WHOLESALE TELCO INDUSTRY IN **THE DIGITAL TRANSFORMATION ERA**
CHALLENGES, OPPORTUNITIES, INTEROPERABILITY AND INTERWORKING IN THE ERA OF ON-DEMAND SERVICES

BY
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The digital landscape is a dynamic arena where change is the only constant. As we dive into the depths of international bandwidth, we must acknowledge that we are in uncharted waters, navigating through evolving trends, technological innovations, and global socio-economic shifts.
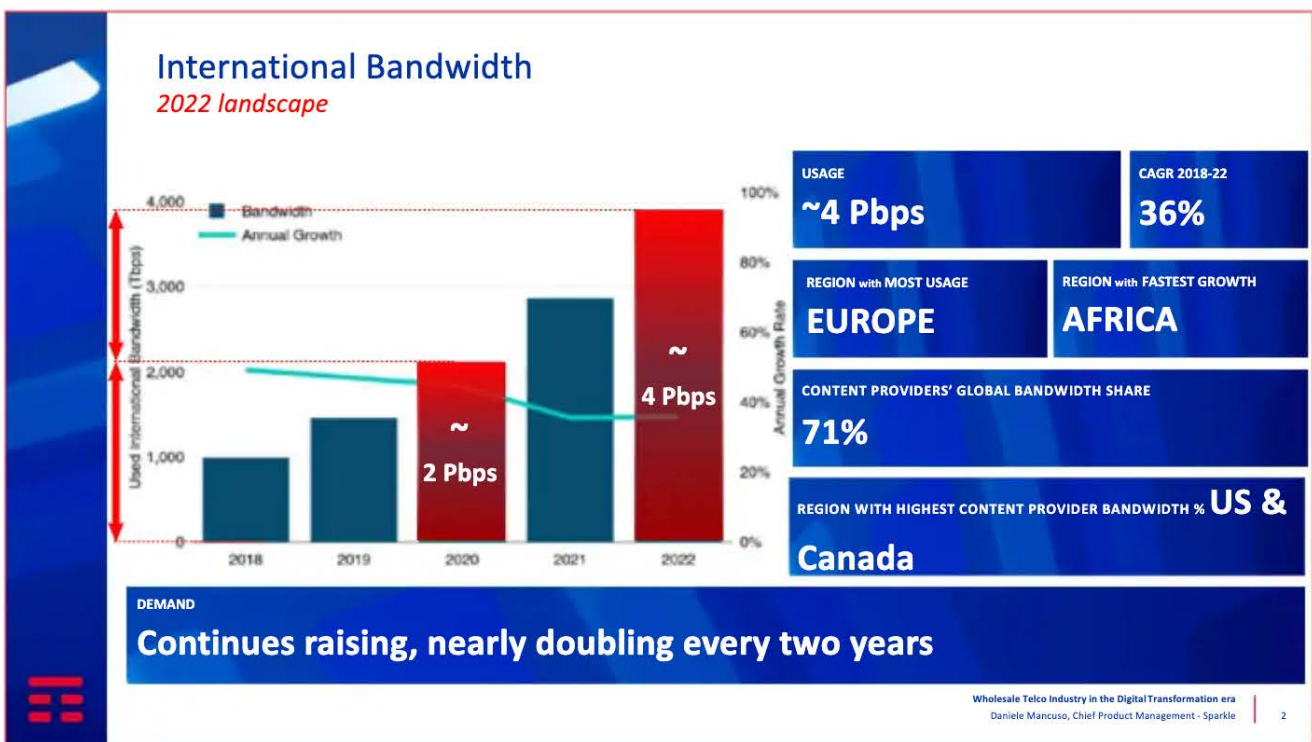
The Ever-Expanding International Bandwidth

International bandwidth, that vast digital highway connecting the world, is continually widening. It's a phenomenon we've witnessed year after year, with bandwidth doubling every 18 to 24 months. We return this year to affirm that this trend endures.

