

The logo for VEDDP, featuring the letters 'VEDDP' in a bold, dark blue font. A small blue square is positioned to the left of the 'V'.

VEDDP

The logo for OCO, consisting of the letters 'OCO' in a white, outlined font.

OCO

European ICT Sector Report

July 2020

CHALLENGE.
CREATE.
COLLABORATE.

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Exploring market size, opportunity and import trends. Understanding the landscape and consumer preferences.

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Europe's ICT sector has grown significantly over the past 5 years where other global tech sectors have stagnated



Investment Growth

124%

Between 2015 – 2019



Value Added

USD 540.2bn

Total in 2017 (manufacturing & services)



Employment

6.1 m developers

Up from 5.7m in 2018



\$1 billion companies

174

75 non-VC backed in 2019

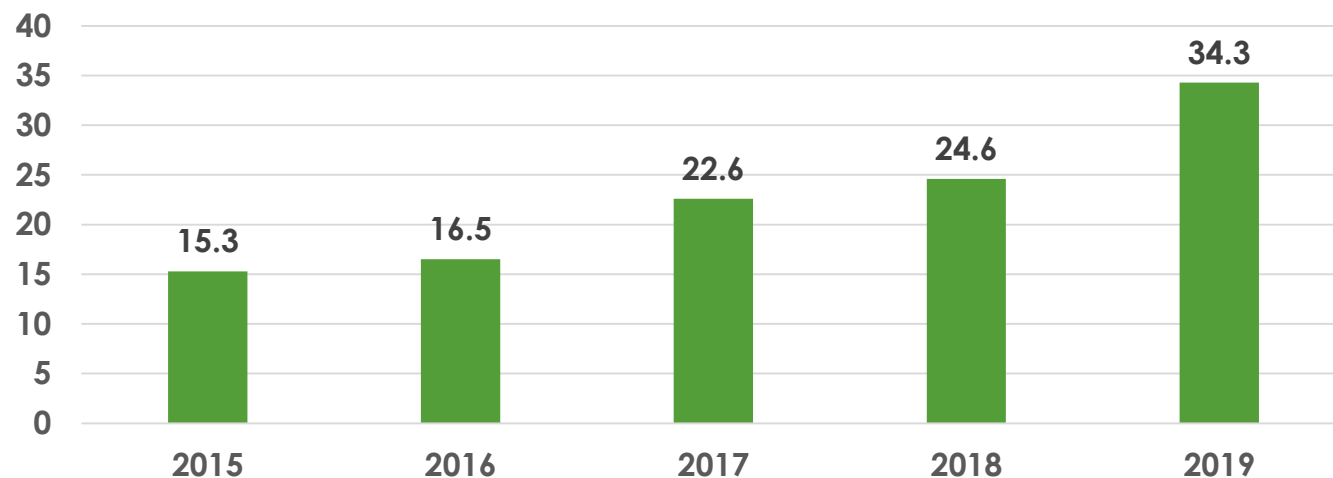
€338 billion

Europe's ICT Imports in 2019 - up €20 billion from 2018



Capital Investment in Europe's Tech Sector 2015-2019

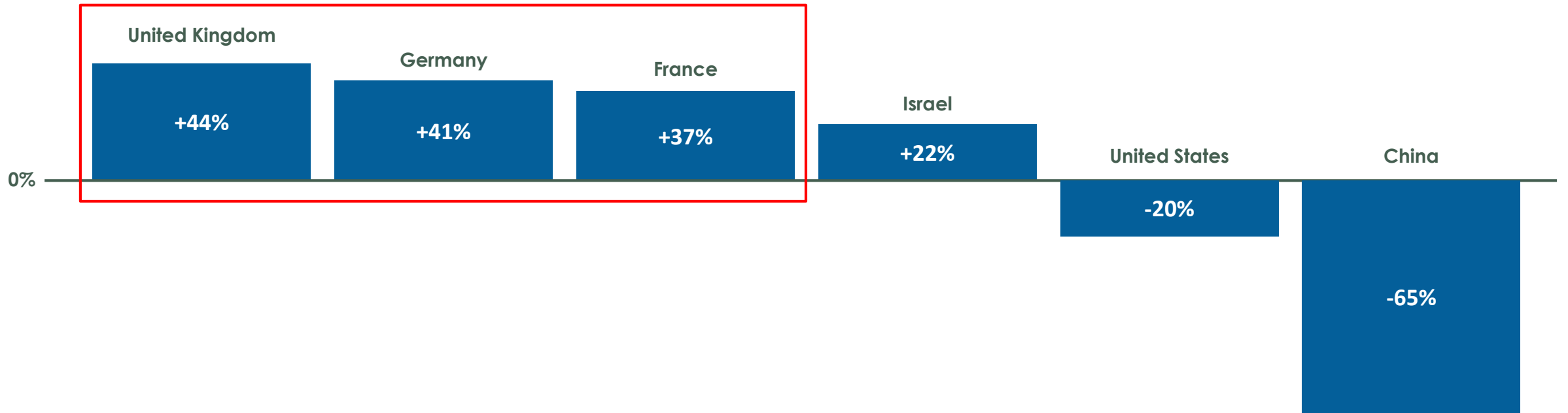
Capital Investment (\$ billion)



The number of rapidly growing tech companies in Europe soared as venture capital investment increased in key markets between 2018-19



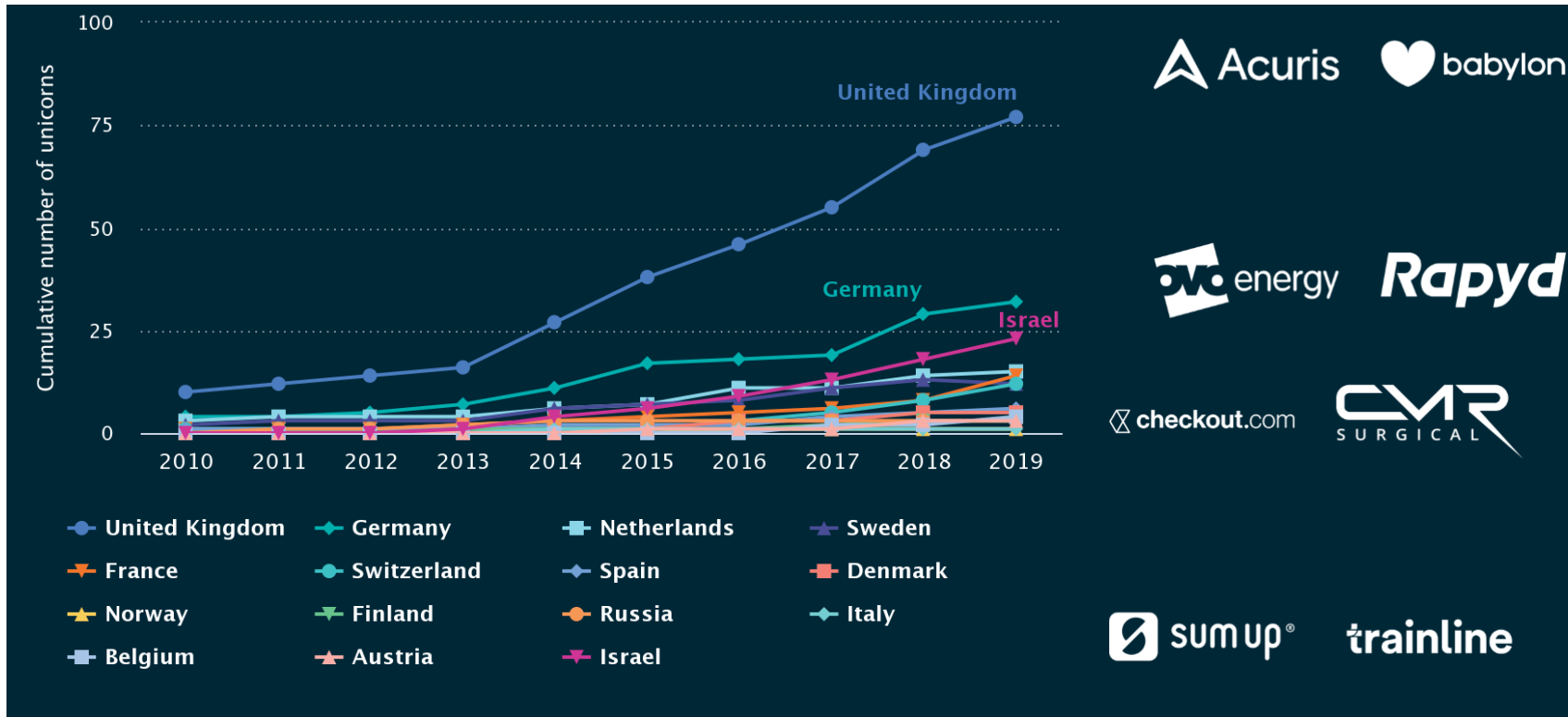
Change in Venture Capital (VC) Investment (in 2018 – 2019 in%)



In Europe, the UK excels and ranks first by number of unicorns with Germany & the Netherlands among the top 5



