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Avaliação do Programa de Apoio ao Desenvolvimento Tecnológico da Indústria de Semicondutores (PADIS)

Estudo de forsight para o setor de semidutores

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Brasília, DF

Dezembro,2022

Avaliação do Programa de Apoio ao Desenvolvimento Tecnológico da Indústria de Semicondutores (PADIS)

Estudo de forsight para o setor de semidutores

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APRESENTAÇÃO

A compra do estudo "**Global Semiconductor Market, 2018-2029**" da empresa de inteligência de mercado da *Fortune Business Insights* têm origem na demanda do Departamento de Ciência, Tecnologia e Inovação Digital e da Secretaria de Empreendedorismo e Inovação do Ministério da Ciência, Tecnologia e Inovações (DECTI/SEMPI/MCTI) e insere-se no âmbito do projeto "Avaliação do Programa de Apoio ao Desenvolvimento Tecnológico da Indústria de Semicondutores (PADIS)".[i]

A compra visa subsidiar especialistas na elaboração de um diagnóstico do PADIS, que identifique os elementos estruturantes para a proposição de um recalculo de rota, objetivando capacitar o Programa enquanto um instrumento complementar ao *catching-up* tecnológico. Com isso, se busca potencializar as chances de inserção das empresas instaladas no Brasil nas cadeias globais de valor, com produtos e serviços mais sofisticados.

Ou seja, o referido estudo ao levantar tendências, dados empíricos e caraterísticas do setor de semicondutores, um dos mais intensivos em capital e PDI no mundo, viabiliza a construção de uma compreensão abrangente do mercado global e dos desafios e oportunidades colocadas para as empresas brasileiras que atuam nesse setor. Nesse sentido, proporciona subsídios técnicos tanto para a avaliação do PADIS quanto para a formulação de propostas de aprimoramento que sejam coerentes com a atual conjuntura econômica e tecnológica.

A aquisição do estudo, de acesso limitado aos colaborados do CGEE, consiste em dois arquivos:

1. Uma apresentação em Power Point (PPT) com a exposição das principais tendências no setor de semicondutores, com destaque para: (a) as principais dinâmicas de mercado; (b) o impacto e as perspectivas de futuro para os mais recentes desenvolvimentos tecnológicos; (c) o panorama de acirrada competição entre Empresas e Estados; (d) a caracterização do setor tendo em vista os componentes e aplicações tecnológicas desenvolvidas; (f) a participação, por região, nas relações comerciais; (e) a identificação dos principais players.
2. Uma base de dados em Excel com os dados tabelados, com planilhas que segregam as informações segundo as aplicações, componentes e o recorte

global e regional (América do Norte, Europa, Ásia-Pacifico, Oriente Médio & África e América Latina), para o período entre 2018-2021 mais prospectivas para o intervalo entre 2021-2029.

Os referidos arquivos foram agrupados num único documento PDF, que segue essa breve apresentação.

As perguntas-chave que objetivou-se responder com a compra do Estudo foram:

A. Qual é o tamanho do mercado e qual é a taxa de crescimento esperada?
B. Quais são os principais players do mercado global de semicondutores?
C. Quais as estratégias de negócios adotadas pelos principais players do mercado global de semicondutores?
D. Quais os impactos da Pandemia do COVID 19 para o mercado global de semicondutores?
E. Quem são os principais fornecedores de componentes de semicondutores?
F. Quais são as tendências de crescimento (estimativa de crescimento) do mercado de semicondutores?

Após a compra desse estudo, foi encomendada a realização de uma *Nota Técnica* por uma especialista em Inteligência Estratégica, *Raquel das Neves Monteiro*, em janeiro de 2023, contendo uma análise do mesmo, com o objetivo de identificar as principais tendências, as janelas de oportunidade para o desenvolvimento do Brasil e as possibilidade de inserção do país nas cadeias globais e regionais de valor no setor de semicondutores. A previsão de entrega do produto, contendo essa análise, está prevista para a primeira semana de março.

Nesse sentido, a atividade de consultoria em execução visa a apropriação e análise dos dados levantados pelo **Global Semiconductor Market**, considerando a conjuntura nacional e as características do PADIS. O produto derivado compõe um esforço mais amplo, no âmbito desse projeto, de subsidiar o MCTI com um diagnóstico que viabilize o recalculo de rota do Programa e se soma com outras iniciativas, em execução, particularmente a realização de uma pesquisa de campo junto as empresas beneficiárias.

[i] **Linha de Atividade**: Estudos, Análises e Avaliações. **Centro de Custo**: (8.10.51.08.01.02).

FORTUNE
BUSINESS INSIGHTS

Semiconductor

Global Market Analysis, Insights and Forecast, 2022-2029

www.fortunebusinessinsights.com

Table of Content (1/7)

Table of Content (2/7)

Table of Content (3/7)

Table of Content (4/7)

Table of Content (5/7)

Table of Content (6/7)

Table of Content (7/7)

Introduction

Section 01

Definition, By Segment

Section 1.1

FORTUNE BUSINESS INSIGHTS

Definitions, By Components (1/3)

The report of Semiconductor Market covers the market analysis of components and applications referred to the end-user activities. Semiconductors have simplified the autonomous vehicles with a viable technology implementation. The semiconductor components have become essential for the operation of economy and national security of the data. Demand for semiconductors is bringing new convenience for making the impossible operations possible. The report focuses over the key market players such as Broadcom, Intel Corporation, etc.

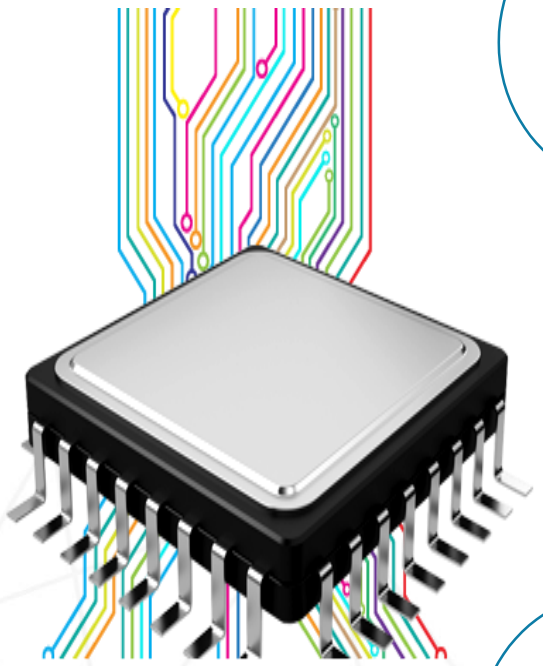
Memory Devices

Memory devices are used to store information for immediate use computed with the hardware devices. These devices are capable of storing temporary (RAM) or permanent (ROM) memory used by hardware, software and operating systems

