Information and Communications Technologies Industry

2022 Market Data

May 2023

Deloitte.

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Forewords

Levent Kızıltan

Chairman of the Board, TÜBİSAD

In a new world order fueled by digitalization, sustainable growth is only achieved by countries that are able to make the leaps in technology. In the same vein, the only way for Türkiye to connect to the world and the future is digitalization. At this point, Information and Communications Technologies sector holds utmost importance for our country. Developments in the area of Information and Communications Technologies (ICT) contribute to Türkiye's economic growth, global competitive power and social development, while paving the way for important transformations in all areas of social life.

For 12 years, TÜBİSAD has been publishing the Information and Communications Technologies Sector Market Data Report, which holds significant value for Türkiye, particularly for companies, public institutions, and academia. According to 2022 data, the information and communications technologies market size went from 266 billion liras in 2021 to 408.9 billion liras in 2022.

The data, however, indicates that our sector has not been growing at the desired rate, which is also evident in another of our studies, titled "Türkiye's Digital Transformation Index Report". The index study shows a slight decrease in momentum when compared to countries actively pursuing digital transformation worldwide. Our country, which ranked in the middle section in our study, also ranked 52nd in another international index study. Digitalization is not only associated with sales figures of hardware, software and services, but also, rather very closely, with innovative business models, efficiency of current business models, innovation and human resource skills which create competitiveness.

TÜBİSAD maintains strong faith and confidence in the sector, assuring that challenging years will be overcome without losses and anticipating rapid growth in the sector in the near future.

I would like to thank the Ministry of Industry and Technology of the Republic of Türkiye, BTK, Context, TÜBİSAD members and sector companies for their valuable contributions.

Murat Boyla

Data Market Bilgi Hizmetleri A.Ş.
CEO

A strategically important sector for Türkiye, Information and Communications Technologies has been among the fastest growing sectors in our country in recent years. Boasting a great potential both in terms of exports and employment, our sector creates added value for the national economy. In particular, the digital transformation process has affected the entire business world and started an era full of new opportunities. However, we should not oversee the difficulties brought about by this change. Intense competition, the pace of technological innovations, together with the changes in customer expectations are all reminders that we must always be improving ourselves.

Türkiye's growth in the Information and Technology sector is an indicator of utmost value both economically and socially. Our sector also holds an important place in digital transformations of companies operating in multiple fields. Our lives are intertwined with new technologies, business models and digital transformation processes. In such a process, we have to adapt fast so we can remain competitive and achieve sustainable success.

The Information and Communications Technologies Sector Market Data Report created by TÜBİSAD is of great importance in terms of revealing important data on the sector.

I express my gratitude to all stakeholders involved in the project, including the Ministry of Industry and Technology, the Information and Communications Technologies Authority, Context, TÜBİSAD employees, and our board members. Their contributions have added significant value to this important work in our industry.

With our 30 years of experience, Data Market is committed to contributing to the growth of our sector by continuously evolving and investing in sustainable IT solutions. We recognize the ever-changing nature of the industry, much like technology itself, and remain dedicated to its development.

M. Buğra Koyuncu

Logo Grup CEO and Board VP

The Information and Communications Technologies Sector 2022 Market Data Report, with its valuable insights, results, and forecasts, will aid us in analyzing our country's potential in this field and optimizing the opportunities available, just as in previous years. We extend our gratitude to the Republic of Türkiye, Ministry of Industry and Technology, the Information and Communications Technologies Authority, and TÜBİSAD for their valuable contributions to this comprehensive and informative study.

The ICT sector is experiencing ongoing growth, particularly fueled by the advancements in cloud computing, artificial intelligence, 5G, Blockchain, IoT, and digitalization. This momentum is strengthening the sector further. The growth of organizations is significantly influenced by the agile and rapid adaptation capabilities developed through these technologies.

The success of our sector, which serves as a driving force for various industries, is attributed to our country's strategic geographical location, dynamic business environment, and the presence of young, innovative, and talented employees. Supportive initiatives, such as the emergence of innovative business models, particularly with cloud-based software, improved digital literacy, and the implementation of incentives, play a vital role in fostering the development of the information and communications sector.
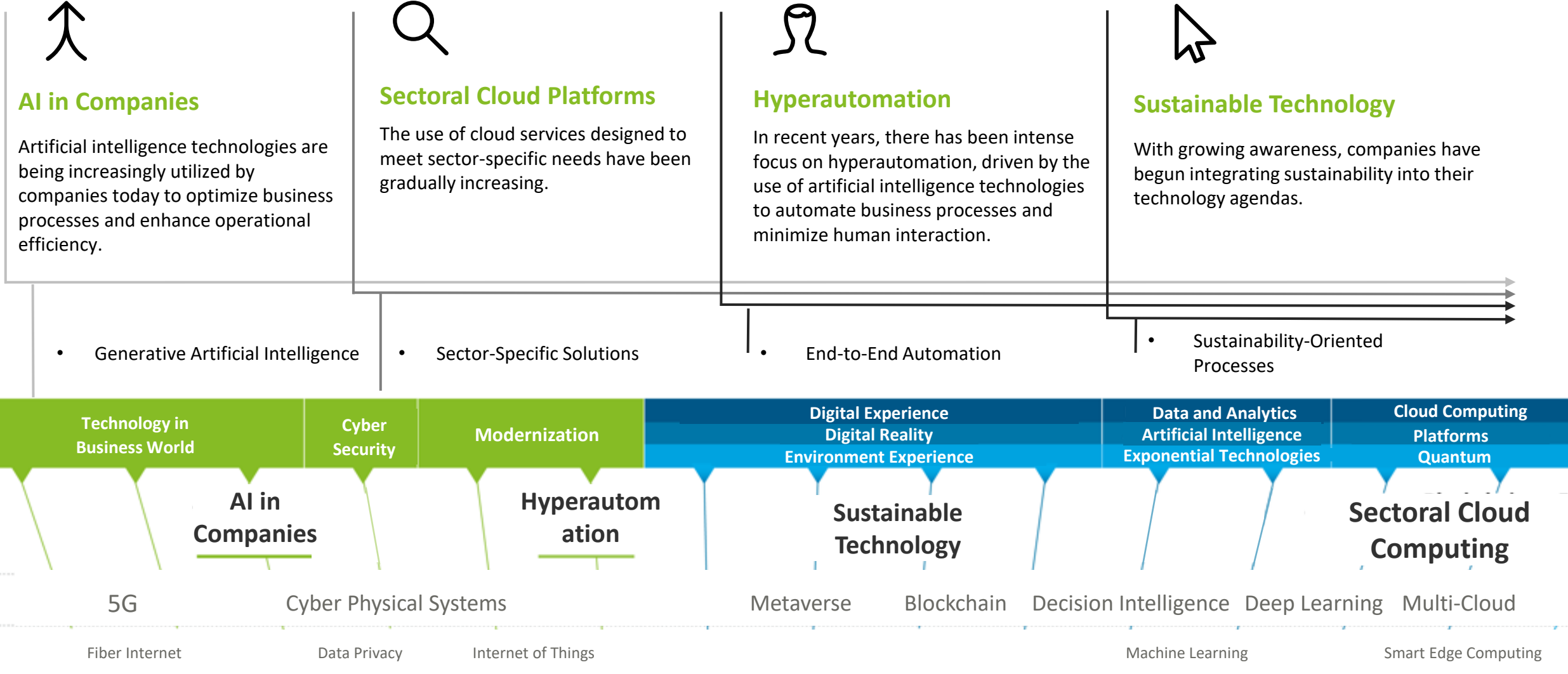
I am confident that as the adoption of vehicles equipped with efficient and smart solutions powered by new technologies increases, our industry data will depict a significantly more positive outlook in the coming years. Logo Yazılım remains steadfast in our commitment to supporting the advancement of our industry, leveraging our 39 years of experience, R&D, and innovation capabilities. Our aim is to ensure that Türkiye takes a leading position in the information and communications technologies sector.

1. Leading technologies in the sector

Leading technologies in the sector

Leading Technologies in the Sector

There is a growing demand in the business world for technological solutions that promote sustainability, efficiency, and automation.

AI in Companies

Artificial intelligence technologies are being increasingly utilized by companies today to optimize business processes and enhance operational efficiency.

Sectoral Cloud Platforms

The use of cloud services designed to meet sector-specific needs have been gradually increasing.

Hyperautomation

In recent years, there has been intense focus on hyperautomation, driven by the use of artificial intelligence technologies to automate business processes and minimize human interaction.

Sustainable Technology

With growing awareness, companies have begun integrating sustainability into their technology agendas.

- Generative Artificial Intelligence
- Sector-Specific Solutions
- End-to-End Automation
- Sustainability-Oriented Processes

	Technology in Business World	Cyber Security	Modernization	Digital Experience / Digital Reality / Environment Experience	Data and Analytics / Artificial Intelligence / Exponential Technologies	Cloud Computing Platforms / Quantum
2022			**AI in Companies**	**Hyperautom ation**	**Sustainable Technology**	**Sectoral Cloud Computing**
2021	5G	Cyber Physical Systems		Metaverse	Blockchain	Decision Intelligence	Deep Learning	Multi-Cloud
2020	Fiber Internet	Data Privacy	Internet of Things		Machine Learning	Smart Edge Computing

AI in Companies

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Companies are progressively recognizing the value that comes with integrating artificial intelligence (AI) into their business processes.
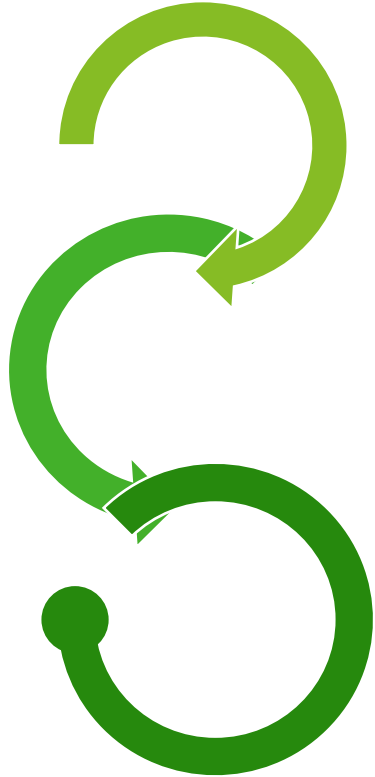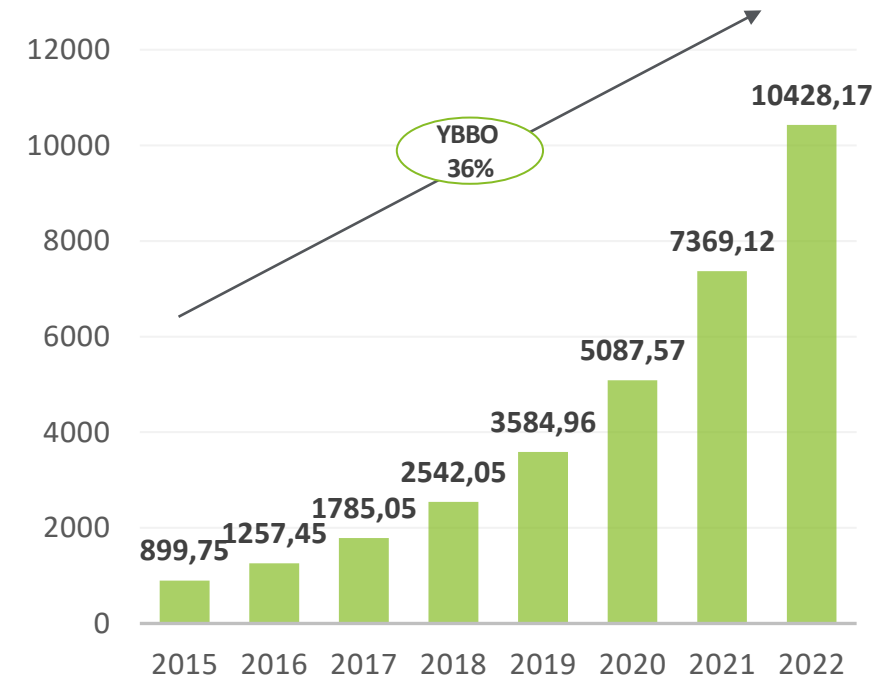
- Technological advancements have made it possible to **widely and easily deploy** AI-enabled systems **more than ever before**.
- By automating process flows, companies are **leveraging AI to enhance operational efficiency and reduce costs**.
- For instance, **AI-powered chatbots** allow **companies to decrease their process costs by up to 30%**.

1.7 times higher

Likeliness of companies with an AI strategy to achieve their goals compared to companies without a strategy in this area

- The advancement of **Generative AI** technology enables **companies to reduce application development time** when utilizing AI as an assistive technology.
- The use of applications such as **ChatGPT and DALL-E** are becoming widespread and **codes, text, video, simulation, and other types of outputs can be generated by artificial intelligence**.

Companies' Artificial Intelligence Investments (Million Dollars)

YBBO 36%

Year	Investment
2015	899,75
2016	1257,45
2017	1785,05
2018	2542,05
2019	3584,96
2020	5087,57
2021	7369,12
2022	10428,17

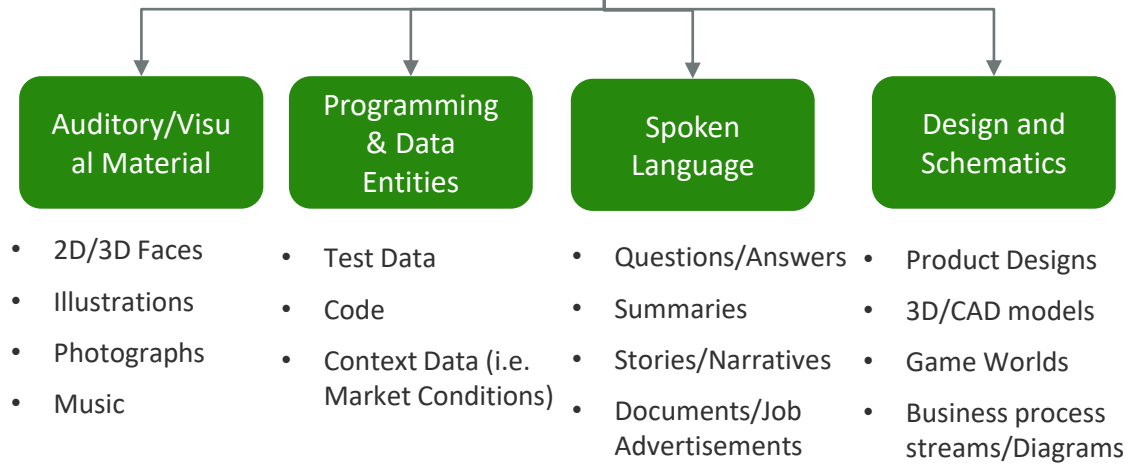Source: Deloitte Analysis, Deloitte Tech Trends, Grandview Research

AI in Companies

While the use of generative artificial intelligence is increasing, its integration to work processes and impact on the ways to do business are monitored in all sectors.

