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REPORT

Vietnam's Technology Trends 2023 - 2025

MARCH. 2023

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Vietnam's Technology Trends 2023 - 2025

Overview

In the context of macroeconomics have many unpredictable changes such as inflation, geopolitical tensions, and economic instability, businesses may continue to face challenges but can also receive special opportunities in 2023. However, according to a survey by the Ministry of Planning and Investment in 2022, only 2.2% of enterprises can really reach the maturity of digital, master technology and software to make business decisions. According to Cisco, Vietnam ranks 57 out of 146 countries in terms of digitization, a relatively low rate compared to Vietnam's technological potential. Therefore, Vietnamese businesses need to accelerate the digital transformation process with core technologies in the digital ecosystem.

According to FPT Digital, some key technologies such as Cloud computing, IoT, AI, Cybersecurity and other prominent technologies such as Blockchain, Big Data, Data Analytics, Metaverse... will be widely applied to production activities in the near future, the period of 2023-2025. Cloud Computing helps manufacturing companies efficiently store and manage data, reduce infrastructure costs, and increase flexibility and ease of management. IoT allows devices to connect with each other and transmit data about the production process, helping manufacturers accurately track production and detect errors quickly. AI will be used to enhance performance and automate manufacturing processes such as identifying defects in the production process, providing solutions to reduce problems and increase productivity. Blockchain allows to track the entire production process, from raw materials to the final product, while ensuring the accuracy and safety of data. As such, these technologies not only help to optimize the production process, improve quality, and reduce costs by product, but also simplify and optimize the process of managing and tracking production activities, while minimizing breakdowns and increasing production reliability.

However, the adoption of these technologies still relies on various factors such as supporting procedures, investment roadmaps and the readiness of business when immigrating to new systems. Detailed will be listed in FPT Digital's report.

Analyze

FPT Digital report on “Vietnam's Technologies Trend 2023 -2025", includes:

Vietnam's Technology Trends 2023 - 2025

Cloud Computing

THE CORE IN DIGITAL TECHNOLOGY PLATFORM

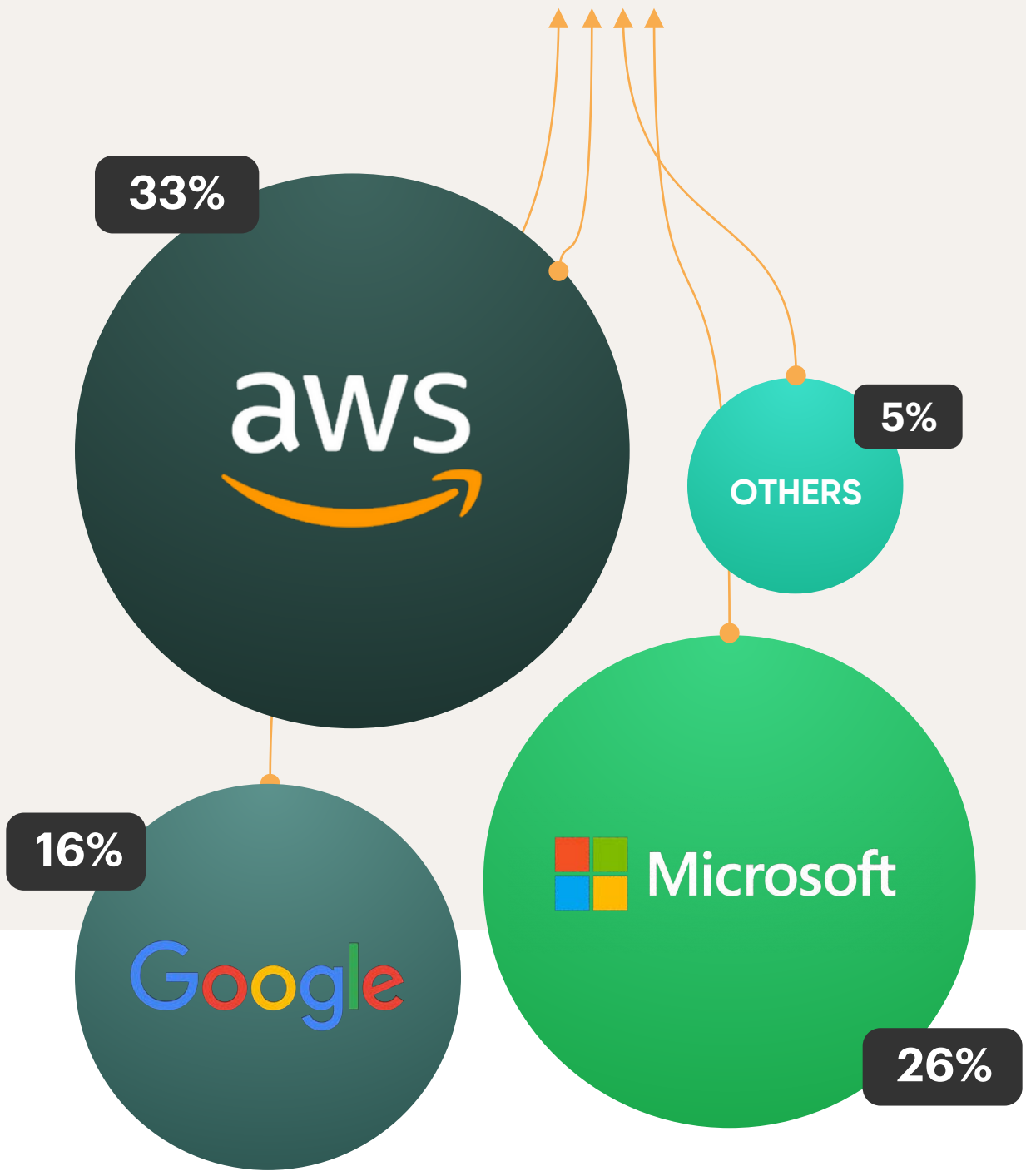
Vietnam in The Cloud's World Map

CLOUD SUPPLIER SERVICES

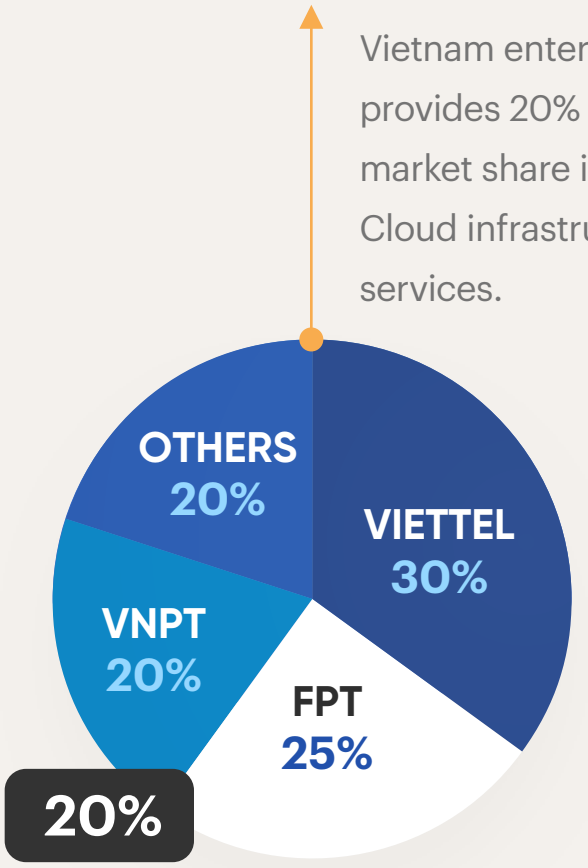
WORLD
490.3 BILLION USD
↑ Growth rate 18%

REVENUE

VIỆT NAM
459 BILLION USD
↑ Growth rate 17%



Vietnam enterprises provides 20% domestic market share in terms of Cloud infrastructure services.



