cybersecurity is a good example in Bahrain, where Executives point out that there are a lot of people who 'know' about the requirements of cybersecurity, but very few 'skilled' cybersecurity professionals who can secure and repair corrupted systems. The current status is to outsource or recruit skilled expats to manage many of these skill-based roles. The past years has seen extensive digital knowledge building in Bahrain, without much focus on acquiring digital skills. This needs to change if Bahrain is going to continue to compete globally with its Telecommunications sector.

Skills Based versus Role Based

The changing nature of businesses and HR practices, coupled with the current need to focus on a skills-based approach, raises many questions around the traditional 'role based' recruitment model. The figure below outlines a good example of role based versus skills-based recruitment in the area of software engineering³². As skills are becoming so specific and technologies are overlapping, there is a real increase in the need to outline specific skills. You may have a great software engineer on paper with extensive experience, but he/she may not have any skills in Python coding, which is the core script of your business.

Role based VS Skills based approach

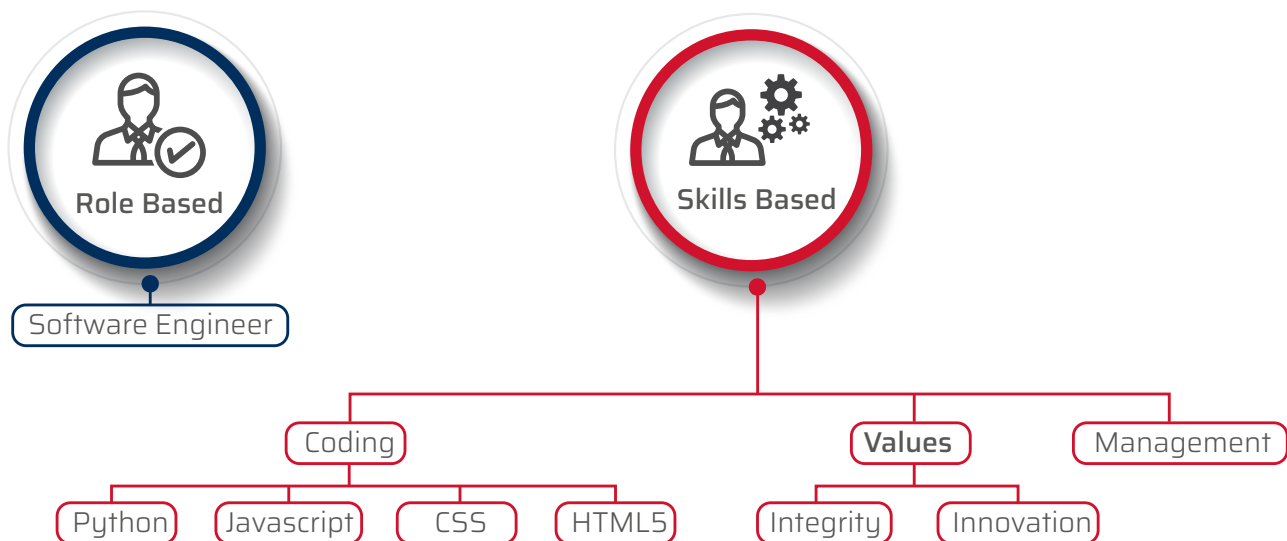


Figure 31 - Role Based versus Skills Based (Source: Academy to Innovate HR)

Skills-Based Learning

Most of the nano learning reported in our survey is much more closely aligned to the development of specific future skills than many of the external training courses funded over the past few years. Skills based learning is very specific by nature and can therefore be broken down into bite sized learning nuggets. Around the world, this new way of learning is enabling people to develop

new skills and define learning paths based on industry demands, new technologies, and, importantly, changing 'skills based' job roles. However, the first step in a skills-based approach is to define and articulate what the specific skills are. This has been the focus of Skills Bahrain's work in developing career maps and National Occupational Standards.

What is Work Based Learning?

Work based learning refers to learning while doing real work that is part of an occupation and eventually leads to the production of goods or a service. In the Financial Services sector this means skill or knowledge attainment that is applied to a real piece of work in the workplace. This could be, for example, writing a report, completing a compliance related procedure, doing research, problem solving for a customer, etc. All of these activities can be measured against a best practice standard (skill or behaviour standards).

The knowledge of how to do an activity is combined with the ability to do something and demonstrated through a job output and measured against a sector agreed skill standard. The work output is then formally assessed by a qualified assessor from a training provider or in-house.

Work based learning is always based on a sector agreed set of standards and is employer led. The demonstration of skill is more important than how that skill was attained. The skill may be attained through formal classroom training, online, self-directed, mentoring etc.

The focus is on the demonstration of the skill on the job, not the training process.

Work based learning as the basis for formal education is now one of the preferred Higher Education routes internationally. The rise of degree level apprenticeships shows how work based learning can be used for various professions as the classroom learning from a degree programme is assessed on the job.

Skills-Based Assessments (Competency Based Assessment)

Skills-based assessments require innovative assessment techniques that go beyond the traditional examination. Evidence-based assessments, enable participants to demonstrate skills without the need to memorise standard exam questions. This type of vocational assessment has been applied in the traditional apprenticeship learning model for many years. Some of the techniques used for evidencing and assessing these skills include 360-degree feedback, peer review, customer feedback, verified learning narrative, documented reflective insights, observation and professional mentor coaching conversations.