Generative artificial intelligence generates content which reflects the properties of the data learned by the AI, but is not repetitive by nature. For such a process, AI **can learn present data**. It can generate various new content such as **images, videos, music, speech, text, software code and product designs**.

Generative AI Outputs

Auditory/Visual Material
- 2D/3D Faces
- Illustrations
- Photographs
- Music

Programming & Data Entities
- Test Data
- Code
- Context Data (i.e. Market Conditions)

Spoken Language
- Questions/Answers
- Summaries
- Stories/Narratives
- Documents/Job Advertisements

Design and Schematics
- Product Designs
- 3D/CAD models
- Game Worlds
- Business process streams/Diagrams

The **economic and social impacts** of generative AI, capable of **swiftly performing time-consuming tasks** like coding, designing, and writing, are expected to become evident in the short term.

By 2025, data generated by generative AI is expected to **account for 10% of all data**

By 2025, **30% of the marketing messages** from large corporations **will be generated by AI**

By 2027, **30% of manufacturers will be using generative artificial intelligence to increase product development efficiency**.

AI in Companies

AI's value is undeniable, but the focus has shifted to optimizing its utilization - to enhance efficiency, establishing trust among employees and users is crucial.

Trust in artificial intelligence is increasingly significant for companies, as computers now **play roles** not only in numerical operations **but also in decision-making processes**. In today's data-driven business landscape, companies that effectively **leverage artificial intelligence** are **making faster progress** towards their goals.
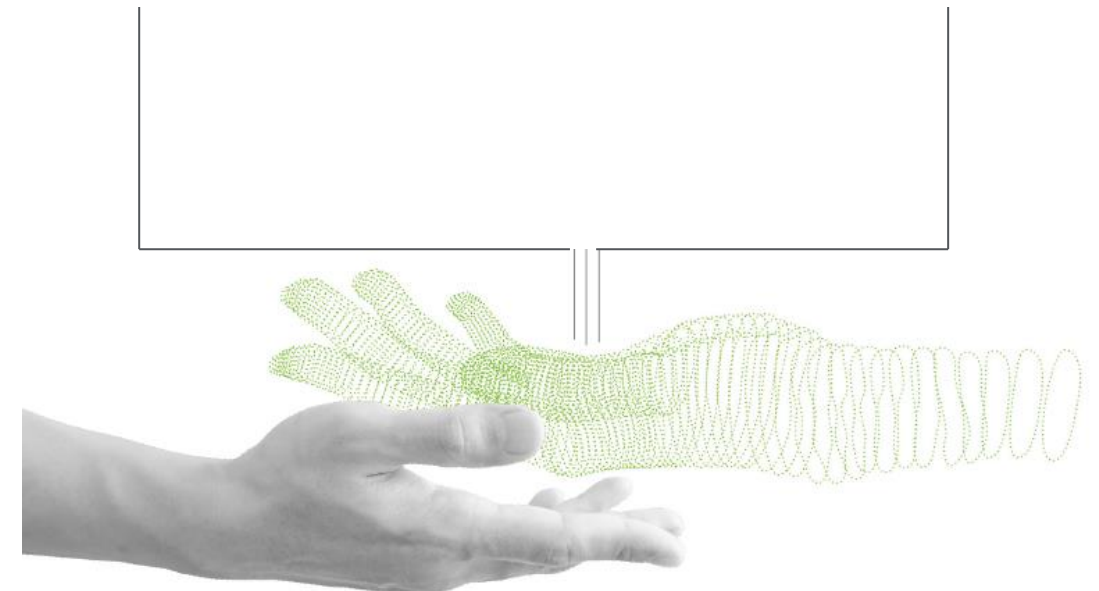
✓ The extensive adoption of artificial intelligence in industries **has facilitated easier access to technology**.

✓ As access to AI becomes more accessible, prioritizing **trust in its usage and efficiency** has surpassed the importance of **creating superior algorithms**.

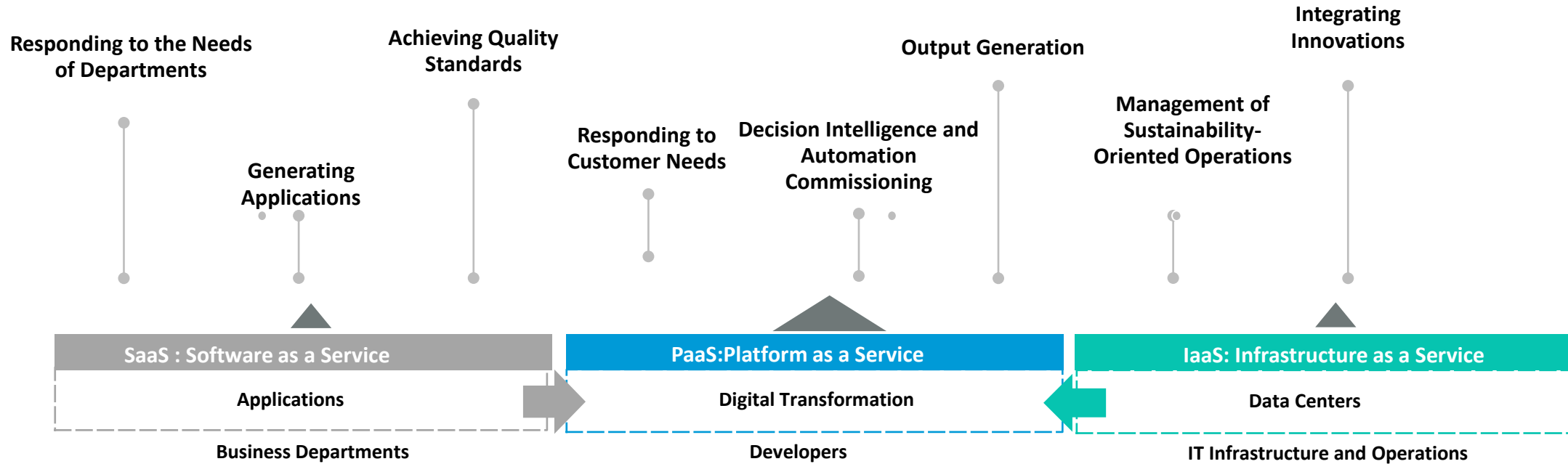**73%** – Companies that see AI as critical to success

41% – Companies with concerns about ethics and transparency in the use of AI

How can artificial intelligence be made more reliable?

Data Transparency

A more transparent data collection process will increase user awareness regarding why data is collected and how data is meant to be used. In this way, users **will have better knowledge** regarding the value created by artificial intelligence.

Explainable Algorithms

The **closed-box** nature of algorithms makes it difficult to explain how AI-generated recommendations are arrived at. Using more explainable algorithms is vital for managers and employees to **employ artificial intelligence as a decision support tool**.

Sectoral Cloud Platforms

Industry cloud platforms are designed to address specific needs by providing industry-specific functionality through SaaS, PaaS and IaaS. Companies are anticipated to boost their investments in industrial cloud platforms to adapt to evolving demands, business practices, and enhance their agility.

Responding to the Needs of Departments

Achieving Quality Standards

Output Generation

Integrating Innovations

Generating Applications

Responding to Customer Needs

Decision Intelligence and Automation Commissioning

Management of Sustainability-Oriented Operations

SaaS : Software as a Service	PaaS:Platform as a Service	IaaS: Infrastructure as a Service
Applications	Digital Transformation	Data Centers
Business Departments	Developers	IT Infrastructure and Operations

By 2027, **over 50%** of enterprises are projected to leverage industry cloud platforms in order to expedite their business initiatives.

Source: Gartner, Deloitte Analysis

Sectoral Cloud Platforms

While the growing number of cloud computing providers is making technology more accessible each day, process-oriented personalized digital experiences are being developed through innovations in cloud infrastructure.

Companies **have started to prioritize the value that artificial intelligence will add to their business processes** rather than technological developments in cloud computing.

Cloud platforms account for 15% of the total **IT spending** in 2022.

Sectoral Cloud Platforms

Sector-Specific

Sector-Specific Solutions
(i.e. Clinical trials, Banking, IoT)

Customer-Oriented Systems
(i.e. CRM, Customer Care and Case Management)

Operational Systems
(i.e. ERP, HR Portals, Financial Management)

Sector-Agnostic Products
(i.e. E-mail, Conference Calls)

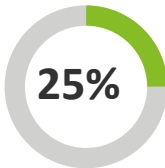**Technology Products**
(i.e. Development, Storage Platforms)

Source: Gartner, Deloitte Analysis

Sectoral Cloud Platforms

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The meta cloud technology facilitates data sharing and integration among different cloud services.

85% Companies which use **at least 1** cloud-based platform

25% Companies which use **more than 5** cloud-based platforms

✓ The more different solutions providers companies use, **the more cloud platforms they use**.

✓ Today, the number of cloud providers used by a company tend to be directly proportional to **possible complexity and issues that may arise in cloud use**.

Using multiple cloud providers **may lead to purchasing of repetitive services**.

The justified difficulty of managing multiple security configurations and data storages **can compromise security**.

The management of multiple cloud providers and comprehension of their intricate structures **can present challenges in terms of human resources**.

Simplicity as a Service: Meta Cloud

The **Meta Cloud approach** establishes a **compatibility layer that grants access to shared services, including storage, AI, data, security, governance, and application development.** This layer **effectively controls multiple cloud platforms**, guaranteeing security and ensuring **consistent operation** of applications.

By simplifying cloud services, companies **can reduce security risk, increase user privacy, decrease costs and output more work with less resources**.

Source: Deloitte Tech Trends, Deloitte Analysis
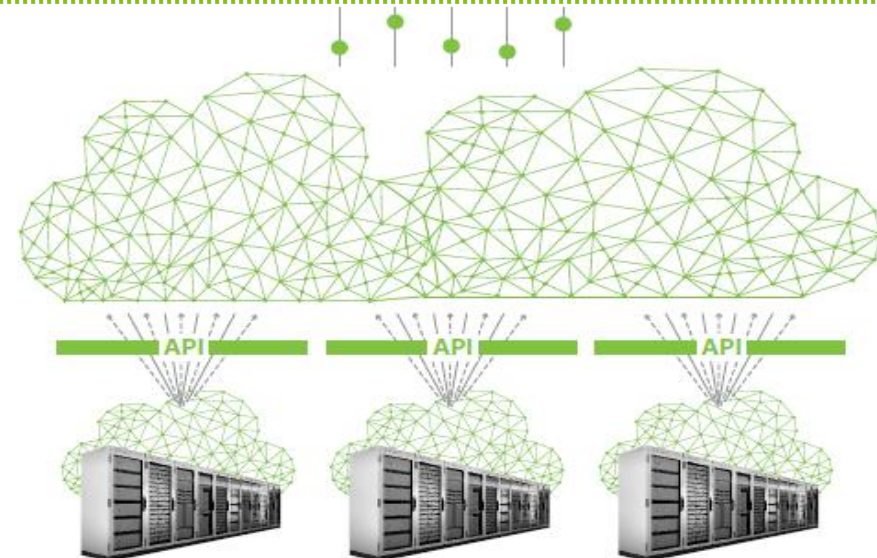
Hyperautomation

Organizations' investments in automation continue to increase.

Organization-oriented hyperautomation is a systematic approach employed by organizations to swiftly **identify, evaluate, and automate** business and IT processes. Hyperautomation encompasses **the integration of various technologies, tools, or platforms such as AI, machine learning, robotic process automation (RPA), and business process management (BPM)**.

Hyperautomation tools **are reinforcing their places in companies' investment plans**.

13% – Companies that incorporated RPA in their investment plan in 2015

74% – Companies that incorporated RPA in their investment plan in 2022

|		
Strategic Investment	**80%**	**Planning to increase investments** for digital business processes
Agility	**65%**	**Planning to increase speed** in digital processes
Time Plan	**72%**	**Planning to shorten the timeline of** digitalization projects **and implement them faster**

Hyperautomation

Managers' focus on growth and organizational excellence is driving the acceleration of hyperautomation initiatives, leading organizations to seek automation for as many processes as feasible.

⭐ The main reason why hyperautomation continues to be a trend is that **companies are constantly demanding accelerated growth** and automation **can be integrated into business processes without being tied to any particular technology or vendor**.
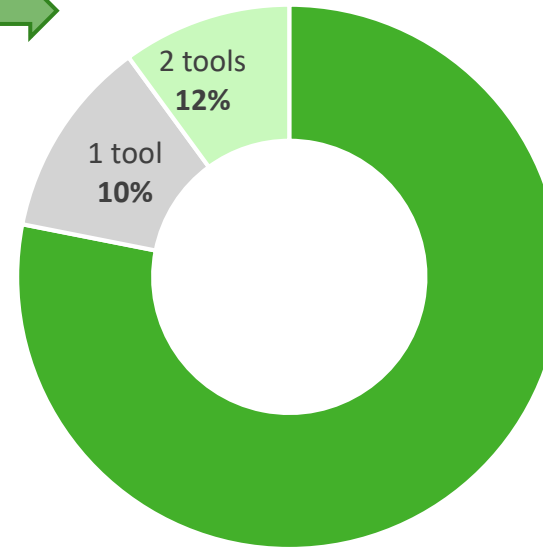
Number of processes automated in companies

Category	Percentage
1	11%
2-3	35%
4-5	33%
5-9	16%
10+	5%

4.2 processes in average
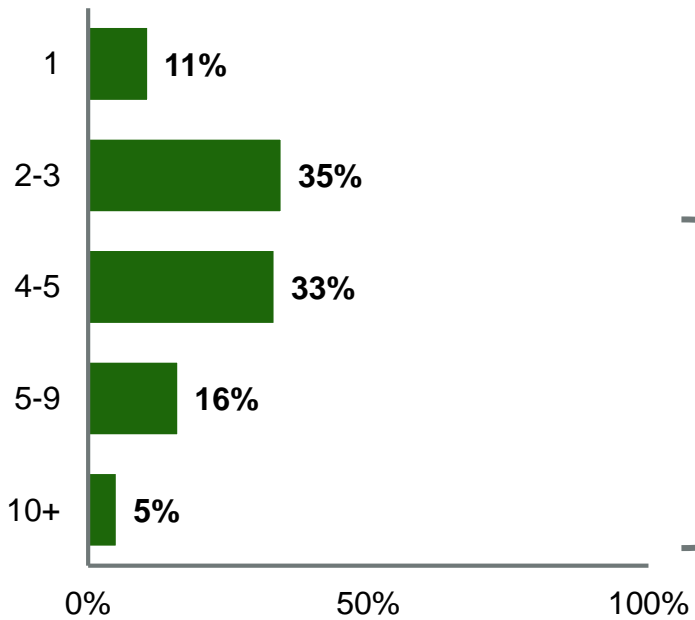
The number of processes increase the number of tools used in turn

- 2 tools **12%**
- 1 tool **10%**
- **78%** – 3 or more tools

Source: Deloitte Analysis, Gartner

Hyperautomation

Companies that adopt an end-to-end automation approach, as opposed to task-based automation, expedite their journey towards achieving digital maturity goals.

