ARTIFICIAL INTELLIGENCE (AI)
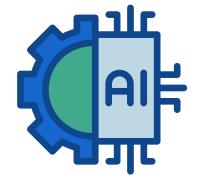
DEFINITION

THE **ABILITY** OF A **MACHINE** TO DISPLAY **HUMAN-LIKE CAPABILITIES** SUCH AS REASONING, LEARNING, PLANNING & CREATIVITY

4 AI USE CASES

AI FOR NETWORK ROLL-OUT AND OPERATION

AI FOR PRODUCTS & SERVICES

BACK-OFFICE AI

FRONT-OFFICE AI

TELECOMS & AI

AI TRANSFORMS TELCOS BY OPTIMIZING NETWORK OPERATIONS, ENHANCING CUSTOMER SERVICE, AND DRIVING INNOVATION THROUGH ADVANCED DATA ANALYSIS AND AUTOMATED PROCESSES

SUSTAINABILITY THROUGH AI

ENERGY AND RESOURCE OPTIMIZATION (incl. emissions reduction)

STREAMLINED OPERATIONS

ENABLING OF SUSTAINABLE SOLUTIONS

ECONOMIC & SOCIAL IMPACTS

AUTOMATION-REDUCED HEALTH AND SAFETY HAZARDS

STREAMLINED ADMINISTRATIVE PROCESSES
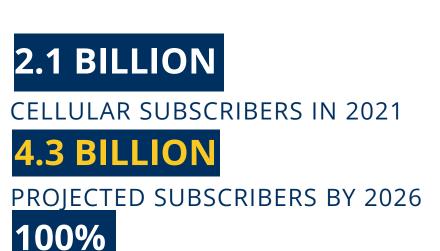
TRANSFORMATION OF SKILL PROFILES

INTERNET OF THINGS (IoT)

DEFINITION

PHYSICAL OBJECTS EMBEDDED WITH SENSORS AND ACTUATORS **THAT COMMUNICATE THROUGH WIRED OR WIRELESS NETWORKS** (E.G. SMART HOME SYSTEM)

IOT: IMMENSE MARKET

2.1 BILLION
CELLULAR SUBSCRIBERS IN 2021

4.3 BILLION
PROJECTED SUBSCRIBERS BY 2026

100%
EXPECTED GROWTH IN ONLY 5 YEARS

NORTH AMERICA

WESTERN EUROPE

CHINA

TELECOMS & IoT

IoT INVOLVES PHYSICAL OBJECTS EMBEDDED WITH **SENSORS AND ACTUATORS** THAT COMMUNICATE THROUGH WIRED OR WIRELESS NETWORKS. **TELECOMS ENABLE IoT AND CAN LEVERAGE IT** TO MANAGE MULTIPLE NETWORK DEVICES EFFECTIVELY.

SUSTAINABILITY THROUGH IOT

ENABLING OF SUSTAINABLE SOLUTIONS

COST REDUCTION

OPTIMISED/ REDUCED ENERGY CONSUMPTION

ECONOMIC & SOCIAL IMPACTS

TRANSFORMATION OF SKILL PROFILES

ENHANCED OPERATIONAL EFFICIENCY

HEALTH AND SAFETY IMPROVEMENTS

5G NETWORKS

etno | UNI global union europa

DEFINITION

FIFTH-GENERATION MOBILE NETWORK, OR 5G, IS THE LATEST ITERATION OF CELLULAR TECHNOLOGY.

IT IS CONSIDERED A PIVOTAL TECHNOLOGY FOR INNOVATION AND DIGITAL TRANSFORMATION BY THE EUROPEAN COMMISSION

5G VS 4G

LOWER LATENCY

SIGNIFICANTLY FASTER

ENHANCED CONNECTIVITY

UP TO 100x MORE DEVICES SUPPORTED

72% EU POPULATION COVERAGE (2022)

TELECOMS & 5G

5G TECHNOLOGY OFFERS ENHANCED BANDWIDTH AND CONNECTIVITY TO ENABLE INNOVATIONS SUCH AS SMART CITIES, TELEHEALTH, AUTONOMOUS VEHICLES, AMONG OTHERS.