Formal psychometric assessment tools, such as the Saville or Hogan products, are widely used for recruitment in Bahrain's financial services sector. These psychometric tests offer insights into some areas of core skills and leadership competencies. These assessments can also form a base line for skills development, in particular 'aptitude' tests that assess reasoning and numeracy.

With the use of technology, there are now sophisticated methods for skills-based assessments for core foundational soft skills. Many Learning Experience (LX) and EdTech platforms include sophisticated digital systems to record evidence of skills. These systems build portfolios that track, evidence and verify the

application of learning on the job. This can be completed by a Line Manager or an assessor. Examples of such portfolios that include robust assessment mechanisms include VaMetric ³³.

The evidence-based approach to soft skill assessment is a new concept in Bahrain and requires a significant cultural change to take place before this is formally recognised. In order to start a process of skills-based assessment there needs to be a skill and behaviour taxonomy in place to ensure mutually agreed understanding of what skills and behaviours look like in practice. This would create a clear baseline that would support harmonised assessment outcomes. This process would then be formalised as part of education and BQA systems and also shared with the industry so there is an agreed understanding of what a specific skill means and looks like at different levels of proficiency.

The Role of EdTech

Short for 'Education Technology', the EdTech industry is exploding around the world with over 20 billion USD invested globally in 2021 alone ³⁴. The ability to design learning pathways, gamify learning and build credentialing and building solutions has dramatically increased the number of users. Corporates are also changing their learning and development strategies to embrace digital. It is seen as a cost effective and targeted way of achieving

skills growth in companies. The new 'agile' way of working with flexible office hours and remote working is also driving this change. The growth in EdTech and changing corporate learning strategies have created a new culture of learning on the job. Short nano and micro learning units provide employees the opportunity to learn on the go. When faced with a problem, it is possible to take a specific training course and then solve it directly. This approach to learning on the job has been called 'learning in the flow' to highlight the integration of learning and work ³⁵.

Learning as a Journey Rather Than a One-Off Event

Survey respondents pointed to the importance of embedding learning into an organisation and the need to align learning with talent strategy. The ability to design meaningful learning journeys is a skill that is often not included in the expected skill set of HR professionals in Bahrain. With easy access to training and support for training, some Telecommunications companies outsourced the development of learning journeys to training institutions. This is particularly the case with Leadership training where the development of learning programmes was often linked

to international universities. In many cases they created generic training programmes that, although of high quality, were often not directed towards the strategy and future skills requirements of the company, making the impact hard to measure.

Formal and Informal Skill Development

The following diagram explains how formal education systems can be complemented by on-the-job, formalised learning systems. As individuals move from graduation (novice) to expert, their ability to support skills development through less formal learning on the job increases to the expert level where learning may occur through reading industry insights or networking conversations with senior peers ³⁵.

The research in Bahrain indicates that the key area needing learning support is the Middle Management level, represented in this chart as 'literate' or 'capable'. This chart would indicate there is a significant role for less formal micro credentialing as part of the learning process for this middle layer of the sector.

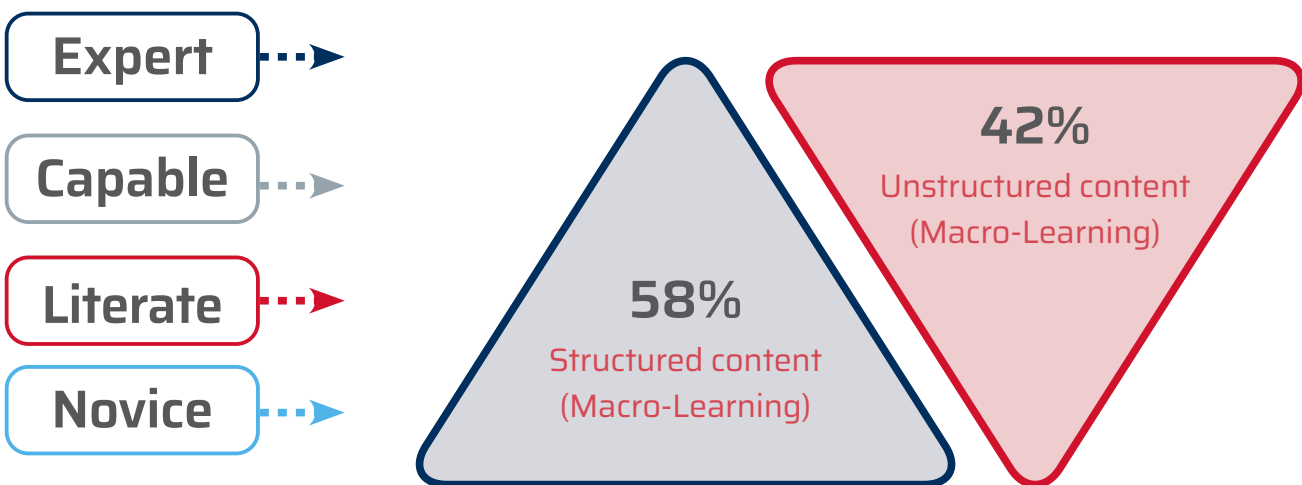


Figure 32 - The New Cycle of On the Job Learning (Source: Bersin, 2021)

In order to progress, the Telecommunications sector needs to define which skill sets are crucial to the development of the industry. In doing so, the sector will be able to provide a clear and concise portfolio of skills that will determine short- and long-term success. The current, extensive portfolio of courses offered in Bahrain needs to be rationalised with a clear focus on relevant skills and competencies. Investment can then be channelled appropriately to upgrade and continually improve curricula and ensure that learning outcomes are relevant. The training landscape will then naturally adjust to provide essential courses that enable business growth, with benchmarked certification routes. This will in turn lead to more effective learning and career pathways.