Logic Devices

Logic devices are also known as programmable logic devices (PLD), an electronic component used to assemble a reconfigurable digital circuit, using a simple combination of digital logic integrated on one single chip

Definitions, By Components (2/3)



Analog IC

Analog integrated circuits (Analog IC) is also called as monolithic IC, that is a set of electronic circuits integrated on a semiconductor wafer plate with millions of capacitors, resistors, and many more other electronic components

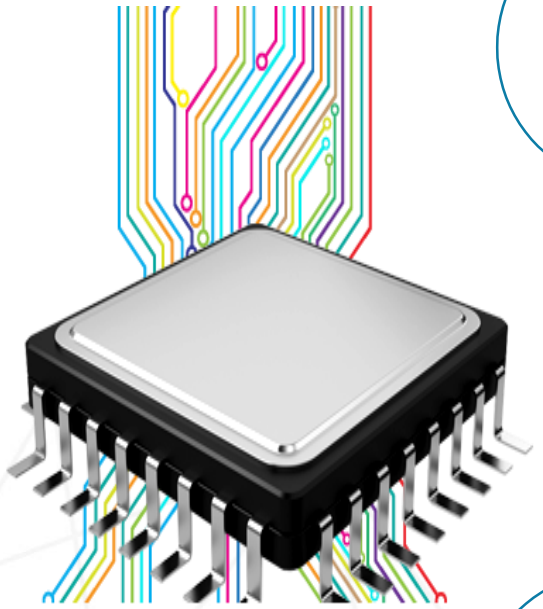
MPU

Microprocessor (MPU) is a device that is incorporated with the core elements of a computer (CPU) or electronic device on a single IC, that performs predefined set of instructions for the entire operating system

Discrete Power Devices

Discrete power devices are single unit of semiconductors like diodes and transistors, which are used in wide range of applications to help low power consumption, regulate voltages, reduce heat generation, etc.

Definitions, By Components (3/3)



MCU

Microcontroller (MCU) is device embedded on a single metal oxide conductor (SOC) with processor, memory and input/out logic devices, to control the system functioning

Sensors

Sensors are sophisticated modules/ devices that are used to detect and respond to the optical or electrical signals and send the information to the electronic system

Others (DSP, etc.)

Others consists of many other semiconductor components, out of which DSP (digital signal processor) is a specialized microprocessor chip that is optimized for audio and video processing

Research Scope

- Competitive analysis
- Profiles of key companies operating in the market

- Understanding key macro and micro economic indicators including parent industry trends

- Key insights

- Market size and growth rate by key segments for the 2018 – 2029 period, with 2018 – 2020 as historical data, 2021 as base year and 2022 – 2029 as forecast period

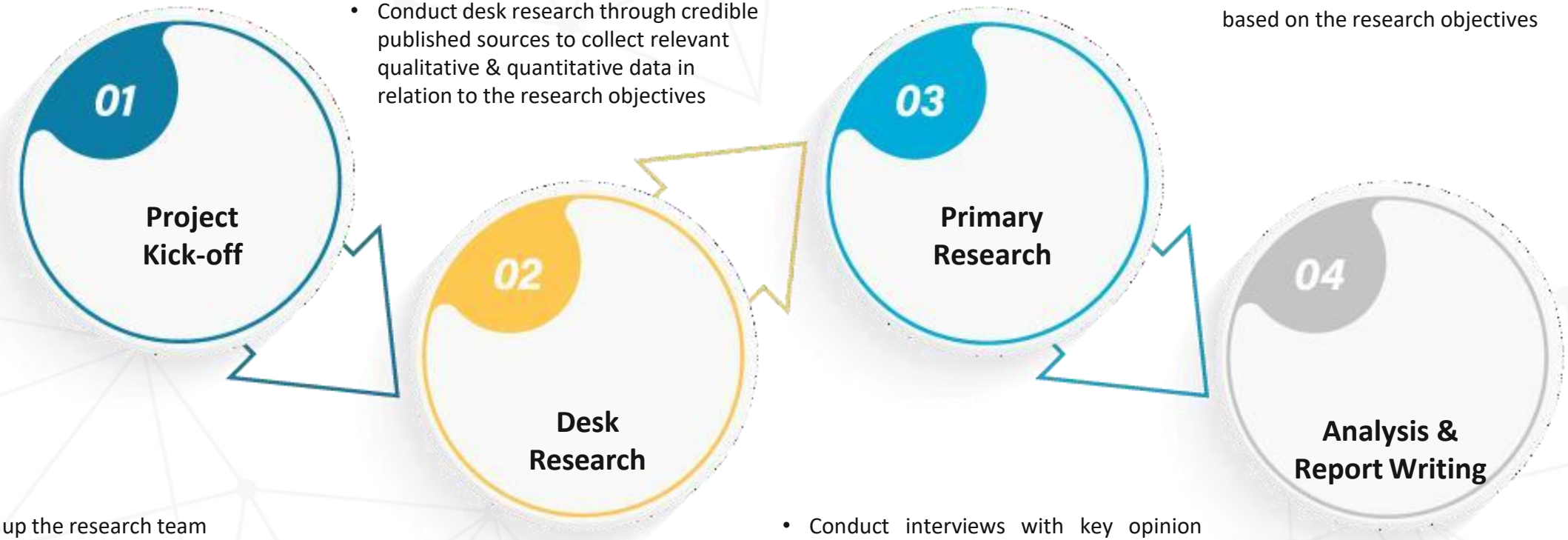
- Market dynamics – Market drivers, restraints, trends and opportunities

- Market share analysis, 2021

Research Methodology/Approach

Section 1.2

Research Methodology – Research Process



- Setting up the research team
- Discussion in relation to the research objectives, research scope, methodology, timeline and challenges

- Develop contact lists, questionnaires and market models
- Conduct desk research through credible published sources to collect relevant qualitative & quantitative data in relation to the research objectives