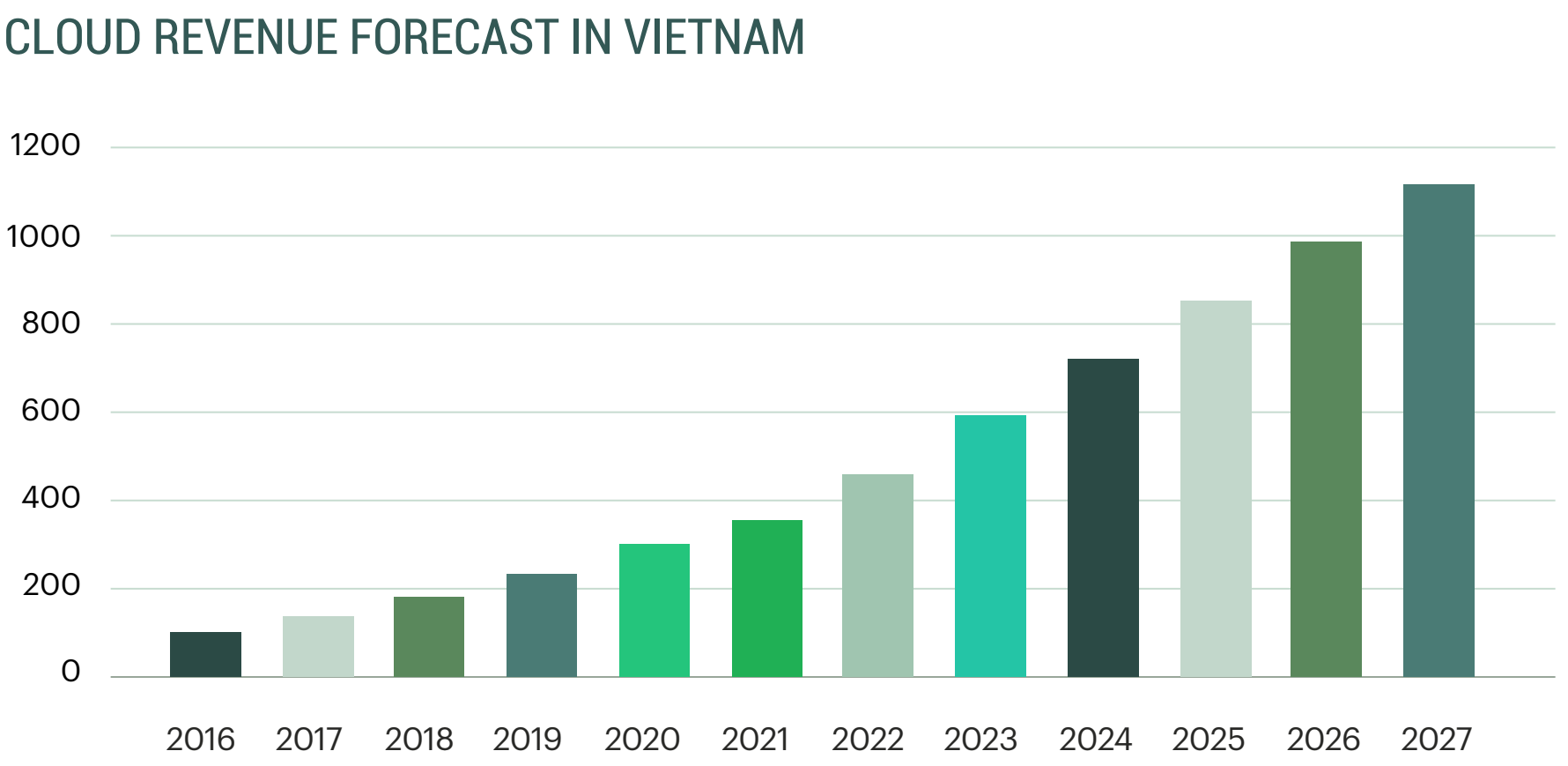
NHÀ CUNG CẤP CLOUD VIỆT NAM

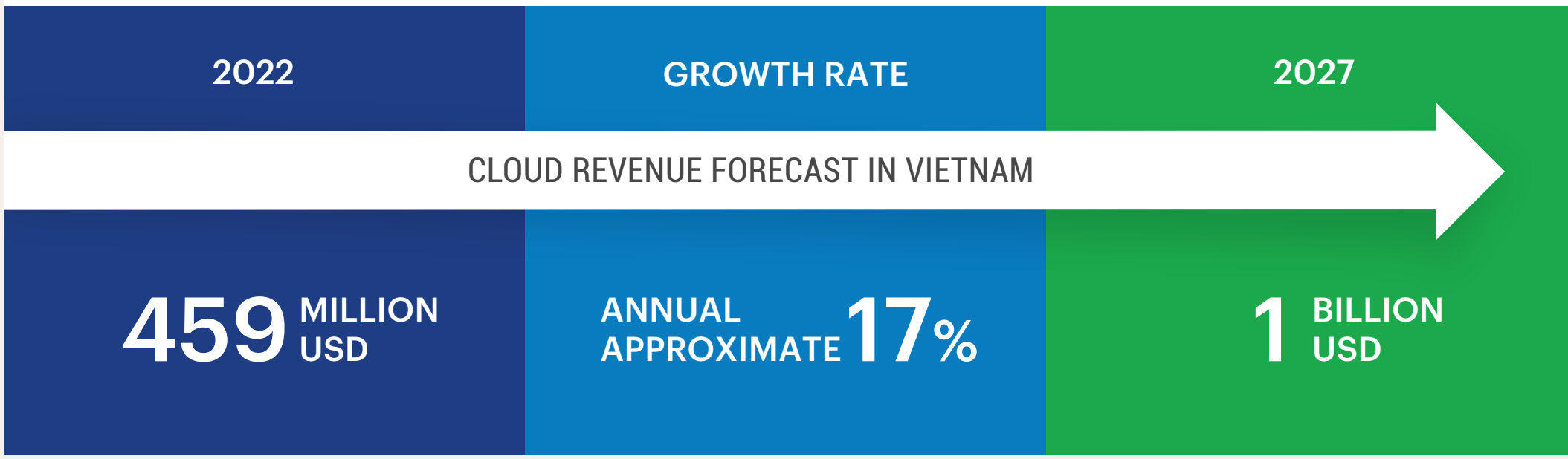
Cloud Computing is the delivery of computing services—including servers, storage, databases, networking, software, analytics, and intelligence—over the internet ("the cloud"). Cloud computing services increasingly chosen by many businesses because it helps businesses reduce investment costs for hard systems, optimize the storage and processing process a large amount of data.

Cloud computing is a key factor to support the development of other modern technologies such as Artificial Intelligence (AI), Data analytics, Internet of Things (IoT), Metaverse...

Cloud market in Vietnam grows fast but not strong enough

Compared to the world, Vietnam is considered to have many initiatives in the field of Cloud and is on the rise, but Vietnam still ranked 53/76th in the ranking of Cloud Ecosystem Index in 2022.





BENEFITS

of businesses when converting storage & data mining solutions to Cloud

01

High adaptability, fast expansion

02

Increase operation productivity

03

Increase data security

04

Reduce operation costs

DISADVANTAGES

of businesses when converting storage & data mining solutions to Cloud

01 No strategic planning to invest properly in terms of both quantity and quality for storage activities and Data mining on Cloud

02 Lack of skillful human resources for operation and management

03 Lack of data security when immigrate to Cloud

04 Limited cloud services options with reasonable prices and flexible adaption

Cloud is applied intensively in various key areas

FINANCE & BANKING

Direct access to data in the Cloud

Practical example

TPBank

TP Bank uses the advatange of Cloud Computing to apply on cardless withdrawals through LiveBank – a Digital Banking system. User data has been stored on the bank's system and is identified by Aritificial Intelligience (AI) by using QR code, fingerprint, FaceID.

MANUFACTURING

Direct access to data stored on Cloud

Smart device connecting in production chain

Practical example

Piramal

Glass material company – Piramal Glass – digitally transforms its manufacturing process using Microsoft's Azure IoT to remotely collect data from all sensors in the producton line to track, minitor and ensure quality in each stage; response and report in real time.

RETAIL

Centrailized data synchroniztion on the system

Practical example

pets at home

Pets At Home Company (UK) develops the application ‘Sales Assist’ - a sale assisstant that built on IBM MobileFirst platform helps 400 stores nationalwide share information, grade and rate product prices, helping staff to update information goods in real time.

IT

Manage and process personal data on Cloud

Practical example

Google

Google provides IT services thorugh SaaS protocol, which help users do not have to install software directly on their personal computers but still use directly in the online platforms that Google provides, such as Google Docs, Google Drive...