Cumulative Number of Unicorns Created by year



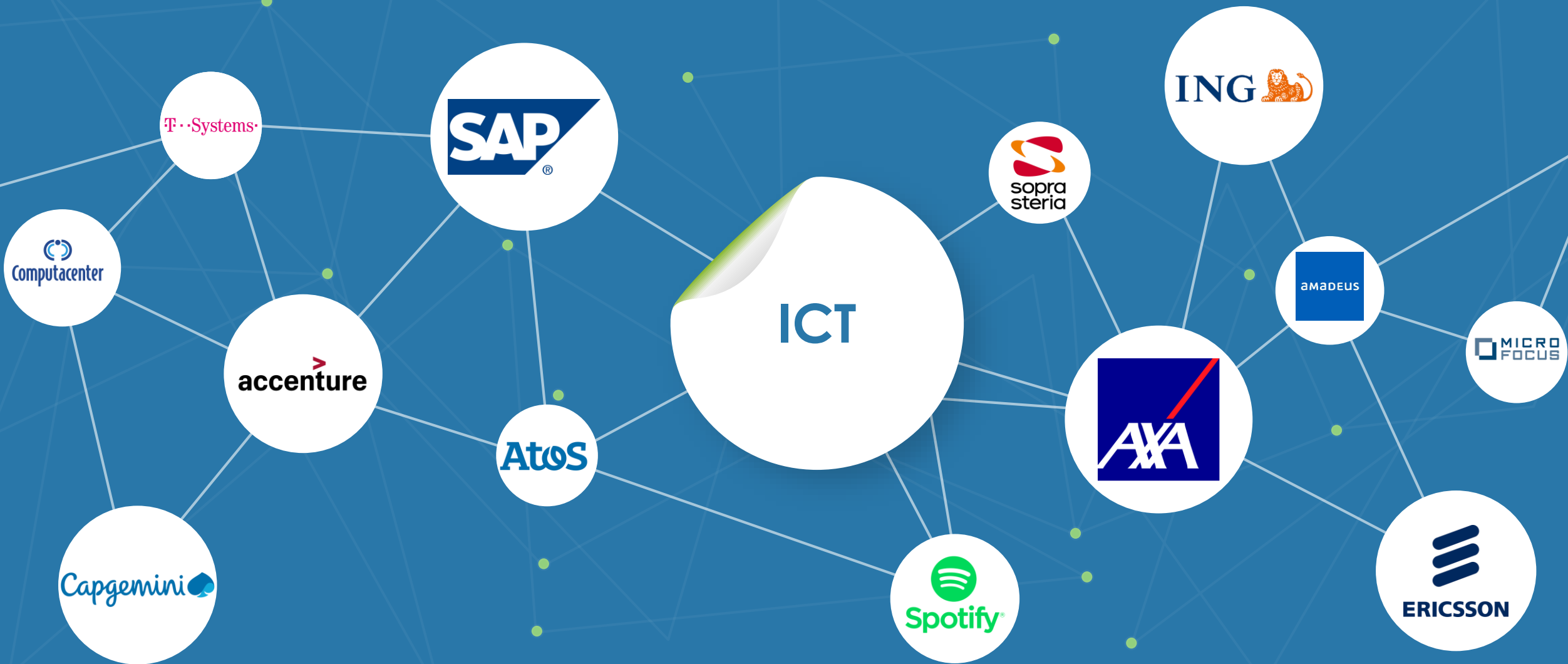
Acuris | babylon

energy | Rapyd

checkout.com | CMR SURGICAL

sum up® | trainline

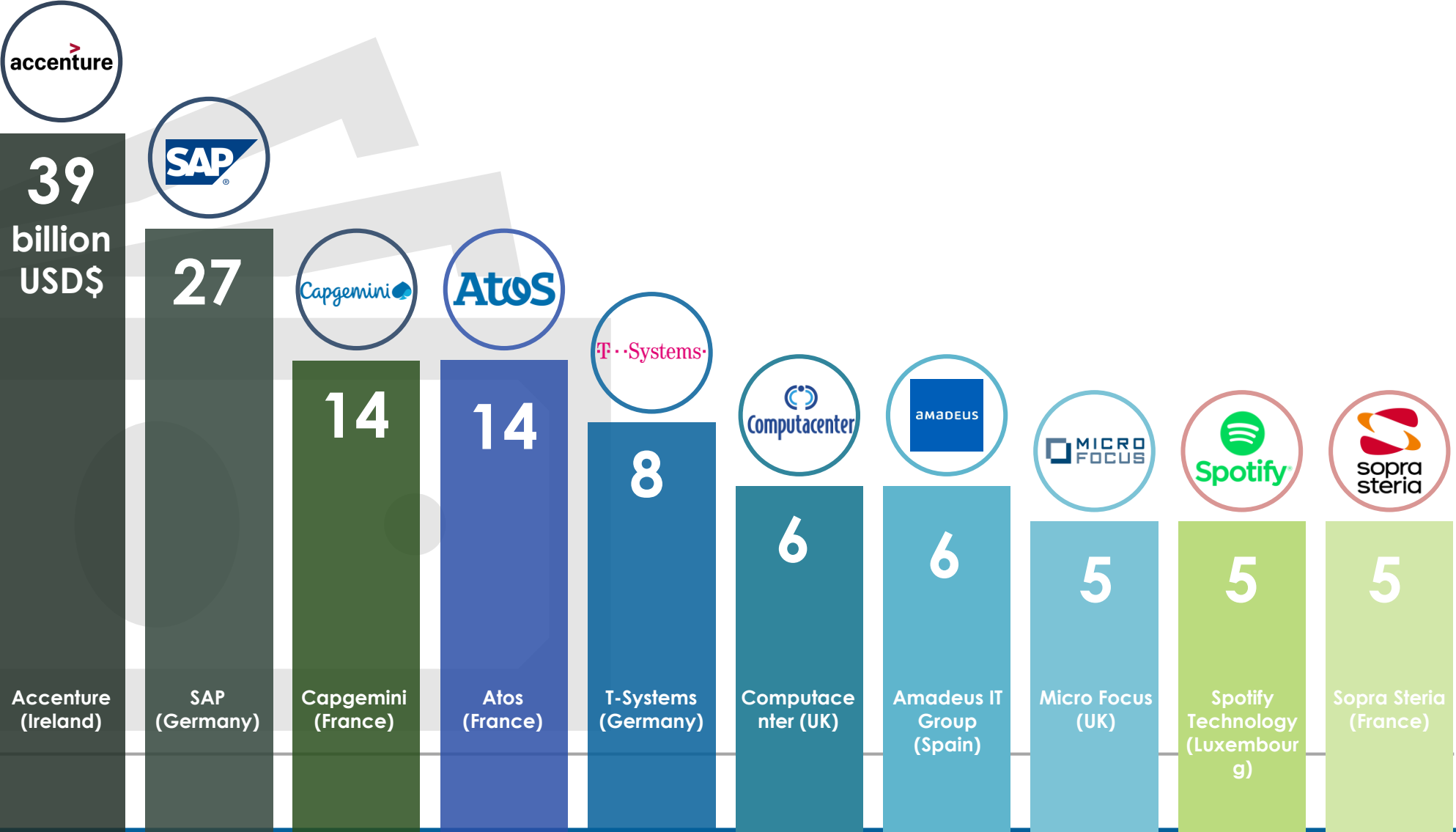
ICT is a competitive landscape throughout Europe with local leading market players who also operate across the region



Digital consultants lead the tech space with other brick and mortar brands in the top 10 list



Top 10 Revenue in 2018
in billion USD



The internet of senses 2030 provides an interesting glimpse on how European consumers feel and believe ICT will develop in the future



The Brain is The User Interface

59% of Europe consumers believe that they will be able to see map routes on VR glasses by simply thinking of a destination



“Sounds Like Me”

Using a microphone, 67% believe they will be able to take on anyone’s voice realistically enough to fool even family members



“Any Flavor You Want”

45% predict a device for the mouth that digitally enhances anything consumers eat, so that any food can taste like their favorite treat



Digital Aroma

Around 6 in 10 expect to be able to digitally visit forests or the countryside, including experiencing all the natural smells of those places



Total Touch

More than 6 in 10 expect smartphones with screens that convey the shape and texture of the digital icons and buttons they’re pressing



Merged Reality

VR games worlds are predicted by 7 in 10 to be indistinguishable from physical reality by 2030



Verified as Real

“Fake news” could be finished – half of Europeans say news reporting services that feature extensive fact checks will be popular by 2030



Post-privacy Consumers

Half of Europeans are “post-privacy consumers” – they expect privacy issues to be fully resolved so they can safely reap the benefits of a data-driven world



Connected Sustainability

Internet of senses-based services will make society more environmentally sustainable, according to 6 in 10



Sensational Services

45% of consumers anticipate digital malls allowing them to use all five senses when shopping

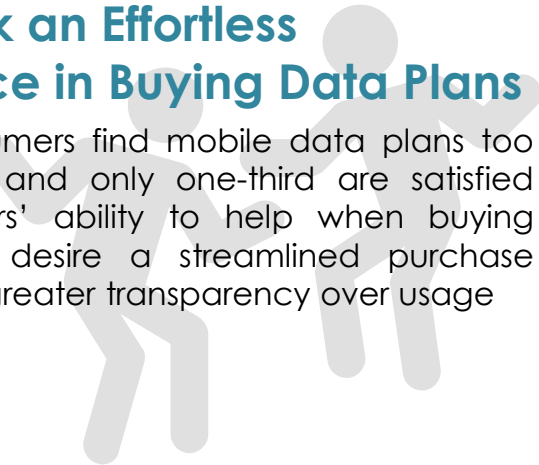


Consumers desire stronger networks and a solid foundation that will allow a seamless usage of ICT goods and services in the future



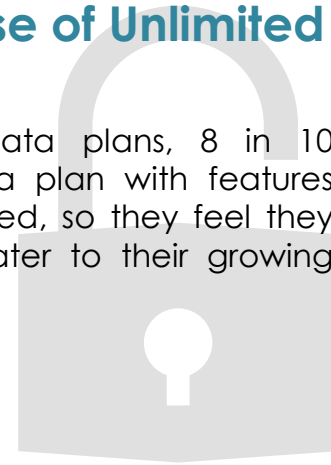
They Seek an Effortless Experience in Buying Data Plans

6 in 10 consumers find mobile data plans too complicated and only one-third are satisfied with operators' ability to help when buying online. They desire a streamlined purchase process and greater transparency over usage



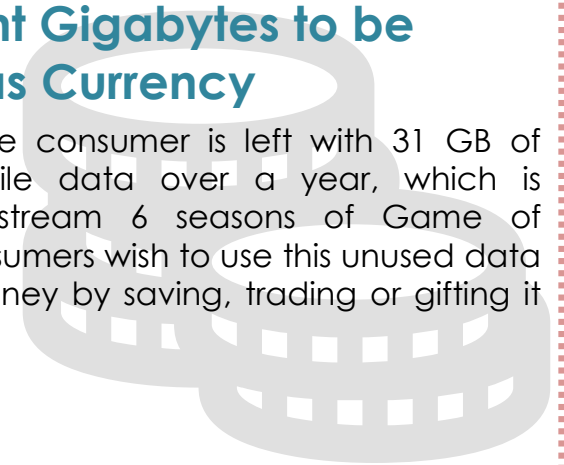
They Desire a Sense of Unlimited

Rather than unlimited data plans, 8 in 10 consumers would prefer a plan with features offering a sense of unlimited, so they feel they have enough data to cater to their growing digital needs



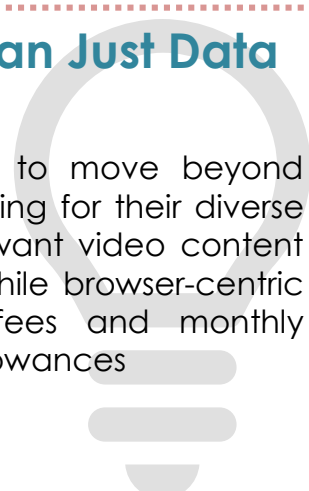
They Want Gigabytes to be Treated as Currency

A smartphone consumer is left with 31 GB of unused mobile data over a year, which is enough to stream 6 seasons of Game of Thrones. Consumers wish to use this unused data as actual money by saving, trading or gifting it to someone



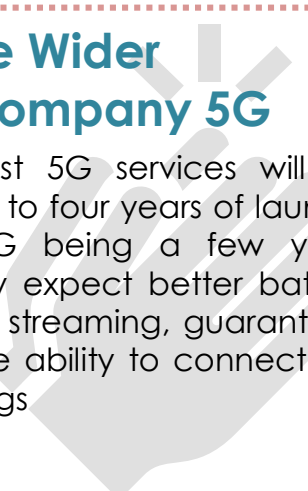
They Need More Than Just Data Buckets

Consumers want operators to move beyond data buckets to plans catering for their diverse needs. Video-centric users want video content bundled with data plans, while browser-centric users want no overage fees and monthly flexibility to change data allowances



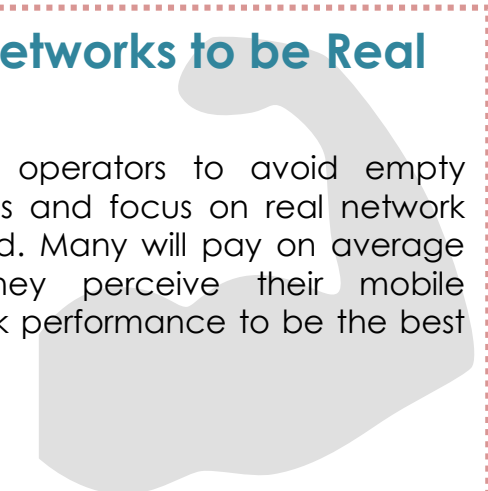
They Want to See Wider Changes to Accompany 5G

Consumers predict most 5G services will go mainstream within three to four years of launch. Despite widespread 5G being a few years away, one-third already expect better battery life, higher-quality video streaming, guaranteed network quality, and the ability to connect not just devices but also things



They Want Networks to be Real for Them

Consumers need operators to avoid empty advertising slogans and focus on real network experience instead. Many will pay on average 17% more if they perceive their mobile operator's network performance to be the best in the market



Consumers are driving innovation from major tech companies and European consumers are globally viewed as early adopters of tech



01. Awareables



6 in 10 virtual assistant users think devices that understand our moods will be mainstream by 2023

02. Smart Quarrels



Virtual assistant users (31%) also believe that different small speakers in their homes will argue like families do

03. Trustworthy



47% of consumers think apps collect data about them even when the apps are not being used. Consumers want to trust the privacy of ICT

04. Enforced Agreement



Always having to accept data collection cookies annoys almost half of consumers

05. Internet of Skills



Similarly, half of AR/VR users want apps, glasses and globes that give virtual guidance for practical everyday tasks

06. Zero-touch Consumption



Half of virtual assistant users want automated bills and subscriptions, as well as self-restocking household supplies

07. Mental Obesity



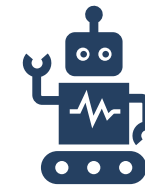
1 in 3 consumers soon expect to go to "mind games" to practice thinking, as everyday decision-making gets increasingly automated

08. Eco Me



39% of consumers want an eco-smartwatch that measures their carbon footprint

09. My Digital Twin



48% of AR/VR users want online avatars that mimic them exactly, so they can be in two places at once

10. 5G Automates Society



1 in 5 smartphone users believe 5G will better connect to IoT devices, such as household appliances and utility meters

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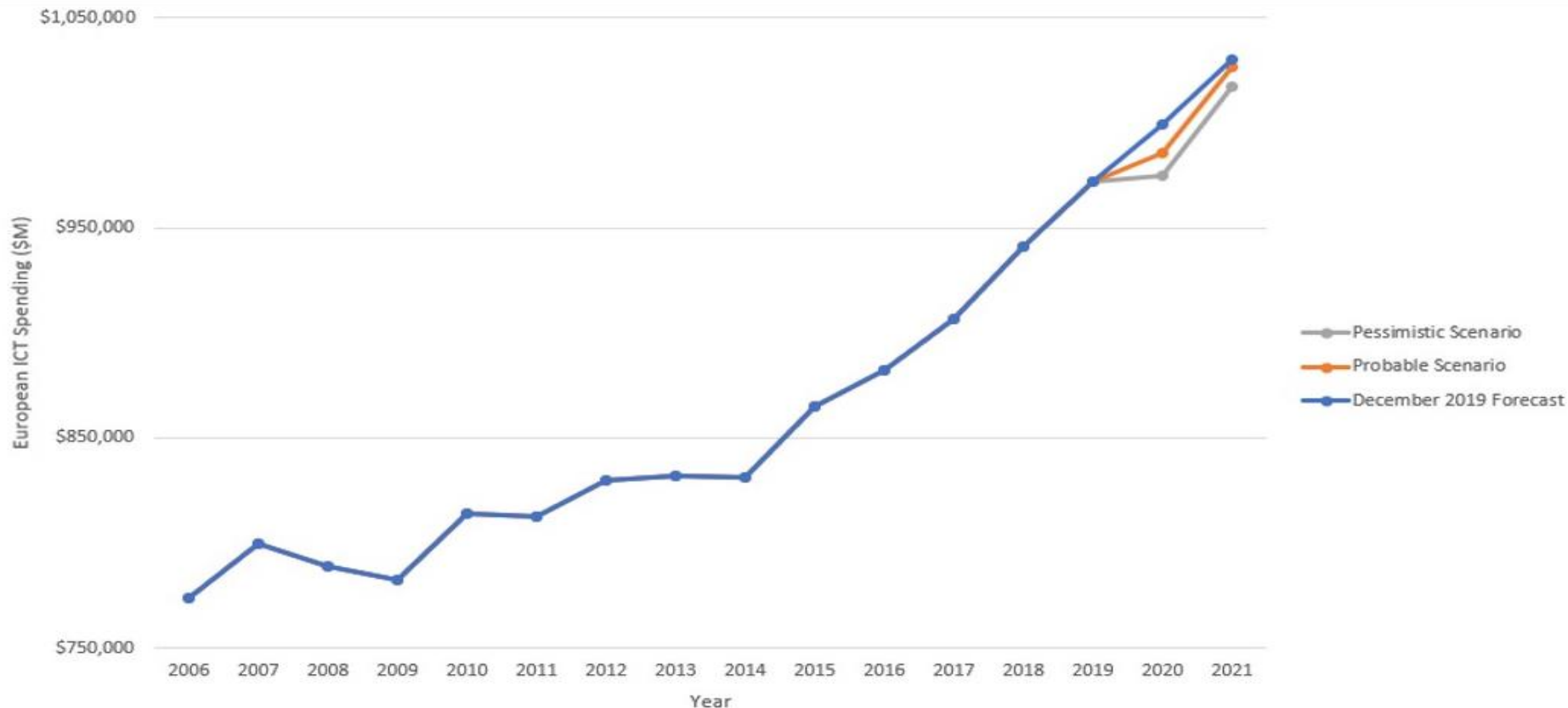
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COVID-19 is set to have an impact on ICT revenue in Europe, however, a probable scenario still predicts growth in 2020