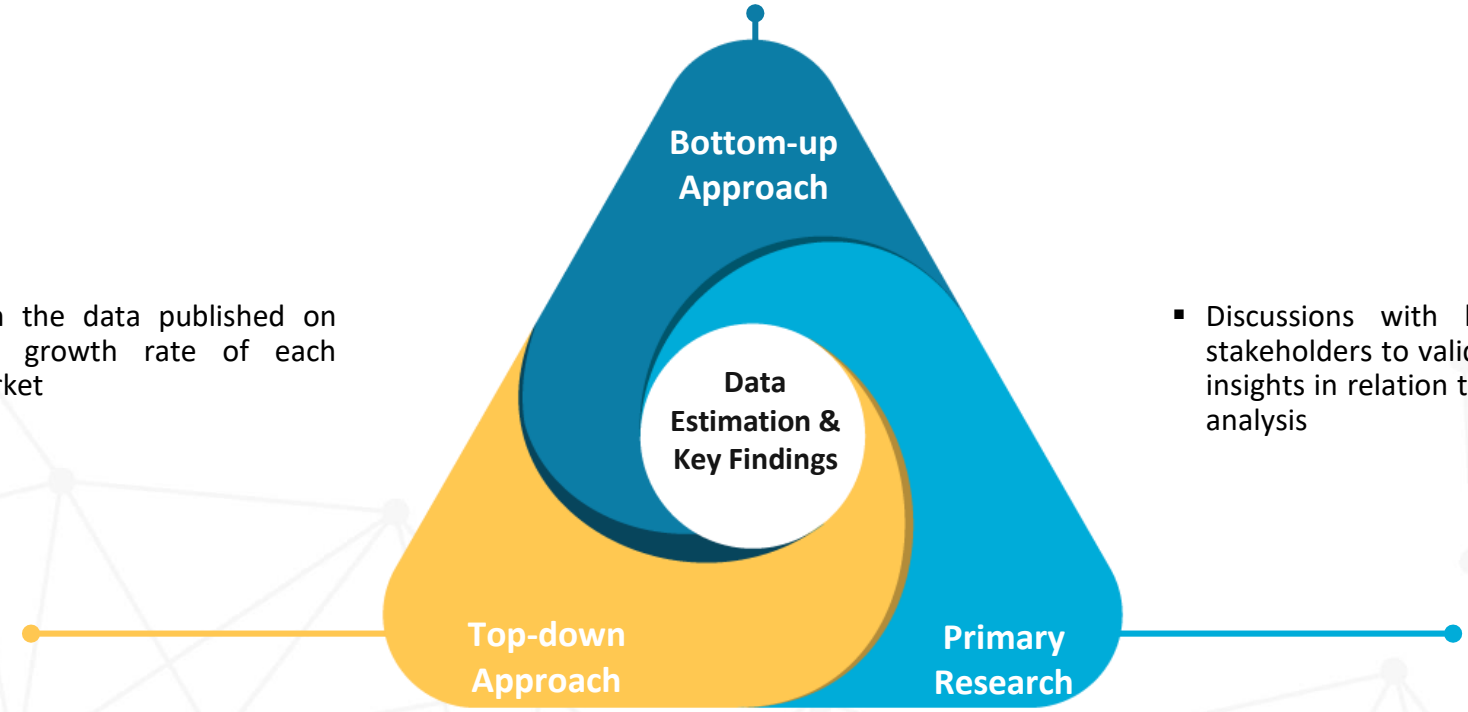
- Conduct interviews with key opinion leaders (KOLs) and stakeholders to gather data in relation to the research objectives and validate market numbers estimated through market models

- Analyze the data gathered through desk and primary research and build report, conclusions and recommendations based on the research objectives

Research Methodology – Data Triangulation

- Detailed service mapping of all major and small players operating in the market
- Estimates based on R&D, new product development, merger and acquisitions etc.

- Top–down approach based on the data published on revenues, market share and growth rate of each component operating in the market



- Discussions with key opinion leaders (KOLs) and stakeholders to validate market estimates and get their insights in relation to trends, dynamics and competitive analysis