HEALTHCARE

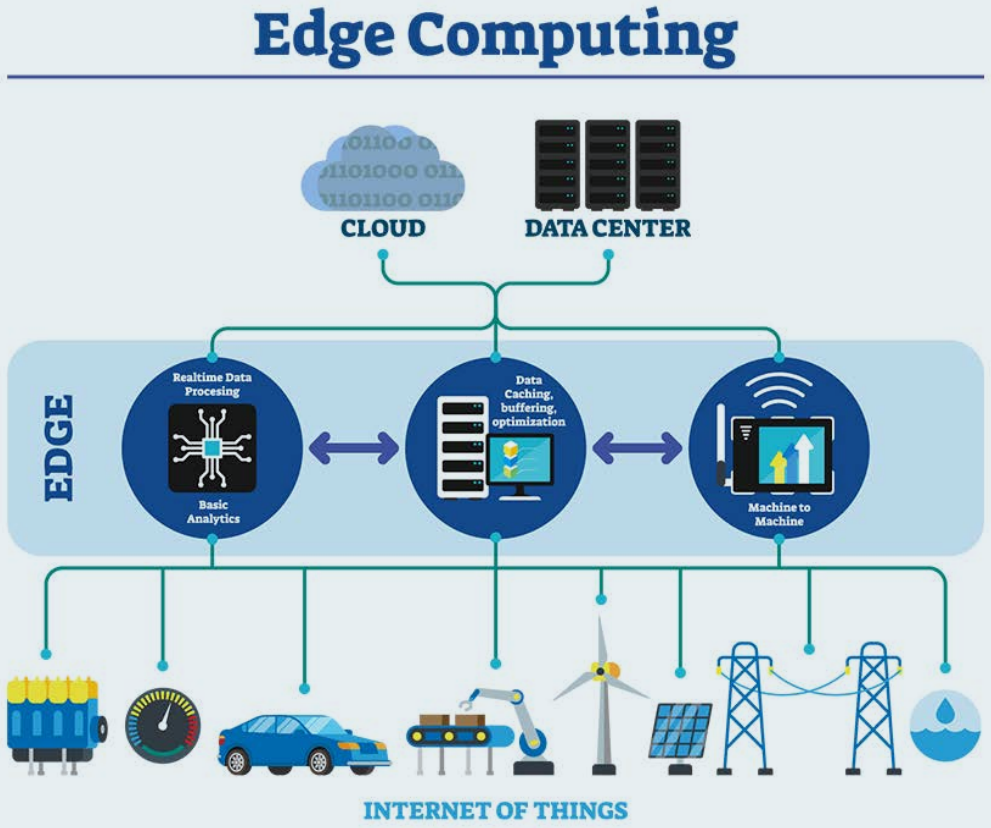
Access, search and remote medical exmaination for patients

Practical example

Teleheath platform is launched using Cloud infrastructure platform to provide remote medical examination and treatment for 328 district-level medical facilitites in 47 provinces and cities in Vietnam.

Edge Cloud Computing

The new generation of Cloud Computing will be widely apply in the near future



Edge Cloud Computing, firstly, is not an upgrade of traditional Cloud Computing. It is a different approach, more scattered to solve the limitations of traditional technology (such as the latency or data traffict). In terms of definition, Edge Cloud Computing is a network technology that put computers and network devices closest to the data sources.

Advantages

- Save data traffics
- Increase the download speed
- Enhance data security
- Fundamental development of new technology, IoT

Edge Cloud Computing adoption has been accelerated

- CAGR of 12%
- The market reaches 65 billion USD by 2025

IoT – Internet of Things

THE AGE OF CONNECTING THINGS

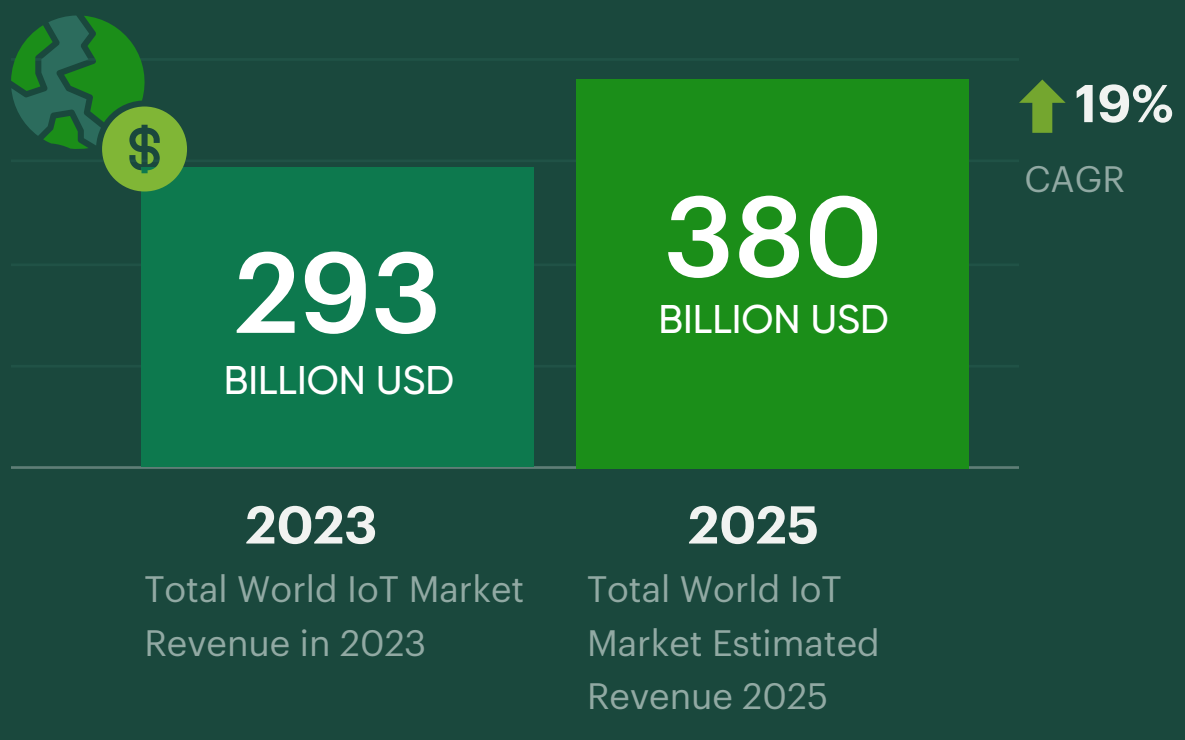
02.

IoT

The key technology in the global Industrial Revolution 4.0

IoT - Internet of Things, is a connection between physical and virtual devices capable of communicating automatically with each other using Internet Protocol (IP).

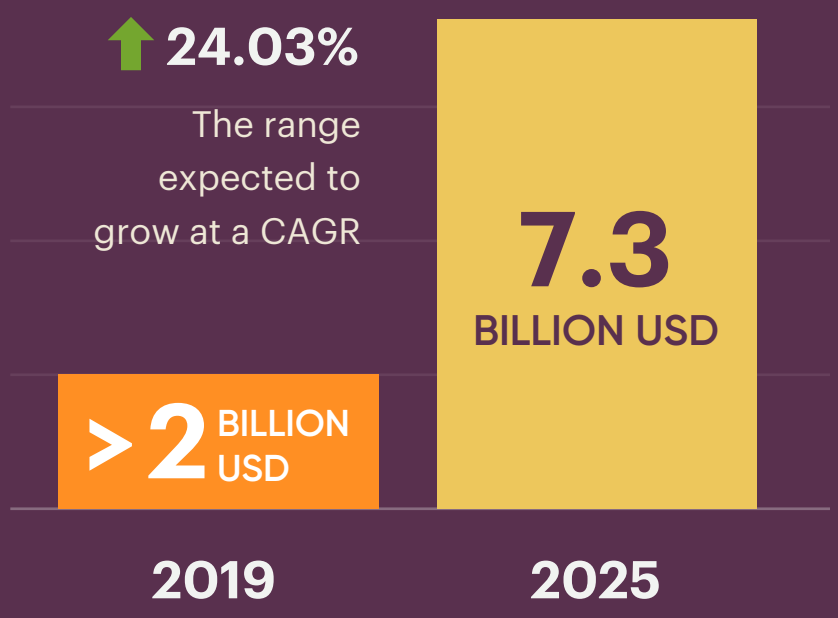
15,4 Billion IoT connected devices in 2023