✓ Many companies **have started their automation journey with basic tools such as RPA** to automate tasks in specific areas such as finance processes.

✓ While such initiatives provide value to companies, **the limitations of limiting the process of increasing automation to specific processes and tools** are now manifesting.

✓ As companies **steadily progress from basic task-based automation towards end-to-end automation**, aiming for digital maturity, certain *obstacles* along the journey have been identified, including:

Resistance against change

Lack of vision

Process cost

Lack of skills

• **End-to-end automation** entails the complete automation of all workflows, spanning from the initial input to the final output. This transition from task-based automation

  • Enables **increased productivity** and **cost savings** by automatizing all processes

  • **Reduces the risk of human error** and **improves output quality** by reducing the need for manual intervention

  • Enables rapid adaptation to **changing market demands** and **customer expectations** with seamless integration between systems and applications.

  • Allows companies to **expand or alter** their operations as required.

Source: Deloitte Analysis, Deloitte Tech Trends

Sustainable Technology
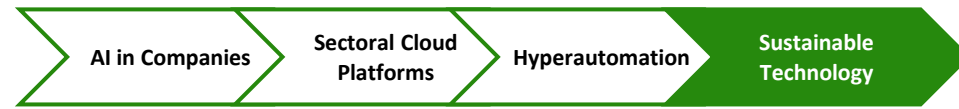
The place of sustainable technologies in companies' investment plans is growing.

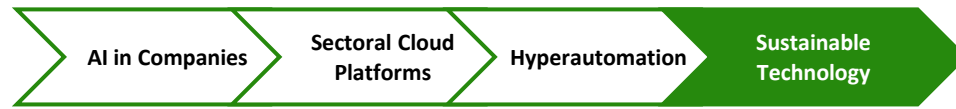| Environmental Technologies	Social Technologies	Governance technologies
Technologies to mitigate and adapt to risks in the world	Technologies to improve human well-being	Technologies to reinforce the ways of doing business and capacity development

✔ **Driving forces to incorporate sustainability into strategic plans are increasing**

Companies are facing stakeholder and investor pressure to integrate environmental, social, and governance factors into every facet of their organization. This includes incorporating sustainability principles into long-term decision-making processes.

✔ **Integrating sustainability at the heart of technology is important in terms of creating long-term value**

Managers require a technology-driven approach that is sustainable in order to accomplish the environmental, social, and governance objectives of their businesses.

Source: Deloitte Analysis, Gartner

Sustainable Technology

Sustainable technology encompasses a variety of solutions that yield environmental, social, and governance outcomes.

Companies' Contact Points with Sustainability

Innovation and R&D → Digital Transformation → Supply Chain Management → Education and Awareness → Transparency and Reporting
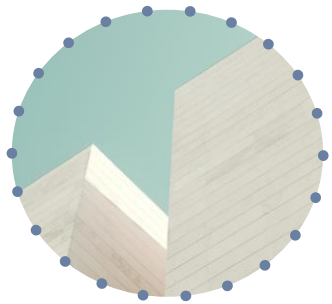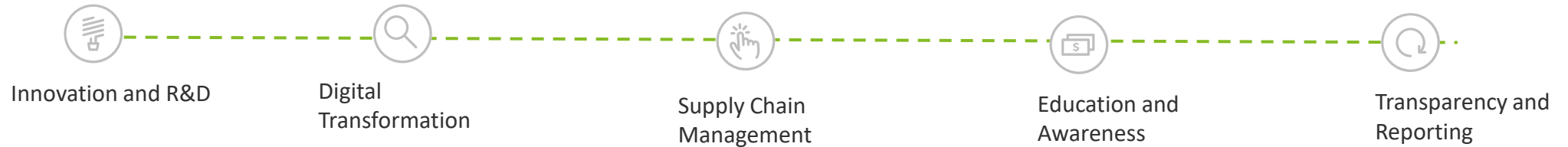
Airtel Sustainable Data Centers

Sustainable data centers play a crucial role in safeguarding the environment and maintaining resilient infrastructure. Airtel powers its data center facilities using renewable energy sources such as solar, hydro, and wind energy. This approach ensures energy efficiency and contributes to the reduction of greenhouse gas emissions.
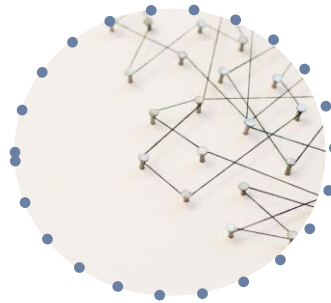
Unilever Sustainable Operations

Unilever is enhancing traceability within the palm oil supply chain by leveraging geo-analytical technologies. This approach enables the sourcing and sustainable procurement of raw materials, enhances risk management throughout the supply chain, and ensures compliance with ESG standards.

OCBC Bank Sustainable Finance

Banks and financial institutions are progressively integrating ESG factors into their financial decision-making processes. OCBC Bank actively promotes and monitors the ESG performance of its clients. It assesses ESG risks and opportunities in activities like lending and debt issuance, aiming to foster a more sustainable and resilient financial system.

Source: Deloitte Analysis, Gartner

2. Global Market Size

Total size of Global Information and Communications Technologies Sector

Size of the Global ICT Market in 2022

The size of the global ICT market grew by 3.3% to 4.4 trillion dollars in 2022, while the information technologies and communications technologies market sizes increased by 9.3% and shrunk by 3.8%, respectively.
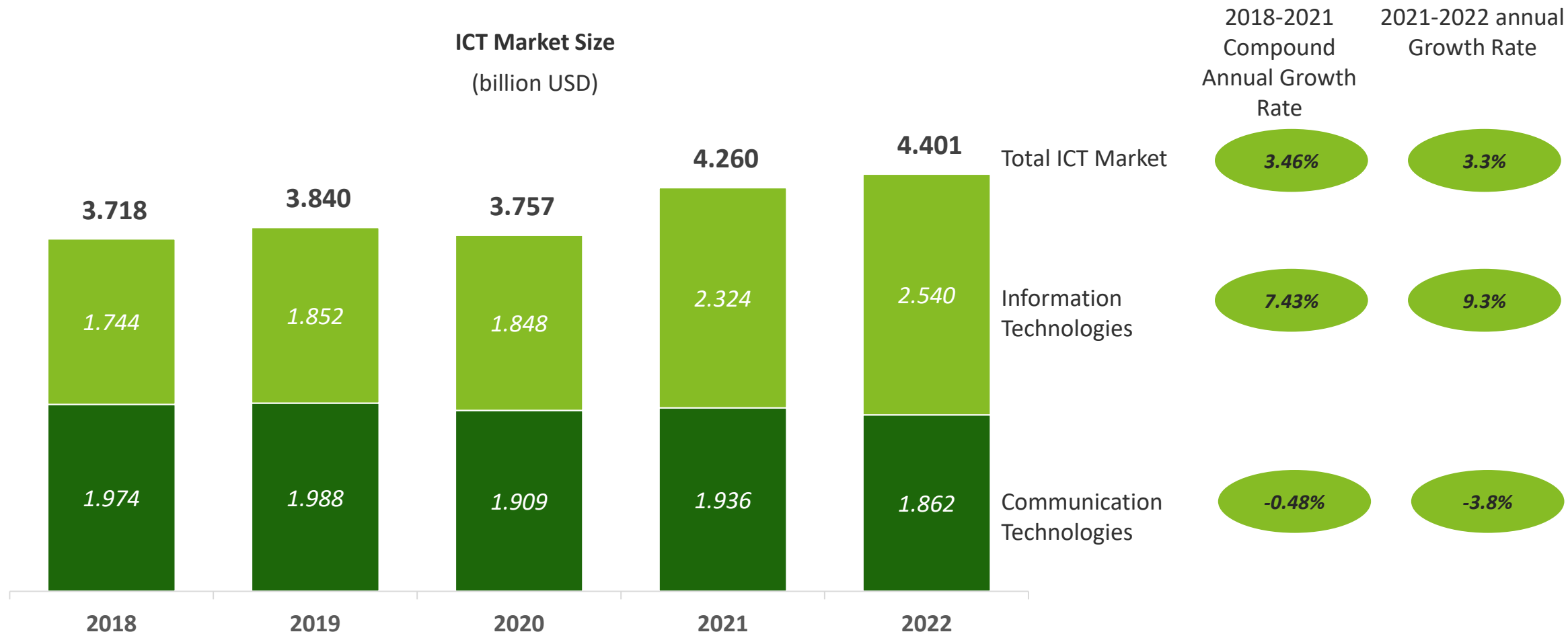
ICT Market Size

(billion USD)

Year	Total	Information Technologies	Communication Technologies
2018	3.718	1.744	1.974
2019	3.840	1.852	1.988
2020	3.757	1.848	1.909
2021	4.260	2.324	1.936
2022	4.401	2.540	1.862

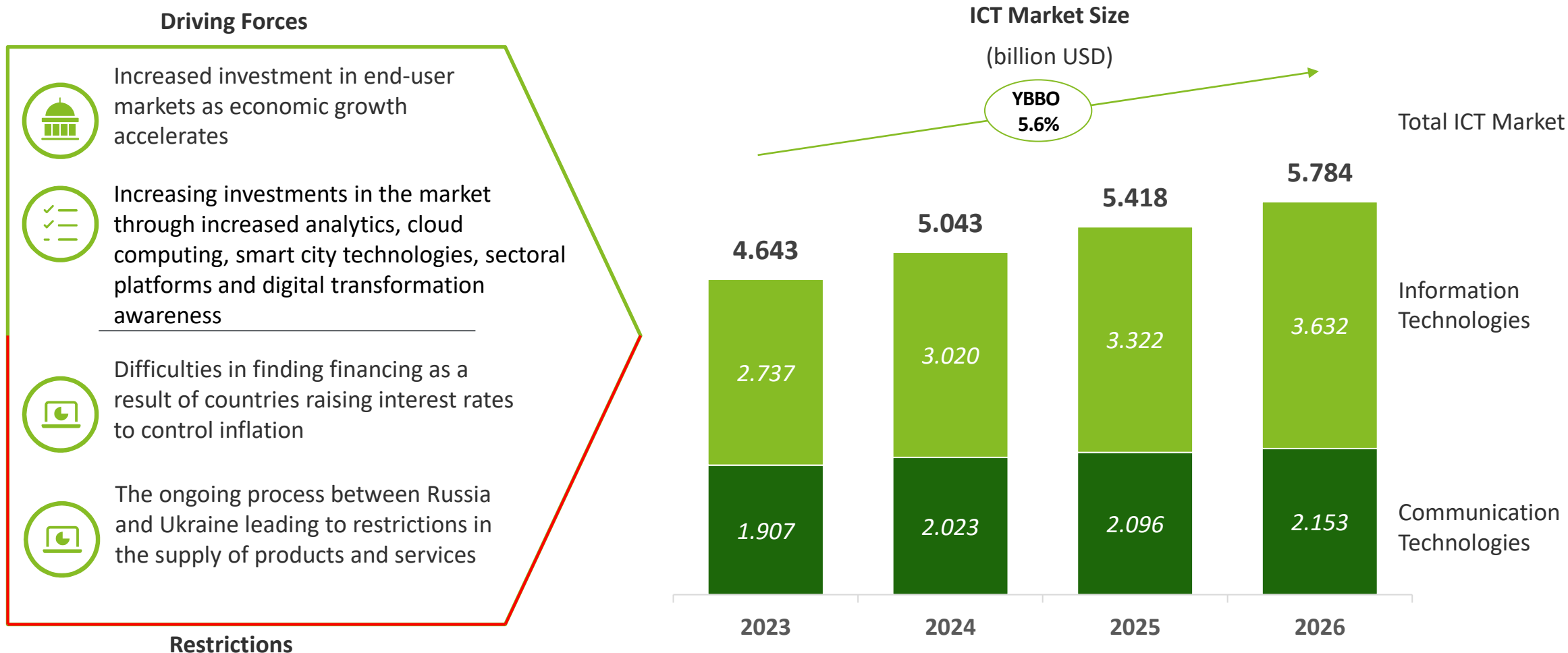|	2018-2021 Compound Annual Growth Rate	2021-2022 annual Growth Rate
Total ICT Market	3.46%	3.3%
Information Technologies	7.43%	9.3%
Communication Technologies	-0.48%	-3.8%

Note: Sums may differ due to rounding.
Source: Gartner, Deloitte analysis

Future Expectations and Global ICT Market Growth Expectation

It is estimated that the global ICT market will grow by 5.5% in 2023 to reach 4.6 trillion dollars before achieving an annual growth rate of 5.6%, reaching 5.8 trillion dollars in 2026.