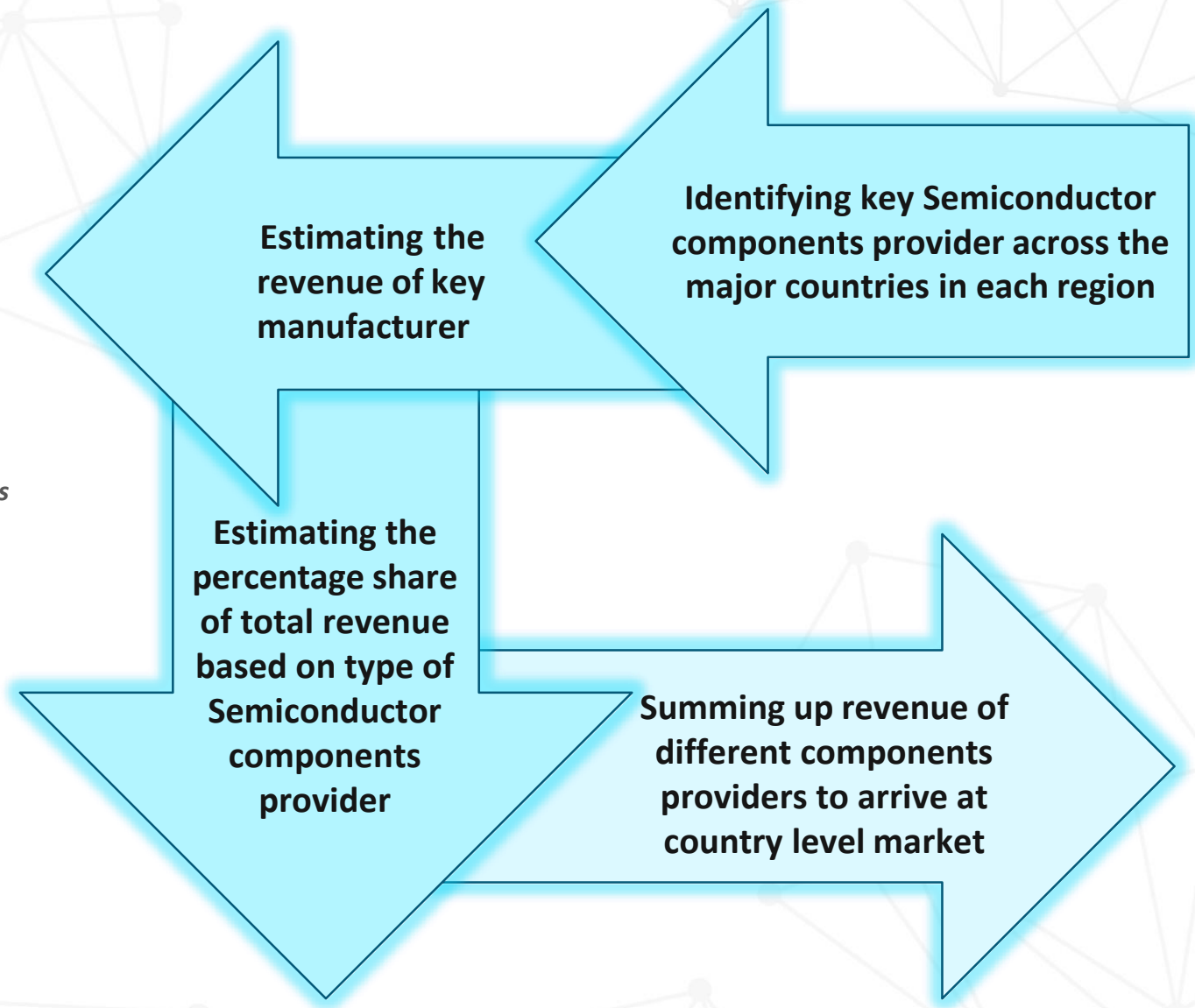
Research Approach I

Analysis

- *Major key players were identified on the basis of -*
  - *Product Offerings*
  - *Research & Development Activities*
  - *Recent Technological Developments*
  - *Expansion Plans*
  - *Mergers & Acquisitions*
- *Also other local and regional players are considered for market estimations*

Sources

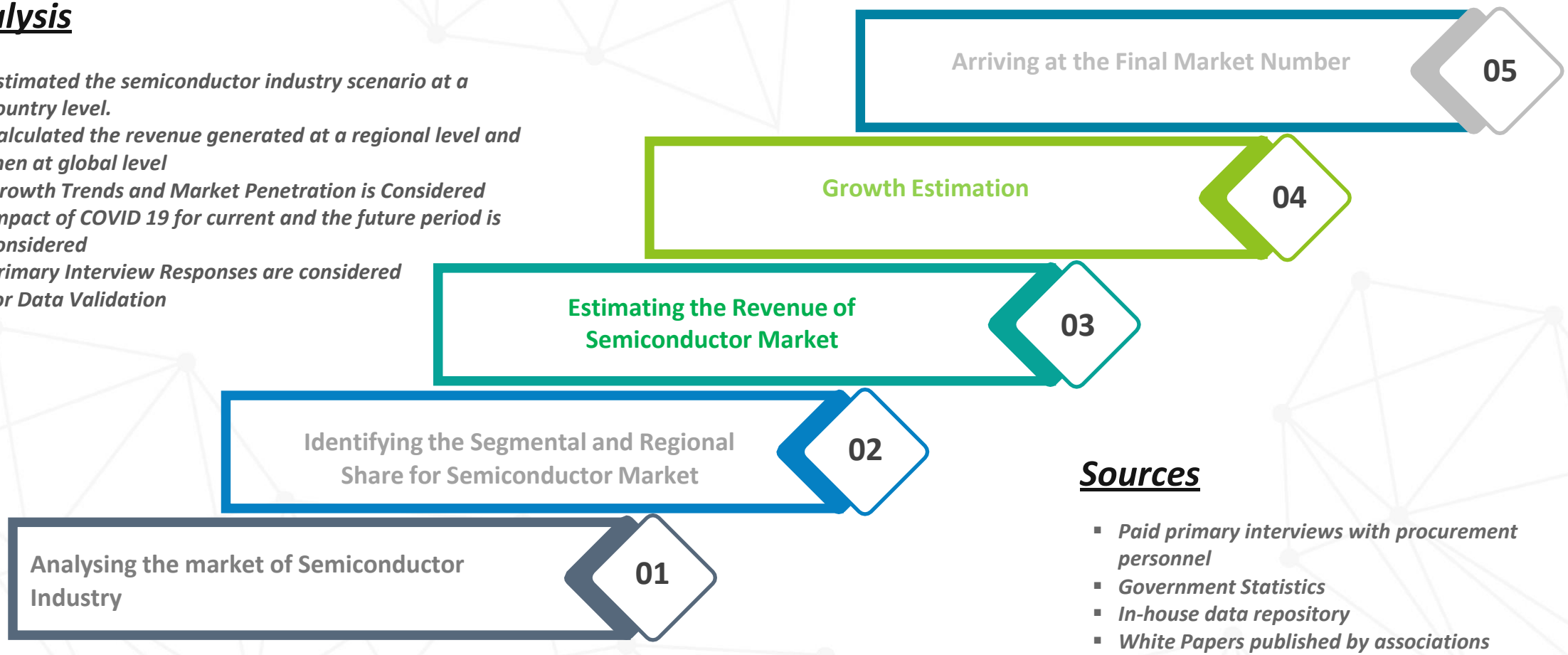
- *Annual Reports, SEC filings, Investors Relations Documents*
- *White Papers published by associations*
- *Paid Databases including Factiva, OneSource, Bloomberg, D&B Hovers*



Research Approach II

Analysis

- *Estimated the semiconductor industry scenario at a country level.*
- *Calculated the revenue generated at a regional level and then at global level*
- *Growth Trends and Market Penetration is Considered*
- *Impact of COVID 19 for current and the future period is considered*
- *Primary Interview Responses are considered for Data Validation*



Sources

- *Paid primary interviews with procurement personnel*
- *Government Statistics*
- *In-house data repository*
- *White Papers published by associations*

Data Sources

Section 1.3

Primary Interviews

Semiconductor Market

- Broadcom, Inc.
- Intel Corporation
- Qualcomm
- Taiwan Semiconductors
- Samsung Electronics
- SK Hynix
- Texas Instruments
- Toshiba Corporation
- Maxim Integrated Products, Inc.
- Micron Technology
- NVIDIA Corporation
- NXP Semiconductors N.V.
- MediaTek
- Western Digital
- STMicroelectronics
- Infineon
- Sony
- Renesas
- Apple
- Analog Devices
- ON Semiconductor