In parallel, the sector will also need to decide on the structure of an agreed skills framework that will support the sector by providing a common language and structure to the development of skills.

Learning and Development Strategies for Future Skills

One of the challenges facing industry leaders when it comes to sourcing and upskilling talent with 'future skills' is the ability to source quality training materials. As with the skills themselves, finding trainers and educational professionals with the knowledge to develop quality training is challenging, especially when wanting to align the training directly with the workplace. This becomes even more difficult when sourcing training materials locally, where there is a shortage of curriculum development skills. This leads to two outcomes:

1. A marketing boom for all courses that are in high demand. Data analytics, cybersecurity, AI and so on are sure sellers, and therefore become a key component of a training provider's portfolios.
2. A growth in online training that utilises technology to bring global training content to people all over the world.

The first outcome often leads to significant quality assurance problems. It is hard to measure learning outcomes and give accurate feedback to training providers as there is little in terms of a benchmark. Without a clear training impact strategy and alignment of learning outcomes to career maps and skills frameworks, it becomes easy to lose control.

The second outcome, while convenient, also has its shortcomings. A vast amount of content becomes available locally, without any way to manage quality outcomes, track delivery, assure

participation and track progress. The ability for companies to manage learning outcomes becomes more challenging as employees have far more freedom to learn flexibly. This online learning world also limits interaction and exchange and does not provide a consistent way to develop core skills.

Learning 'bites' Skills Mastery

Another interesting trend, when looking at future skills, is that they can in principle, be taught and mastered in a short amount of time if a person has a good baseline skill set and good digital literacy. According to Coursera, it could take just one to two months to acquire one of its top 10 mastery skills in emerging professions across people and culture, content writing, and sales and marketing. It could take two to three months for learners to expand their skills in product development and data and AI, while a four-month learning programme could help people move into roles in cloud computing and engineering.



Figure 33 - Time Taken to Learn New Skills (Source: Coursera, 2021)

Such figures suggest that although learning a new skill set is increasingly accessible through digital technologies, individuals will also need the time and funding to be able to pursue new opportunities ³⁶.

An outcome of this is the growth of micro and nano learning strategies.

6.3. Microlearning IBM Case Study ³⁷

IBM Example Using Microlearning to Develop Cloud Expertise

IT professionals and web developers using the IBM Cloud platform often had a number of 'how-to' questions that cropped up as they were using the platform. Through microlearning, IBM found a better way to answer these questions.

IBM's Challenge: Employees working with IBM Cloud often need to develop some key skills each time they handle a project. And they needed to develop these skills quickly. They could not wait for scheduled training classes and practice labs every time they had a project or an assignment.

IBM's Solution: In 2018, IBM launched IBM Micro Learning, a platform that helped employees to develop cloud expertise at their own pace. The platform consisted of a number of exercises, each of which answered a specific question and helped employees develop a specific skill.

Why the Solution Worked: The IBM microlearning platform offered employees a quick, focused, and easily accessible way to develop the skills they require. Employees can access the platform at any time during their day and work their learning according to their own pace. The short-spaced lessons do not overwhelm employees with information, rather, it helps them develop their knowledge quickly and efficiently.

6.4. Evidencing Skills Through Education

Discipline based education is rapidly becoming outdated and the need for skills-based approaches to education are becoming mainstream. The vocational education sector has been at the forefront of work-based learning, providing hands-on, job-based skills training. Traditionally vocational education and apprenticeship schemes have been linked to the blue-collar sector, but now degree apprenticeships within the UK are becoming the norm. Internationally, higher education is moving towards focusing on evidencing the skills of graduates, rather than just their qualifications.

This change requires a much closer relationship between academia and industry. Skills portfolios are being used widely across education, including at the PhD level in response to the growing need for skills-based recruitment and employments. While this type of approach is obvious for professionals with tangible outputs as evidence of skill, it is also relevant for soft skills and leadership skills.

Sector agreed National Occupational Standards and the skills and behaviours proficiency descriptors can be used by higher education to map skills to curricula and for curriculum design. This brings higher education closer to the needs of employers.

6.5. Massive Upskilling at AT&T Case Study

Examples of massive workforce upskilling provide an insight into what is possible when the sector works closely with all stakeholders to ensure its workforce is future proof. The following case study from AT&T highlights how the coordination of business strategy, talent strategy and installing self-determination in employees helped to avoid sector layoffs and ensure the workforce was able to transition into the future.

AT&T Massive Workforce Upskilling ³⁸

AT&T recognised the need to move from being a phone company to a business solutions company and respond to changes in the market. Executives recognised the potential for workforce crises where employees were to lose their jobs if they didn't change their skills set, so AT&T set about plans to retrain 100,000 employees.

Part of the transformation involved changing AT&T's business model from a focus on technology and operations to a focus on ICT and operations with a focus on adopting a 'devops' philosophy. Aligned with this was their talent strategy, called Workforce 2020. This strategy created a blueprint for workforce transformation that involved:

- Reinventing and simplifying current job roles
- Providing career roadmaps for skills-based job matching
- Collaborating with education providers to create curricula for high demand complex skills
- Creating education and upskilling tools
- Creating alternative talent pipelines
- Integrating retrained workers into the agile ecosystem to maximise innovation

Simplifying job roles - As a starting point, Line Managers were asked to design future role profiles for all employees. Job roles were simplified and restructured to allow for greater mobility between jobs. This minimised 2,000 job titles into 250 job roles.