COVID – 19 Impact on European ICT Spending Probable & Pessimistic Scenarios (2006 – 2021)



The pandemic is creating new opportunities for cloud service vendors who have seen an increase in demand across the region



Social Distancing – as more people are following and practising social distancing, several companies are asking their employees to work from home. As majority of the data transfer, process, and exchange take place over the internet, there is **a sudden rise in the use of cloud platforms across the world.**

Microsoft – in March 2020, **Microsoft** announced that the coronavirus outbreak has led to a **surge in the adoption of cloud services.** The company announced that the team's communication platform '**Microsoft teams**' reached **44 million users.**

Others - besides this, other companies that operate cloud-based platforms including **Skype** and **Zoom** also announced that there has been a **massive rise in the demand for online services** since the emergence of the coronavirus outbreak. Altogether, the Covid-19 pandemic has created a huge platform for the cloud-based service vendors in the information and communication technology sector.



As ICT is a connected space, increasing usage and uptake is highlighting the need for faster and safer internet connections



Stronger Network Equipment – increase in the use of cloud services as more technology companies encourage employees to telecommute will have **potential benefits** for **companies** that have **technologies already in that space**.

Desire for 5G – need for ever-faster access to data and **automation** will enhance the focus on network equipment and communications as never before, **speeding up 5G network deployment and its adoption**.

Secure Networks – **security software will see third-order benefits** from a growing remote workforce. IT spending on **security software** will **increase as organisations race to secure endpoints**, particularly cloud-based tools, log management and VPNs.



Globally and across Europe, major ICT players have responded and pivoted towards new and different ways of doing business



Europe:

openSAP learning is open for all (topics on AI, IoT, VR/AR and more)

Germany:

T-Mobile launched its lowest price 5G smartphone plan

Netherlands:

ING increases limit on contactless payments to help distancing

UK:

BT Group committed to unlimited home broadband for all

The pandemic is the unexpected catalyst for tech adoption as COVID-19 sees a range of changing consumer behaviour



More Online Shopping



Across Europe, online shopping adoption has gained traction thanks to improvements in infrastructure (speed and cost), participation, transparency and trust. The online shopping space is opening up new opportunities for companies as consumers are getting more familiar with exploring and purchasing online.

Digital & Contactless Payments



In Europe, there has historically been dependence on cash payments for instore purchases. During the pandemic, consumers are now more familiar and comfortable with paying digitally for goods or services they use. Even pre-pandemic, contactless card payments were on the rise with less desire for cash payments.

Distance Learning



School closures and health concerns have led to children across Europe relying on online teaching and remote lessons from home through education tech platforms. Parents are now more familiar with remote learning and how to navigate the online space for the benefit of all.

Tele-Health



Consumers are also hesitant to go for an in-house doctor consultation. Emerging technology around digital health was already providing patients with a direct to doctor service through software platforms, the pandemic has not only accelerated this trends but made it more important than ever.

The Future



Consumers expectations are growing for the ICT sector in Europe as more technology enters their lives. They are now immersed with tech and have a grown desire for consistency, speed and high quality. As such, this is a catalyst for the growth of more reliable networks and tools for them, one of which is the 5G technology

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E-Health



E-Health, defined as the integration of Information and Communications Technology into healthcare.

Below is a list of topics covered within this section:

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Current
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03

Key
European
Markets

04

Key
Opportunities
in Market

Europe is the 2nd largest market for E-Health and is expected to reach 7.1 billion USD by 2024



Key Market Drivers

- Horizon 2020
- COVID-19 pandemic
- The digitalisation of the healthcare system (Electronic Health Records)
- An ever increasing number of mobile and Internet users
- The infrastructural support with better Internet connections and electronic systems
- Decreasing costs of technological sensors and other devices due to the advancement in ICT

Germany

- E-Health law first introduced in 2015
- Germany announced plans to become a global power in digital health with Digital Care Act in 2018.

Belgium

- Youngest activity sector, but ranked 3rd in value added
- The E-Health Brussels platform
- Internationalisation is desired

Key Market Trends

Electronic /
Patient Health
Records



Telemedicine
/ Tele-Health



Health Info
Exchange
with
External
Providers



\$3.4
Billion USD

Europe's
Market Value
2019

15.9%
CAGR

Compound
Annual
Growth Rate

Netherlands

- Leader in EU's E-Health with clear policies and good regulatory framework.
- Dutch healthcare start-ups are flourishing
- Best at patients rights and information

As the industry matures, an increasing number of new technologies are becoming available in the E-Health space



Wearables



IoT integrated wearable devices, which can track biometrics are a common feature in the European market, as consumers are becoming increasingly health conscious, and use such technologies to augment their lifestyle.

User Centric



One of the main purposes of E-Health is to improve patient care, hence its primary applications are often patient centric, and aim to improve aspects such as convenience, experience and outcomes.

EHR



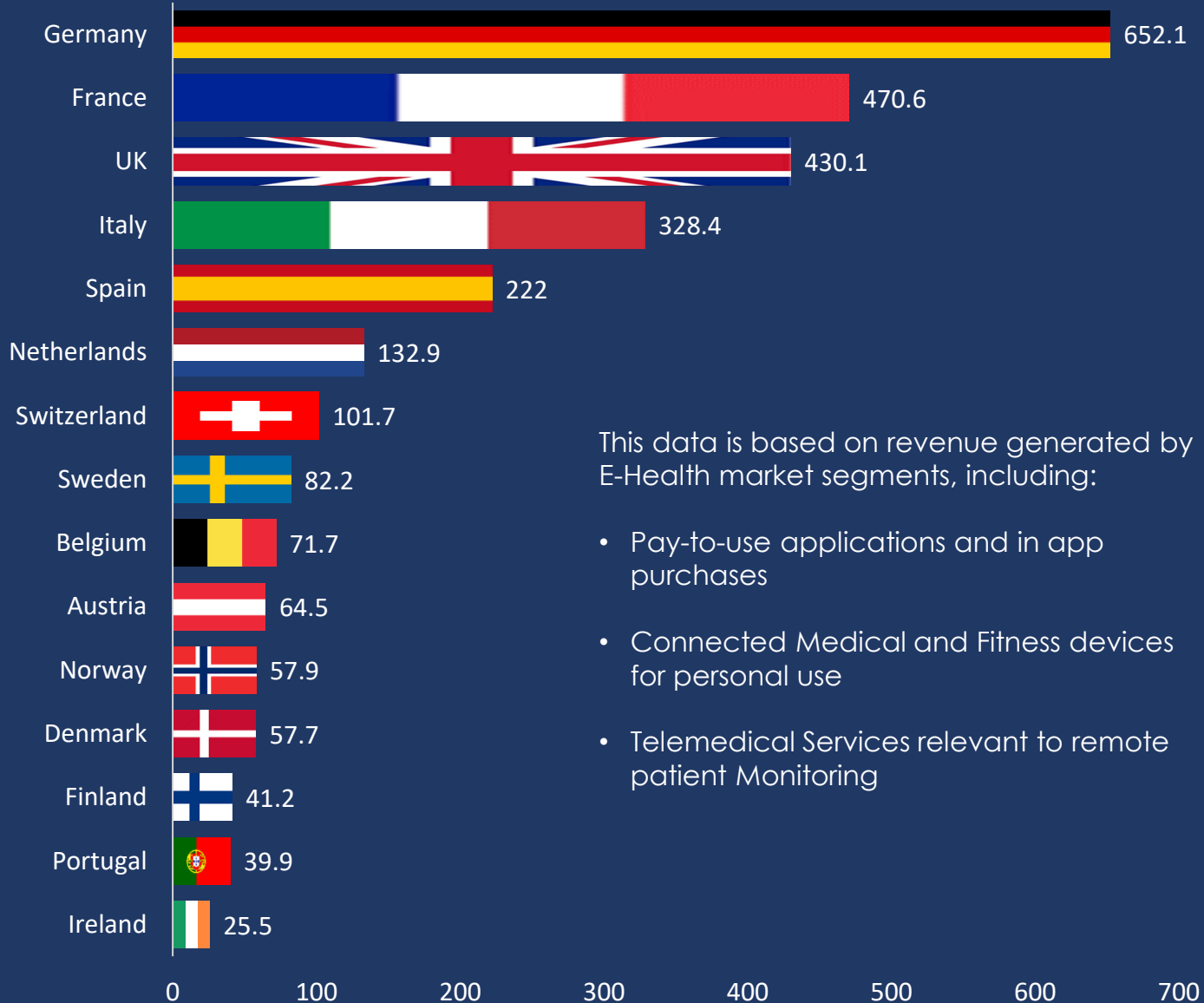
The appropriate collection, management, analysis and dissemination of Electronic Health Records is a commonly contested topic within the E-Health industry. Ensuring patients medical records remain accessible yet secure is key.

Cost



Whilst medical professionals and patients are both aware of the potential benefits brought about by integrating technology and Healthcare, the single biggest constraint for the industry in the years to come is the initial cost of digitization and implementation of E-Health solutions.

E-Health Market By Country



This data is based on revenue generated by E-Health market segments, including:

- Pay-to-use applications and in app purchases
- Connected Medical and Fitness devices for personal use
- Telemedical Services relevant to remote patient Monitoring

E-Health Policies



The World Health Organisations E-Health Survey in Europe found that:



70%

Of European Countries now have a national E-Health Policy or Strategy



Frameworks to protect personal data in an electronic format is in place in 80% of member states, an increase of:



Policies to address Tele-Health was already implemented in 62% of Member States, an increase of 30%.

30%

1/2

Publicly Funded Mobile Health programmes are now present in almost half of all member states.

Cyber Security



Cyber Security, defined as the protection of computer systems and networks, including hardware, software and data from unauthorised access, theft and damage .

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European
Markets**

04

**Key
Opportunities
in Market**

The pandemic shows an increased demand for cybersecurity support as the value of the market in Europe is expected to exceed \$300 billion USD by 2024



Key Market Drivers

- Digital Single Market Strategy (2015)
- Cybersecurity Act (2019)
- Cybersecurity Month
- 667% increase in spear-fishing emails related to COVID-19 since Feb
- Trust and security lay at the heart of online transactions
- The move towards a 'gigabit society'

Germany

- The 5th biggest market globally
- The biggest in Europe
- CAGR at 13.5%
- Spending exceeded GDP growth

Belgium

- Valued at 350 million euros
- CAGR at 11.2%
- Focused development of advanced cybersecurity solutions such as: vulnerability management and incident monitoring

Netherlands

- Valued at 3,800 million euros
- CAGR at 14.5%
- The Dutch government puts Cybersecurity high on the national agenda via both legislation and capacity building, releasing a new strategy in 2018

Key Market Trends

Enterprise
Cybersecurity



Cryptomining
/ Jacking



Cyber
hygiene /
e-Learning



\$146
Billion USD

Europe's
Market Value
2019

12.3%
CAGR

Compound
Annual
Growth Rate

The Cyber Security market in Europe is growing rapidly, as hackers become bolder and more innovative



SMEs

are criminals primary targets



SMEs are up to **two times** as **likely** to be **targeted** by **cyber attacks** compared to larger organisations, this is mainly due to their **lack** of **resources** and **investments** into adequate security.

61%

of companies reported Cyber attacks



Over **60%** of European firms **reported cyber attacks** in 2018, **up from 45%** from the previous year, with The **average cost per attack increasing** by almost **600%** to **\$200,000**.

E-mail

the most common form of attack



Email and **phishing** messages are the **primary form of attack** due to its **simplistic nature**. When coupled with **human error**, it has a **alarming success rate**, and has caused a **significant growth in cyber-security training**.

A.I

Redefining the Cyber Security Industry



Artificial intelligence and machine learning looks set to redefine the cyber security industry, with **emerging applications** such as **network security monitoring**, user authentication, and **cyber threat detection** as well as vulnerability assessment and management.

Target Demographic

TOP 5 Cyber Security Markets in Europe by Sales Value



#1



Germany

Cyber Security Sales valued at €34,261M, an 18.3% increase over the previous year.

#2



The UK

Cyber Security Sales valued at €31,950M, an 19.7% increase over the previous year.