SUSTAINABILITY THROUGH 5G

ENABLING OF SUSTAINABLE TECHNOLOGIES

TRANSITION TO A CONNECTED SUSTAINABLE SOCIETY

REDUCED ENERGY CONSUMPTION
compared to its predecessors

ECONOMIC & SOCIAL IMPACTS

UPSKILLING OF TELECOM WORKERS

ORGANISATIONAL MONITORING POSSIBILITIES

IMPROVED CONNECTIVITY FOR REMOTE WORK

EXTENDED REALITY (XR)

DEFINITION

EXTENDED REALITY REFERS TO **VIRTUAL REALITY**, **AUGMENTED REALITY**, **MIXED REALITY**, AS WELL OR ANY OTHER POTENTIAL DIGITAL REALITY ON THE **REALITY-VIRTUALITY CONTINUUM**.

THEY **BLEND DIGITAL CONTENT WITH THE REAL WORLD**, CREATING IMMERSIVE EXPERIENCES.

REALITY-VIRTUALITY CONTINUUM
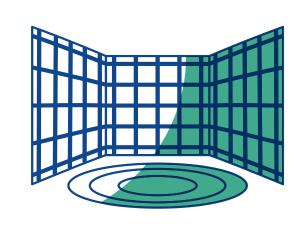
REAL ENVIRONMENT

AUGMENTED REALITY

AUGMENTED VIRTUALITY

VIRTUAL REALITY

TELECOMS & EXTENDED REALITY

EXTENDED REALITY TECHNOLOGIES ENABLE TELCOS TO D**ELIVER IMMERSIVE EXPERIENCES, STREAMLINE OPERATIONS, AND INNOVATE IN NETWORK DESIGN AND CUSTOMER SERVICE**, THEREBY DRIVING DIGITAL TRANSFORMATION.

SUSTAINABILITY THROUGH XR

REDUCED CARBON FOOTPRINT

EFFICIENT DATA CENTRE MANAGEMENT

REMOTE CUSTOMER SERVICE APPLICATIONS

ECONOMIC & SOCIAL IMPACTS

IMPROVED SITUATIONAL TRAINING FOR EMPLOYEES

INCREASED OCCUPATIONAL SAFETY

OPPORTUNITIES FOR REMOTE WORK

CLOUD COMPUTING

DEFINITION

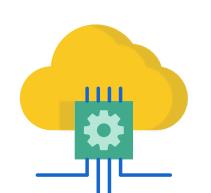A TECHNOLOGY THAT **PROVIDES INTERNET-BASED ACCESS TO STORAGE, PROCESSING, AND APPLICATIONS**, OFFERING A COST-EFFECTIVE, SCALABLE WAY TO USE COMPUTING RESOURCES WITHOUT OWNING HARDWARE OR SOFTWARE.
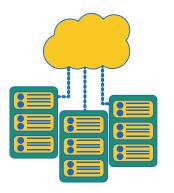
CLOUD COMPUTING: APPLICATIONS

CLOUD-BASED NETWORK FUNCTIONS

CLOUD-BASED CUSTOMER RELATIONS

CLOUD-BASED DATA ANALYTICS

CLOUD-BASED SECURITY

TELECOMS & CLOUD COMPUTING

CLOUD COMPUTING REVOLUTIONISES TELECOMS BY **ENHANCING NETWORK FUNCTIONALITY, CUSTOMER RELATIONS, DATA ANALYTICS, AND SECURITY**, OFFERING SCALABILITY, COST EFFICIENCY, AND INNOVATIVE SERVICE DELIVERY.