Career Maps - Profile tools were used to create career maps and pathways. Using LinkedIn, employees could create a career profile page with experience, credentials and skills to help with identifying other opportunities within the company and what upskilling would be needed to get them there.

Collaborate with education providers - Content for an AT&T University was developed utilising MOOCs and EdTech solutions to help employees upskill. Additionally, bachelor's and master's qualifications were identified and aligned with Skills Gaps where more formal upskilling was needed

Education tools - were created and aligned to in-house development. Nano degree providers were integrated as part of the upskilling programmes. This included creating a Collaborative Experiential Learning Lab (CELL) to help with advanced technical training in areas such as big data, agile dev tactics, cloud, etc

Alternative talent pipelines and agile integration - Alternative talent sources were identified, and partnerships made. For example, 'Girls Who Code' was a not-for-profit organisation which cultivated skills in technology and provided a clear talent pipeline. The skills-based career profiles allowed for agile teams to be formed easily and knowledge to be shared as silos were broken down.

Impact - Beside the impressive numbers of people training, upskilling, requalifying and undergoing other formal changes, the key impact was that many employees were able to be retained in employment within AT&T or move to other quality jobs out of the sector. This enhanced employee engagement and reduced the impact of layoffs as all employees were empowered to take responsibility for their own career development and learning within the organisation to avoid becoming redundant.

The ultimate indicator of success is the significant increase in business performance and innovation that has allowed AT&T as a legacy organisation to remain competitive in the face of digital native new joiners to the sector.

6.6. Conclusion: The Development of Future Skills for the Sector

The global shortage of digital skills is driving a war for talent that goes beyond borders. Data analytics, cloud computing, cybersecurity, AI & ML and blockchain skill sets are in high demand across industry sectors. From Finance, to Logistics, to Retail and Telecommunications, these skills will become increasingly important. The speed at which the industry is changing, creates a challenging scenario where skill demands, and skill forecasting are in a constant state of flux.

New models of attaining and assessing skills have become standard for the Telecommunication industry internationally looking to create agile skills-based teams. Research indicates that skills-based recruitment is more effective and organisations that regularly assess and monitor skills across their organisations are better prepared for the future.

The new world of learning provides alternatives and new opportunities for organisations to better align talent strategy

with business outcomes. Implementing a system of evidencing skills on the job, rather than focusing on qualifications, allows various forms of learning and assessment to be included into individual learning journeys as appose to one off training events.

Technology can play a role in supporting organisations with tracking and assessing skills. Likewise, skills portfolios are now the norm in many sectors internationally, including Telecommunications.



07

The Telecommunications Sector The Way Ahead – Key Priorities



The following outlines the key priorities for the sector to begin addressing some of the skill challenges outlined in this report. The suggested areas of focus and are designed to prompt a call for action between the sector and education, and training and funding agencies. It is clear the sector is grappling with a number of specific skill challenges, especially around the technological skills required to support the transition from traditional telecommunications to ICT and communications.

The priorities here are NOT presented in any specific order of importance. The priorities outlined below will have different levels of importance to different audiences and stakeholders in the sector. They are designed to initiate action and sector-wide engagement to ensure the key challenges outlined in this document are addressed.

7.1 Summary of Future Skills and Development Needs for Each Job Family

As the nature of work in each Job Family changes, there are new skills required and alternative pathways to enter the sector and attain the skills.

The table below lists all the families showing the focus areas for skills development and the level required for both core and technical skills for each. It also outlines potential pathways for entry into each Job Family directly from high school.

Job Family, Skills and Potential Pathways for Bahrain

Job Family	Upskilling Core Skills and Behaviours	Upskilling Technical Skills	Role Convergence/ Higher Skill Requirements	Alternative Entry to First Job (Direct from High School)
Infrastructure	<ul style="list-style-type: none"> • Critical thinking L3 • Commercial Awareness L3 • Process Optimisation L3 • Analysing L4 • Finding and Using Data L4 • Agility L3 	<ul style="list-style-type: none"> • Cloud Computing • Spectrum Re Farming • Networking • Vendor Specific Networking Certification • Project Management • Designing and implementation of LAN, WAN, Wireless LAN, and WWAN 	No risk of convergence	Apprenticeship Examples Include: <ul style="list-style-type: none"> • Information Communications Technician - Support - AWS • Information Communications Technician - Support - CompTIA • Telecommunications Tower Technician • Wireless Technician • Telecommunications Tower Construction Lead • Maintenance & Condition Assessment Lead • Maintenance & Condition Assessment Foreman • Fiber Optic Technician • Underground Utility Installer Technician • Overhead Utility Installer Technician • Small Cell Technician³⁹
Software Applications	<ul style="list-style-type: none"> • Innovation and Creativity L4 • Critical Thinking L3 • Commercial Awareness L4 • Finding and Using Data L3 	<ul style="list-style-type: none"> • 5G and Edge Computing • Industrial IoT, AR, VR • Programming and Coding • Robotic Process Automation • User Experience (UX)/User Interface (UI) 	No risk of convergence. Growth in the industry due to 5G; need for telecom engineers will increase	DevOps Engineer Diploma/ Degree Apprenticeship L6, L7, L8 ⁴⁰ Software Development Apprenticeship L6
Strategy, Governance and Regulatory	<ul style="list-style-type: none"> • Commercial Awareness L4 • Critical Thinking L3 • Analysing L3 • Using and Finding Data L3 • Collaboration and Influence L4 	<ul style="list-style-type: none"> • Data Analytics • Data Design • Big Data • Prototyping and Wireframing • AI • Product Development • UX/UI 	Product design and development can be affected due to the rapid changes in the sector and the continuous effect of new technology. Regulatory and legal will continue to change as telecom is starting to merge with other sectors	Digital UX Professional (Integrated Degree) ⁴¹ Regulatory Compliance Officer Apprenticeships L6 ⁴²