#3



France

Cyber Security Sales valued at €23,302M, an 17.2% increase over the previous year.

#4



Italy

Cyber Security Sales valued at €19,910M, an 15.1% increase over the previous year.

#5



Spain

Cyber Security Sales valued at €11,934M, an 16.5% increase over the previous year.

Top 5 Cyber Security Products and Services



#1 Security Infrastructure

Valued at €33,040M, a 19% increase on the previous year.



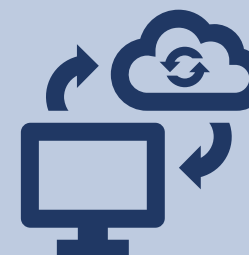
#2 Situational Awareness

Valued at €32,717M, a 17% increase on the previous year.



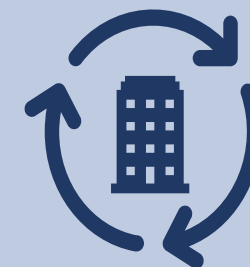
#3 Application Security

Valued at €27,296M, a 17% increase on the previous year.



#4 System Recovery

Valued at €20,971M, an 18% increase on the previous year.



#5 Business Continuity

Valued at €12,813M, a 14% increase on the previous year.

Opportunities for Cyber Security Product and Solutions Suppliers

Security Applications



Security Applications is one of the fastest growing segments of the market, and includes aspects such as the development of code and patches. Furthermore, A.I. and machine learning looks set to become a significant element of the industry in the years to come, through automated threat, assessment, detection and mitigation.

Securing Infrastructure



Ensuring Critical infrastructure is secure is one of the largest segments of the European Market. Its key elements include protecting network boundaries through Intrusion monitoring and detection platforms, in addition to controlling and regulating access to restricted resources, particularly data stored on the cloud.

Opportunities for Cyber Security Professional Service Providers

Staff Training



Human Error is one of the most common causes of security breaches, and is specifically targeted by criminals through various phishing methods. Corporations are now taking preventative steps, through staff training, in an effort to minimise the likelihood of a security breach, and to respond appropriately should an attack occur to mitigate its impact.

Incident Response



Undoubtedly a key segment of the European Market involves Responding to Cyber attacks that have already occurred. This typically comes in the form of system recovery and IT related forensics analysis, in addition to providing other related business continuity services. The key focus is to minimise the disruption to the organisation, and attempt to reassure clients.

FinTech



FinTech is defined as the different goods and services provided by several institutions that could be non-financial. It is the technology and innovation that aims to compete with traditional financial methods by delivering new innovative methods of financial services

Below is a list of topics covered within this section:

01

**Digital
Payments**

02

**Personal
Financing**

03

**Alternative
Financing**

04

**Alternative
Lending**

Despite ongoing geopolitical uncertainty in a number of regions, the outlook for FinTech investment in 2020 remains strong in Europe



Key Market Drivers

- Alliances between crowdlending FinTech & large banks
- New European regulation for the crowdlending sector
- Public institutions will continue to be strategic allies to consolidate alternative finance
- Strategic agreements with large business groups
- Increased consumer & SME awareness
- FinTech fuelling an ecosystem future in Europe

Germany

- FinTech adoption by consumers is at 64%
- Digital banks are looking to expand outward, N26 is a strong example
- The biggest VC deal in 2019, 6 billion USD acquisition of Concardis

Belgium

- FinTech adoption by consumers is at 43%
- Market's largest segment is digital payments valued at 14,000 million USD
- Strong push from the government to encourage SME /start-up activity within this sector

Key Market Trends

Cybersecurity
& Digital
Identity
Management

Digital
Banking
Licenses

Contactless
Payments



\$88

Billion USD

Europe's
Market Value
2019

23.8%

CAGR

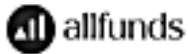

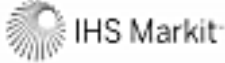








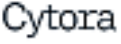








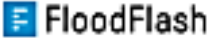
Compound
Annual
Growth Rate

United Kingdom

- FinTech adoption by consumers is at 42%
- London is a global hub for FinTech with over 1 600 companies, expected to double by 2030
- UK FinTech sector generated £6.6 billion revenue in 2019

We're now in the fourth wave of FinTech innovation, with Europe being a test bed for global FinTech players

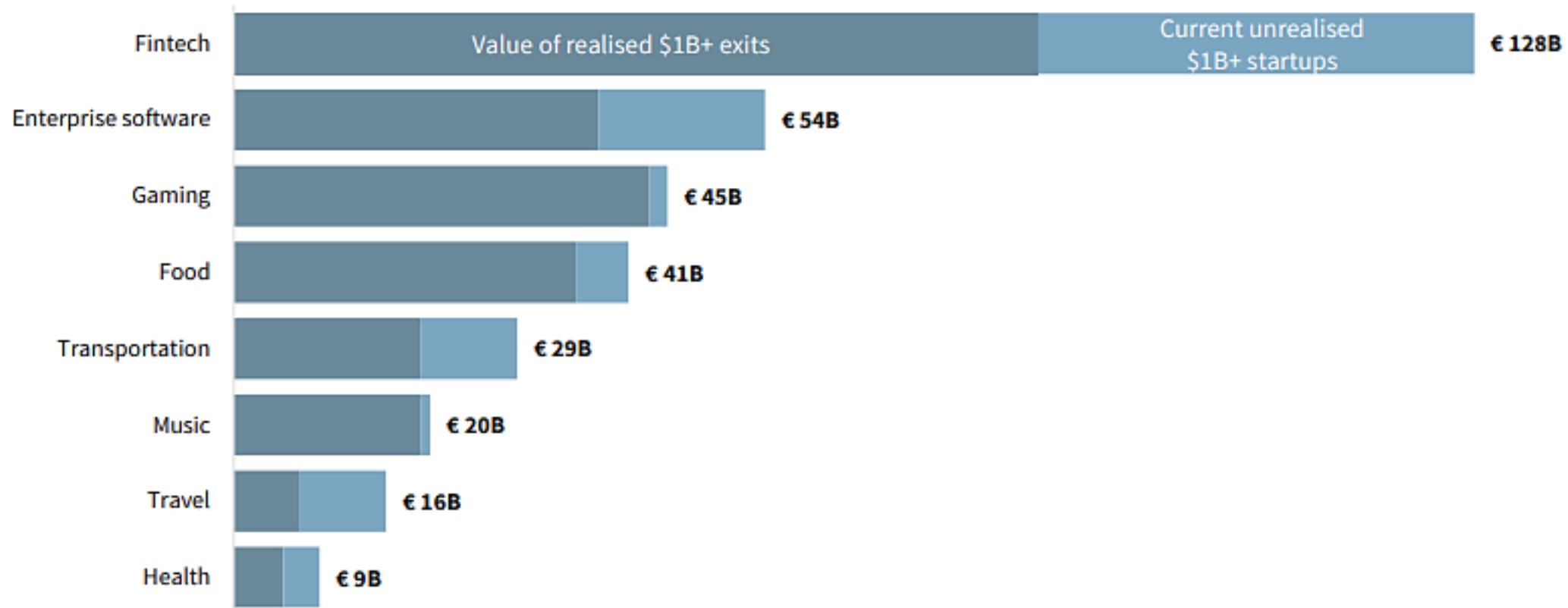


1970-2000	2000-2010	2010-2015	2015-2020
Financial software	E-payments & financial marketplaces	Digital challengers	AI, IoT & Blockchain enablers
 allfunds  Fidessa nets:® TransUnion.™ avaloq	 IHS Markit iZettle  PAYVISION adyen Skrill Klarna.	 Revolut  Funding Circle  TransferWise  OakNorth  monese  raisin.	 solarisBank  Cytora  CHAINALYSIS  TRACTABLE  YAPILY  cleo.  hiber.  Comply Advantage  re:ceivee  skywatch.ai  FloodFlash

European FinTech companies have created over two times more value than any tech sector in Europe



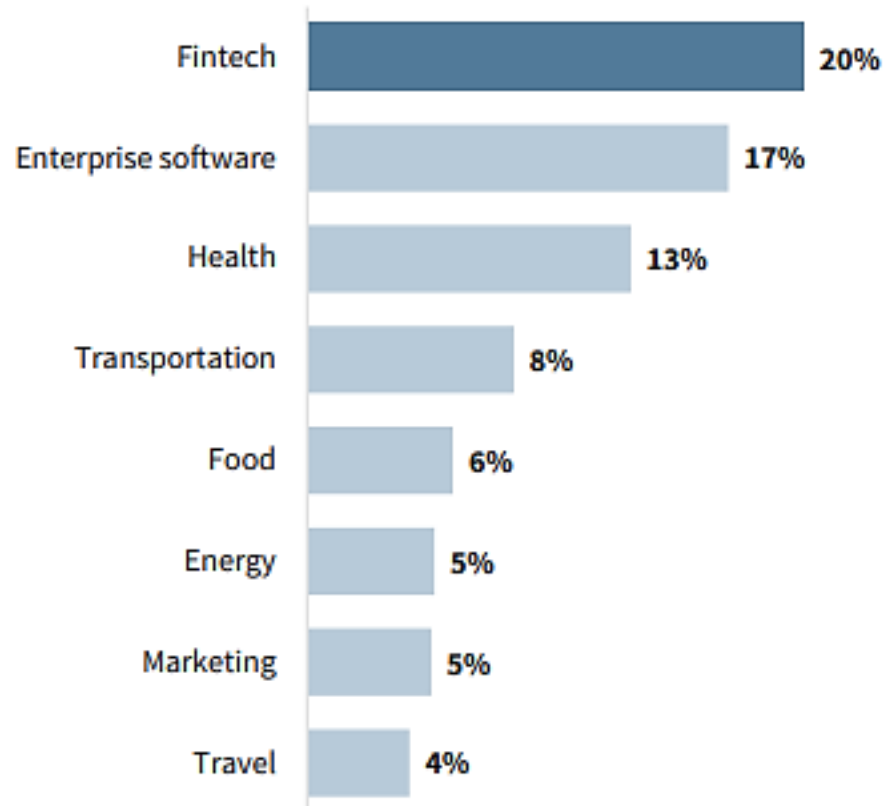
Europe Tech Sectors Value Added (in billion Euros 2019)



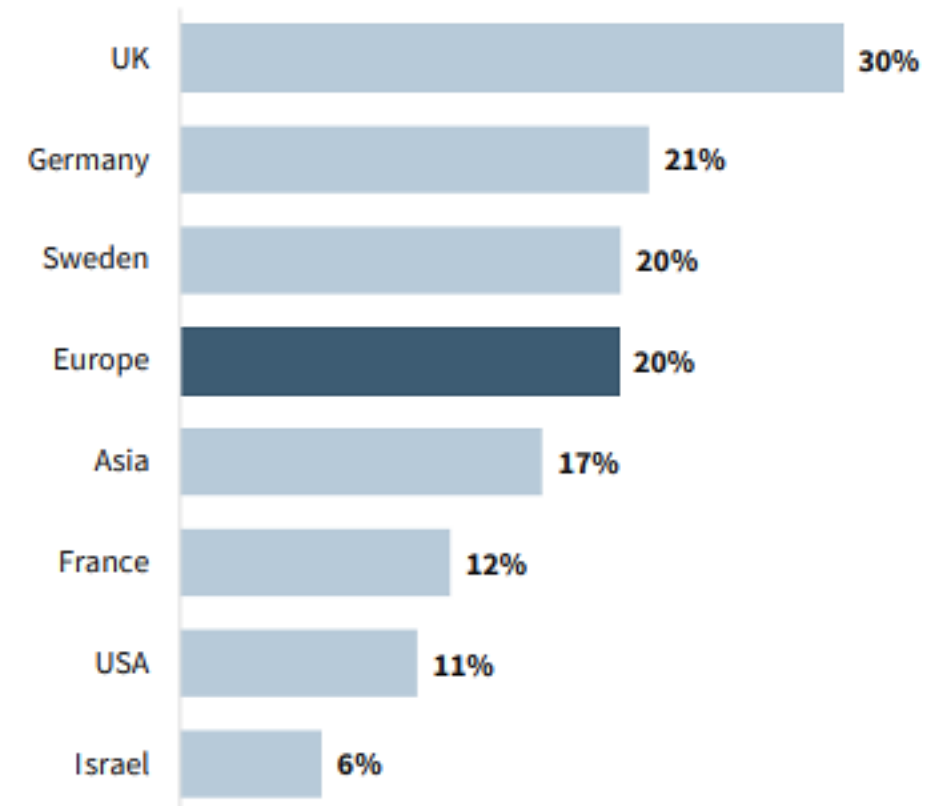
FinTech is Europe's largest venture capital investment category, receiving 20% of all venture capital in Europe



Share of VC investment in Europe per sector (2017-2019 YTD)



Share of FinTech in total VC investment per region (2017-2019 YTD)



These investments are driven by a multitude of acquisitions that bring diversity to the sector and as such driving interest across Europe



Multiple Acquisitions Across The Region – the top FinTech deals in Europe in 2019 were diverse both geographically and technically. After Worldpay (UK), the next three largest deals included the acquisition of digital asset trading company AliExchange in Estonia for \$2.1 billion, the buyout of alternative investment software company eFront in France for \$1.3 billion, and the buyout of platform company SIA (Italy) for \$894 million.

Europe Gains Attention From Global Investors – one example is Australia's Commonwealth Bank participated in Sweden-based Klarna's \$460 million funding round in Q3'19.