Industry Associations/Reference Sources

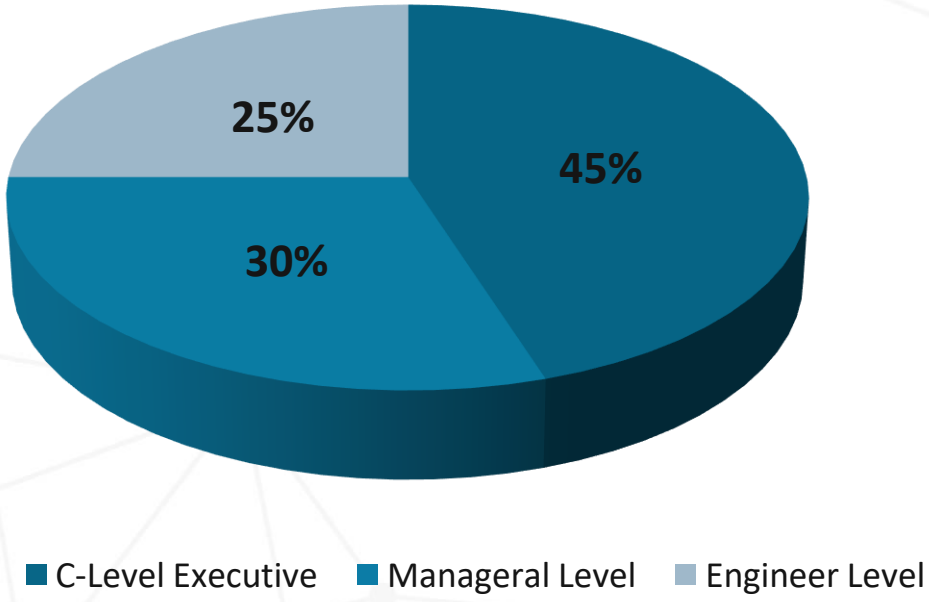
- Semiconductor Industry Association (SIA)
- Semiconductor Equipment and Materials International (SEMI)
- Singapore Semiconductor Industry Association (SSIA)
- Taipei Semiconductor Industry Association (TSIA)
- China Semiconductor Industry Association (CSIA)
- Japan Semiconductor Industry Association (JSIA)
- European Union Semiconductor Industry Association (ESIA)
- Korea Semiconductor Industry Association (KSIA)
- Semiconductor & Electronics Industries Philippines Foundation Inc. (SEIPI)

Paid Databases

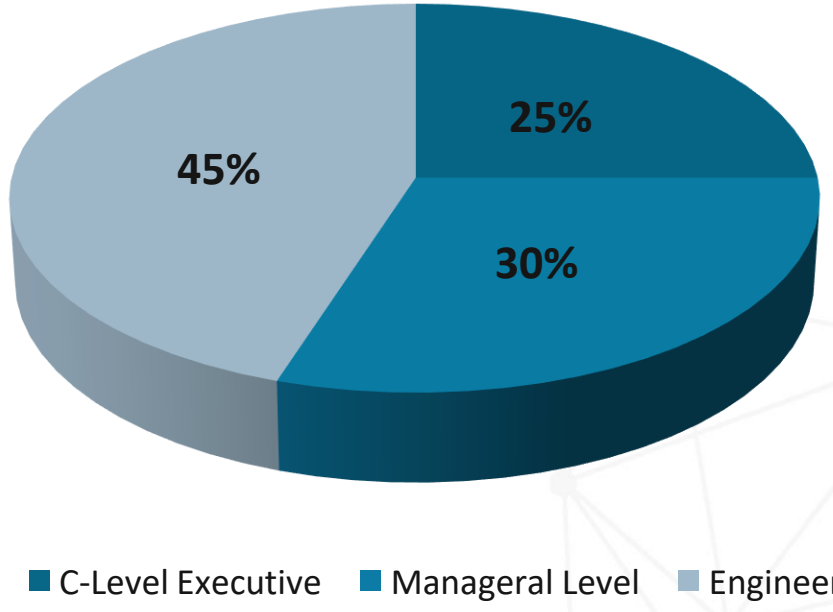
- Factiva
- OneSource
- D&B Hoovers

Primary Interviews

Semiconductor Manufacturers



End-users



Note – In order to validate the information received from the secondary resources, multiple primary interviews were conducted with RPC (Right Person Contact) from the supply-side and the demand side across the semiconductor market.

Acronyms

- USD: United States Dollar
- billion: billion
- Mn: Million
- ASP: Average Selling Price
- CAGR: Compound Annual Growth Rate
- H: Historic Years
- A: Actual Year
- E: Estimated Year
- F: Forecast Years

Executive Summary

Section 02

Executive Summary (1/6)