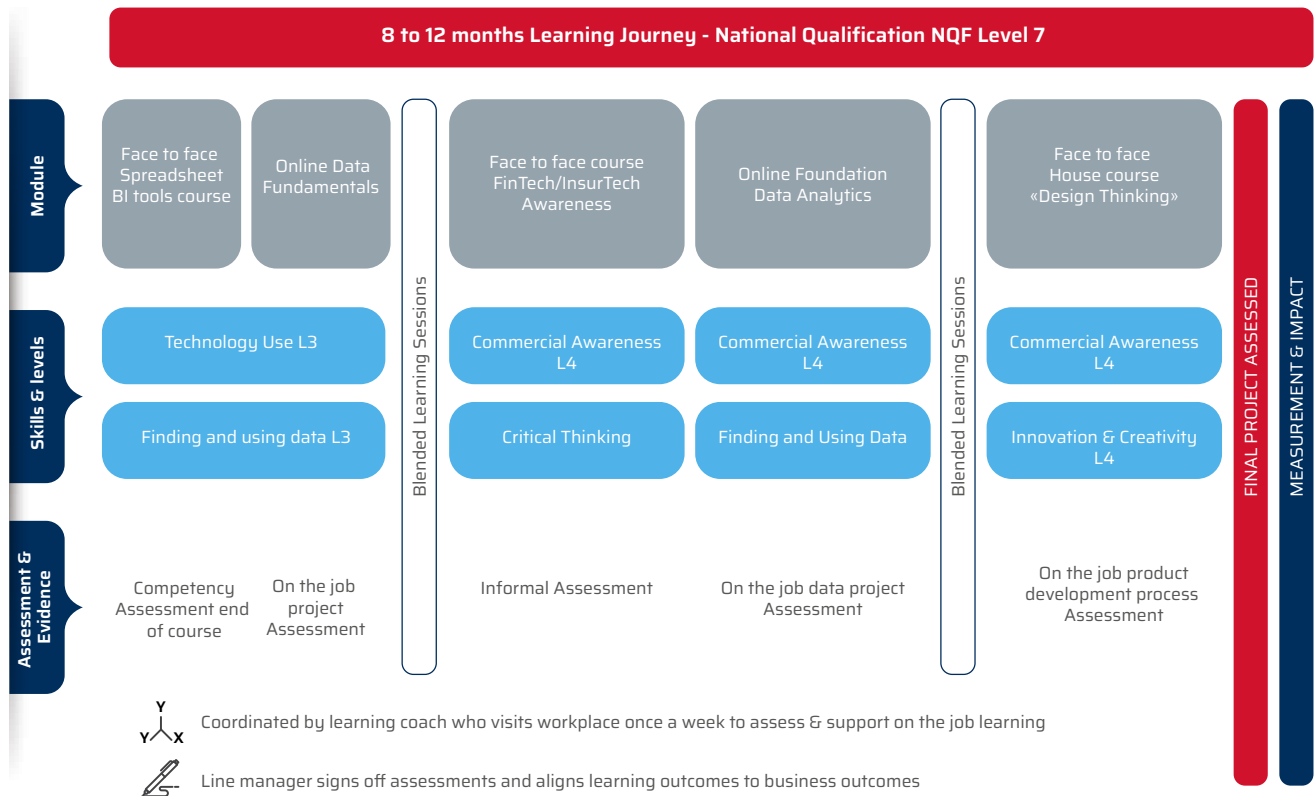
Operations and Support Job Family	<ul style="list-style-type: none"> Analysing L3 Collaboration and Influence L3 Emotional Intelligence L4 Process Optimisation L3 Finding & Using Data L4/L5 	<ul style="list-style-type: none"> AI Big data Cloud Computing Data Engineering Robotic process automation 	Process automation is highly affecting current and future jobs of this Job Family	Control Technical Support Engineer Degree Apprenticeship L8
Sales and Marketing	<ul style="list-style-type: none"> Finding and Using Data L3 Emotional Intelligence L4 Critical Thinking L3 Commercial Awareness L3 (higher for B2B) Innovation and Creativity L3 	<ul style="list-style-type: none"> Product Development Product Testing Sales Skills Design Thinking Digital Marketing Customer Journey/ Experience Mapping 	Risk of convergence - customer service and product - higher levels of data analytics insight for tailored products both B2C and B2B	Customer Service Apprenticeship L6
Data and Digital	<ul style="list-style-type: none"> Commercial Awareness L3-L5 Collaboration and Influence L3 Critical Thinking L4 Analysing L3 Finding and Using Data L5 Innovation and Creativity L3 	<ul style="list-style-type: none"> Data Science Text Analysis Data statistics Machine Learning AI Specialist 	Convergence sees these roles move from purely data roles to commercial roles with data insights	<ul style="list-style-type: none"> Data Analytics Technician L6/L7 Data Science Apprenticeship L7/L8 AI Apprenticeship Machine Learning Apprenticeship
Cybersecurity	<ul style="list-style-type: none"> Critical Thinking L4 Analysing L3 Finding and Using Data L5 Commercial Awareness L3-L5 	<ul style="list-style-type: none"> Cyber Risk Analysis Threat Detection CompTIA IR Management Network Security Cyber and Data Breach Incident Management Cyber Forensics Security Governance Audit and Compliance Penetration Testing 	No role convergence, this role is likely to expand into specialist areas	Information Communications Technician - Support - CompTIA

Priority One - Address the Urgent Need for Technical Upskilling and Reskilling of Employees in the Sector

With a third of the sector working in the sales and marketing Job Family, there is an urgent need to ensure these employees develop additional skills and can transition into other roles as roles converge and change. This is to not only avoid job loss, but to ensure employees with customer experience and product knowledge can be utilised in product development or other roles.