IoT is a potential market for development in Vietnam

"More than half of companies in Vietnam said that: IoT is one of the top three technologies that will impact the digital future of every business, of which 36% of the companies that responded have started using IoT solutions. This is the highest rate in Southeast Asia, on par with Singapore. "

IOT MARKET IN VIETNAM



Smart Home - The most popular IoT application use case in Vietnam

2,3 Million homes already have smart home devices, an increase of 15.4% compared to 2021

179,3 Million USD of total Smart Home revenue in Vietnam, increased by 45.8%

Industrial production and smart home are the 2 most popular IoT application areas

Industrial production

Applications

- Digitize manufacturing plants with IoT sensors installed in production lines
- Remote factory control
- Automatically notify about product status and quality
- Control the amount of inventory

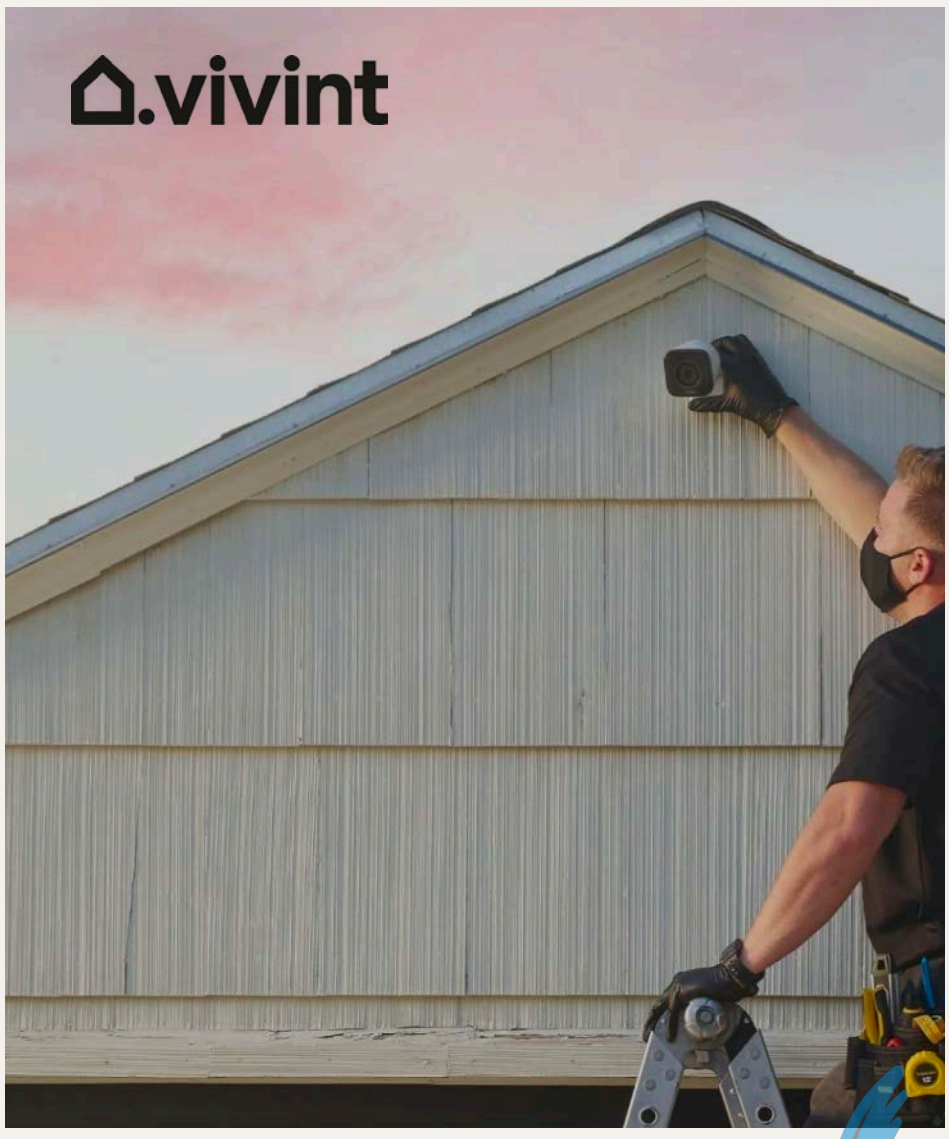
Example

BMW factory in Regensburg, Germany. Using a smart factory model that connects 3,000 automated machines, robots, and traffic devices through Microsoft's management system integrating IoT and artificial intelligence -AI. The system helps to detect strange noises, mechanical errors in automobile production and assembly lines.

Smart Home

Applications

- Automate house cleaning
- Managing energy use in the home
- Safe and secure
- Remotely control and operate home appliances



Example

Vivint is a custom built smart security system that works to keep the home safe. The system is capable of controlling outdoor cameras, smart doorbells and smart locks. These systems continuously monitor the home and send out alarms in the event of unusual activity.

Health

Application

IoT for health includes tracking applications to monitor the human body

- Wearables
- Implant devices
- Diagnostic equipment rated through Bluetooth or Wifi connection

Example

Samsung smart watches include advanced health monitoring features such as heart rate measurement, blood oxygen level, thereby helping users to monitor their own health status.

Application

A network of smart devices capable of connecting and exchanging data with each other via the Internet, such as sensors, cameras, traffic lights, bus navigation, computers or mobile phones, etc.

- Traffic monitoring and controlling
- Air quality management
- Energy Optimization

Example

Transport for London

Transport for London partners with Siemens to install an adaptive traffic light system in London that reduces signal delays, optimizes waiting times and automatically prioritizes traffic

Agriculture

Application

Industry IoT helps control, monitor and care for crops:

- Automatic irrigation system
- Control and improve soil quality
- Optimize resource usage

Examples

nextfarm

Next Farm project – Solution to apply IT in Agriculture of Vietnam, is one of the companies operating in software technology industry that has many successful commercialized products. Next Farm allows the irrigation system to be operated remotely based on analyzing data about the environment, plant type, and plant growth stage and users can monitor these parameters in real-time.

IoT will grow more and more popular with the arrival of 5G

5G – 5th Generation, is the fifth generation of wireless mobile communication technology. 5G operates in higher bands than previous networks, with fast speeds and stable connections with more devices, processing more data with very low latency, making the system responsive in real-time.

With these benefits, 5G IoT will be increasingly applied in many fields:

IoT is forecasted to grow strongly in the near future, and 5G networks will be one of the most important factors for this increase.

01

Automotive industry

5G helps IoT connect cars with advanced navigation systems that control speed, signs, lanes, etc.

02

Smart Energy

Smart Energy reduces costs and energy consumption. 5G uses only half the energy of 4G when transmitting the same amount of data, and will reduce it by more than 10 times by 2025.

03

Medical

With 5G having a very fast connection and very low latency, with a system of IoT-connected medical devices, doctors can perform surgery remotely.

04

Retail

IoT and AR – VR (virtual reality) will increasingly be applied. Thanks to 5G, brands can enhance the shopping experience with widespread connectivity at very high speeds and low latency.

05

Logistics

5G connectivity will help IoT sensor sensors work continuously, not only helping to collect data in close to real-time but also helping to store diverse data for a long time due to less energy consumption.