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Driving Forces

Increased investment in end-user markets as economic growth accelerates

Increasing investments in the market through increased analytics, cloud computing, smart city technologies, sectoral platforms and digital transformation awareness

Difficulties in finding financing as a result of countries raising interest rates to control inflation

The ongoing process between Russia and Ukraine leading to restrictions in the supply of products and services

Restrictions

ICT Market Size

(billion USD)

YBBO 5.6%

Total ICT Market

	2023	2024	2025	2026
Total	4.643	5.043	5.418	5.784
Information Technologies	2.737	3.020	3.322	3.632
Communication Technologies	1.907	2.023	2.096	2.153

Note: Sums may differ due to rounding.
Source: Gartner, Deloitte analysis

3. Stakeholders of the Project

Data sources used, and stakeholders collaborated with, for subsector categories when calculating the sector size in Türkiye
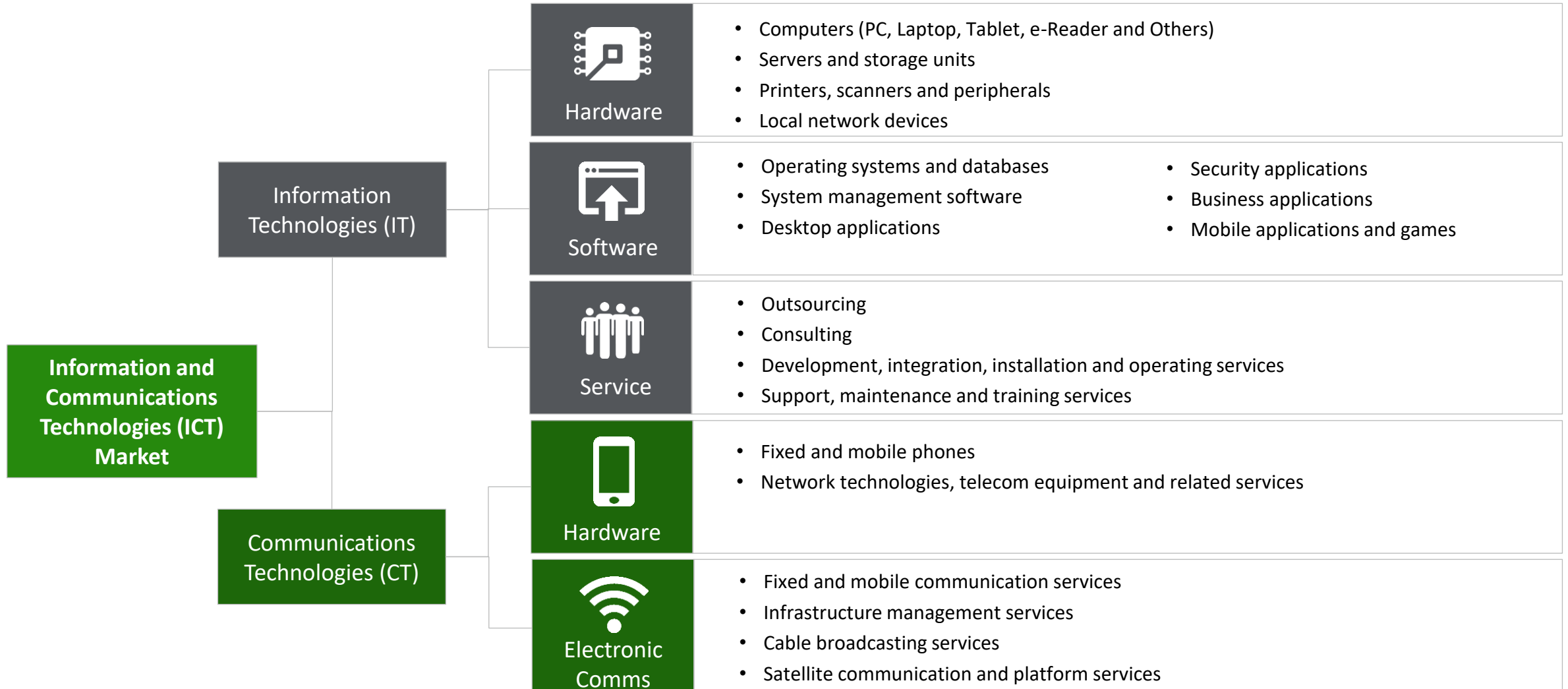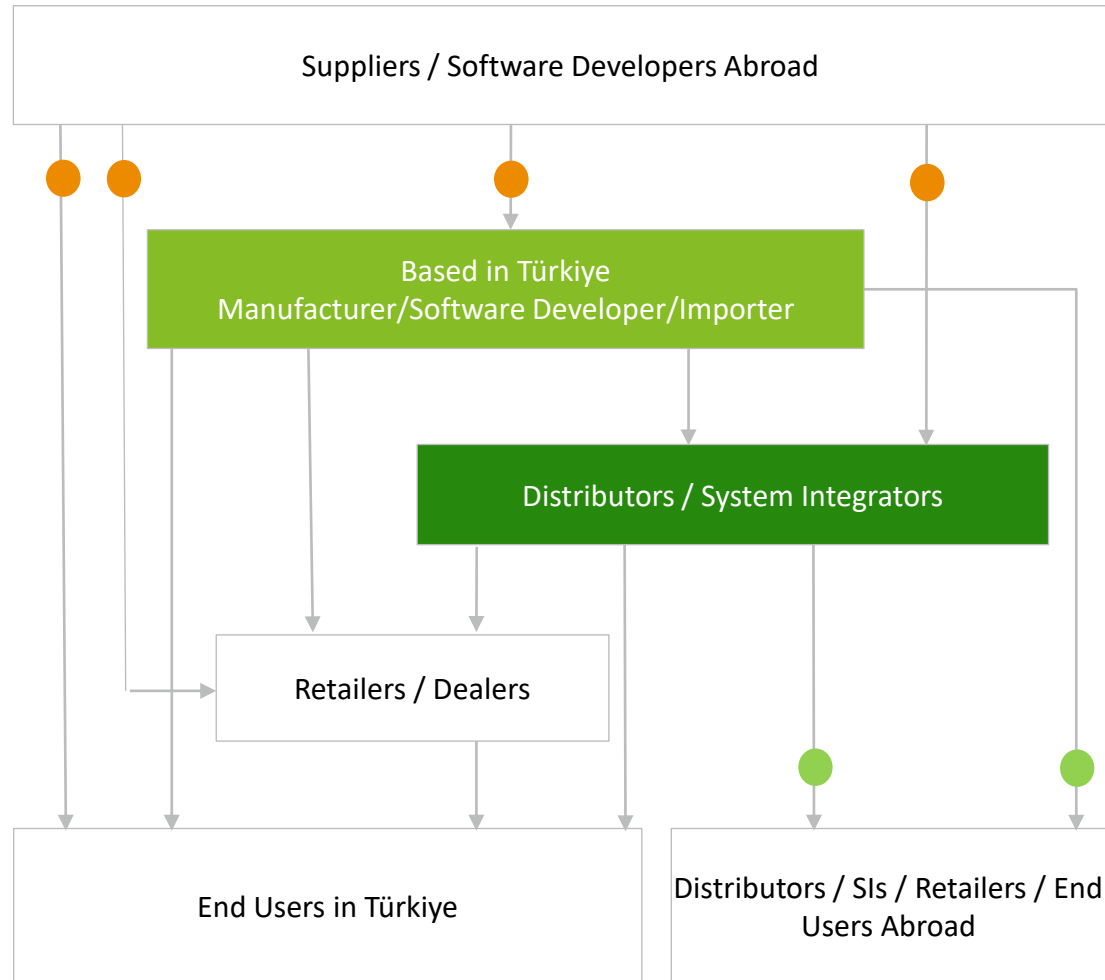
Project Consultant

Project Data Partners

4. Scope of the Project

Subsectors assessed as part of the study when calculating the sector size, and the types of products and services produced by such subsectors

Scope of the Project

TÜBİSAD's Market Data study, which has been conducted since 2012, has been performed with Deloitte with a standardized scope and methodology for the last 11 years.

Information and Communications Technologies (ICT) Market

Information Technologies (IT)

Hardware
- Computers (PC, Laptop, Tablet, e-Reader and Others)
- Servers and storage units
- Printers, scanners and peripherals
- Local network devices

Software
- Operating systems and databases
- System management software
- Desktop applications
- Security applications
- Business applications
- Mobile applications and games

Service
- Outsourcing
- Consulting
- Development, integration, installation and operating services
- Support, maintenance and training services

Communications Technologies (CT)

Hardware
- Fixed and mobile phones
- Network technologies, telecom equipment and related services

Electronic Comms
- Fixed and mobile communication services
- Infrastructure management services
- Cable broadcasting services
- Satellite communication and platform services

Measurement methodology

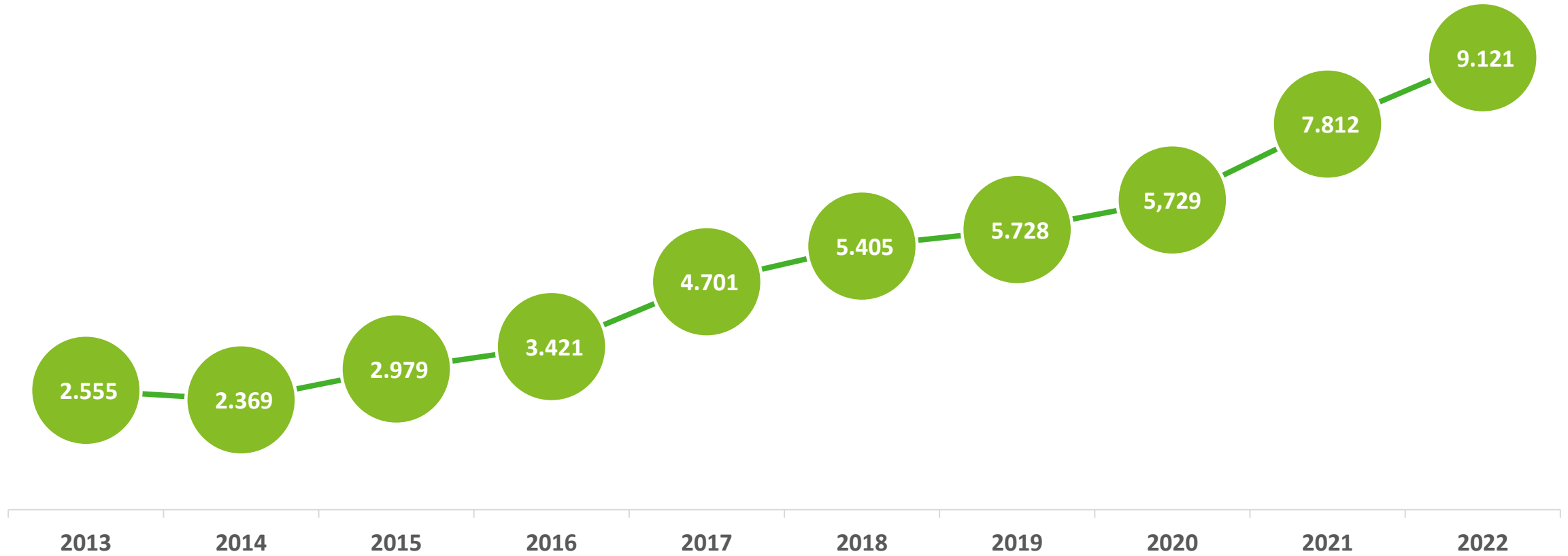Sector size is calculated and verified through a bottom-up approach.

In addition to the data provided by our sector companies through a comprehensive survey, data from institutions such as BTK, Context, SASAD and the Ministry of Industry and Technology is also utilized.

- Company and sector data is measured properly to avoid any overlaps or duplicate calculations.
- Company data is gathered together with different breakdowns:
  - Sales direct to end-users vs through distributors
  - Import vs export
  - Origin of products and services
  - Technopolis share

● = Import
● = Export

Sector Players in the Scope of the Study

All data collected as part of the market data project is provided by sector companies. The number of companies covered by our study was 9,121 in 2022.

Year	Value
2013	2.555
2014	2.369
2015	2.979
2016	3.421
2017	4.701
2018	5.405
2019	5.728
2020	5,729
2021	7.812
2022	9.121