Attracting Larger Ticket Sizes - median VC deal sizes in Europe grew significantly across all deal stages in 2019. FinTech companies that began with a focus on a niche product offering continued to broaden their range of services over 2019, with some moving from unregulated offerings to becoming more like traditional financial institutions. The increasing capital requirements associated with this shift, combined with the capital needed to fuel growth both product-wise and geographically, will likely continue to push deal sizes higher over the next year.



Germany is a market leader in FinTech with a particular interest in insurance and regulatory technology



Solid activity in Germany particularly in Q3'19 – FinTech investment in Germany was strong in 2019, led by N26's \$470 million raise. M&A activity was also robust, with a number of maturing FinTechs starting to acquire smaller start-ups in order to expand their breadth of offerings. For example, company builder finleap acquired SME banking Penta in April, online lender CreditshelF acquired Valendo in September, while savings marketplace Raisin acquired pension products company Fairr.de in August.

Regtech & Insurtech in Germany – Interest in regtech continued to grow in Germany during 2019, particularly related to risk management. Insurtech also gained traction as the insurtech ecosystem continued to expand and grow. Insurtech hubs and innovation labs Insurtech Hub Munich and InsurLab Germany continued to be instrumental in driving this growth.

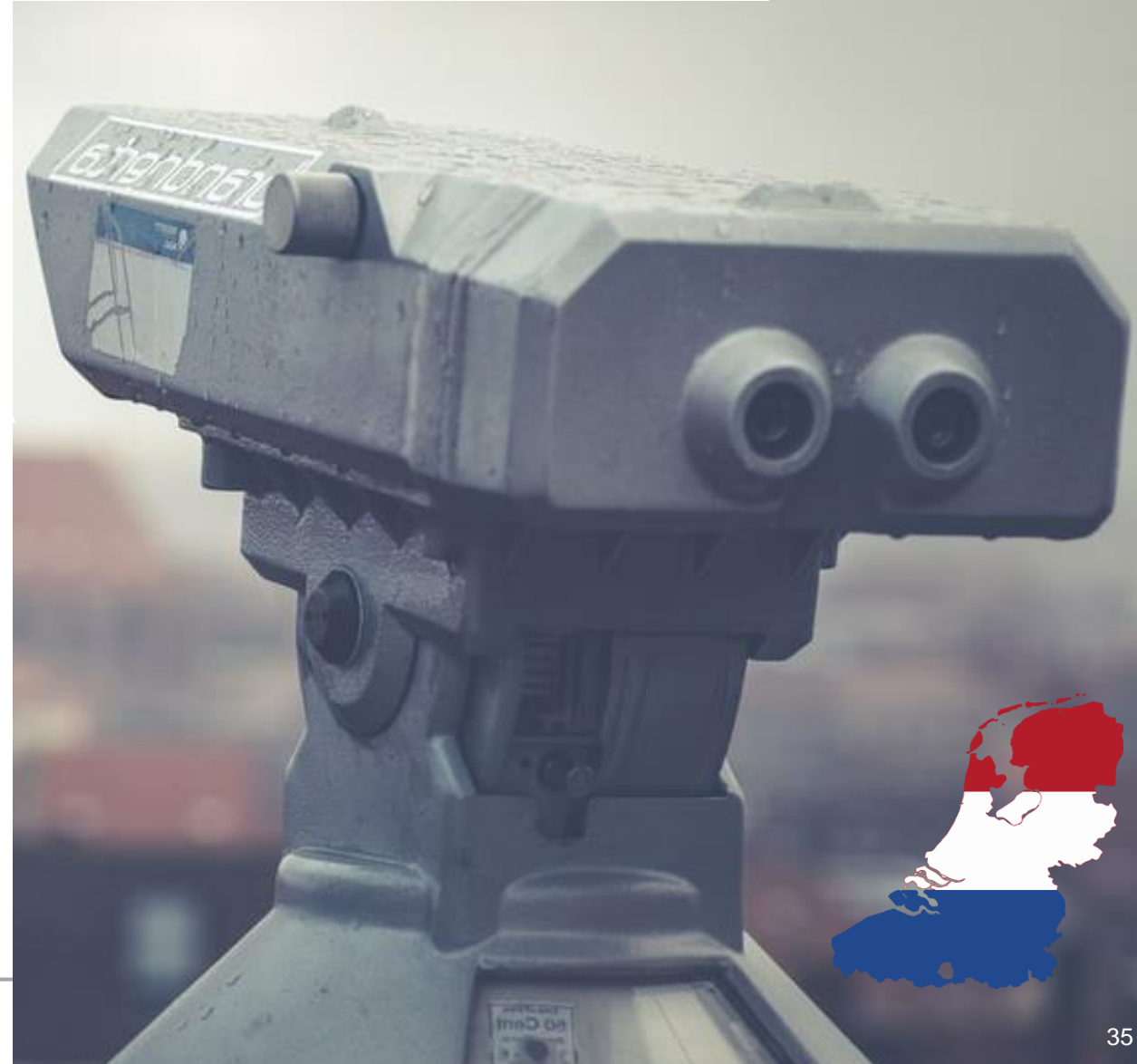


The Netherlands is benefiting from several partnerships between FinTech and traditional players



Joint Forces for The Benefit of The Netherlands – the Dutch financial sector has always had a good record of collaboration, and many incumbent banks even collaborate on topics of mutual interest. For instance, the three major banks have joined forces to start a joint KYC facility to maximize compliance efficiency, and have come together to issue joint guidelines on the financing of a completely circular economy, in line with the Dutch Government's vision of having a fully circular economy by the year 2050.

Financial Inclusion & Health is One Area They're Focused on – along a similar vein, Dutch incumbents also work with FinTech providers on goals around financial health / inclusion. For example, ABN AMRO bank relied on FinTech player Tink to provide all the white label solutions required for its Grip app, which allows users to track and visualize their spending according to expense categories.



Belgium is the fifth highest producer of FinTech deals across Europe despite falling short of being in the top ten economies in Europe



A Strategic Location – it certainly helps that Brussels is in the very heart of one of the most densely populated places in Europe, with three quarters of the consumer power within a few hundred miles. Tech giants, therefore, do not have to span the globe to find potential customers.

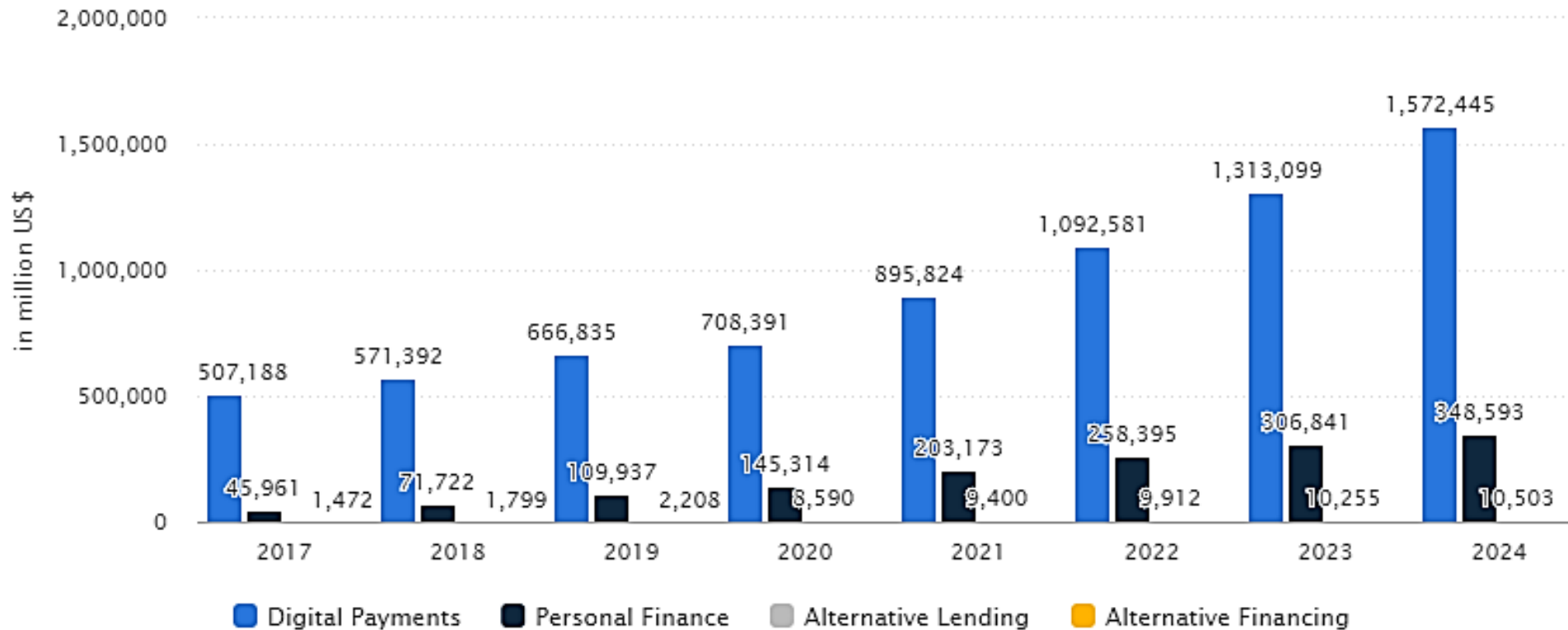
Big Market Players – the big players based in Belgium are Cashforce and Clear2pay, both of which boast some of the most influential global banks as clients. Some of the largest banks and financial institutions in the world are a short train ride.

Straightaway Incentives – Belgium has minimal red tape for technology companies compared with other European countries. In the last five years, the country created policies that helped reduce tech companies' taxes by more than 25% and more than 100 deals have been made in generating capital for FinTech start-ups.



Digital payments lead the way in terms of growth in Europe, with transaction values forecasted to more than double in the next 5 years

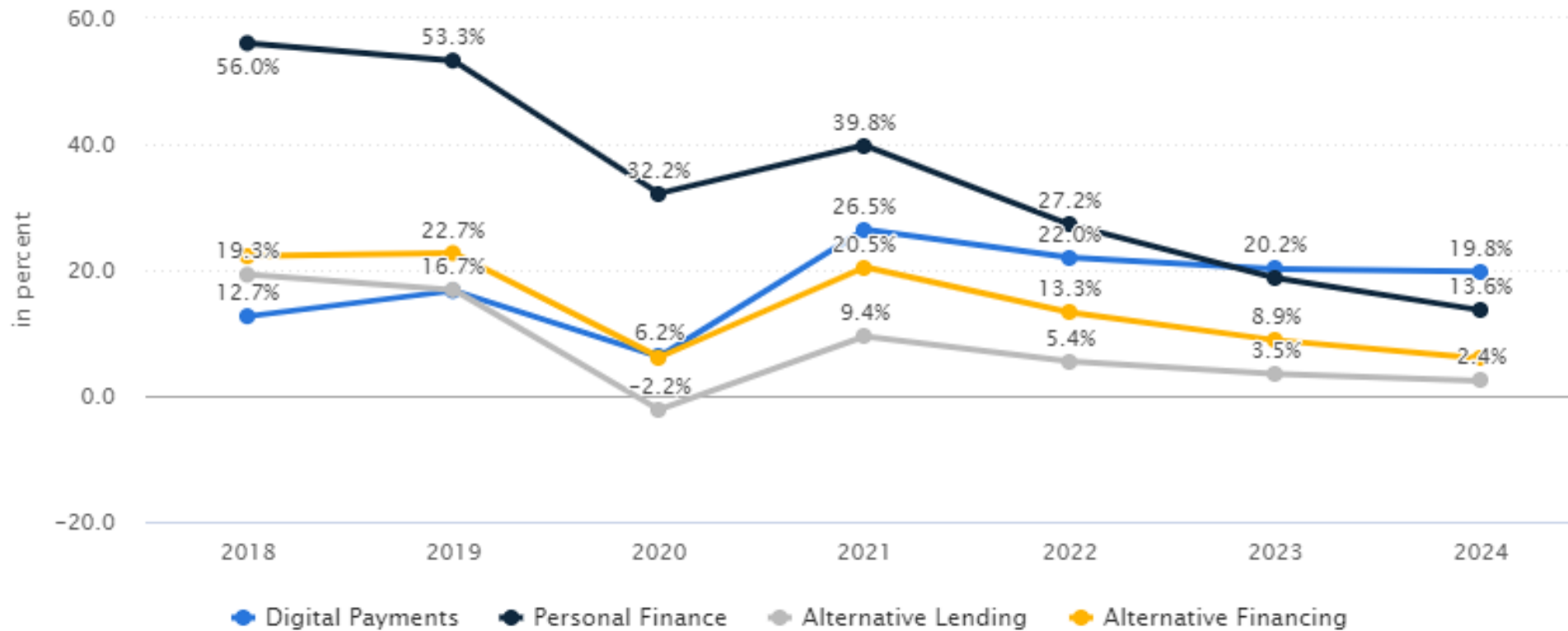
FinTech Europe Transaction Value
(in million USD 2017 – 2024)



VALUE

Despite the COVID impact, the market is still growing with tech companies digging deeper into the financial services value chain and are creating new market structures

FinTech Europe Transaction Value Growth
(in % 2017 – 2024)