Asia Pacific

Analog IC

MPU

Discrete Power Devices

MCU

Sensors

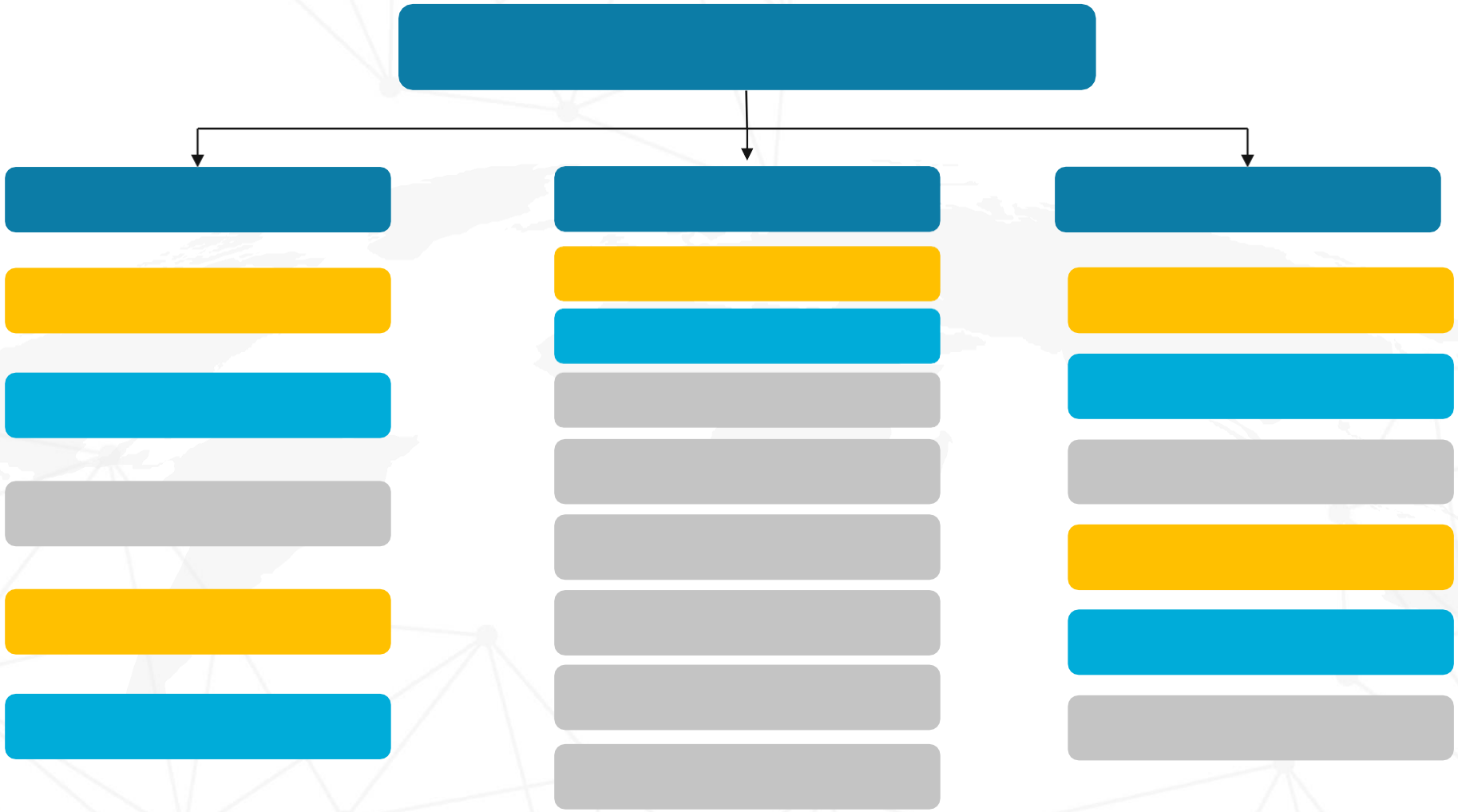
Others (DSP, etc.)