5. Information and Communications Technologies (ICT) Sector in Türkiye
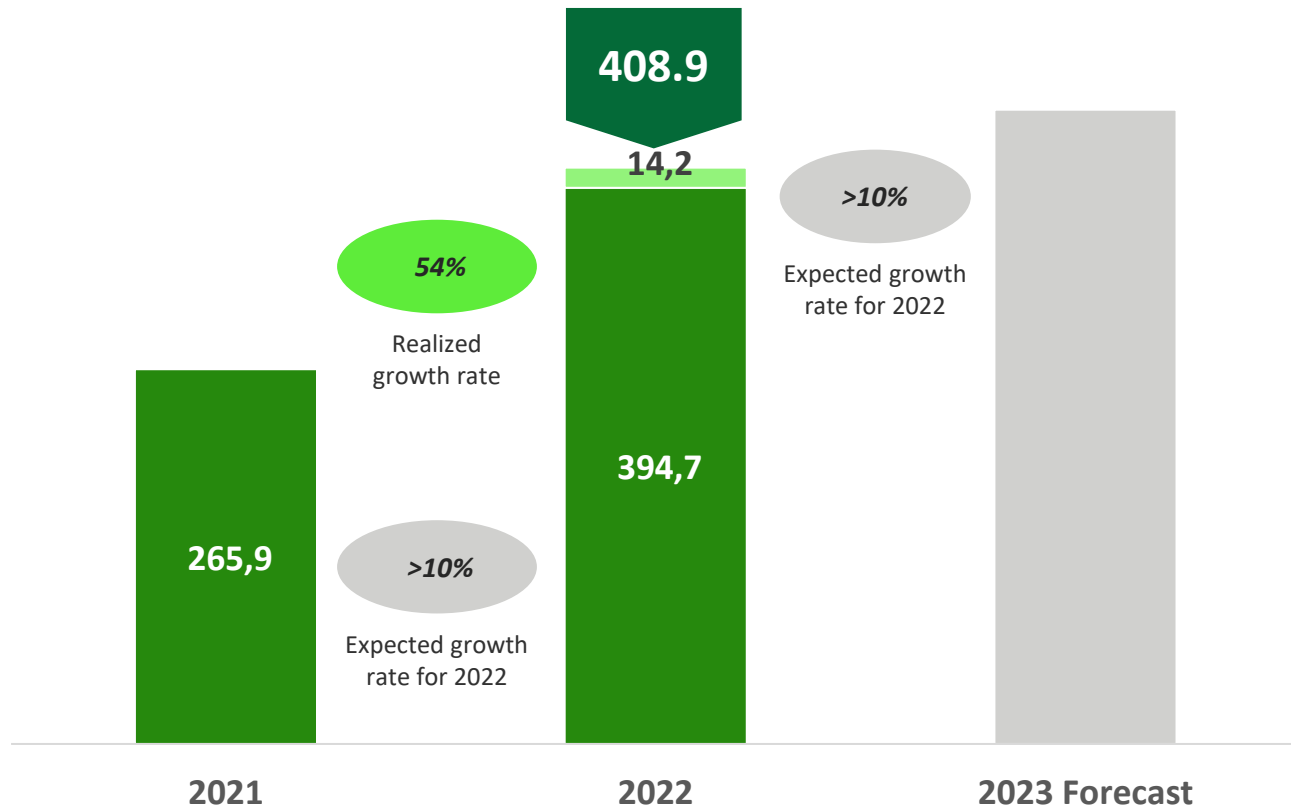
Size of the Information and Communications Technologies Sector in Türkiye
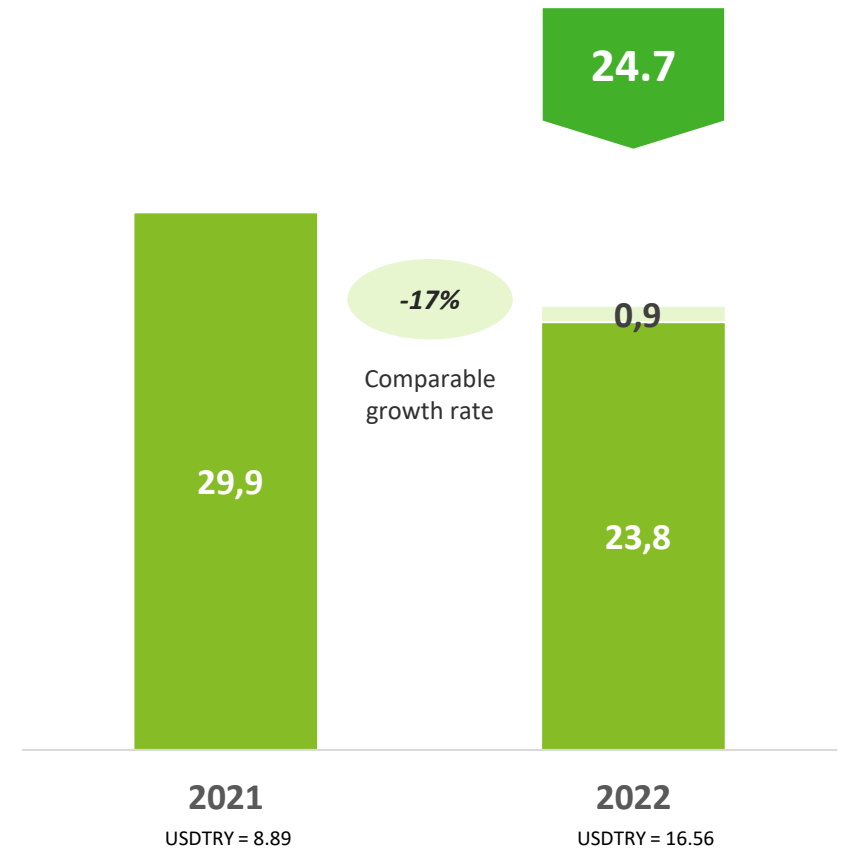
Total Sector Size (billion TRY)

In 2022, the market size reached 408.9 billion TRY (USD 24.7 billion).

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ICT Market Size

(billion TRY)

(billion USD)

408.9

14,2

>10%

Expected growth rate for 2022

54%

Realized growth rate

394,7

>10%

Expected growth rate for 2022

265,9

2021

2022

2023 Forecast

24.7

0,9

-17%

Comparable growth rate

29,9

23,8

2021

USDTRY = 8.89

2022

USDTRY = 16.56

Size of newly added companies this year

Size of newly added companies this year

Annual changes refer to comparable rates of growth.
Note: Sums may differ due to rounding.

Total Sector Size (billion TRY and USD)

Between 2018 and 2022, the annual average growth of the sector on a TRY basis was 25.2%.

TÜBİSAD
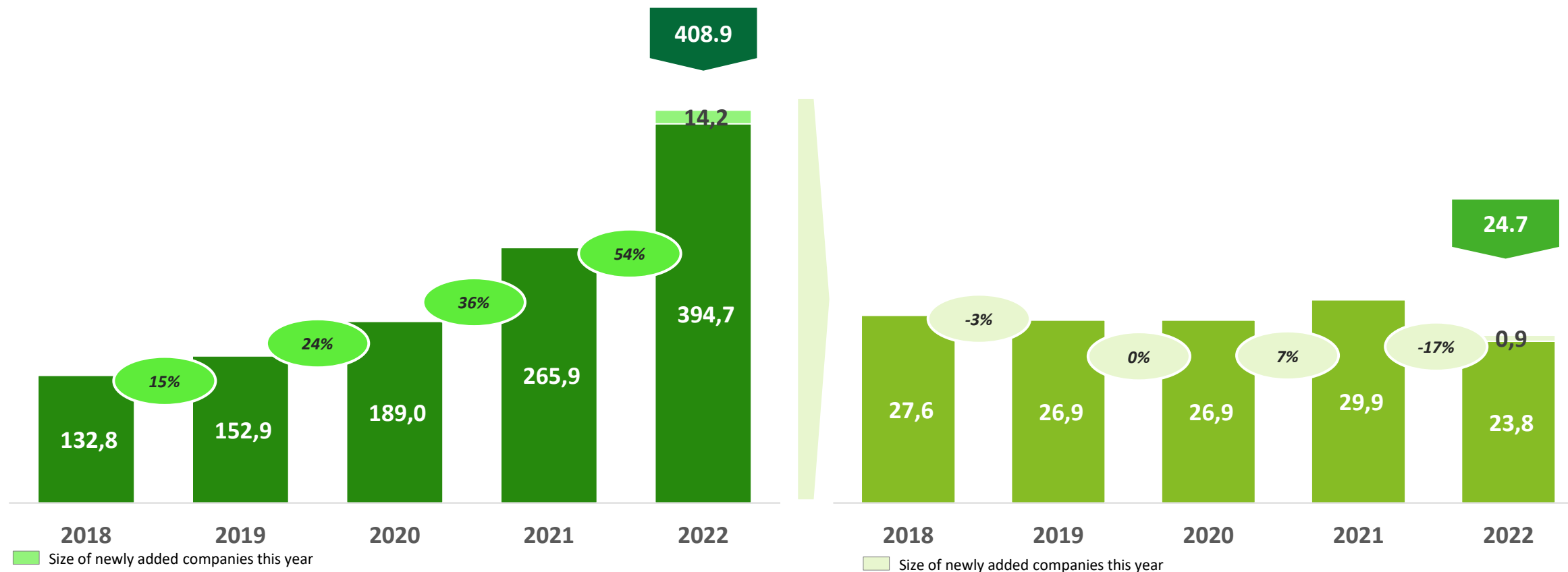BİLİŞİM SANAYİCİLERİ DERNEĞİ

ICT Market Size Growth

(billion TRY)

(billion USD)

Annual Avg. Growth: 25.2%

Annual Avg. Growth: -2.2%

408.9

14,2

394,7

54%

36%

265,9

24%

189,0

15%

152,9

132,8

24.7

0,9

-3%

0%

7%

-17%

23,8

29,9

27,6

26,9

26,9

| 2018 | 2019 | 2020 | 2021 | 2022 |

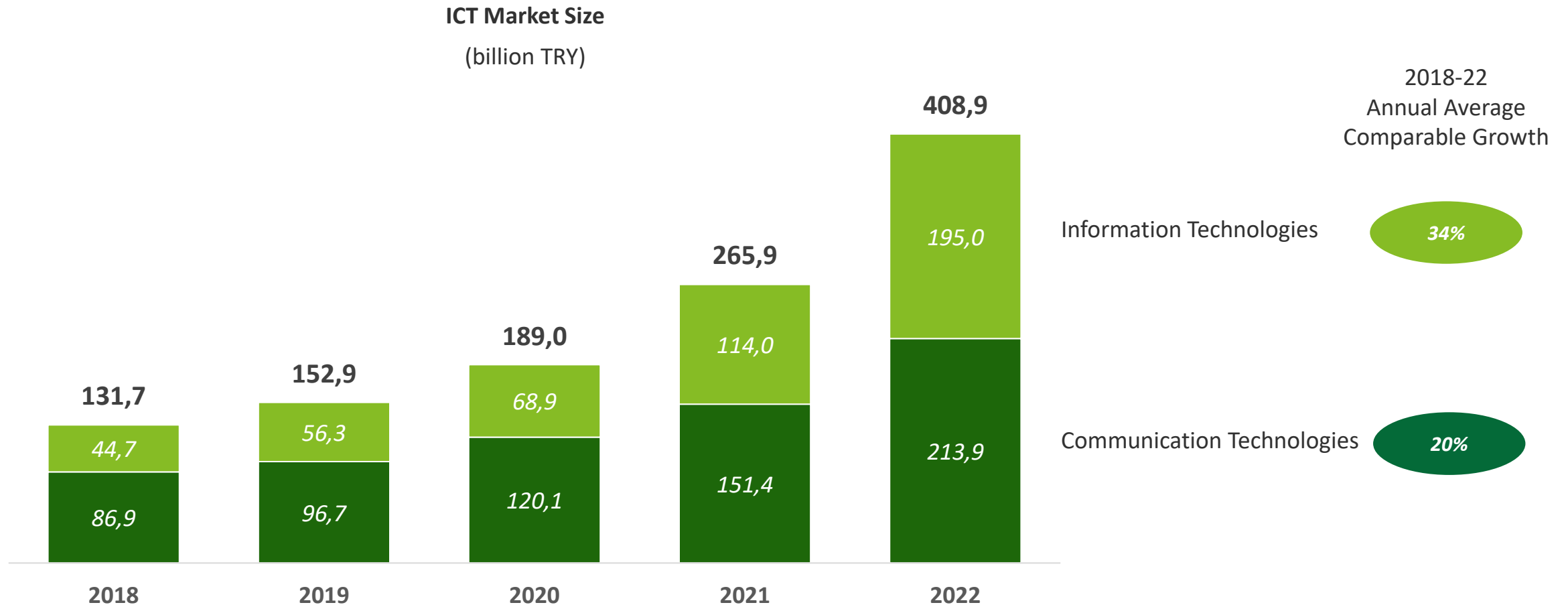| 2018 | 2019 | 2020 | 2021 | 2022 |

◼ Size of newly added companies this year

◻ Size of newly added companies this year

Annual changes refer to comparable rates of growth.
Note: Sums may differ due to rounding.

Information and Communications Technologies Market Breakdown (billion TRY)

Information Technologies grew faster between 2018-2022 compared to Communications Technologies.
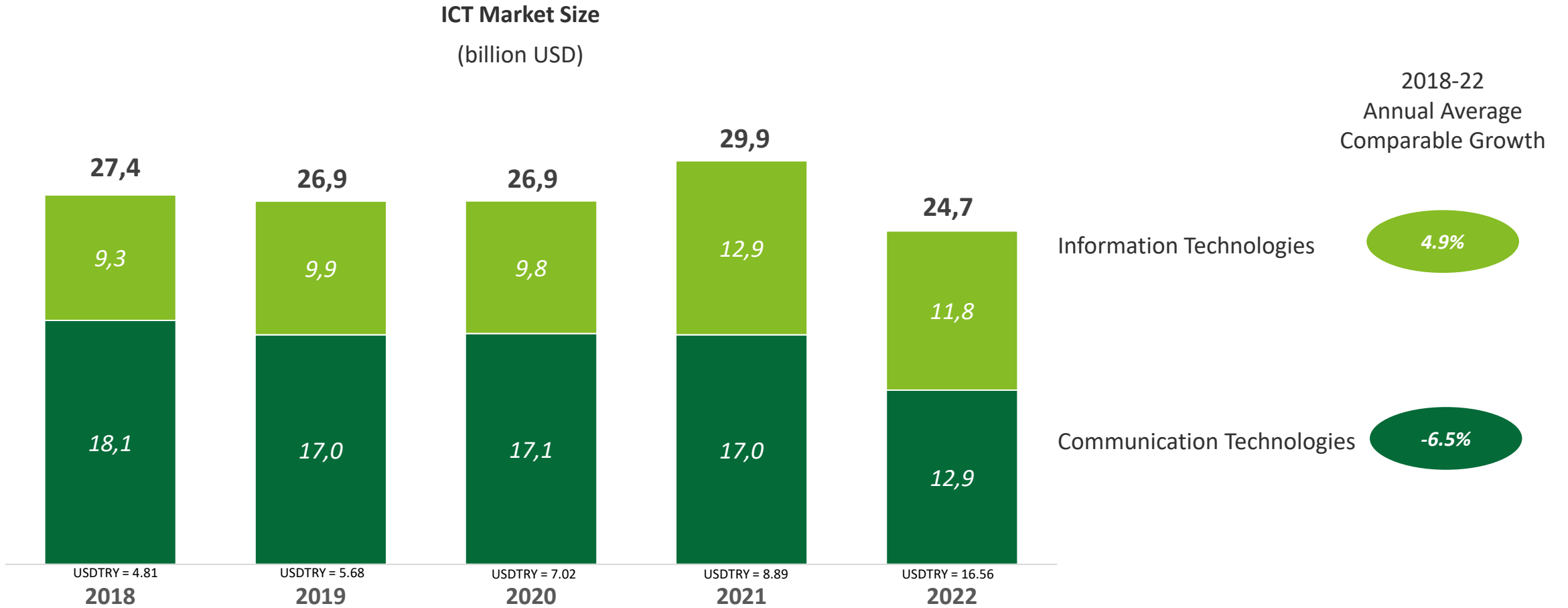
ICT Market Size

(billion TRY)

2018-22
Annual Average
Comparable Growth

Year	Communication Technologies	Information Technologies	Total
2018	86,9	44,7	131,7
2019	96,7	56,3	152,9
2020	120,1	68,9	189,0
2021	151,4	114,0	265,9
2022	213,9	195,0	408,9

Information Technologies — **34%**

Communication Technologies — **20%**

Note: Sums may differ due to rounding.