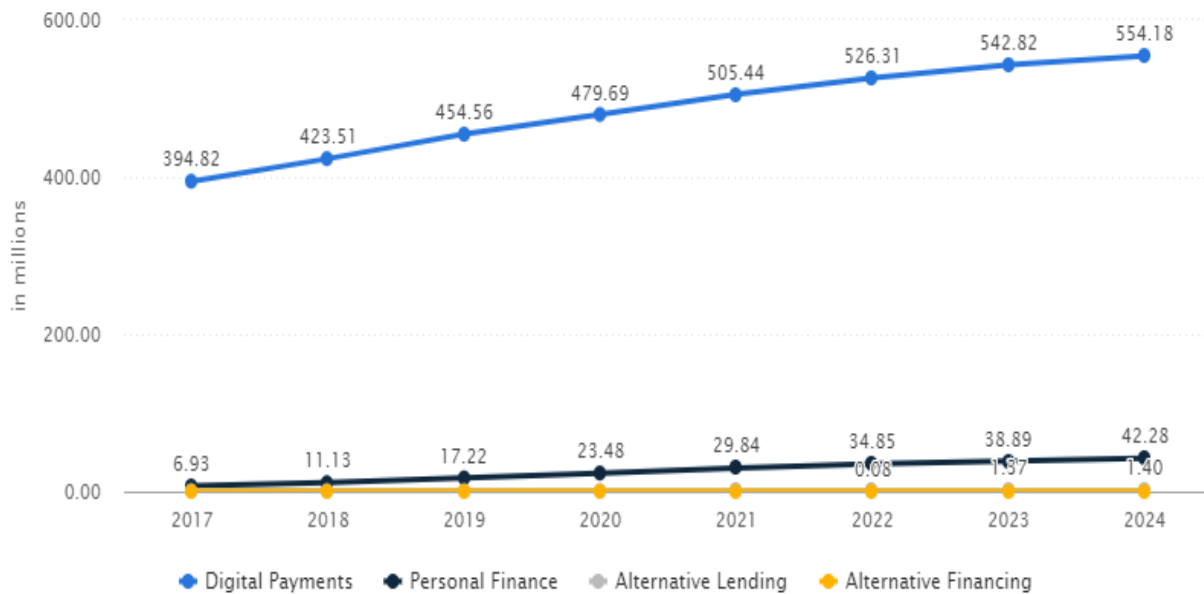


GROWTH

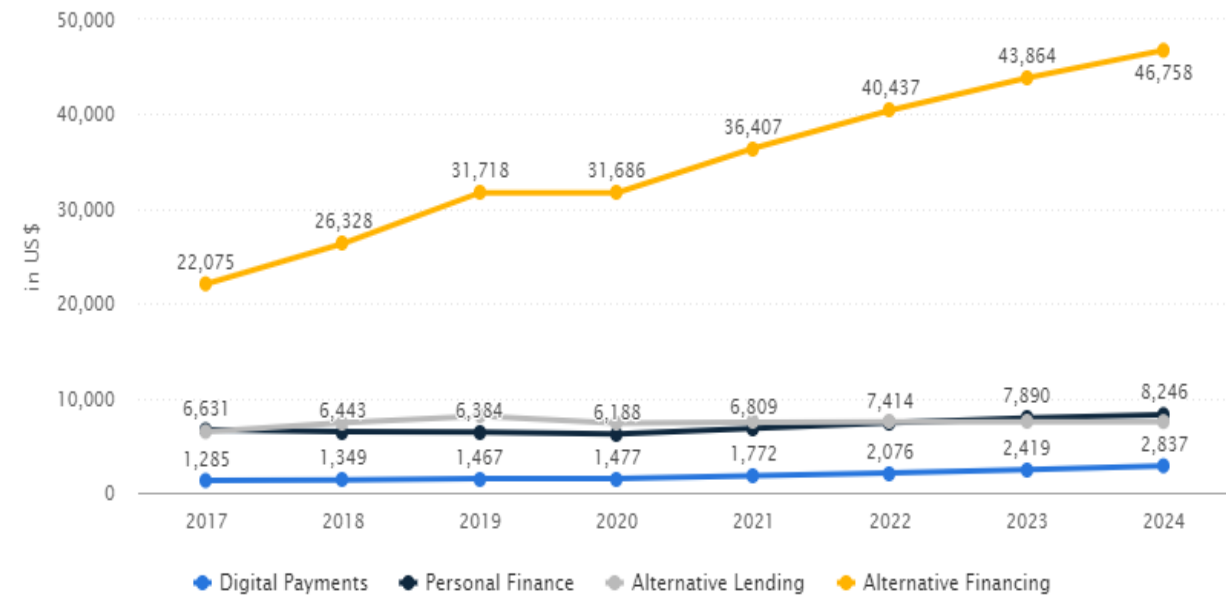
Increased awareness and accessibility of the industry have led to a growing number of users



FinTech Europe Users
(in millions 2017 – 2024)



FinTech Europe Average Transaction Value per User
(in % 2017 – 2024)



These developments are yet to grow rapidly with multiple lookouts for the future of the European FinTech market...

Bigger, Bolder Deals

Deal sizes will continue to grow as investors focus on late-stage FinTechs. Frothy deals will be increasingly replaced by high-conviction deals focused on companies with proven business models and paths to profitability.

Product Expansion

Maturing FinTechs and challenger banks will continue to expand the breadth of their service offerings beyond their initial niche focus areas into adjacencies, e.g. energy, telco, etc.

Deals in Diverse Locations

FinTech deals will increasingly be seen in jurisdictions outside of traditional FinTech markets, such as in Southeast Asia, Latin America and Africa.

Rise of Big Tech

Alibaba, Alphabet, Apple and Tencent will increase their focus on the FinTech space, to grow their reach into developing markets – whether directly or by forging FinTech investments or through strategic alliances.

Digital Banking Licenses

Following the lead of Hong Kong, Australia and Singapore, more countries will develop digital banking regimes to stimulate competition and deliver services to under-served/un-served segments of the population.

The Hunted Start Hunting

Mature FinTechs will increasingly make their own investments in other emerging FinTech start-ups as they seek to augment their capabilities, get access to talent more quickly and grow in new markets.

Partnerships

This will accelerate cooperation between big tech players & FinTechs, traditional firms & FinTechs, & FinTechs with each other. It will be highly customer-focused & geared toward creating more value.

Open Banking to Open Finance

The focus on open data opportunities will move beyond banking and into other aspects of the financial services industry, as well as solving common pain points in other sectors.

Re-bundling of Financial Services

The unbundling of financial products will begin to reverse course as consumers increasingly seek a solution to complex and fragmented digital lives, preferring a trusted platform to orchestrate their financial affairs.

Cybersecurity & Digital Identity Management

Cybersecurity-focused FinTech firms will become more attractive as traditional financial institutions shift from building to buying cyber.

All of these new developments are driven by consumers, who are more immersed with FinTech than ever



Meeting Consumer Needs



With the technological advancements across the globe and Europe in particular, consumer expectations are on the rise. FinTech providers in the region are following a 'consumer centric' approach built around understanding user needs and then building a continuously improving user experience. For European FinTech users, this is the main driver that makes them more frequent users and reliant on FinTech

Convenience & Usability are The New Normal



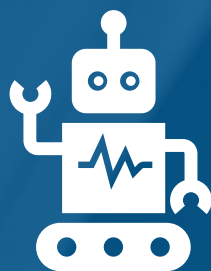
Consumers have immersed themselves with digital goods and services provided by Big Tech firms like Apple, Google, Amazon and Facebook. As such, as they become accustomed to the digital experience provided by these giants, they expect the same level of customer experience from their financial services providers. As a result, the pursuit of customer centricity has become a main priority.

E-Commerce has a Direct Effect on FinTech



The new normal of consumer shopping is shaping the way people pay online and their increasing reliance on FinTech payment methods. Online banking and alternative payment methods are leading the way in this space.

Artificial Intelligence (AI)



AI is defined as the intelligence demonstrated by machines as opposed to natural intelligence demonstrated by humans. AI is also referred to as machine learning, signifying the machines' intelligence is also through continuous development and innovation

Below is a list of topics covered within this section:

01

**Hardware
AI**

02

**Software
AI**

03

**AI
Services**

'Adaptive' Artificial Intelligence is amongst the highest growing markets in Europe



Annual Growth

44%

Between 2018 – 2025

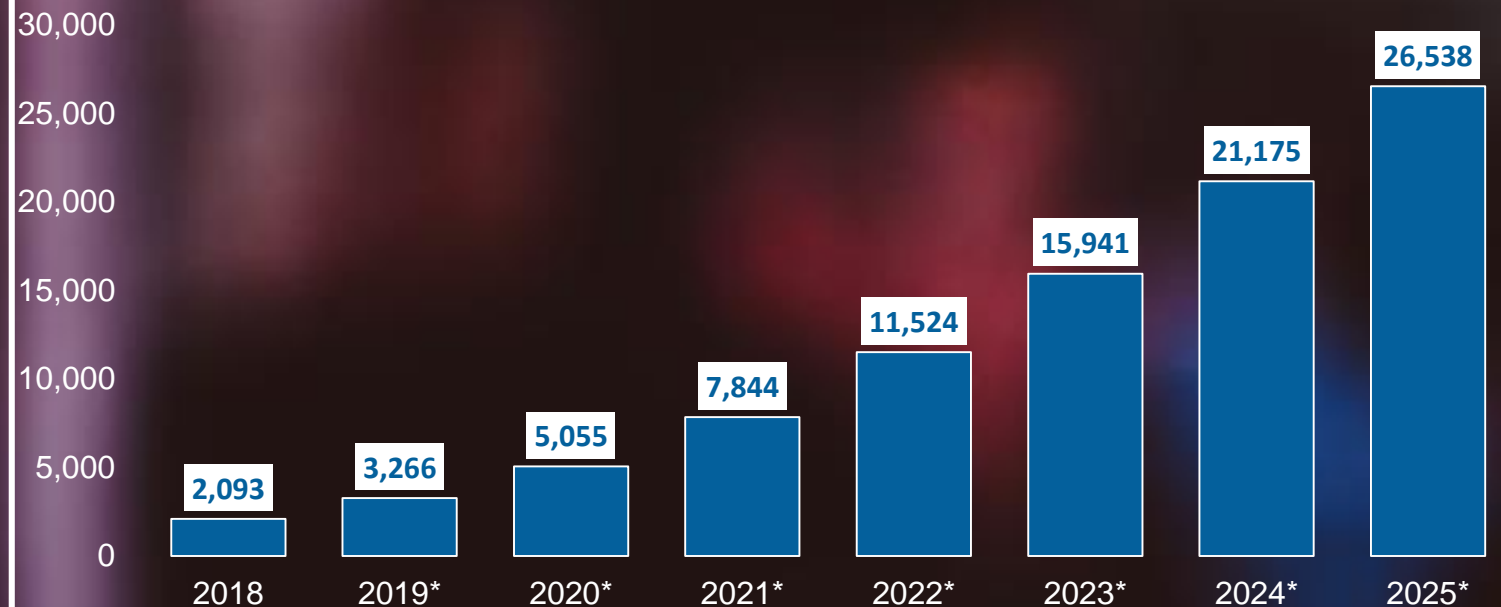


Turnover

USD\$2,093mn

Total in 2018

Europe's AI Software Turnover 2018 – 2025



Despite falling economies, Artificial Intelligence will experience a solid growth over the coming few years

Impact Analysis of COVID-19

Information Technology

The Information Technology sector will see MIXED impact due to COVID-19 outbreak and is expected to register a neutral growth rate compared to the global GDP growth



Market Impact

This market will have **POSITIVE IMPACT** due to the spread of COVID-19



Global Artificial Intelligence-as-a-Service (AlaaS) Market 2020-2024

Market growth will **ACCELERATE** at a CAGR of over

48%



Incremental growth

USD 15.14 bn



Growth for 2020

42.68%



IMPACT

Market growth in 2020 likely to **INCREASE** compared to 2019

Prior to the pandemic, the European Commission was already prioritising investments and initiatives to further grow AI in the region



A Clear Vision for Europe – as AI has become an area of strategic importance and a key driver of economic development, The European Commission puts forward a European approach to Artificial Intelligence. It deals with technological, ethical, legal and socio-economic aspects to boost EU's research and industrial capacity and to put AI at the service of European citizens and economy

Being ahead of technological developments and encouraging uptake by the public and private sectors – the Commission is increasing its annual investments in AI by 70% under the research and innovation programme Horizon 2020. It will reach EUR 1.5 billion for the period 2018-2020

Missions to Achieve The Vision – the Commission will:

- Connect and strengthen AI research centres across Europe
- Support the development of an "AI-on-demand platform" that will provide access to relevant AI resources in the EU for all users
- Support the development of AI applications in key sectors



Socio-economic, legal and ethical impacts have to be carefully addressed to ensure that the vision is sustainable and appropriate



Prepare for socio-economic changes brought about by AI:

- Support business-education partnerships to attract and keep more AI talent in Europe;
- Set up dedicated training and retraining schemes for professionals;
- Foresee changes in the labour market and skills mismatch;
- Support digital skills and competences in science, technology, engineering, mathematics (STEM), entrepreneurship and creativity;
- Encourage member states to modernise their education and training systems

Ensure an appropriate ethical and legal framework – in February 2020, the Commission published a White Paper aiming to foster a European ecosystem of excellence and trust I proposing:

- Measures that will streamline research, foster collaboration between member states and increase investment into AI development and deployment;
- Policy options for a future EU regulatory framework that would determine the types of legal requirements that would apply to relevant actors



Raising funds, bringing in foreign investment and growing the market is the bigger vision for Europe amid fears that the US & China are pulling ahead in areas such as AI & Blockchain

The European Commission and European Investment Fund are launching a **€2 billion** fund to invest in fundamental technologies

“ There is still not enough investment coming into Europe compared to the US and Asia, especially in AI. It is more even in blockchain but there we don't want to lose the good position we have ”

Helen Kopman

Deputy Head of the Digital Innovation and Blockchain Unit at DG Connect

The home of industries in Europe, Germany aims at “AI Made in Germany”



A Clear Objective for Germany – Germany aims at being an international leader in the field of artificial intelligence & robotics. The ultimate goal would be the number one worldwide.