As outlined in the summary table above, there is a need for all Job Families in the sector to develop a level of data analytics understanding as a core skill in the sector. In addition, the sector needs to train in various technical areas, outlined previously.

As discussed previously, teaching technical skills in isolation is not as effective as when the technical skill includes additional commercial/product related skills, and core skills and behaviours are embedded within training. Therefore, it is recommended that a 'learning journey approach' is used for the development of both soft and technical skills. It is essential to ensure programming is pitched at the right level for employees. Accordingly, a basic assessment of their core capability against the technical skill is necessary before committing them to a technical course. For example, if an employee does not have core statistics and standard deviation understanding, they will not be successfully enrolled in a data analytics course. The following outlines an example of how technical and soft skills might be developed using skills standards on a learning journey approach.



Call to Action Priority One – Support the sector to develop specific learning journeys around the technical skills required, in particular ‘finding and using data’ (data analytics) to be rolled out to those in the Sales and Marketing Job Family.

Priority Two – Build Learning and Development around Skills and Behaviour Standards

The National Occupational Standards outline the core and technical skills needed to create a benchmark of the level of skills and behaviours required. Outlined in the National Occupational Standards, job specific technical skill standards spotlight specific skills and define the level of proficiency for that skill. These should form the basis for any technical development.

A standards-based approach to learning and development allows an agreed taxonomy across the sector of skills and the expected proficiency at each level. They also facilitate conversations between the sector and training and development professionals, ensuring that all requirements are clearly articulated based on the skills descriptors. Skills and behaviour standards can also be used by sector professionals for performance management to align them to an existing competency framework.

Call to Action Priority Two – Share technical skill standards for areas identified as needed in the future with HR Managers in the sector. These include the technical skill proficiency descriptors for: cybersecurity, cloud computing, data analytics, data science,

machine learning, AI, UX/UI, and other relevant software development and programming proficiency descriptors used for the National Occupational Standards for the Telecommunication sector.

This will support the sector and training providers in understanding skills and behaviour standards and occupation specific National Occupational Standards, including how to use them for a skills-based approach to learning and development and performance management. This includes embedding core skills and behaviours into specialist technical training.

Priority Three – Evidence of Impact and Skill Progression in the Workplace

More robust mechanisms need to be in place to demonstrate skill attainment and development from investment in learning and development. Ideally, assessments are directly aligned to an individual’s work. Current training models do not lend themselves to the alignment of skill attainment and the workplace. Within a work-based learning model, the attainment of skills is demonstrated through the application of the skill in real work. There are various vocational assessment techniques that can be applied to bring workplace and evidence of learning closer together. These may include: observation, professional conversation, training others, and project-based work outputs.

Call to Action Priority Three – Mechanisms for linking learning

and development to impact should be made mandatory for all learning and development investments. These include meaningful application of work-based assessment practices and use of skill standards to design pre and post assessments. Other mechanisms for assessing the impact of learning on the job include: learning and assessment coaches in the workplace; psychometric tests, Return on Investment (ROI) metrics; and performance appraisal systems linked to skill standards.

Priority Four - The Changing Role of Training Providers

Effective training is aligned to the workplace. The Telecommunications sector in Bahrain needs to move from a traditional classroom-based model to an on-the-job application model that includes numerous learning modalities, including online, mentoring, self-directed learning, etc. Training providers need to change from face-to-face delivery to taking a 'learning and assessment coach' role and going to the workplace of learners for more aligned learning and assessment. Quality assurance of training providers needs to include their competence in supporting work-based learning. BQA and other regulatory organisations need to align their quality systems to include work-based learning. "The focus needs to be on demonstrating skill attainment, not on the mechanism by which the skill was learnt."

Call to Action Priority Four - Bahrain training providers upskill to ensure they are prepared to support work-based learning and assessment models and meaningful work-based learning such as apprenticeships. This includes going into the workplace to assess the application of technical skills, where relevant.

Priority Five - Upskill People Managers in the Sector to support Work-Based Learning

Work-based learning can only be as effective as those supervising and mentoring learners. Bahrain employers in the sector need support to understand work-based learning and assessment models and how standard based skill development is demonstrated and assessed in the workplace. As Line Managers will play an important role in the learning process, they need to be supported to effectively mentor learners and recognise the attainment of skills on the job.

Likewise, many Human Resource professionals in the sector will need support to develop work-based learning as the key learning and development strategy for their organisations. HR will need to understand how skills and behaviour standards can be used to support on-the-job skill development and performance management.