Vietnam's Technology Trends 2023 - 2025

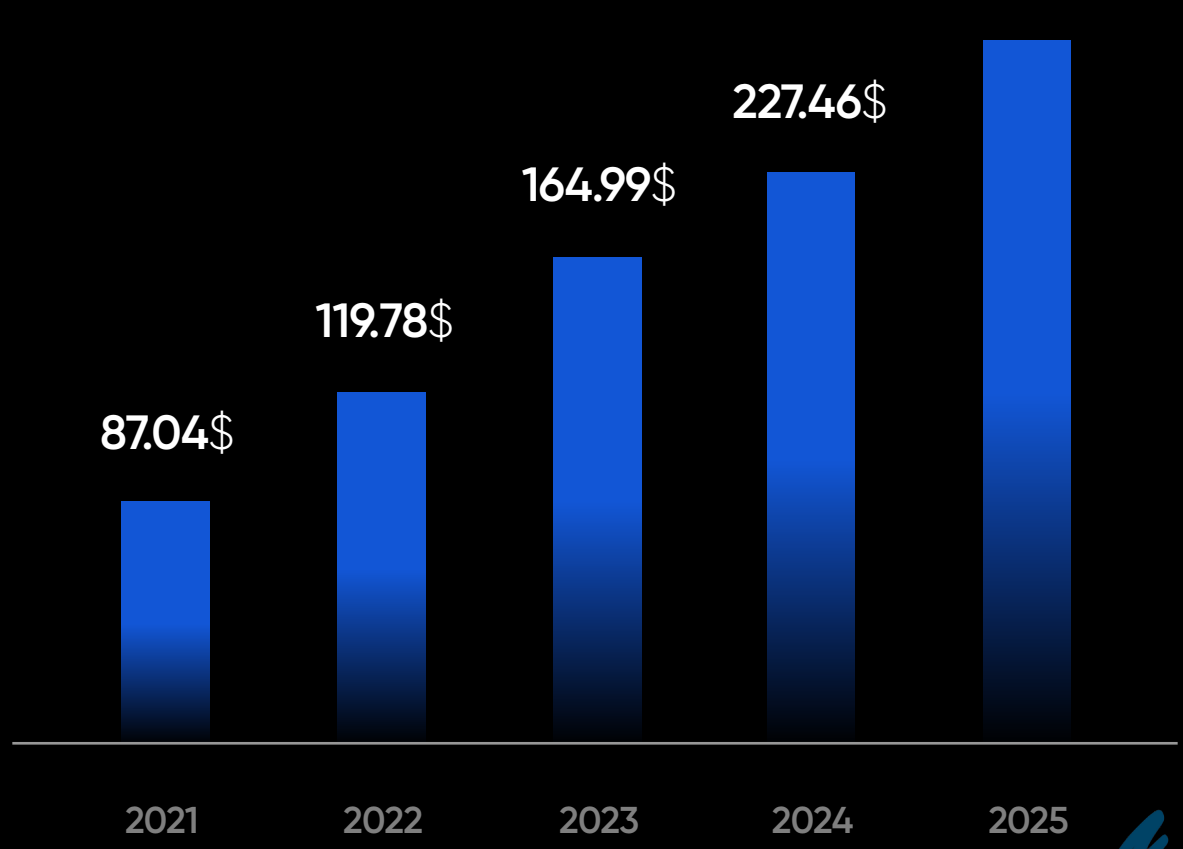
AI - Artificial Intelligence

NEW KNOWLEDGE OF THE DIGITAL ECOSYSTEM

The global market for AI is forecasted to grow strongly in the next decade

Table:

Global AI Market Size, to 2925



The market for the AI will be

$119.78 billion by 2022

and is forecast to reach

$313.86 billion by 2025

Compound growth rate – The average CAGR for this market from 2022 to 2030 is forecasted to reach **38.1%**

The market in the Asia-Pacific region is forecasted to grow the fastest, with a CAGR of **42%**

The field of AI includes many technologies such as: Machine learning, Natural Language Processing, Speech Recognition, Planning, Robotics.

Industries with high demand for AI applications include:

- **Retail & e-Commerce**
- **Bank**
- **Health**
- **Food**
- **Car**
- **Logistics**

Technologies in the field of AI are widely applied

Technology	Machine learning	Natural language processing	Speech recognition
Application	Image recognition, voices, emotions, behaviors, patterns, etc.	Translation, chat, voice recognition, etc.	Document search, timetable arrangement, meeting organization, etc.
Purpose	Media and advertising support, security support, etc.	Perform in-depth analytics, increase customer experience, etc.	Improve work productivity
Practical example	Morningstar has applied machine learning to develop the Quantitative Ratings tool, which helps them evaluate investment efficiency 6 times more. The system has been taught to understand indicators that measure investment performance, thereby making an	Accenture's ALICE project assists 2800 legal professionals worldwide in analyzing contracts and finding terms by processing contract wording	Apple has developed Alexa and Siri on its iPhone lineup. By analyzing the owner's voice, these virtual assistants can understand the human voice and make voice requests on the phone

AI Artificial intelligence

Technology	Planning	Robotics	Vision
Application	Scientifically based future forecasting	Manage supply chain, optimize production processes, etc.	Self-driving cars, intrusion detection, cancer detection, X-ray analysis, traffic analysis,..
Purpose	Reduce procedures and save time, increase accuracy for forecasting, react quickly to changes,...	24/7 operation, operation in hazardous environments,...	Quickly and simplify processes, improve products and services, reduce costs,...
Practical example	Omdena has partnered with Carryt to optimize shipping routes by using AI for transportation planning, to reduce carbon footprint and protect the environment	Advantech has teamed up with NVIDIA to build robots that apply AI technology to automate the work of warehouses, stores, and malls	Orbital Insight has carried out an aerial image extraction and observation project, using vision technology for image analysis at the Hengyi site in Brunei

AI Artificial intelligence

Success stories

Identify customers quickly and accurately with AI technology – eKYC

Problem

One of the leading retail banks in Vietnam faces the problem of how to identify customers automatically without having to meet customers directly.

Result

Accuracy reaches

> 95%

Number of input errors

↓ 25%

Average processing time from

0.7 to 1.2s

Customer confirmation time

↓ 70% (reduce to 10 seconds)

Solution

The Bank has cooperated with FPT to apply FPT. AI - eKYC into the bank's customer identification process. The operating process of the technology takes place as follows:

S1: The customer accesses bank's application on the phone.

S2: Customers take a photo of ID card, etc. for identification. At this step, AI technology will collect data about customers.

S3: Customers take a portrait photo.

S4: Photo verification. In this stage, AI technology will verify whether the photo taken by the customer is the same as the image on the ID card, etc., or not.

S5: Return photo verification results.

S6: Enter data into the data portal. At this step, there will be human involvement to correct if an error occurs.

04. Cybersecurity

ENSURE THE SAFETY OF THE NEW TECHNOLOGY ECOSYSTEM

Cybersecurity is ranked second in the cloud transition portfolio

As more businesses operate and conduct business in the digital environment, and as IT evolves at an increasingly rapid pace, the risks in cyberspace continue to rise. As a result, businesses must be fully equipped with a network security system to reduce risks to business operations.

5 factors influencing the cybersecurity market

01

Internet penetration rate

The rate of internet access among Vietnamese people is rising, with the country ranking fifth in the Asia-Pacific region by 2022.

02

Remote working is becoming more popular

Companies are increasingly at risk of cyber-attacks as a result of vulnerabilities in IT systems used in remote work environments.

03

Digital business model transformation

Online shopping trends encourage the creation of digital business models. Cybercriminals are always looking for ways to obtain information from online businesses and customers.

04

Increased Cybercrime

The global number of cyber-attacks and the cost to cybercriminals is rapidly increasing. As a result, businesses must strengthen their cyber defenses to keep their operations safe.