The compound annual growth rate (CAGR) remains robust, hovering around 40%. It's worth noting that, for the first time in recent memory, we are observing a slight dip in the CAGR, but before we jump to conclusions, we must contextualize this data.

The demand for international capacity remains unwavering. It's crucial to remember that we have emerged from the throes of the COVID-19 pandemic and are amidst various geopolitical tensions, particularly concerning chipset production. This complex backdrop may explain why demand and production of international capacity aren't always in perfect harmony. What is clear

is that the digital hub of the world is not the United States, as some may have believed. Europe is the epicenter of the global internet and international bandwidth, playing a pivotal role in connecting vast regions, including Southeast Asia, Africa, and even Oceania.

A staggering 71% of the four petabits of international bandwidth is generated and shared among mega data centers belonging to content providers. This illustrates that the demand for international bandwidth remains on a relentless upward trajectory.

International Bandwidth
2022 landscape

USAGE	CAGR 2018-22
~4 Pbps	**36%**

REGION with MOST USAGE	REGION with FASTEST GROWTH
EUROPE	**AFRICA**

CONTENT PROVIDERS' GLOBAL BANDWIDTH SHARE
71%

REGION WITH HIGHEST CONTENT PROVIDER BANDWIDTH % **US & Canada**

DEMAND
Continues raising, nearly doubling every two years

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The Sociological Impact of the Digital Age

As we journey further into the digital realm, it's essential to examine the sociological impact of our interconnected world. Out of the eight billion that are populating our planet, approximately five billion are mobile subscribers, five billion are internet users, and another five billion actively participate in social networks. Social networks have emerged as a significant driver of international bandwidth consumption, reflecting a fundamental human need.

The popularity and ubiquity of

social media platforms stem from their ability to cater to our intrinsic desire to create a digital legacy, to immortalize our experiences in the digital era. Consequently, social media will continue to be a formidable force driving the demand for international bandwidth.

Essential Digital Headlines
Overview of the adoption and use of connected devices and services
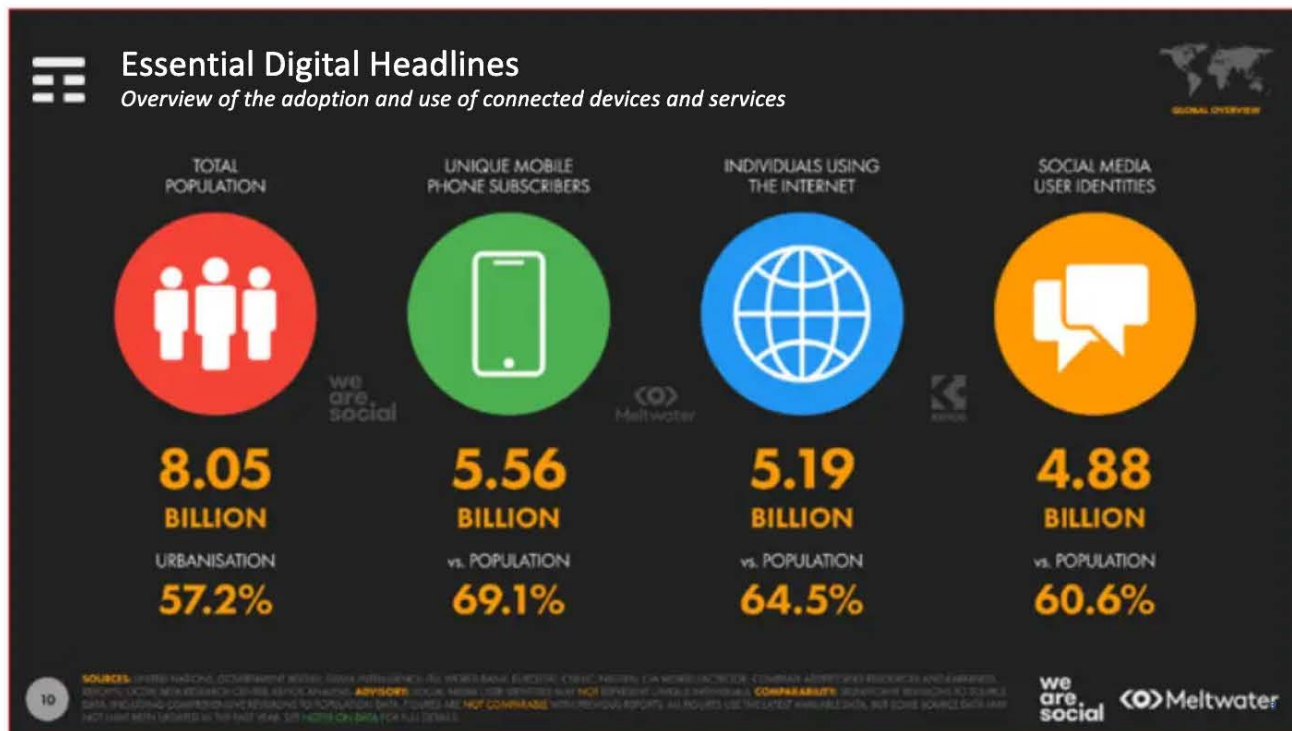
Bridging the Digital Divide