SUSTAINABILITY THROUGH CLOUD

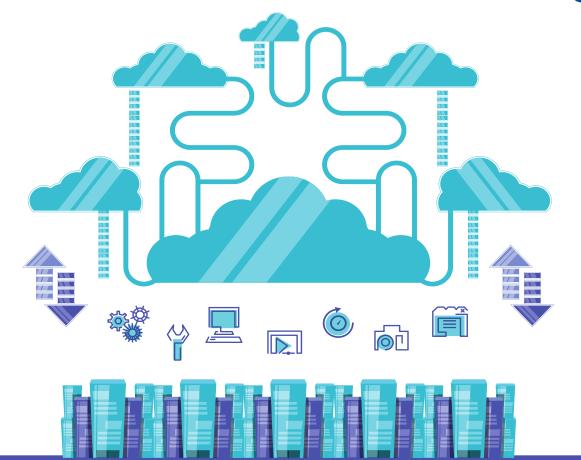HELPS ACHIEVE DECARBONIZATION GOALS

'GREEN CLOUD' ENERGY EFFICIENCY

DATA CENTRES OPTIMIZATION

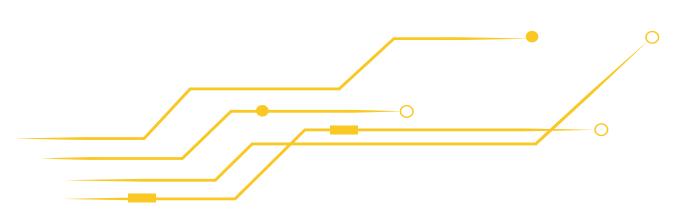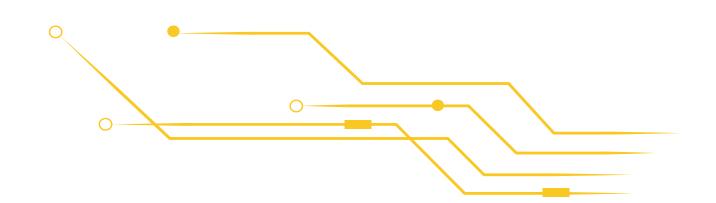## ECONOMIC & SOCIAL IMPACTS

TRANSFORMATION OF SKILL PROFILES

AUTOMATION OF ROUTINE TASKS
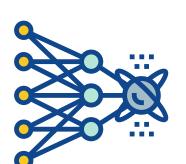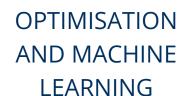
OPPORTUNITIES FOR REMOTE WORK

QUANTUM TECHNOLOGY

DEFINITION

QUANTUM TECHNOLOGY HARNESSES THE PRINCIPLES OF **QUANTUM MECHANICS TO CREATE ENHANCED NEXT GENERATION TECHNOLOGY SUCH AS COMPUTERS AND SENSORS**, CAPABLE OF FUNCTIONING MORE EFFICIENTLY THAN TRADITIONAL TECHNOLOGIES.

QUANTUM TECH: APPLICATIONS

OPTIMISATION AND MACHINE LEARNING

NETWORK & INFRASTRUCTURE SECURITY

DATA SECURITY & ENCRYPTION SERVICES

SENSING OF FIELDS FOR MEDICAL IMAGING

TELECOMS & QUANTUM TECHNOLOGY

QUANTUM TECHNOLOGY OFFERS GREAT POTENTIAL FOR TELCOS, **ENHANCING NETWORK EFFICIENCY, ENABLING ADVANCED DATA ANALYSIS AND AI SOLUTIONS, AND SIGNIFICANTLY IMPROVING CYBERSECURITY** THROUGH QUANTUM ENCRYPTION METHODS.

SUSTAINABILITY THROUGH QUANTUM

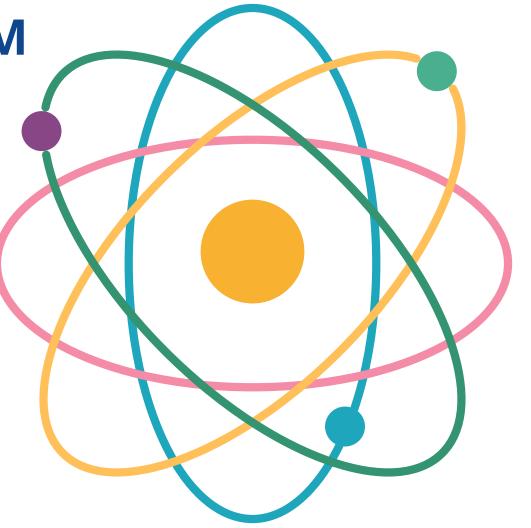ULTRA-SECURE DATA TRANSMISSION

NETWORK ENERGY OPTIMISATION USING QUANTUM COMPUTING

NETWORK RESOURCE OPTIMISATION USING QUANTUM COMPUTING

ECONOMIC & SOCIAL IMPACTS

TRANSFORMATION OF SKILL PROFILES

QUANTUM ENGINEERING SKILLS REQUIRED

NEW SECURITY THREATS TO CRIPTOGRAPHY

BLOCKCHAIN

DEFINITION

BLOCKCHAIN IS A DISTRIBUTED LEDGER TECHNOLOGY THAT SECURELY RECORDS AND VERIFIES TRANSACTIONS ACROSS A NETWORK OF COMPUTERS.
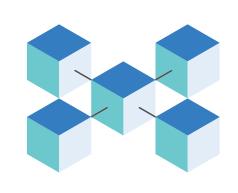
BLOCKCHAIN: APPLICATIONS