05

Cyberspace Warfare

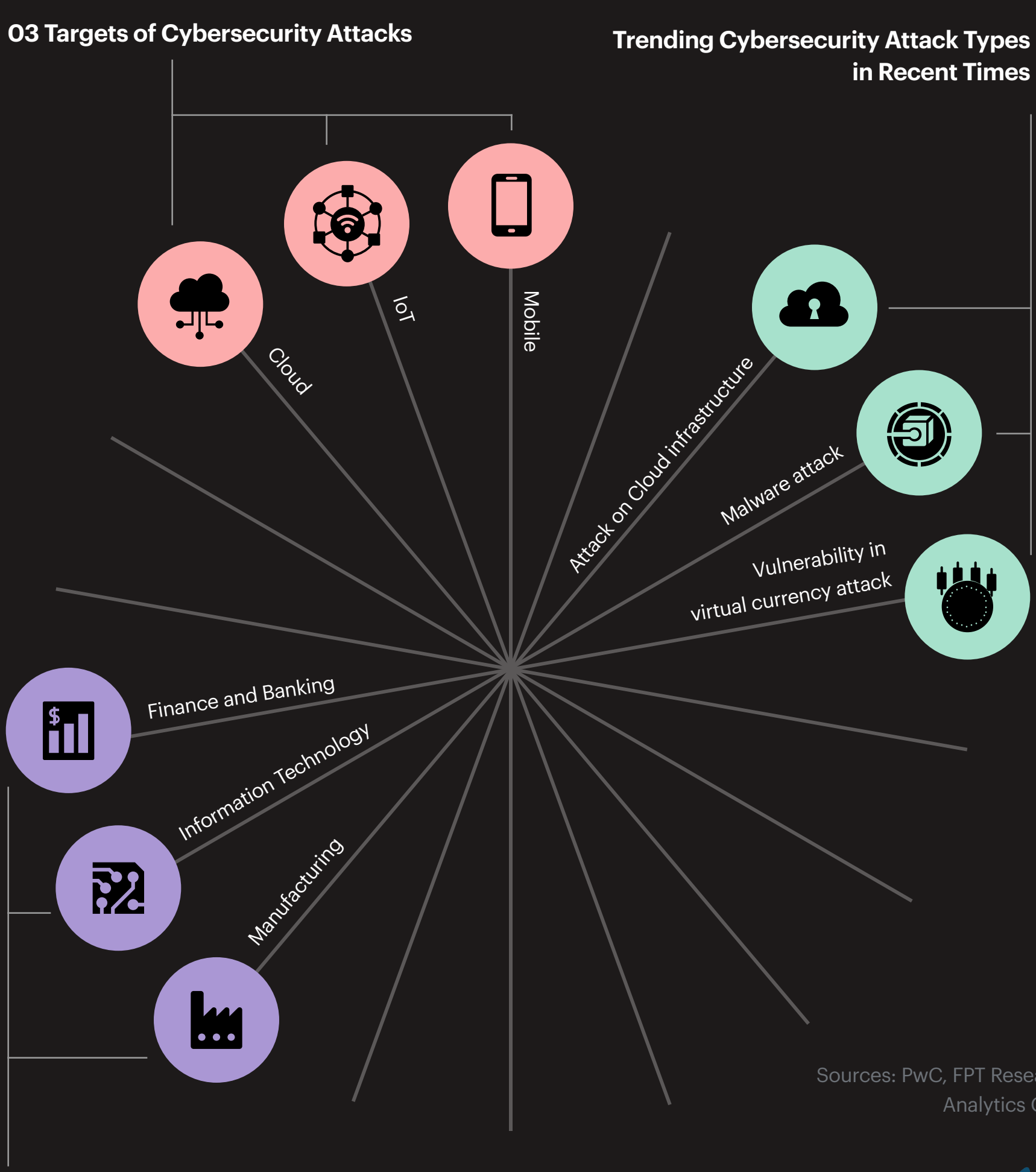
Governments may be required to take measures to protect and respond to attacks on the country's Internet system as a result of global economic and political uncertainty.

"Cybersecurity promotes business trust, which in turn promotes long-term business growth."

Sources: PwC, Statista

Businesses in Vietnam must prioritize cybersecurity

- Vietnam's Cyber Security (CS) market will grow rapidly in 2022, reaching a revenue of **246.7 million USD**, a **20.1%** increase over 2021. The market is expected to reach $300 million USD by 2023.
- According to the FPT Digital survey, risk management and VCS have the lowest scores in the survey to assess the readiness of Vietnamese businesses for digital transformation, with an average of 2.4/5 points.



Sources: PwC, FPT Research & Analytics Center

Industries with the highest number of cyber attacks

Data and finance are the two most common targets of cyber-attacks in Vietnam

Data stealing

- Hackers steal system **source code, personal data, customer information, and other information when they gain unauthorized access to a company's database system as well as the national database.**
- Data has now become an **asset** that hackers target when they attack businesses.

Hackers disseminate user information

- In 2018, hackers attacked and stole the data of 163 million user accounts on a Vietnamese company's system, including: password, username, email, phone number, date of birth, etc.

Financial fraud

- Financial fraud includes things like i**nstalling spyware, hijacking user sessions, and exploiting security flaws in online financial services.**
- **Spoofing emails, personal phone numbers, designing malicious code to target e-wallets, stealing online banking information, and so on** are all common types of attacks.

Credit card fraud campaign using fake bank messages

- There were over 600 domains impersonating reputable large banking institutions in Vietnam in the third quarter of 2022, as well as many anonymous messages.
- These messages instruct the user to click on fake links that contain malicious code, allowing money to be stolen from the user's account. The damage is estimated to be in the **tens of billions of Vietnamese Dong**.

5 trends that are expected to emerge in Vietnam's cybersecurity market

01.

Artificial Intelligence

Artificial Intelligence (AI) - AI has brought significant changes to cybersecurity. AI has played an important role in the development of automated security systems, natural language processing, facial recognition, and automated threat detection. However, it is also used to bypass the most recent data control security protocols. As a result, AI-enabled threat detection systems can predict new attacks and immediately notify administrators of data breaches.

02.

5G and IoT

With the start and growth of 5G networks, the Internet of Things (IoT) will bring in a new era of continuous connectivity. Connecting multiple devices increases the risk of introducing external vulnerabilities or software bugs that are difficult to detect. In comparison to other architectures in the industry, the 5G architecture is new and requires extensive research to identify vulnerabilities and protect the system from outside attacks. As a result, manufacturers must be extremely cautious when developing modern 5G hardware and software to control data intrusion.

03.

Data Security

Data will continue to be a top priority for businesses around the world. Protecting digital data, whether for an individual or an organization, is a major goal today. Any minor flaw or bug in your system or software browser is a potential vulnerability for hackers to exploit to access personal information. Several data regulations have been issued: GDPR or Resolution No. 13/NQ-CP approving the Vietnamese government to create a law on personal data protection.

04.

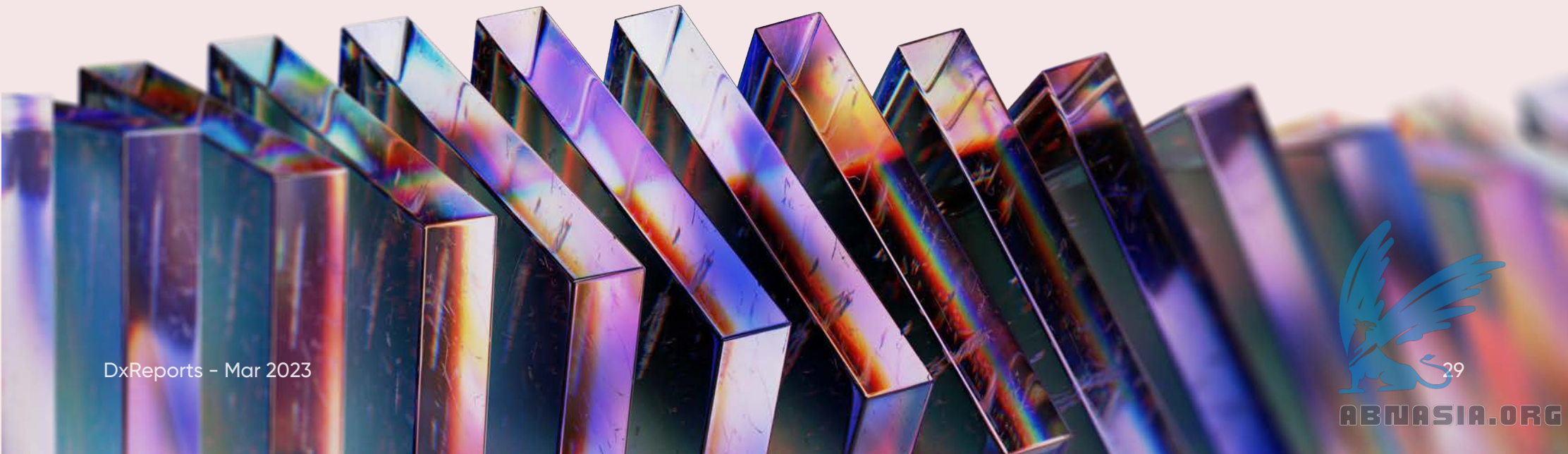
Smart cars

Modern cars like smart cars have automated software that connects cruise control, door locks, airbags, and advanced driver assistance systems in a way that is easy for the driver to use. Because these cars can talk to each other through Bluetooth and WiFi, hackers may be able to find more ways to attack them. By 2023, more hackers are likely to take control of vehicles or use microphones to listen in on conversations. So, self-driving or autonomous vehicles need to use a system that is even more complicated and has strict rules about security.