IIn a world where data is the lifeblood of our digital existence, we must address the issue of digital inclusivity. The map of global internet adoption reveals marked disparities, with regions such as India still below 50% adoption. When you aggregate the numbers for Africa and Southeast Asia, it becomes clear that nearly 70% of the world's population is yet to fully access the internet. As carriers, it is our duty and, indeed, our business imperative to invest in bridging these gaps.

Internet Adoption
Individuals using the Internet as a percentage of Total Population
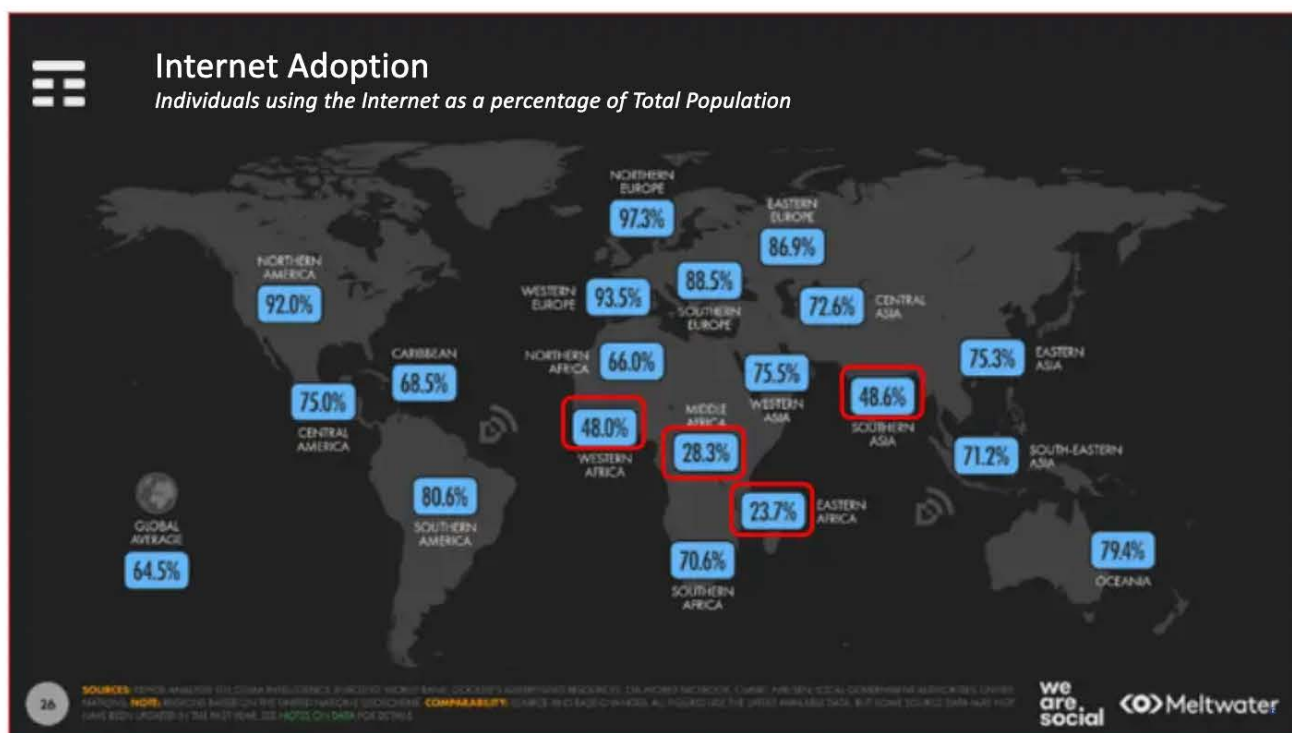
Subsea Cables: The Backbone of Connectivity