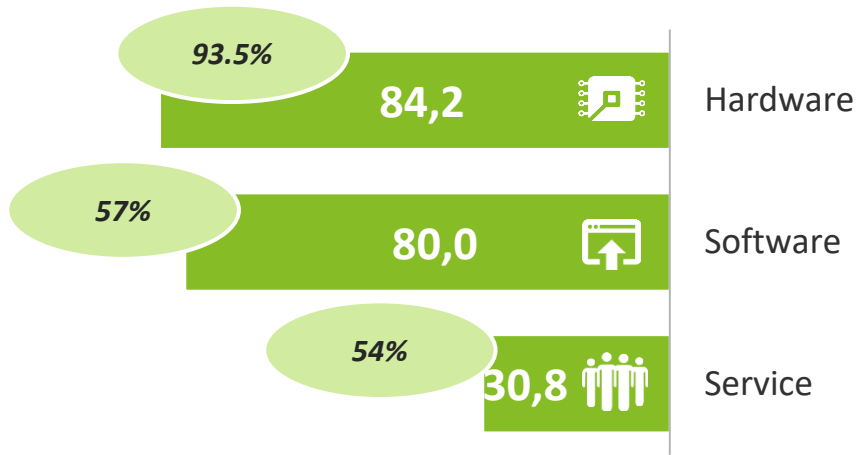# Information and Communications Technologies Market Breakdown (billion USD)

Information Technologies grew in spite of the increasing exchange rate, while Communications Technologies were affected by said exchange rate and shrank.
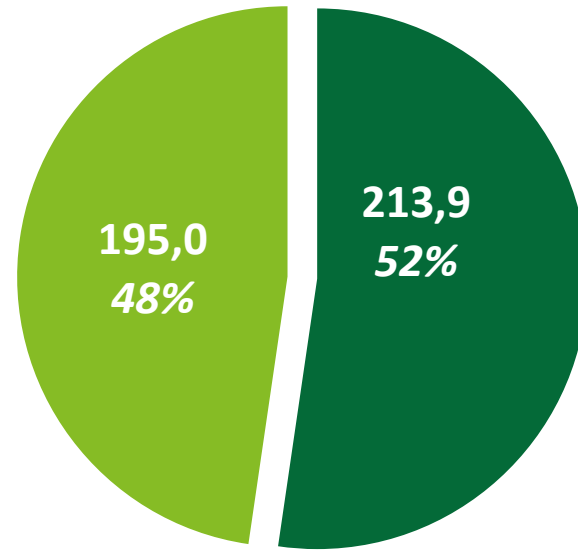
ICT Market Size

(billion USD)

	2018	2019	2020	2021	2022
Total	27,4	26,9	26,9	29,9	24,7
Information Technologies	9,3	9,9	9,8	12,9	11,8
Communication Technologies	18,1	17,0	17,1	17,0	12,9
USDTRY	4.81	5.68	7.02	8.89	16.56

2018-22 Annual Average Comparable Growth

Information Technologies: **4.9%**

Communication Technologies: **-6.5%**

Note: Sums may differ due to rounding.

Information and Communications Technology Industry Subcategories
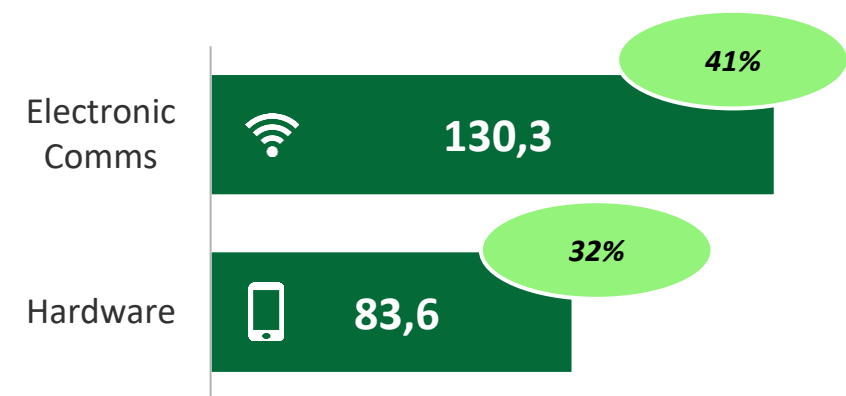
Information Technologies

(billion TRY)

93.5%

84,2 — Hardware

57%

80,0 — Software

54%

30,8 — Service

70%

2021-22
Comparable Growth Rate

195,0
48%

213,9
52%

2022

Communication Technologies

(billion TRY)

41%

130,3 — Electronic Comms

32%

83,6 — Hardware
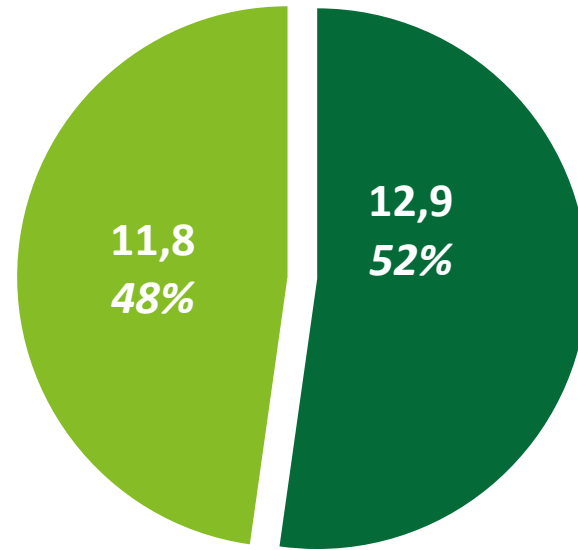
41%

2021-22
Comparable Growth Rate

Information and Communications Technology Industry Subcategories

Information Technologies

(billion USD)
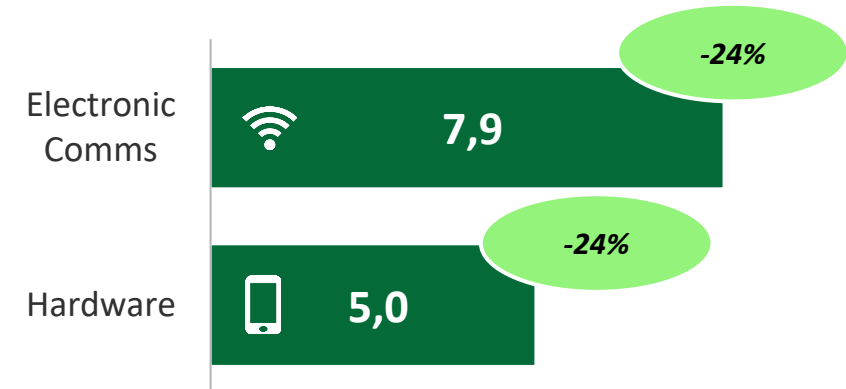
- 4% — **5.1** Hardware
- -16% — **4.8** Software
- -17% — **1.9** Service

-8%

2021-22
Comparable Growth Rate

11,8
48%

12,9
52%

2022

Communication Technologies

(billion USD)

- Electronic Comms — **7,9** — -24%
- Hardware — **5,0** — -24%
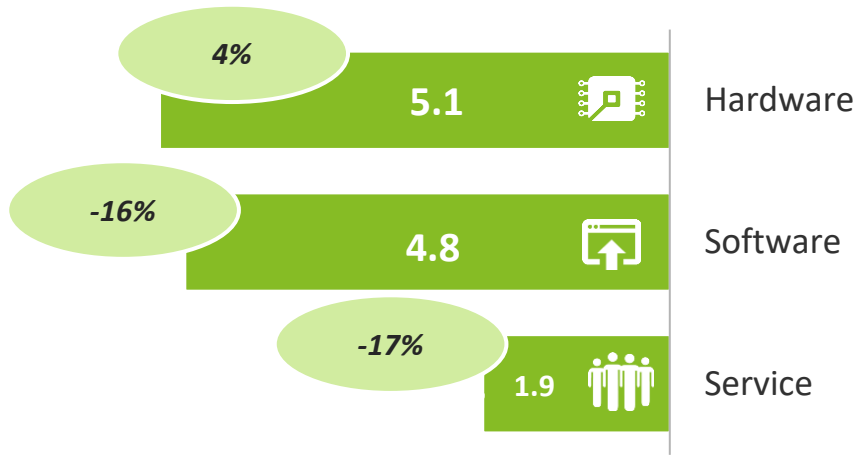
-24%

2021-22
Comparable Growth Rate

Technology Development Zones

Technopolis in Türkiye	2021	2022	Change
Number of Technopolis	92	97*	5.4%
Number of Companies	7707	8972	16.4%
Number of Employees	79,641	93,173	17%
Total Revenues (billion TRY)	51.8	75.6	46%
Total Exports (billion TRY)	13.3	19.9	50%
Revenue per Company (million TRY)	*6.7*	*8.4*	*25.4%*
Revenue per Employee (thousand TRY)	*650*	*811*	*24.8%*
Exports per Technopolis (million TRY)	*144.9*	*204.9*	*41.4%*
Exports per Revenues	*26%*	*26%*	*-*

Source: Republic of Türkiye, Ministry of Industry and Technology
*There are 82 operating technology development zones from a total of 97. Remaining 15 zones are not operating due to ongoing infrastructure construction.
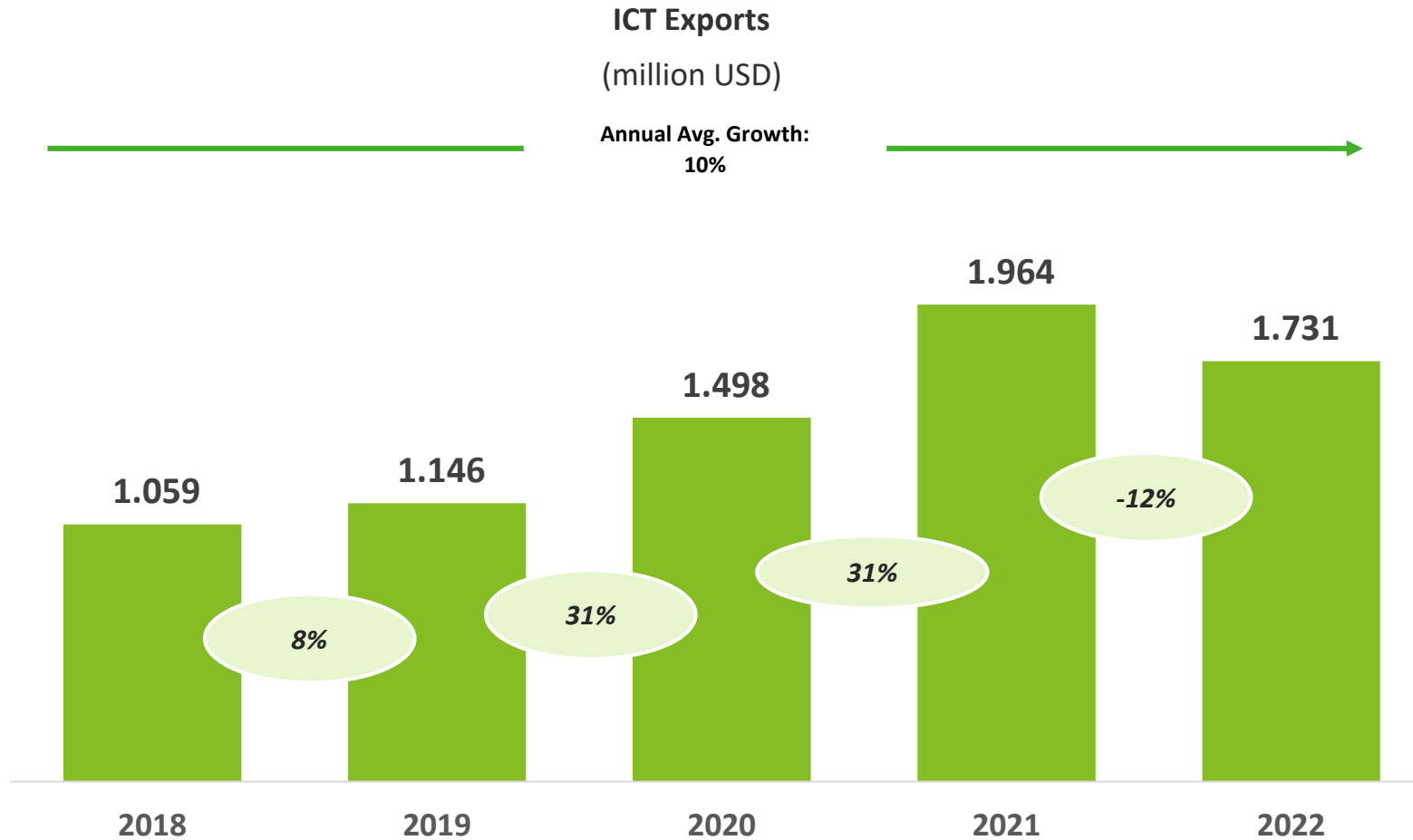
ICT Sector Exports

The largest share in total exports is that of the Information Technologies Software category.