Political Support of AI – AI will make far-reaching changes to the way we work and our society. For that reason, the German federal government is concerned not only with country-wide financial support for AI, such as planned investments amounting to 3 billion euros by 2025, but also with turning technological progress into social progress

The Federal Government's Strategy – since 2018, the federal government has been accelerating Germany's ascent to becoming one of the leading nations in the development and application of AI technologies with its national AI strategy. Many experts were involved in carving out the strategy, which defines the essential framework conditions against the backdrop of the technology's dynamic development. The AI strategy defines twelve spheres of action. It is designed to be a learning strategy, which will be continuously fine-tuned by policy makers, the scientific community, the business sector as well as civil society.



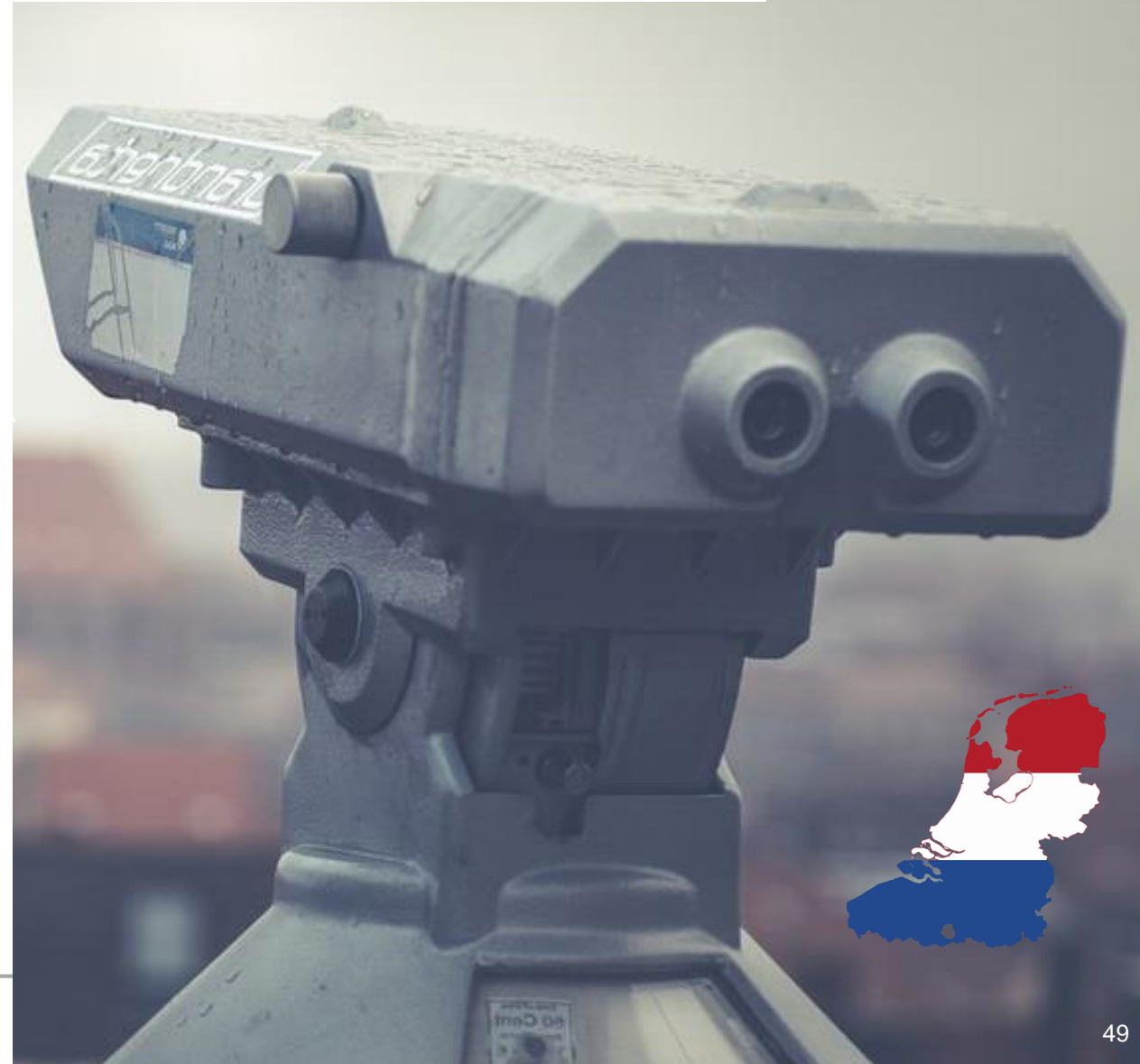
The Netherlands on the other hand, is home for innovation and support for all AI players to drive the market forward



The Dutch AI Strategy – budget of 45 million euros to :

- Capitalising on societal and economic opportunities: policies encouraging the adoption, use and development of AI in the private and public sector and promoting the use of AI to tackle societal challenges
- Creating the right conditions: policies supporting education and skills development in AI; fostering research and innovation in AI, facilitating the access to qualitative data and improving the digital infrastructure
- Strengthening the foundations: including policy actions related to ethical issues, such as trust, human rights, consumer protection, and safety of citizens

The Kickstart AI initiative – Five Dutch companies Ahold Delhaize, ING, KLM, NS and Philips aim to further boost the AI ecosystem in the Netherlands by accelerating and promoting the development of AI technology and nurturing AI talent in the country. This effort will add educational capacity, foster the development of the AI community in the Netherlands and reiterate the position of the Netherlands as a competitive and relevant global AI hub. The initiative provides: **AI superchallenges, Joint appointments & Dutch National course for AI**



Belgium have focused on boosting their AI scene through attracting talent and supporting SMEs



Belgium's National AI Strategy –

1. Improve tools and standards to invite workers to identify skills and skill gaps and find appropriate reskilling programmes
2. Improve opportunities to engage in lifelong learning and make lifelong learning a core mission of all schools
3. Set up a Belgian Innovation Hub
4. Position Belgium as the European AI Lab by scaling up research laboratories and setting up sandboxes for testing purposes
5. Set up large-scale blue-sky projects to fuel research
6. Set up financial instruments for SMEs to experiment with AI
7. Support SMEs when applying for European investment programmes
8. Support scale-up growth through a large-scale AI public-private matching investment fund



The future of AI in Europe is shaped by the following trends

Refining Business Processes

Filling in forms, generating reports and diagrams and producing documentation and instructions are all tasks that can be automated by machines that watch what we do and learn to do it for us in a quicker and more streamlined manner

More Personalisation

AI allows providers to quickly and accurately project a 360-degree view of customers in real-time as they interact through online portals and mobile apps, quickly learning how their predictions can fit our wants and needs

AI Growth is Reliant on Data

As technology and methods of simulating real world processes and mechanisms in the digital domain have improved over recent years, accurate data has become increasingly available

More AI-powered Devices

As the hardware and expertise needed to deploy AI become cheaper and more available, we will start to see it used in an increasing number of tools, gadgets, and devices

More Human & AI Cooperation

More and more of us will get used to the idea of working alongside AI-powered tools and bots in our day-to-day working lives

AI Increasingly at The Edge

AI is taking place at the "edge," close to the point where data is gathered and used. AI-powered insights will be a reality outside of the times and places where super-fast fibre optic and mobile networks are available

AI in Media & Creative Industries

Robert De Niro de-aged in front of our eyes with the assistance of AI, in Martin Scorsese's epic *The Irishman*, and the use of AI in creating brand new visual effects and trickery is likely to become increasingly common

More AI in Cybersecurity

AI and advanced prediction algorithms, smart technology will play an increasingly important role in protecting us from these attempted intrusions into our lives

More AI Interaction

More of us will interact with AI, maybe without even knowing it

Smart AI, Smarter Than Us?

AI will recognize us, even if we don't recognize it

Internet of Things (IoT)



The Internet of Things (IoT) is the network of physical objects that contain embedded technology to communicate and sense or interact with their internal states or the external environment

Below is a list of topics covered within this section:

01

**Manufacturing
Operations**

02

Transportation

03

**Smart Grid
Technologies**

04

**Smart
Buildings**

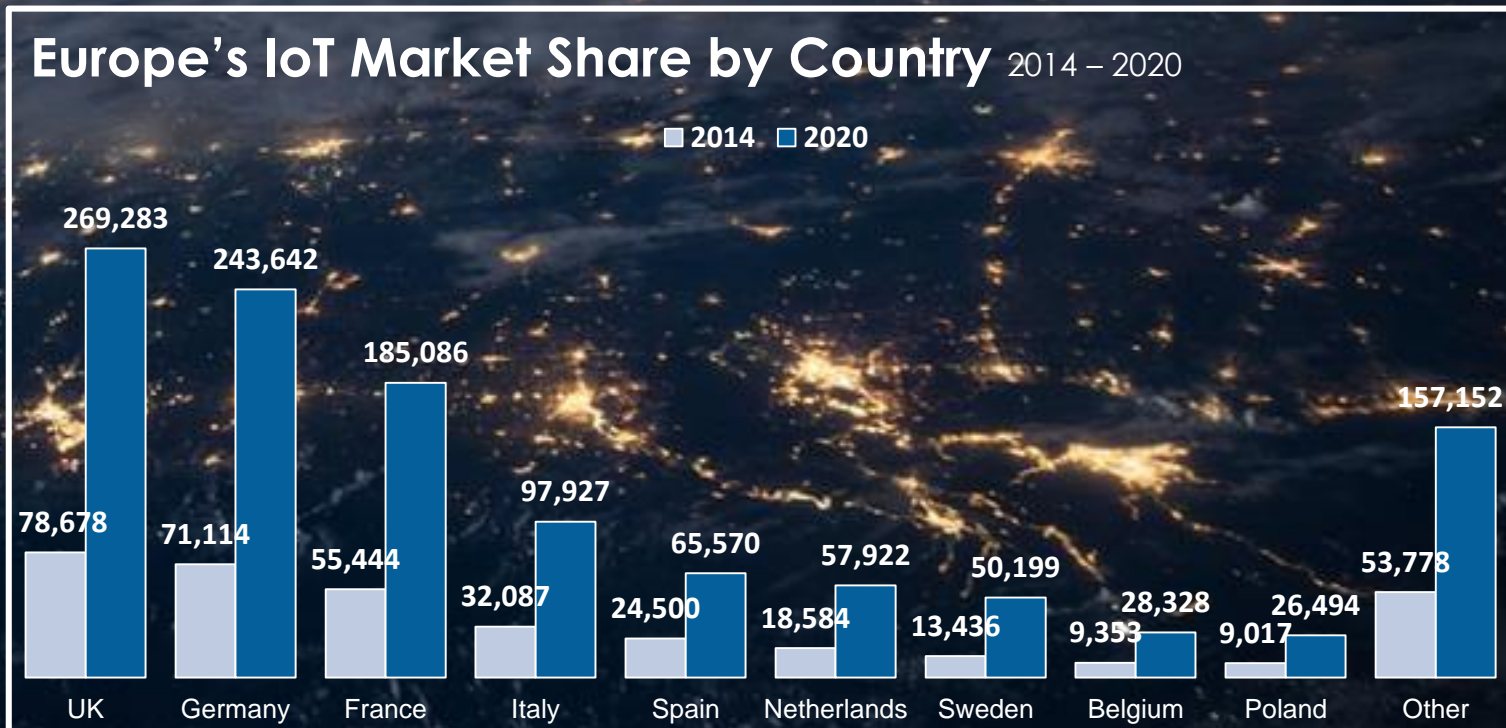
05

**Consumers
IoT**

06

**Smart Home
Automation**

The Internet of Things has a valuable revenue in 2019 with more growth projected over the coming 5 years; the UK, Germany & France are the market leaders



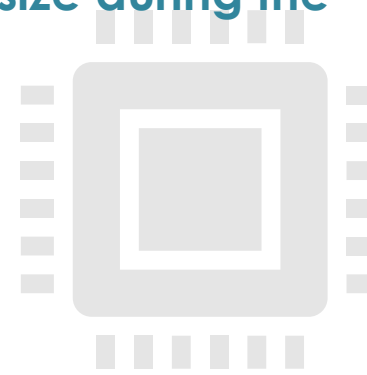
The outbreak of the COVID-19 has caused disruption across verticals in the IoT sector, however, it has opened the doors in other areas



The transportation segment to show the highest growth rate during the forecast period

With the unprecedented decline in air traffic, The application of IoT is opening new revenue streams by facilitating real-time tracking of vehicles and providing monitoring feeds of passengers, which help in checking passengers' travel histories to identify if they need to be quarantined. Also, companies are using drones as another mode of transportation to ensure essential supplies and food deliveries.