05.

Cloud Computing

More and more business operations are moved to or built directly in the Cloud, so security methods need to be constantly checked and updated to keep data from leaking. Even though cloud apps are designed to keep users safe, they could still be a major source of errors, malware, and phishing attacks.



Other technologies

HAVE BEEN DEVELOPING IN THE NEAR FUTURE

Big Data and Data Analytics

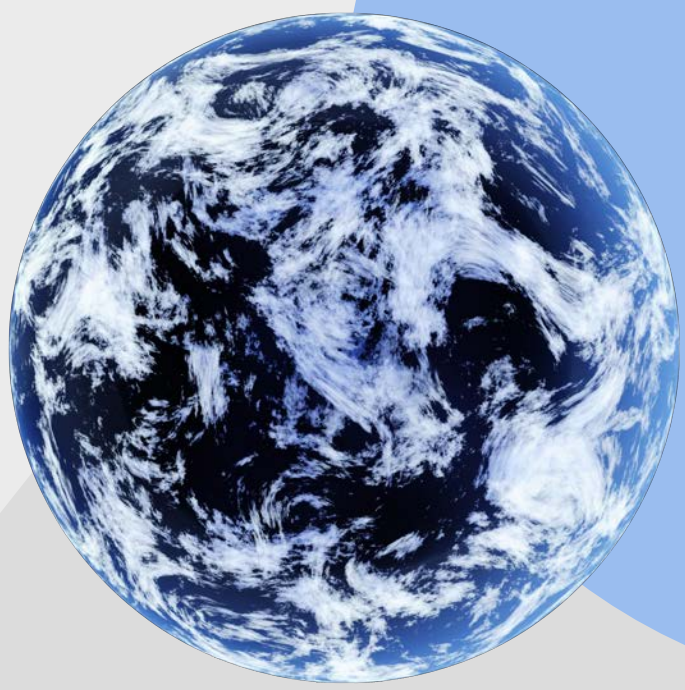
WORLD

2023

$41.5 billion

2038

$345.5 billion

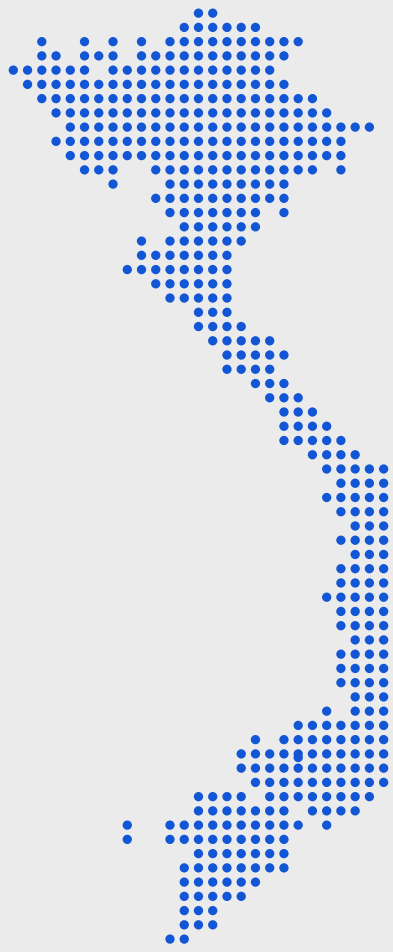


30.4% billion USD 2023 2038 Compound Annual Growth Rate – CARG

VIETNAM

Investment priorities

- Ranked No. 1 (52%) in the IT category that will increase the 2023 budget
- Accounts for the 2nd proportion of IT investment annually (ranked after Cloud)



Benefit

Increase business operational efficiency	Make accurate data-driven decisions	Set up a financial plan
Effective resource management	Know your customers	

Areas of application

Digital Government

Retail, e-commerce

Production

Agriculture

Source: Statista, Gartner

Success stories

Use smart cameras to help manage customer data

VINCOM RETAIL

Background

Vincom, a large chain of commercial centers, with an area of more than **200,000m^2**, needs to collect information about shoppers for effective management and launch programs to increase point-of-sale revenue.

Result

Analyzed customer behavior and data with **126.000** visits/day

Accuracy rate **95%**

Solution

VinBigData has consulted and provided modern technology solutions such as smart camera systems with facial recognition, collecting purchase behavior, thereby helping to analyze data to help make appropriate programs as well as increase management efficiency.

Blockchain

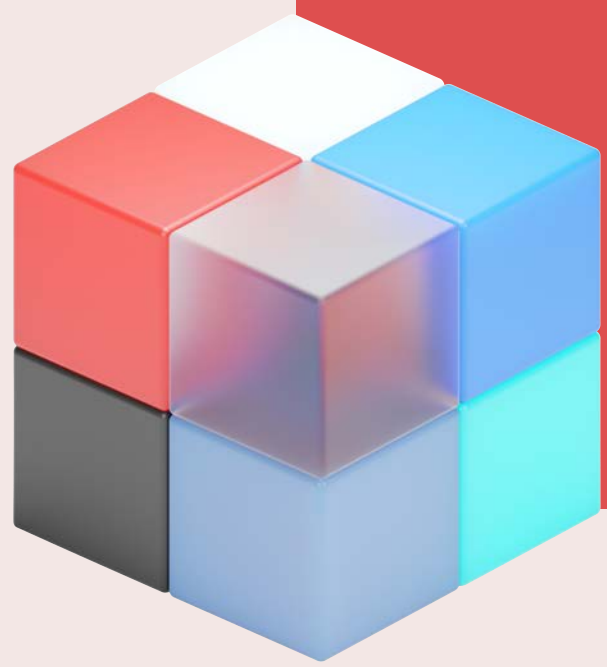
WORLD

2021

$6.6 billion

2025

$25 billion



69.4% Compound Annual Growth Rate - CARG

VIETNAM

- No. 1 in the world for cryptocurrency acceptance
- No. 2 ASEAN in terms of crypto holders

Benefit

Honesty Guaranteed	Stored Permanently	Reduce operational management costs	Exact query

Industries that are being applied in Vietnam

Decentralized Finance (De-Fi)

Online Games (Game-Fi)

Industries that will be widely applied in the coming years

Logistics

Education

Health

Bank

Sources: Statista, Gartner

Success stories

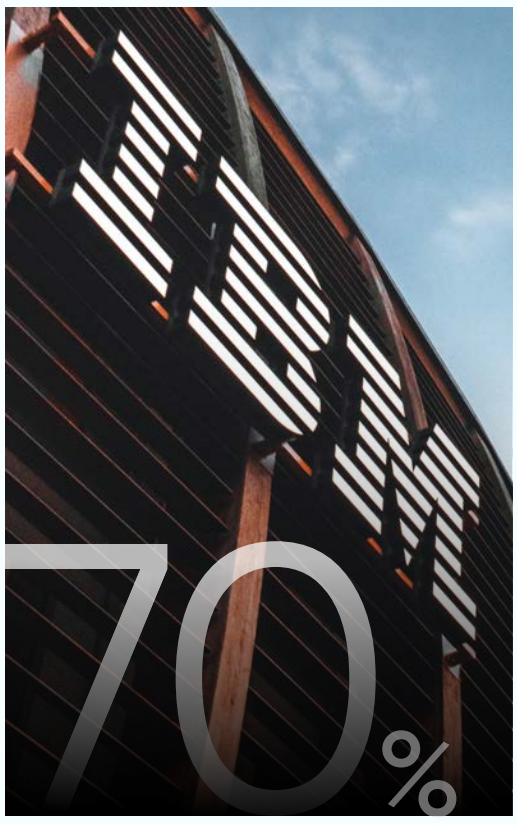
Blockchain helps retail companies ensure the quality of supplier data

Trust Your Supplier

Background

Trust Your Supplier realizes 2 major issues when the retailer works with suppliers: supply chain disruptions and quality expectations. These two problems make finding a good supplier time-consuming in verifying information and increase the cost of validation.