Call to Action Priority Five -

- Support people managers across the organisation with mentoring and on-the-job learning support skills
- Support HR managers in the sector to understand how to use skills and behaviour standards and the principles and practices of work-based learning

- Help HR managers to understand how to design and support a learning journey approach to learning and development and move away from one off training events

Priority Six - Sector Integration with Higher Education

The sector needs more input into higher education programming. This may include insisting that sector agreed skill standards form the basis for curricula. University business collaboration is essential to ensure better alignment between what is taught in Business Administration education and what the sector needs. This includes both the core skills and behaviours (also called employability skills) and the discipline specific technical skills.

Call to Action Priority Six -

- Establish a sector-led Sector Skills Taskforce to approve skills and behaviour standards and Occupational Standards that can be shared with Higher Education Institutions for use in curriculum and assessment design
- Skills Bahrain to support higher education institutions to understand how to use standards and embed them into curricula

Priority Seven - Career Development and Career Guidance

The lack of information about jobs and career pathways in the sector makes it difficult for graduates to properly assess the best route for them in the labour market, and how their skills best meet labour market demand. Career guidance in Bahrain needs to follow international best practice where agencies work together to ensure quality career guidance is delivered to job seekers, school students, Higher Education students, parents and employees. A recent review of career guidance in Bahrain by the Ministry of Labour (MOL) identified weaknesses in the system in Bahrain and made recommendations that included implementing the UK-based Gatsby Standards for career counselling. These standards provide a benchmark for a national system of career guidance and include applying labour market intelligence to career advice, ensuring those working in career guidance are professionally trained and qualified for the role, and offering meaningful career insights to students and employees.

Call to Action Priority Seven - National agencies responsible for career guidance to develop a robust career guidance system for Bahrain. Skills Bahrain publications can be used to inform various audiences on sector specific career pathways and occupations.

Appendix One – Scope of the Sector for Research

MolCT CODES	Activities
61-1	Telecommunication Activities - Individual License for Internet Exchange
61-10	Telecommunication Activities - Individual License for Public Access Mobile Radio Services
61-11	Telecommunication Activities - Individual License for Very Small Aperture Terminal (vsat)
61-12	Telecommunication Activities - Individual License for National Wireless Services
61-13	Telecommunication Activities - Fixed Telecommunications Infrastructure Network License
61-2	Telecommunication Activities - Class License for Internet Services
61-3	Telecommunication Activities - Individual License for International Telecommunications facilities
61-4	Telecommunication Activities - Individual License for International Telecommunications services
61-5	Telecommunication Activities - Individual License for Mobile Telecommunications
61-6	Telecommunication Activities - Class License for Value Added Services
61-7	Telecommunication Activities - Individual License for National Fixed Services
61-8	Telecommunication Activities - Individual License for Public Access Mobile Radio Services
61-9	Telecommunication Activities - Individual License for Very Small Aperture Terminal (VSAT) for Private Purposes Only
619001	Internet/ Call Cabins
4652	Sale and Installation of Telecommunications Equipment and Parts
474	Sale/Trade of Information, and Communications Equipment and Related Software
9512	Repair of Communication Equipment

The Categories and Subcategories included within the scope of this research

Categories	Subcategories
Class License	Class License for Internet Services
	Class License for Value Added Services
Individual License	Fixed License for Telecom Infrastructure Network
	Individual License for Telecom International Facilities
	Individual License for Telecom International Services
	Individual License for Mobile Telecom Services
	Individual License for National Fixed Services
	Individual License for National Fixed Wireless
Individual License for Very Small Aperture Terminal (VSAT)	
Telecom Vendors	Telecom Vendors

Appendix Two - Example of a Skills Bahrain Level Proficiency Descriptor for Finding and Using Data

Skill/ Behavior Standard	Finding and Using Data Skill					مهارات البحرين Skills Bahrain
Pillar	Performance Drivers					
Definition	The competent use of sourcing, analysing and using data to enhance business insights					
Descriptor	Level 1 (Level 3&4) High School	Level 2 (NQF Level 5&6)	Level 3 (NQF Level 7) SECTOR MINIMUM	Level 4 (NQF Level 8)	Level 5 (NQF Level 9)	
Description	The ability to identify, extract and analyse simple information	The ability to extract, analyse and make sense of information to form a holistic statistical descriptive analysis and generate findings	The ability to access, manage, understand, integrate, communicate, evaluate, and perform descriptive and inferential analysis appropriately. Seeks to include data insights as part of a routine work practice	The ability to apply advanced data analytics solutions to routine business requirements through diagnoses of business data needs and using relevant programming languages to access, mine, clean, validate, model, integrate, communicate, and analyse information to visuals that can be used to offer business insights and support decision making	An expert level ability to apply detailed data analytics solutions to 'big data' modelling and management, data warehousing, data staging, predictive modelling, and business scenarios analytics. Is able to model, integrate, communicate, analyse complex unstructured information. Designs new models and tools to extract deep data insights	