FRAUD DETECTION

SMART CONTRACTS

5G NETWORK ENHANCEMENT

SUPPLY CHAIN TRANSPARENCY

TELECOMS & BLOCKCHAIN

BLOCKCHAIN OFFERS TRANSFORMATIVE APPLICATIONS FOR TELECOMS, **ENHANCING DATA SECURITY, FRAUD PREVENTION, AND THE EFFICIENCY OF IOT CONNECTIVITY** THROUGH ITS DECENTRALIZED AND TAMPER-PROOF LEDGER SYSTEM

SUSTAINABILITY THROUGH BLOCKCHAIN

INCREASED SUPPLY CHAIN EFFICIENCY

BLOCKCHAIN-BASED PROXIMITY ENERGY GRIDS

INCREASED TRANSPARENCY OF CARBON CREDITS

ECONOMIC & SOCIAL IMPACTS

TRANSFORMATION OF SKILL PROFILES

SIMPLIFIED COMPANY PROCEDURES

ENHANCED DATA SECURITY & PRIVACY

DEFINITION

BIG DATA IS A LARGE COLLECTION OF INFORMATION FROM DIFFERENT SOURCES THAT IS OFTEN COLLECTED IN REAL TIME. **ANALYTICS** INVOLVES ANALYSING THIS DATA TO DISCOVER PATTERNS AND GAIN INSIGHTS FOR DECISION-MAKING.

BIG DATA & ANALYTICS: APPLICATIONS

FRAUD DETECTION

PERSONALIZED CUSTOMER EXPERIENCE

NETWORK OPTIMISATION

DATA-DRIVEN DECISIONMAKING

TELECOMS & BIG DATA

BIG DATA AND ANALYTICS EMPOWER TELCOS TO **ENHANCE CUSTOMER EXPERIENCES, OPTIMIZE NETWORK PERFORMANCE, AND MAKE DATA-DRIVEN DECISIONS** FOR IMPROVED SERVICE AND OPERATIONAL EFFICIENCY.

SUSTAINABILITY THROUGH BIG DATA

RESOURCE AND ENERGY OPTIMISATION

IMPROVED MACHINES AND INFRASTRUCTURE

SUSTAINABLE INFRASTRUCTURE PLANNING

BIG DATA

ECONOMIC & SOCIAL IMPACTS

REQUIREMENT FOR DATA ANALYSIS SKILLS

INCREASED REMOTE WORK PRACTICES

NEED TO ENSURE PRIVACY & ETHICS

EDGE COMPUTING

DEFINITION

EDGE COMPUTING IS A METHOD WHERE **DATA PROCESSING AND ANALYSIS HAPPEN NEAR THE LOCATION WHERE DATA IS GENERATED**, INSTEAD OF IN CENTRALIZED DATA CENTERS OR CLOUDS

EDGE COMPUTING: APPLICATIONS

ENHANCED SECURITY

EASIER UPGRADES

NETWORK FLEXIBILITY

IMPROVED EFFICIENCY

TELECOMS & EDGE COMPUTING

EDGE COMPUTING ENABLES TELCOS TO PROCESS DATA CLOSER TO THE SOURCE, SIGNIFICANTLY **REDUCING LATENCY, ENHANCING NETWORK EFFICIENCY, AND SUPPORTING THE DEVELOPMENT OF ADVANCED SERVICES** LIKE IoT, AR, AND VR.

SUSTAINABILITY THROUGH EDGE COMPUTING

INCREASED ENERGY EFFICIENCY

DATA CENTRE CONSOLIDATION

RETROFITTING POSSIBILITIES

ECONOMIC & SOCIAL IMPACTS

TRANSFORMATION OF SKILL REQUIREMENTS

PATHWAY TO DIGITAL INFRASTRUCTURE

NETWORKING & CONNECTIVITY SUPPORT

xRAN

DEFINITION

xRAN IS A **MODERN APPROACH TO RADIO ACCESS NETWORKS,** EMPLOYING ADVANCED CONFIGURATIONS AND OPEN, SOFTWARE-CENTRIC SOLUTIONS **TO ENHANCE FLEXIBILITY & EFFICIENCY** IN TELECOMMUNICATIONS NETWORKS