Result



More than 70% reduction in onboarding time to suppliers.

50% reduction in data validation costs

Improve legislation by checking suppliers' international certifications, e.g. GRI, ISO,...

Solution

Trust Your Supplier has partnered with IBM to develop an open platform based on Blockchain technology, allowing companies to share data with authorized partners. The platform allows data to be validated by third parties such as Dun & Bradstreet, Eco Vadis, Rapid Ratings. After a company's data is confirmed, a web portal is created, allowing for improved legislation, improved risk management, and reduced onboarding time for suppliers.

Metaverse

WORLD

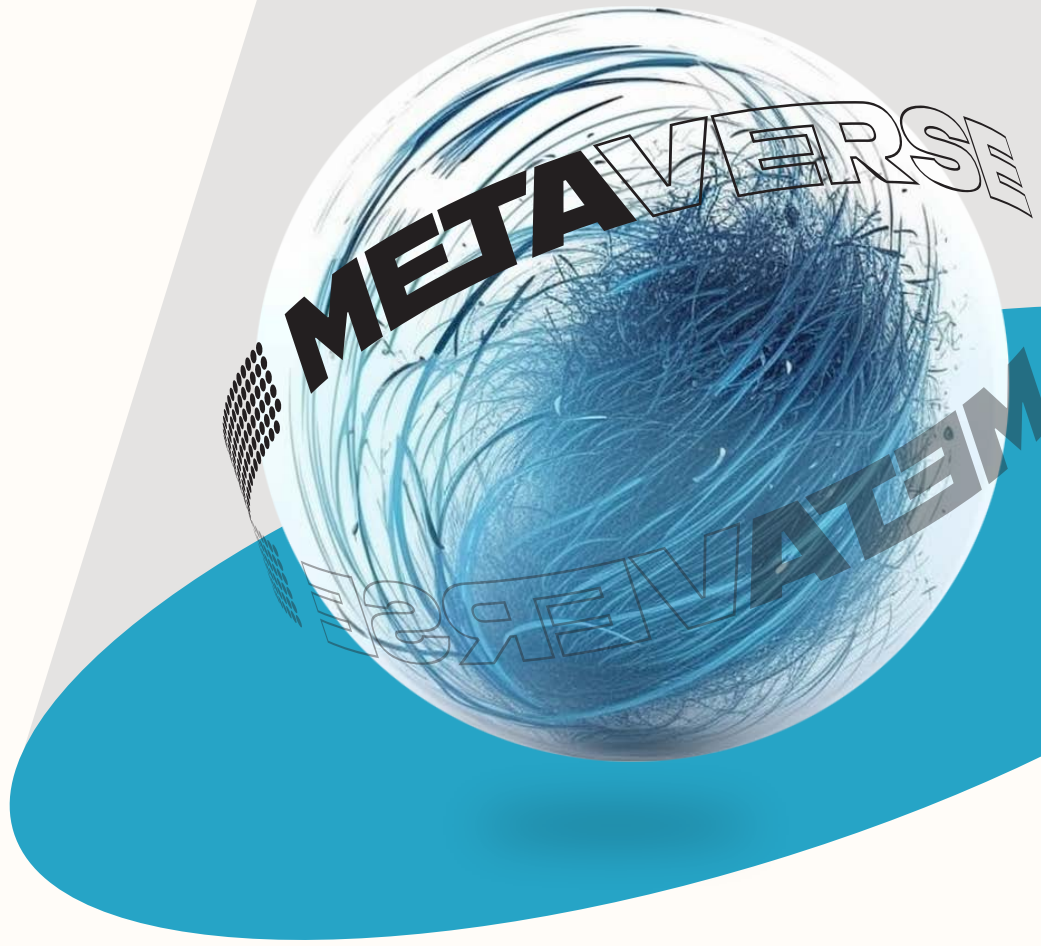
2022

$120 billion

2030

$5000 billion

41.6% Compound Annual Growth Rate Forecast – CARG (2023-2030)



VIETNAM

- Starting to be applied in industries such as Retail, Tourism, Real Estate, Game
- Launching Metaverse Technology Village in Da Nang
- Game Axie Infinity once reached a capitalization of up to $ 8.5 billion

Benefit

Improve customer experience

Enhance communication at work

Build brand image

Effective employee training and coaching

Create new revenue streams from digital assets

Areas of application

Media & Entertainment

Retail & E-commerce

Education & Training

Production

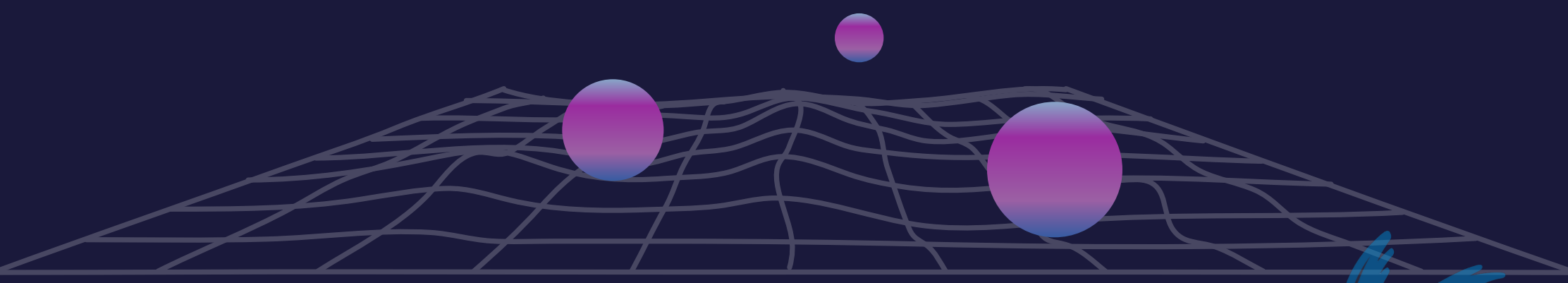
Health

Sources: Statista, Gartner

Metaverse is widely applied, helping to change the experience in many industries

Industry	Fashion, luxury goods		Financial Services	
Application	Virtual costumes	NFT	Web 3.0	Web 2.0
Purpose	Generate new revenue	Nurturing customer loyalty	Reach new customer segments	Employee training
Success stories	Gucci auctioned a virtual version of the Dionysus bag on Roblox, after the auction each bag was worth $4000	Adidas NFT collection in association with Bored Ape Yatch Club reaches over US$100 million in sales	HSBC bought virtual real estate on The Sandbox platform to reach e-sports enthusiasts	Bank of America has applied virtual reality to train employees, including "financial towns" and telecommunic -ations centers

Ngành	Consumer goods		Retail		Real estate
Application	Digital assets	Virtual experience	Virtual reality/ Augmented reality	Virtual/ Online store	Digital twin
Purpose	Nurture customer loyalty		Enhance customer experience	Enhance brand presence	Reduce operating costs
Success stories	Neft Launches Nerf Hub Product Line on Roblox	P&G Beauty has allowed customers to experience the virtual story BeautySphere	Dyson has opened a virtual store, accessed by virtual reality technology, allowing customers to "travel" and experience the products there	Samsung opened a store on the Decentraland platform in early 2022, simulating the Samsung 837 store in New York	A real estate company in New York created digital copies of the properties they owned. As a result, they developed a cost-effective operating model that earned $170,000 in costs



Conclusion

With impressive numbers forecasting the growth rate of Cloud Computing, IoT, AI, etc., in the world and Vietnam, it can be seen that the application of new technologies in production and business is an undeniable trend. The near future of production and business will depend heavily on the development and application of these technologies. Businesses should invest to increase competitiveness and improve production and business efficiency, quickly increase productivity, reduce costs, improve product quality, increase flexibility or increase responsiveness to customer requirements. To achieve these results, FPT Digital provides some recommendations. Firstly, businesses need to define specific goals when applying new technologies to ensure that the investment is effective and brings real benefits to businesses. Next is to train personnel with sufficient digital competencies so that they can use and apply them effectively and prudently in protecting the information and data of customers, partners, and businesses to ensure safety and reliability. In addition, always check with relevant policies to ensure that the use of new technologies by businesses is legal and compliant.

Report

Vietnam's Technology Trends 2023 - 2025

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