Descriptor	Level 1 (Level 3&4) High School	Level 2 (NQF Level 5&6)	Level 3 (NQF Level 7) SECTOR MINIMUM	Level 4 (NQF Level 8)	Level 5 (NQF Level 9)
Knowledge	<ul style="list-style-type: none"> • Foundation knowledge of data terminologies, research and enquiry methods • Basic knowledge of spreadsheets • Understands qualitative versus quantitative data • Using search engines 	<ul style="list-style-type: none"> • Applied knowledge of research methods • Applied knowledge of basic statistics • Uses spreadsheets and BI tools to perform calculations and graphs • Understands the types and sources of data used in business 	<ul style="list-style-type: none"> • Knowledge of simple mathematical and statistical techniques for descriptive statistics • Understands the principles of median/mode/mean, variance, and standard deviations • Understands core principles of data analytics and its business application • Analyses charts and graphs for business insights • Understands data flows and structures • Understands data models and their relationships to datasets and data tables • Ability to perform basic ETL operations on datasets • Applied knowledge of the commercial uses and application of data in Financial Services 	<ul style="list-style-type: none"> • Basic application of query languages and other data related languages • Basic applied knowledge of mathematical and statistical techniques for descriptive, prescriptive, predictive, and diagnostic analytics • Building data models using datasets • Ability to explore and structure data into manageable formats • Ability to perform advanced ETL operations on datasets • Ability to integrate APIs into data models • Create advanced visualisations to aid in decision making • Applied knowledge of the commercial uses and application of data in Telecommunications Services 	<ul style="list-style-type: none"> • Advanced application of query languages and other data related languages • Advanced applied knowledge of mathematical and statistical techniques for descriptive, prescriptive, predictive, and diagnostic analytics • Ability to perform expert-level ETL operations on datasets • Analyses and structures complex data into manageable formats • Develops, selects, and/or applies algorithms and advanced computational methods to enable systems or software agents to learn, improve, adapt and produce desired outcomes or tasks (machine learning) • Ability to critique and perform in-depth analysis of visualisations to aide in decision making • Applies data modelling techniques to explore and address specific data requirement • Applied knowledge of the commercial uses and application of data in Telecommunications Services

Descriptor	Level 1 (Level 3&4) High School	Level 2 (NQF Level 5&6)	Level 3 (NQF Level 7) SECTOR MINIMUM	Level 4 (NQF Level 8)	Level 5 (NQF Level 9)
Abilities	<p>Demonstrated by:</p> <ul style="list-style-type: none"> • Uses spreadsheets to perform basic calculations • Performing simple research and reporting findings • Using known structured quantitative and qualitative data sources appropriately 	<p>Demonstrated by:</p> <ul style="list-style-type: none"> • Applies basic research methods for data collection • Supports data preparation from existing sources • Understands principles of data quality and credibility • Assists with the creation of intelligence reports using standard business tools • Identifies simple patterns in data to draw meaning • Uses spreadsheets to perform simple data calculations • Uses spreadsheets to create a graph • Understands how internet search engines work • Understands the principles and laws of personal data protection 	<p>Demonstrated by:</p> <ul style="list-style-type: none"> • Uses spreadsheets and/or BI tools to perform simple analytics and visualise data • Applies data visualisation to draw conclusions for reporting on business intelligence • Effectively sources credible data • Uses a data visualisation tools to design and create data visuals • Communicates conclusions of data, both through visuals and narrative, effectively to a target audience to augment comprehension of new information • Demonstrates algorithmic literacy (understanding bias in AI systems or how a search engine system works) in how they source and critically evaluate data and information • Understands the terminology of data analytics and knows how to communicate with technical expertise • Follows national level and organisational-level data and privacy related policies and regulations 	<p>Demonstrated by:</p> <ul style="list-style-type: none"> • Applies query languages or other programming/coding languages to perform data analytics • Mines and cleanses data for analytical use • Applies excellent mathematical and statistical skills to programming and analysis work • Turns unstructured data into data models • Communicates conclusions of data, both through visuals and narrative, effectively to a target audience to augment comprehension of new information • Applies sector, organisation and product knowledge to data insights • Creates algorithms and predictive models for future business insights • Translates business needs into data models for deeper data insights • Follows national level and organisational-level data and privacy related policies and regulations and applies international standards and best practices related to data usage • Follows national level and organisational-level cybersecurity related policies and regulations 	<p>Demonstrated by:</p> <ul style="list-style-type: none"> • Translates business needs into data models for deeper data insights • Effectively applies query languages or other programme languages to design and perform macro level data analytics • Communicates conclusions of data, both through visuals and narrative, effectively to a target audience to augment comprehension of new information • Applies advanced techniques data cleansing and data mining for analytical use • Creates advanced algorithms and predictive models for future business insights • Where relevant applies command line tools, data infrastructure tools such as cloud platforms, big data frameworks and machine learning tools • Applies sector, organisation and product knowledge to data insights skills to programming and analysis work

Appendix Three - The Companies included in the Scope of this Research

- Bahrain Telecommunications Company (BATELCO) BSC
- BNET BSC
- BT Solutions Limited (Bahrain Branch)
- Equant Global Network - Foreign Branch (EGN BV)
- Etisacom Bahrain Company W.L.L
- Golden Sands Electronics & Phone
- Gulf Electronic Tawasul Company
- IMC Telecom W.L.L
- Infonas W.L.L
- iWire Global - Bahrain W.L.L
- Mobitel Communications W.L.L
- North Star Technology Company W.L.L
- Nuetel Communications SPC
- Rapid Telecommunications W.L.L
- Societe Internationale de Telecommunications Areonautiques - SITA
- STC Bahrain BSC Closed
- VIACLOUD W.L.L
- Vodafone enterprise bahrain W.L.L (Formerly Cable & Wireless worldwide Bahrain W.L.L)
- Zain Bahrain BSC
- Zain global communications services SPC (Formerly MADA communication company SPC)
- Zajil information technologies international W.L.L
- Kalaam telecom Bahrain company BSC
- Huawei technologies Bahrain W.L.L
- Ericsson AB
- Teleserv telecom services W.L.L
- Ascentech services CO. W.L.L.
- Cisco Bahrain W.L.L
- Silah
- Horizon telecom services company W.L.L
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