	Export	% Share in Subcategory	% Change
Information Technologies Hardware	1,886 million TRY	2%	87%
IT Software	23,840 million TRY	31%	61%
IT Service	984 million TRY	3%	59%
Communications Technologies Hardware	1,955 million TRY	2%	92%

Total Exports

2022

28,665
million TRY

Comparable Growth: 64%
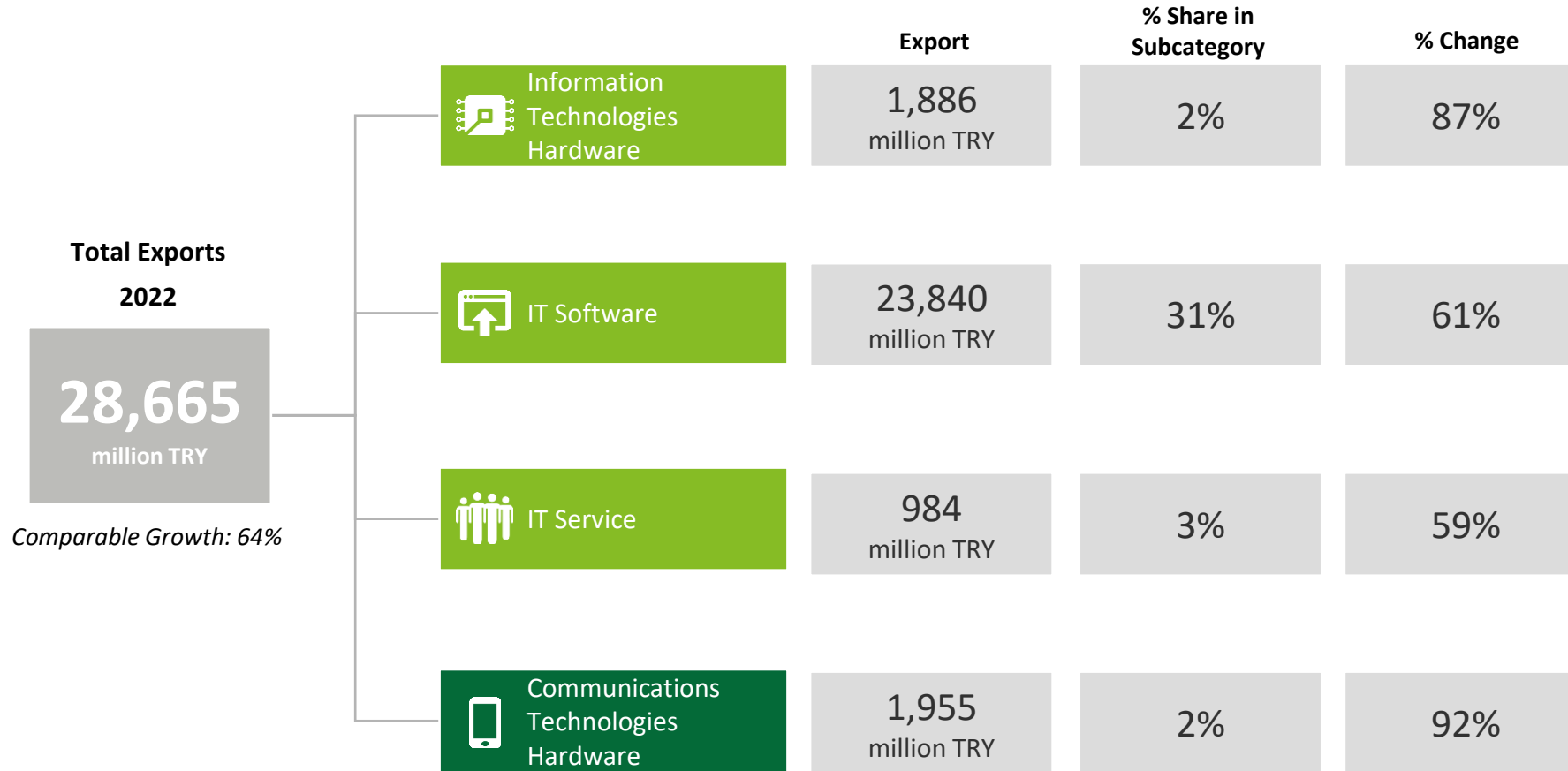
*Mobile phones are excluded.
Annual changes refer to comparable rates of growth.
Note: Sums may differ due to rounding.

ICT Sector Exports

The total exports of the sector grew by an average of 10% annually on a dollar basis between 2018 and 2022.

ICT Exports
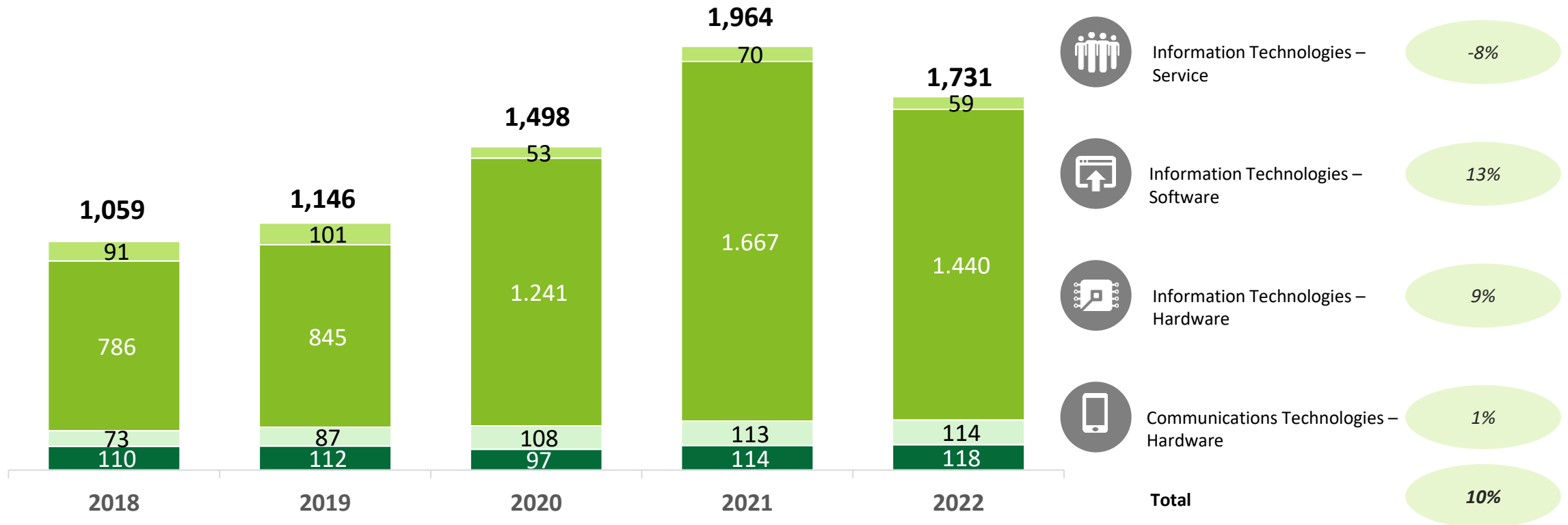
(million USD)

**Annual Avg. Growth:
10%**

- In 2022, the total sector size experienced a growth of 54% in terms of Turkish lira, while total exports increased by 64% in parallel.

- The most important category driving the increase is the growth in the Information Technologies – Software category, which also has the largest share in exports.

- Between 2018 and 2022, the average annual growth in dollar terms was 10%. However, there was a contraction in dollar terms between 2021 and 2022 due to fluctuating exchange rates during that period.

ICT Sector Exports

Development of subcategories- million USD
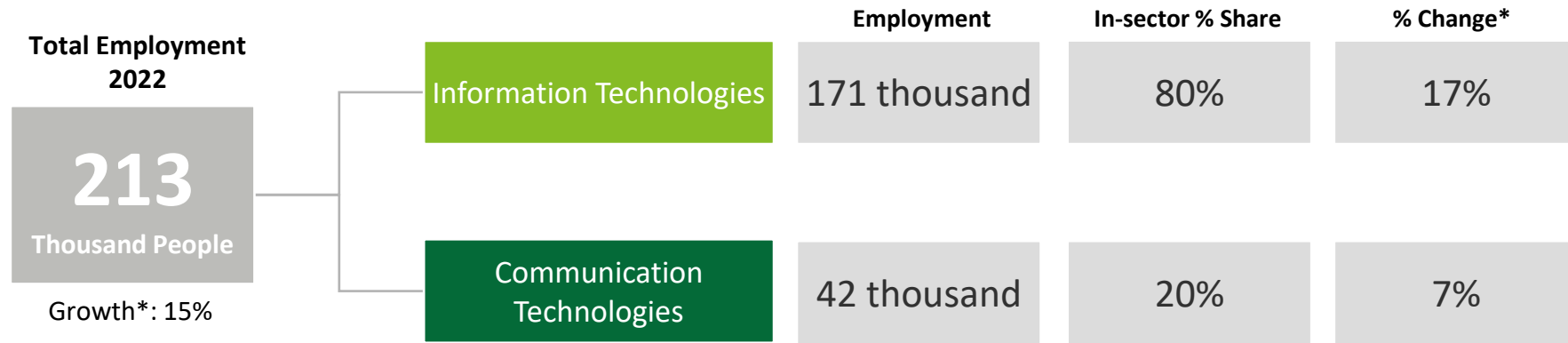
ICT Exports

(million USD)

2018-22 Average Rate of Change

	2018	2019	2020	2021	2022
Total	**1,059**	**1,146**	**1,498**	**1,964**	**1,731**
IT – Service (light green top)	91	101	53	70	59
IT – Software (green)	786	845	1.241	1.667	1.440
IT – Hardware (pale green)	73	87	108	113	114
Communications – Hardware (dark green)	110	112	97	114	118

Category	2018-22 Average Rate of Change
Information Technologies – Service	-8%
Information Technologies – Software	13%
Information Technologies – Hardware	9%
Communications Technologies – Hardware	1%
Total	**10%**

Note: Sums may differ due to rounding.

Employment (in thousands)

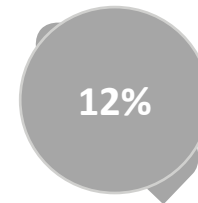The total jobs in the sector reached 213,000 in 2022 with a growth rate of 15%.

Total Employment 2022

213 Thousand People

Growth*: 15%

	Employment	In-sector % Share	% Change*
Information Technologies	171 thousand	80%	17%
Communication Technologies	42 thousand	20%	7%

22% — % of female employees**

49% — % of university-graduate employees**
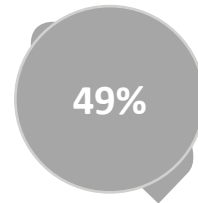
49% — % of R&D employees***

12% — % of contractor employees**

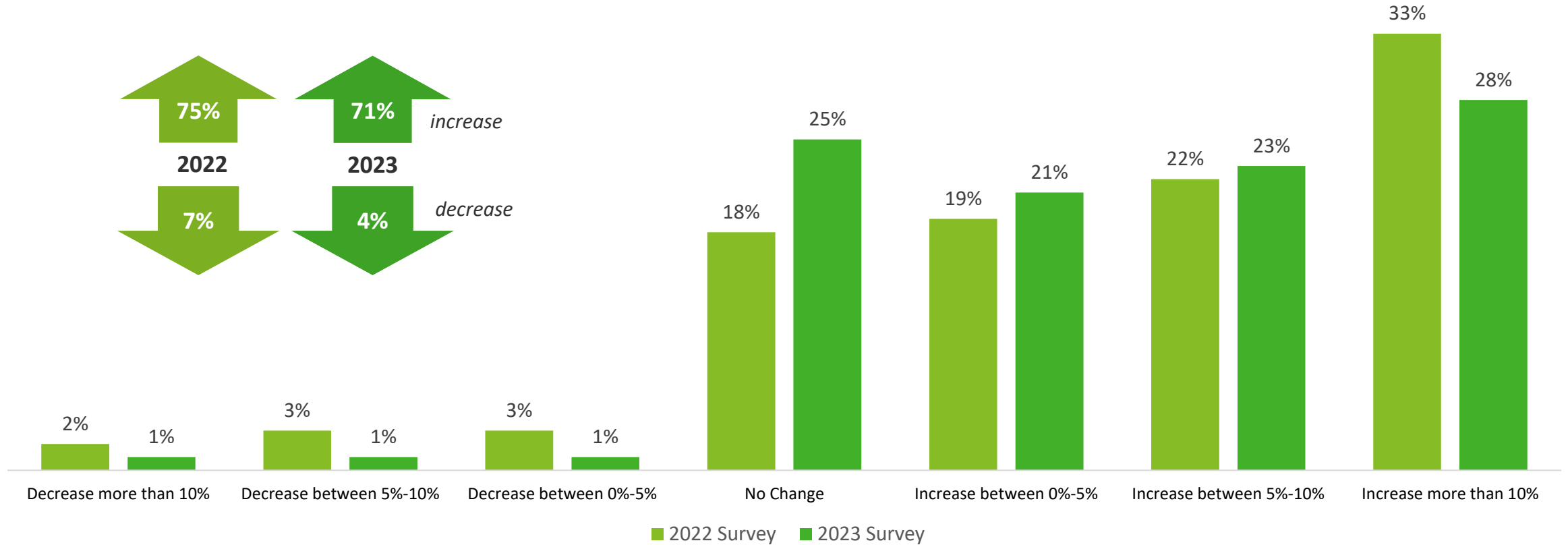*Growth rates refer to comparable rates (calculated by excluding surveyed firms for the first time this year).
**: Based on Survey Respondent Firms and BTK data
***: Survey Respondent Firm, data from the BTK and the Ministry of Industry and Technology of the Republic of Türkiye

Employment

In 2023, the rate of sector players expecting a growth in the sectoral employment has reduced compared to 2022.

TÜBİSAD
BİLİŞİM SANAYİCİLERİ DERNEĞİ

In your view, how is the number of employees for your company likely to change this year?

75% 2022 / **71%** 2023 — *increase*

7% 2022 / **4%** 2023 — *decrease*

	Decrease more than 10%	Decrease between 5%-10%	Decrease between 0%-5%	No Change	Increase between 0%-5%	Increase between 5%-10%	Increase more than 10%
2022 Survey	2%	3%	3%	18%	19%	22%	33%
2023 Survey	1%	1%	1%	25%	21%	23%	28%

■ 2022 Survey ■ 2023 Survey

Note: Sums may differ due to rounding.

Software Development Activities in the Sector

Among the companies included in the study, decision support systems emerge as prominent players within the software industry.