xRAN: APPLICATIONS

ENHANCED SECURITY

EASIER UPGRADES

NETWORK FLEXIBILITY

IMPROVED EFFICIENCY

TELECOMS & xRAN

xRAN MODERNIZES TELECOMMUNICATIONS BY PROV**IDING MORE FLEXIBLE, COST-EFFICIENT, AND EASILY UPGRADABLE NETWORK INFRASTRUCTURE**, SIGNIFICANTLY ENHANCING THE ABILITY OF TELCOS TO MEET EVOLVING DEMANDS AND TECHNOLOGICAL STANDARDS.

SUSTAINABILITY THROUGH XRAN

RESOURCE OPTIMISATION THROUGH RIC (RAN INTELLIGENT CONTROLLERS)

ENERGY EFFICIENCY THROUGH MIMO

INNOVATIVE ECOSYTEMS – TELEMETRY

ECONOMIC & SOCIAL IMPACTS

TRANSFORMATION OF SKILL REQUIREMENTS

REDUCED OWNERSHIP COSTS

REQUIRED FOCUS ON CYBERSECURITY

OPTIC FIBRE & GPON

DEFINITION

OPTIC FIBRE USES SPECIAL CABLES MADE OF GLASS OR PLASTIC TO **SEND DATA USING LIGHT SIGNALS**. **IT AIMS TO SUBSTITUTE METAL CABLES** BECAUSE IT CAN HANDLE MORE DATA, MAKES TRANSMISSION SIGNIFICANTLY FASTER, KEEPS SIGNALS SAFE, AND IS 'FUTURE-PROOF'.

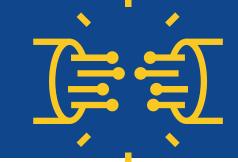## OPTIC FIBRE: APPLICATIONS

HIGH-SPEED INTERNET PROVISION

VERY HIGH-CAPACITY NETWORKS (VHCN)

EFFICIENT DATA DELIVERY THROUGH GPON
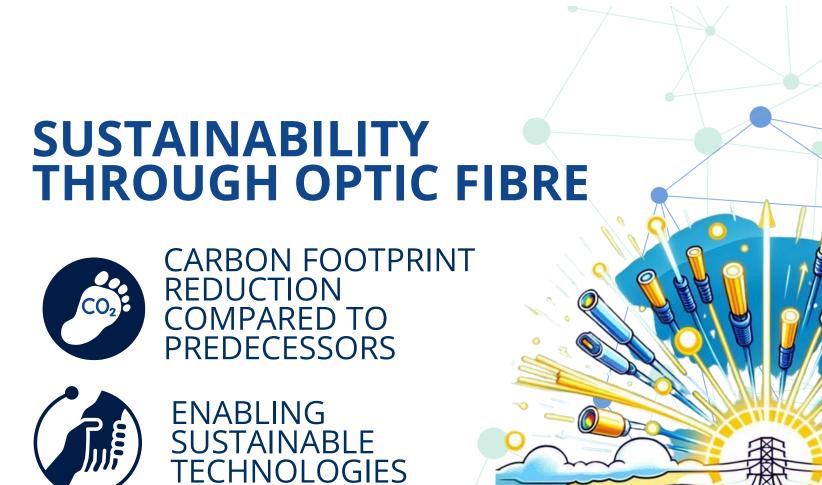
LAST-MILE CONNECTIVITY

TELECOMS & OPTIC FIBRE

OPTIC FIBRE PLAYS A PIVOTAL ROLE FOR TELCOS BY ENABLING THEM **TO PROVIDE HIGH-SPEED INTERNET CONNECTIVITY AND DEVELOP ADVANCED NETWORK INFRASTRUCTURES** TO MEET THE GROWING DEMAND FOR DIGITAL SERVICES.

SUSTAINABILITY THROUGH OPTIC FIBRE

CARBON FOOTPRINT REDUCTION COMPARED TO PREDECESSORS

ENABLING SUSTAINABLE TECHNOLOGIES

INCREASED EFFICIENCY AND DURABILITY

ECONOMIC & SOCIAL IMPACTS

DIGITAL INCLUSION

REMOTE ACCESS EMPOWERMENT

RURAL AND REGIONAL DEVELOPMENT