Industrial

Consumer Electronics

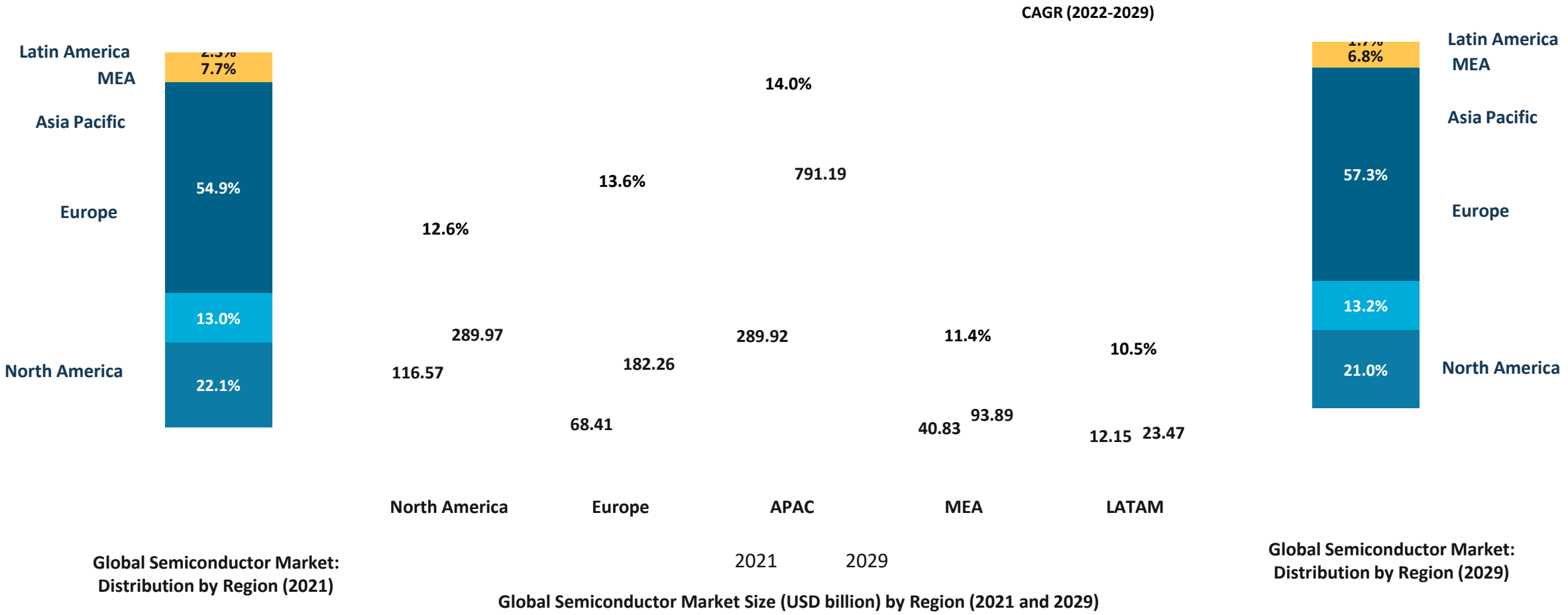
Automotive

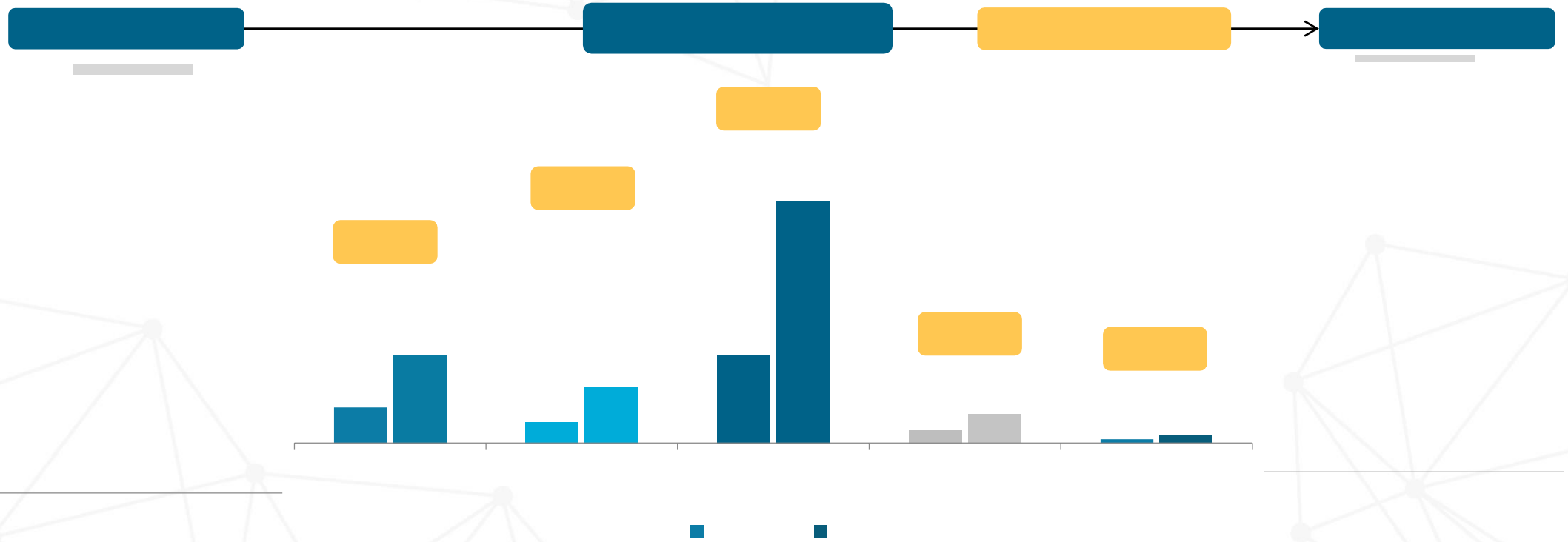
Government



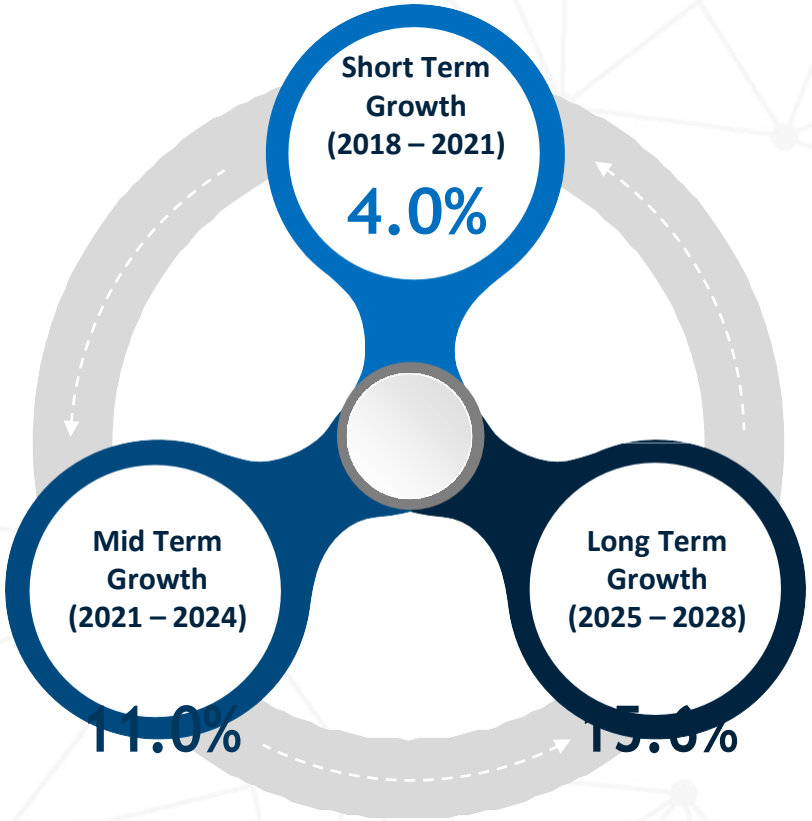
Executive Summary (2/6)

Figure : Global Semiconductor Market Revenue Breakdown (USD billion, %) by Region, 2021 & 2029





Executive Summary (3/6)



Average Growth Rate of Global Semiconductor Market, By Region

The above figure represents the compound annual growth rate of the semiconductor market across globe in terms of the revenue generation

Middle East & Africa	**3.0%**	**11.4%**
Latin America	**-7.0%**	**10.5%**

Executive Summary (4/6)

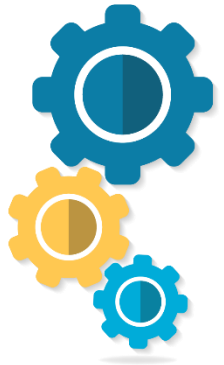
Semiconductor Market

Market Drivers

- Wireless & 5G Communication Technology to Boost the Growth of the Market
- Universal Regulations & Standards to Magnify Global Growth

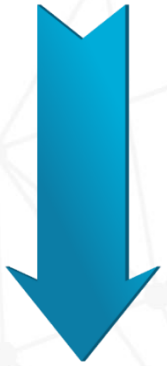
Market Opportunities

- Expansion of Connected Technologies is Creating Multitude Opportunities



Market Trends

- Prominent Factors Prevailing in the Growth of the Market
- Evolution of Chips with Security Features for IoT Devices



Market Restraint

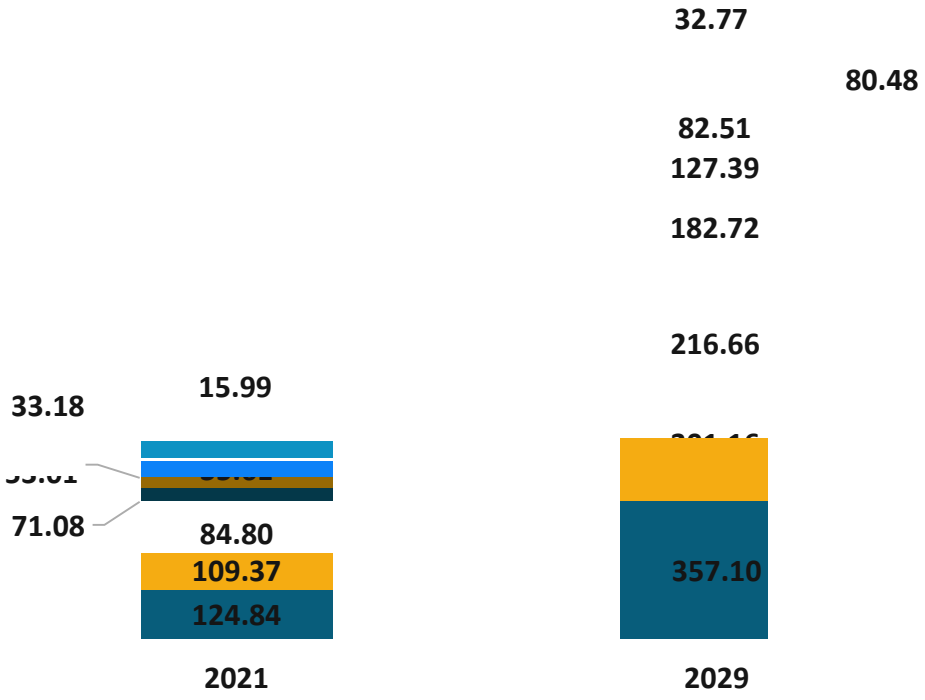
- Tariff Disruption and Shift in Global Trade to Hamper the Market Growth