What are the areas in which your company have software development activities?
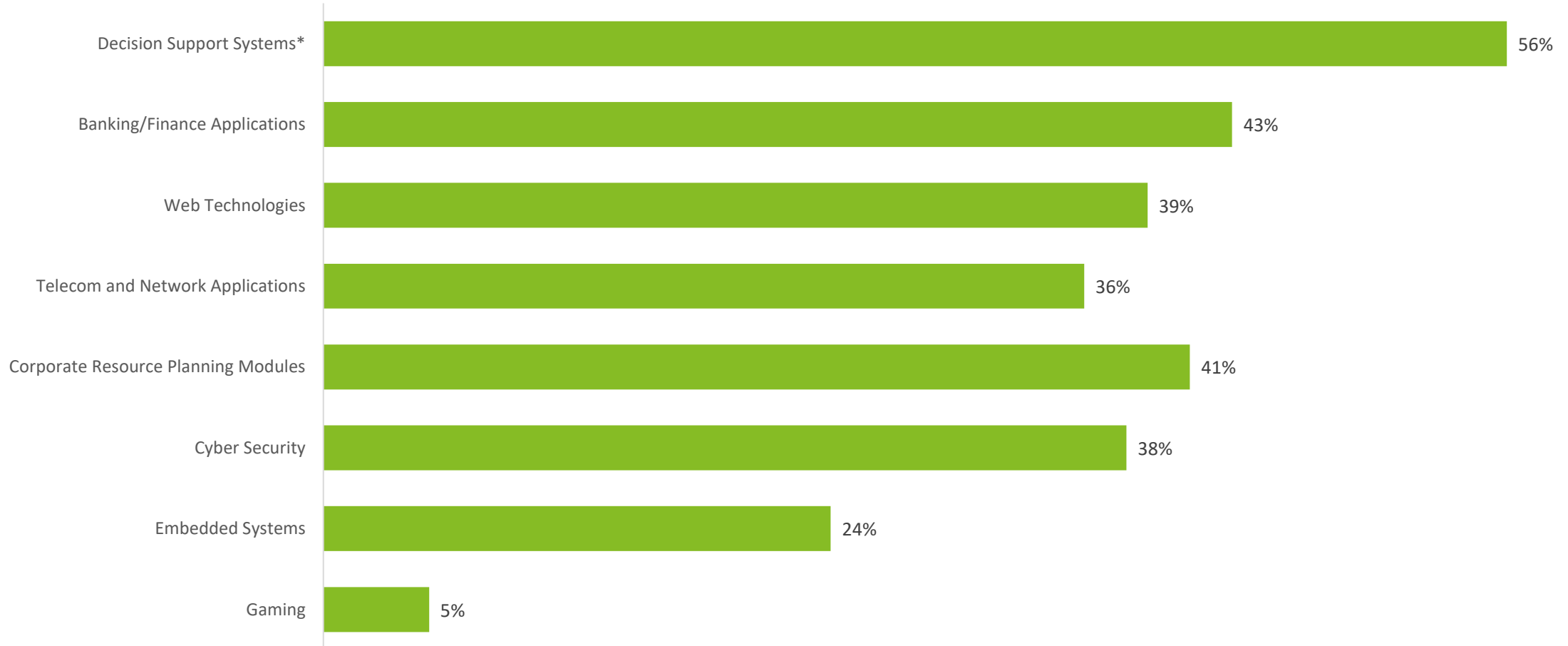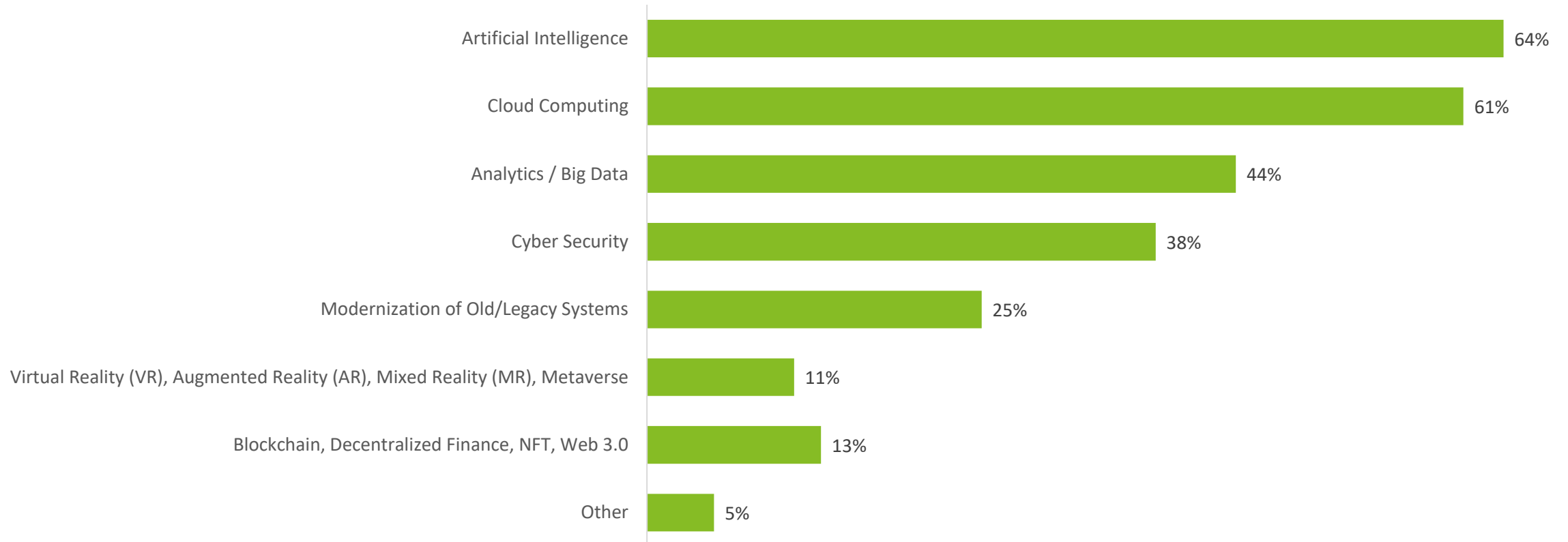

*It contains artificial intelligence, business intelligence and data integration, analytical models, optimization and simulation models.

Among respondent firms with software revenue, N = 80

Impact Areas of the Sector

Participants expect that artificial intelligence and cloud computing will be the main technological area in the 1 to 3 years to come.

For the next 1 to 3 years, which of the following technological areas will have the most impact on your sector?
(Choose three answers at most)

Technological Area	Percentage
Artificial Intelligence	64%
Cloud Computing	61%
Analytics / Big Data	44%
Cyber Security	38%
Modernization of Old/Legacy Systems	25%
Virtual Reality (VR), Augmented Reality (AR), Mixed Reality (MR), Metaverse	11%
Blockchain, Decentralized Finance, NFT, Web 3.0	13%
Other	5%

Shares of Subcategories Over Years

In 2022, there was a shift in the distribution of components within the information technologies market, with a decrease in the share of software and an increase in the share of hardware.

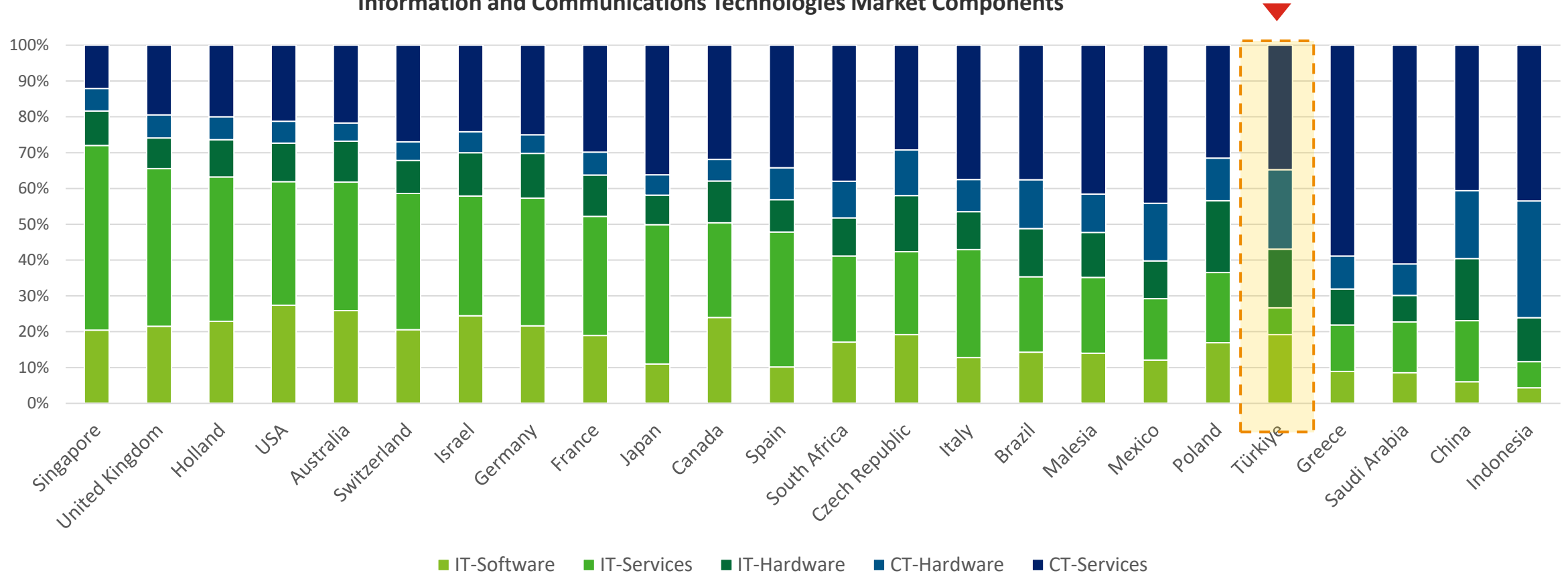**Information Technologies Market Components**
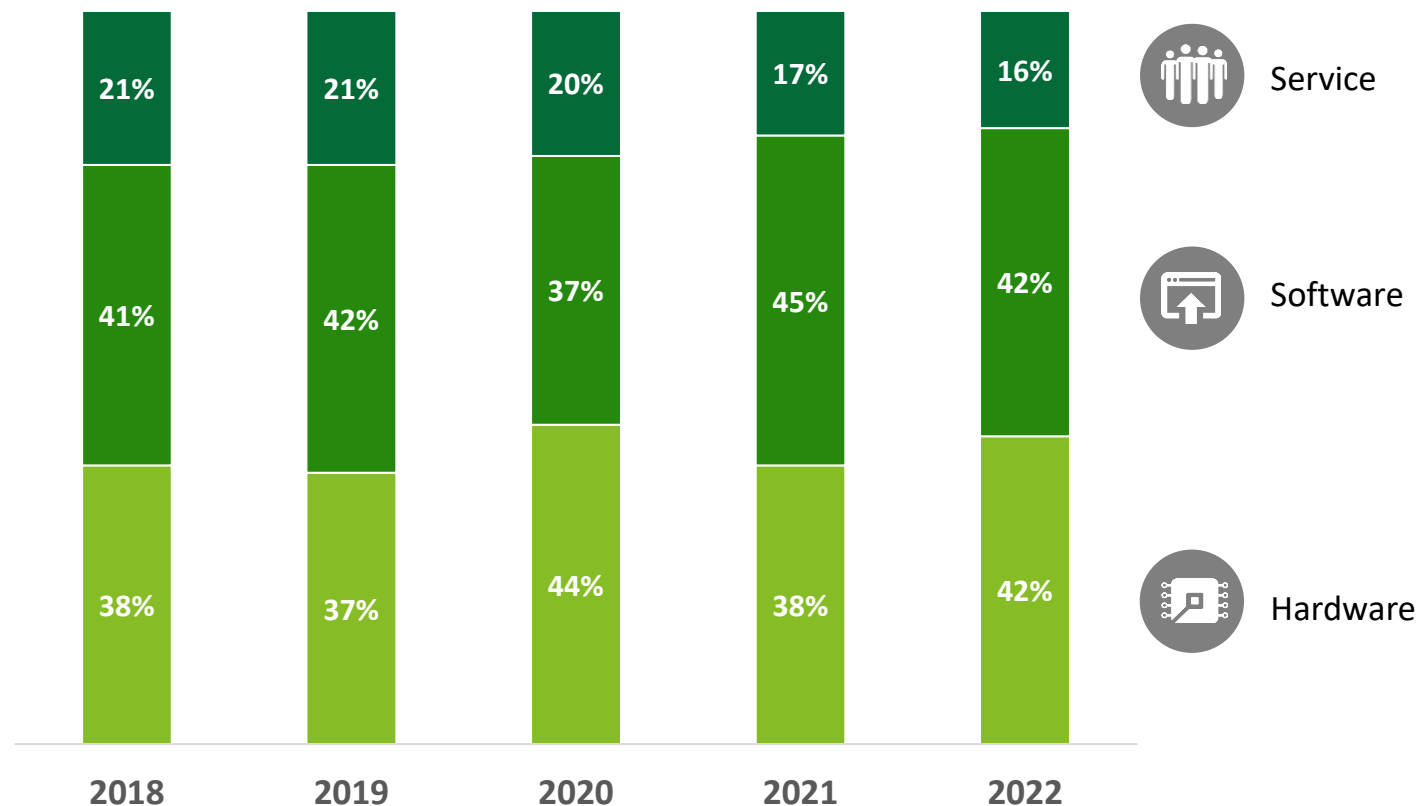
- In 2022, a significant increase was observed in the share of Information Technologies in the overall market.

- Similarly, there is a change compared to last year in the subcategories of Information Technologies.

- The share of hardware, which experienced a notable decrease between 2020 and 2021, rebounded in 2022 due to the rise in the exchange rate.

- On the software front, which comprises nearly half of the IT market, a decline was observed in 2021-2022 following an increase in 2020-2021.

Note: Sums may differ due to rounding.

Shares of Subcategories by Countries

When the countries assessed are ranked according to the share of Information Technologies in the overall sector size, Türkiye's profile is similar to that of developing countries.

Information and Communications Technologies Market Components

Legend: IT-Software, IT-Services, IT-Hardware, CT-Hardware, CT-Services

Countries (left to right): Singapore, United Kingdom, Holland, USA, Australia, Switzerland, Israel, Germany, France, Japan, Canada, Spain, South Africa, Czech Republic, Italy, Brazil, Malesia, Mexico, Poland, Türkiye, Greece, Saudi Arabia, China, Indonesia

2022 Information and Communications Technologies Market
billion TRY

2022 Information and Communications Technologies Industry
(billion TRY)

Total Exports
28.7

Sector Size
408.9

Total Employment
213 thousand

Information Technologies	Communication Technologies
195	213.9

Hardware	Software	Service	Hardware	Electronic Comms
84.2	80	30.8	83.6	130.3

Note: Sums may differ due to rounding.

2022 Information and Communications Technologies Market
billion USD

2022 Information and Communications Technologies Industry
(billion USD)

Total Exports
1.7

Sector Size

24.7

Total Employment
213 thousand

Information Technologies			Communication Technologies	
11.8			**12.9**	
Hardware	Software	Service	Hardware	Electronic Comms
5.08	**4.83**	**1.86**	**5.05**	**7.87**

Note: Sums may differ due to rounding.
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THANK YOU

We would like to thank the
Ministry of Industry and Technology
of the Republic of Türkiye, BTK,
Context, TÜBİSAD members and sector companies
for their valuable contributions.

With support from…