Software solution segment to hold the largest market size during the forecast period



The healthcare segment to record higher investment and growth in 2020

IoT has already found its way in the healthcare sector, with numerous applications, such as telemedicine, connected imaging, inpatient monitoring, medication management, connected health, connected worker, connected ambulance, and more. COVID-19 has led IoT healthcare solution providers to quickly render solutions for combatting the rising demand for high-quality services for protection against the virus.

APAC to record the highest growth rate during the forecast period



Major Consumer Challenges

- 1 Meeting Consumers' Expectations
- 2 Easing Security Concerns
- 3 Keeping IoT Hardware Updated
- 4 Overcoming Connectivity Issues

Europe's Commission has a clear direction for IoT's future within the region



Alliance for Internet of Things Innovation (AIOTI) – in 2015, the European Commission launched this alliance to support the creation of an innovative and industry driven European Internet of Things ecosystem. The Commission works closely with AIOTI and all IoT stakeholders and actors towards the establishment of a competitive European IoT market and the creation of new business models. Today the Alliance for Internet of Things Innovation is the largest European IoT Association.

Digital Single Market Strategy – this strategy includes elements which lead Europe a step further in accelerating developments on Internet of Things. In particular, the strategy underlines the need to avoid fragmentation and to foster interoperability for IoT to reach its potential.

Advancing the Internet of Things in Europe Document – to meet this strategy needs and inform about its upcoming policy, the Commission published in April 2016 "Advancing the Internet of Things in Europe" document. This document is part of the "Digitising European Industry" initiative and specifies the EU's IoT vision which is based on three pillars: a thriving IoT ecosystem, a human-centred IoT approach and a single market for IoT.



Germany is amongst the strongest, most promising markets in Europe within IoT



A Highly Promising Market – Germany IoT market is expected to witness a significant growth with the CAGR of approximately 21% during the forecast period. Germany's well-established infrastructure and consumer base are driving demand for cloud services in the country. It is estimated that 26% of German companies do not currently use or plan to use cloud services in their operations that indicates the huge market potential that Germany's private sector offers for cloud adoption and an expanding need for diverse cloud services

Infrastructure is the Foundation – German IoT market is segmented on the basis of infrastructure, vertical, and application. Based on the infrastructure, the market is segmented into platform, mobile networks and access technologies, cloud solutions/storage and processing, analytics, and security. Based on the vertical, the market is segmented into healthcare, energy, public & services, transportation, retail, individuals, and others (manufacturing)

Competitive Landscape – Some of the major players operating in the Germany IoT market include Capgemini, Dell EMC, Auvesy, and others. These players adopt various organic and inorganic growth strategies such as merger and acquisition and product launch to strengthen their presence in Germany market



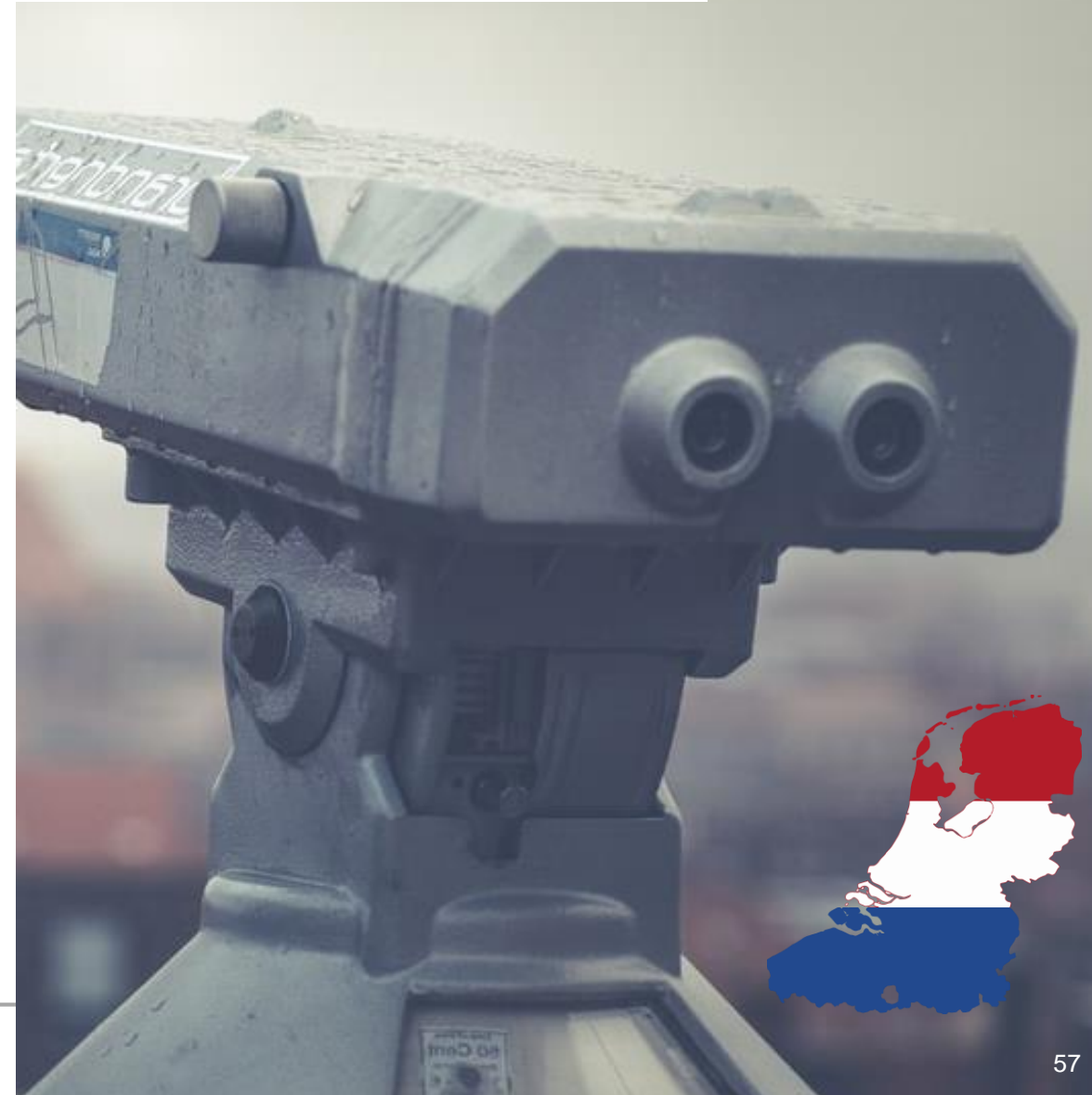
The Netherlands on the other hand, aim to play a leading role within the industry









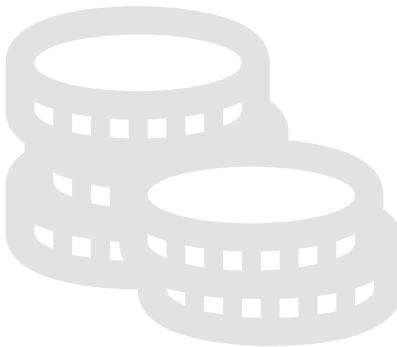



The World-First Nationwide Internet of Things Network

Dutch telecommunications company KPN has switched on its system which reportedly covers the entire country and will be used to connect millions of devices. KPN technicians fitted hundreds of existing mobile transmission towers with LoRa (Long Range) gateways and antennas, to create a new public network dedicated to IoT devices. Sections first went online in Rotterdam and The Hague in November 2015, before work ramped up earlier this year in response to customer interest.

The 'Smart' Industry – TNO, the Ministry of Economic Affairs, VNO-NCW and the Chambers of Commerce and FME have taken the initiative to make a report on the meaning of Smart Industry for companies, knowledge institutions, and government in the Netherlands. The Dutch business community – large and small – holds all the keys to engage with this promising development and to join forces with the frontrunners. The Netherlands has a strong tradition of collaboration in networks and clusters. Add to this world class ICT infrastructure and 93% internet penetration in households and it becomes evident that the Netherlands are poised to play a leading role in Smart Industry.



The future of IoT in Europe is shaped by the following trends

<p>Growth in Data & Devices with More Human – Device Interaction</p> 	<p>VUI: Voice User Interface Will be a Reality</p> 	<p>Real Expansion of Small IoT</p> 	<p>More Movement to The Edge</p> 	<p>More Social, Legal & Ethical Issues</p> 
<p>Artificial Intelligence a Big Player in IoT (Again)</p> 	<p>More Investments in IoT</p> 	<p>The Rise of Industrial IoT & Digital Twin Technology</p> 	<p>IoT Focus on Security Using Blockchain</p> 	<p>Standardisation Still a Problem</p> 

Contents



01

European ICT Market Overview

Exploring market size, opportunity and import trends. Understanding the landscape and consumer preferences.

02

Assessing the Impact of COVID-19

Understanding the current state of play, opportunities created, trends and major changes to consumers and the market.

03

ICT: Sub-Sector Deep Dives

Exploring the detail of specific sub-sectors in Europe; their growth, key statistics and current trends.

04

Accessing The European Market

Evaluating packaging, and regulations of the European market.

Electronics products need to meet certain labelling and packaging requirements



Waste electrical and electronic equipment (WEEE) directive

The directive applies to a wide range of electrical and electronic consumer appliances as well as certain professional equipment, including **IT and Telecommunications equipment**.

RoHS

The WEEE directive aims to divert e-waste from landfills, the directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) aims to reduce the hazardous content of electrical and electronic equipment. The RoHS restricts heavy metals, hexavalent chromium and flame retardants.

Requirements

The WEEE directive requires that waste electrical and electronic equipment **bear a symbol depicting a waste bin with an X** indicating that it should not be placed in the normal waste stream.



Electronics products need to meet certain labelling and packaging requirements



CE Marking



Certain products must bear CE marking before they can be placed on the market within the European Union. This indicates that the manufacturer has carried out a formal assessment procedure to ensure that the product meets health, safety and environmental requirements set out in EU legislation.

Legal responsibilities

Manufacturers have responsibility for placing CE marking on products that are covered by the Directives. They must follow a specified procedure for checking that products conform with EU standards and legislation, completing the necessary technical documentation and applying the CE marking.

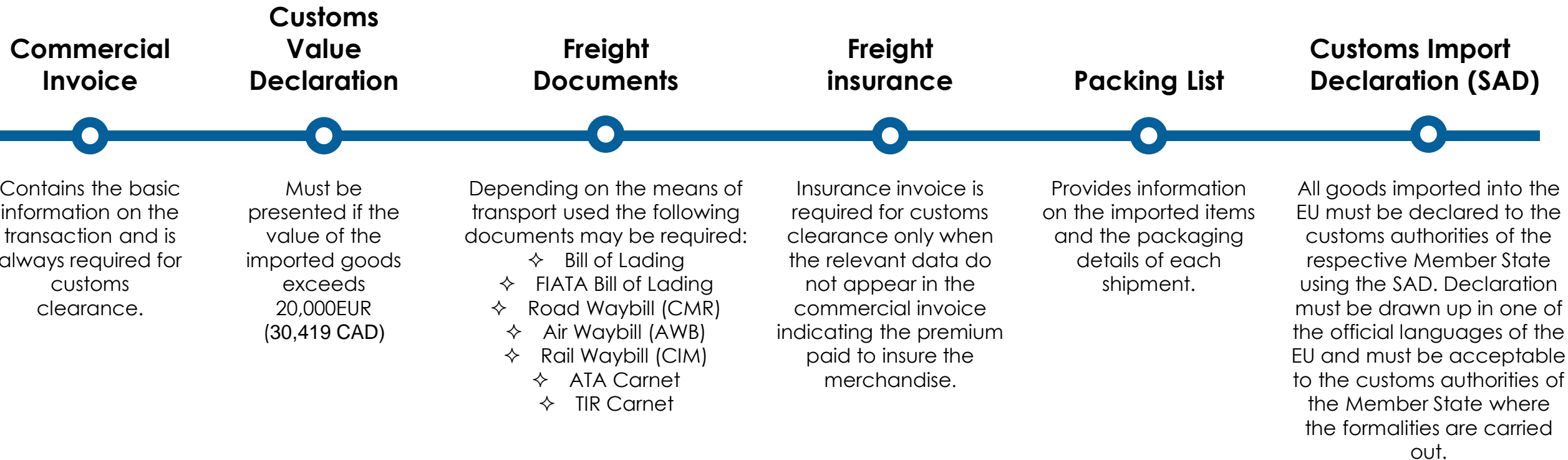
Which products require CE marking?

CE marking is required only for products that are subject to specific EU Directives establishing standards they must meet before they can be sold in the EEA.

The Directives set out the general requirements that products must meet to conform with EU legislation. They also refer to 'harmonised standards', which detail the essential requirements and procedures for CE marking in technical terms.

Go to <https://ec.europa.eu/growth/single-market/european-standards/harmonised-standards> for a list of harmonised standards.

There are a range of general documents that must accompany all products entering the EU



The General Data Protection Regulation is the key piece of legislation on consumer data in the EU



Implemented in 2018, GDPR is a privacy regulation that affects all individuals in the EU member states, as well as all companies that conduct business in the European Union.

GDPR regulates the processing of personal data by individuals, companies or organisations. Under the GDPR individuals have the right to know who is collecting their data, for what purpose, how it will be stored and processed, and how to withdraw consent and make a complaint.

GDPR applies to the following Companies

- ✓ US businesses established in the EU whether or not the processing of personal data takes place within the EU
- ✓ Where the processing relates to the offering of goods or services to data subjects in the EU
- ✓ When the behaviour of an EU resident data subject is monitored

CHALLENGE.
CREATE.
COLLABORATE.