Eons ago, when humanity sought water, villages sprang up along rivers and close to the shores. These settlements evolved into towns, cities, and eventually nations. Similarly, today, ecosystems of interconnected service providers are emerging around subsea cables. These cables are the lifeblood of international bandwidth, transporting a staggering 99% of data across the globe. They are critical infrastructures, demanding our attention, development, and preservation.

Our commitment to this cause is exemplified by projects such as the Blue and Raman cable systems, extending our reach to India, where internet access remains a work in progress. We are also investing in other regions, from Africa to Latin America, building data centers that serve as digital beacons in these burgeoning ecosystems.

Data: The Source of Our Digital Life

In the digital age, data is the currency that fuels our progress. In 2019, on a single day, a colossal 463 exabytes of data were produced, creating an ever-growing need for storage, transmission, and analytics. Data empowers us to make informed decisions, predict future trends, and shape our world. Looking forward to 2030, we anticipate an explosion of data, as physical to digital transitions, human augmentation, digital enterprises, autonomous vehicles, and more generate an unprecedented volume of information.

This burgeoning data landscape poses new challenges: sustainability, experience, and trustability. Sustainability is not only an environmental concern but also a financial one. The energy-intensive mega data centers that support data storage demand a sustainable approach to preserve our planet. Meanwhile, consumers expect ever-faster experiences in a data-driven world, forcing us to evolve.
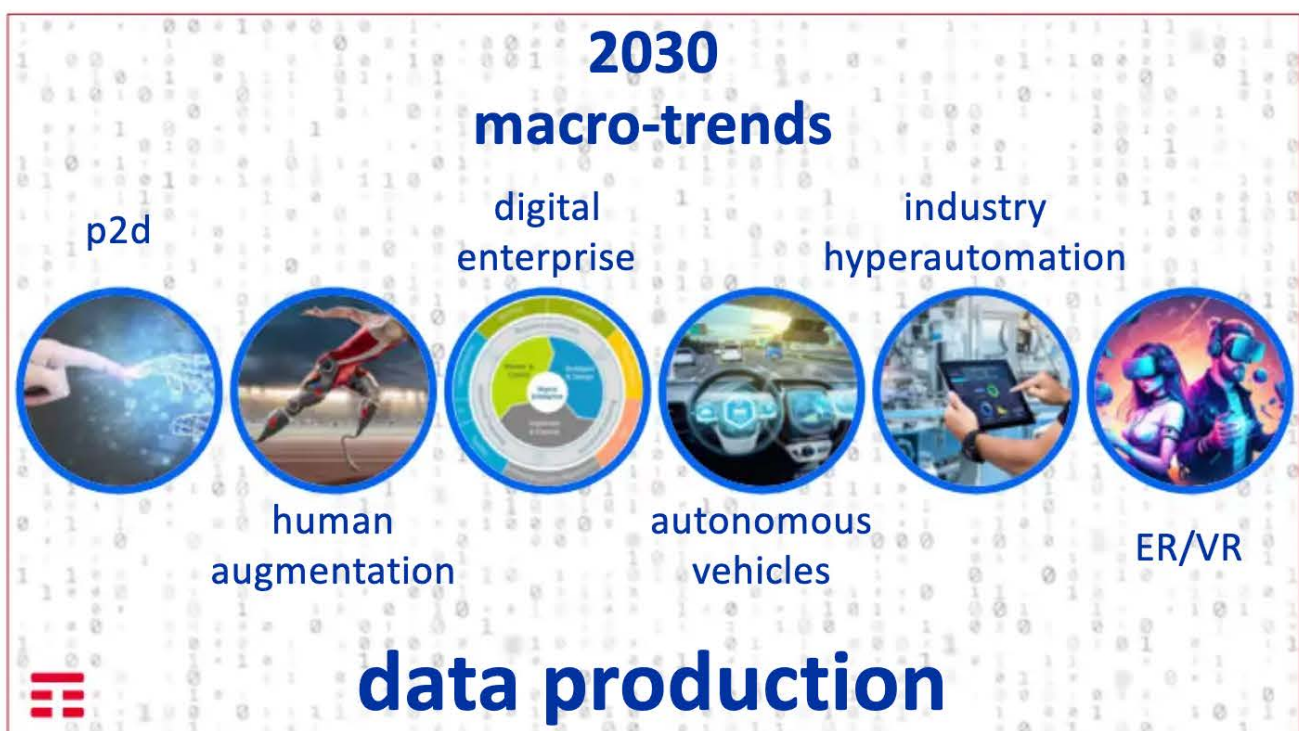
The need for trust has never been more critical. With machines increasingly running our world, ensuring the right machines interact with one another is paramount. Trustability becomes a cornerstone of our hyperautomated future.

> **" THIS BURGEONING DATA LANDSCAPE POSES NEW CHALLENGES: SUSTAINABILITY, EXPERIENCE, AND TRUSTABILITY. SUSTAINABILITY IS NOT ONLY AN ENVIRONMENTAL CONCERN BUT ALSO A FINANCIAL ONE.** THE ENERGY-INTENSIVE MEGA DATA CENTERS THAT SUPPORT DATA STORAGE DEMAND A SUSTAINABLE APPROACH TO PRESERVE OUR PLANET. **"**

2030 macro-trends

p2d

digital enterprise

industry hyperautomation

human augmentation

autonomous vehicles

ER/VR

data production

challenges

sustainability

price vs. cost
doubling volumes YoY
new infrastructures

cost of real-estate
cost of energy
equipment density
chipset shortage
geopolitical frictions
overbooked factories
investment monetization
no Plan[et] B

experience

consumerization
diversification
lock-in

delivery time expectations
biz-tech automation
liquid capacity
new corridors, routes, hubs
quality of service
no loyalty

trust

know your customers
no disputes
security posture

self-sovereign identity
digital twin
assets tokenization
billing & settlement
secure by design

Technology: Our Trusted Partner

Technology stands as our trusted ally on this journey. It has the power to transform our approach, enhancing our business operations and sustainability. Our challenge is to use technology ethically and responsibly, embracing its potential to revolutionize the way we operate.

In recent years, we've explored diverse avenues like APIs, blockchain, and now, generative AI. We must continually evaluate how these technologies can elevate our business standing. In the case of generative AI, we've unearthed a wealth of possibilities, from enhancing business operations to improving customer experience.

In closing, as we navigate the digital frontier, it's imperative that we harness technology's capabilities with responsibility and ethics in mind. We are at a pivotal juncture, one where our choices today will shape the digital landscape of tomorrow. The future is boundless, and with the right approach, we can ensure it remains bright, sustainable, and prosperous.

Watch the full video version of this Keynote presentation on our CC-Media Portal: https://public.carriercommunity.com/media-channels/cc-webinar-live/past-cc-webinar-live/

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CHALLENGES AND OPPORTUNITIES

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