Key Companies

Broadcom, Inc.
Intel Corporation
Qualcomm Technologies, Inc.
Taiwan Semiconductor
SAMSUNG
SK HYNIX INC.
Texas Instruments Incorporated
Toshiba Corporation
Maxim Integrated
Micron Technology, Inc.

Executive Summary (5/6)

Global Semiconductor Market By Components, 2021 and 2029 (in USD billion)

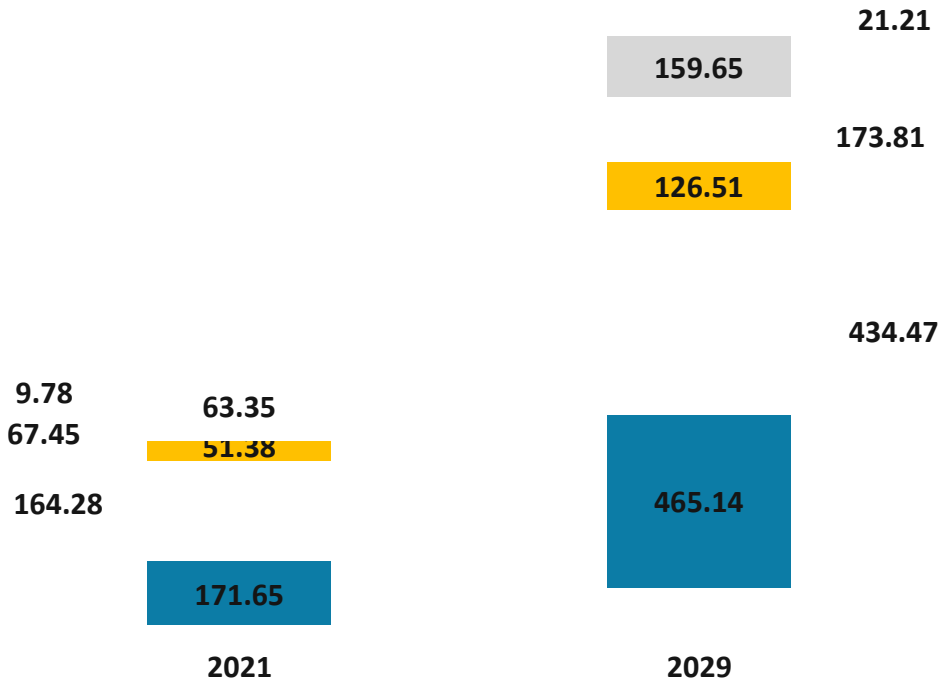


Memory Devices | Logic Devices | Analog IC

MPU | Discrete Power Devices | MCU

Sensors | Others (DSP, etc.)

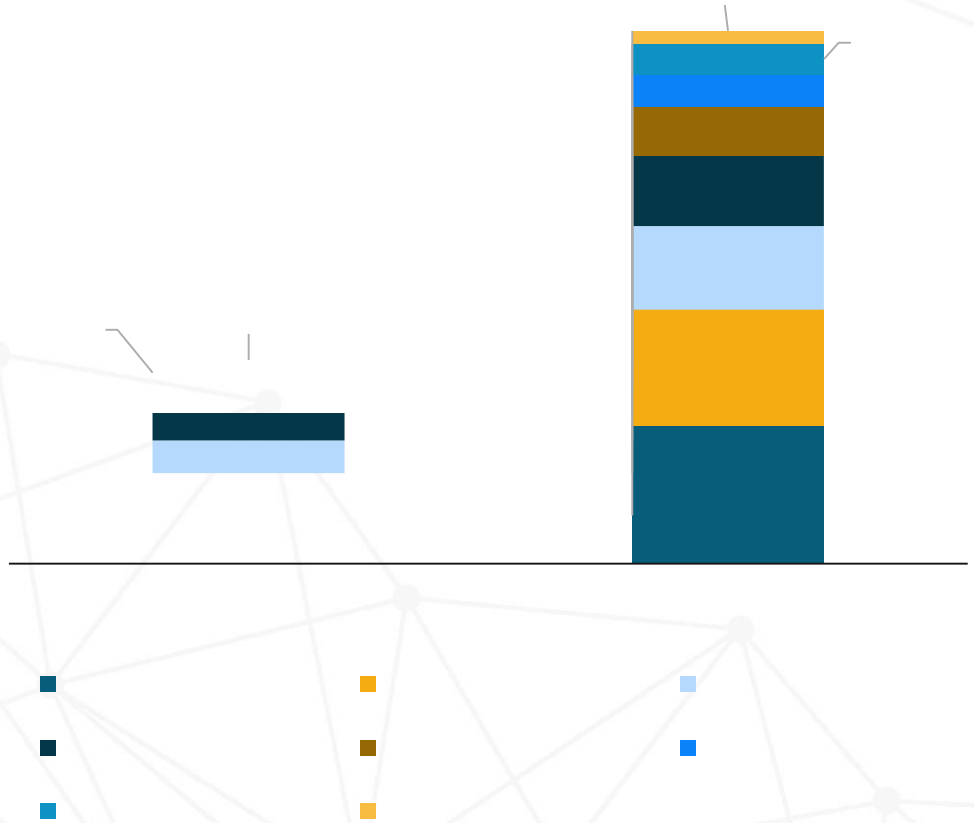
Global Semiconductor Market By Application, 2021 and 2029 (in USD billion)

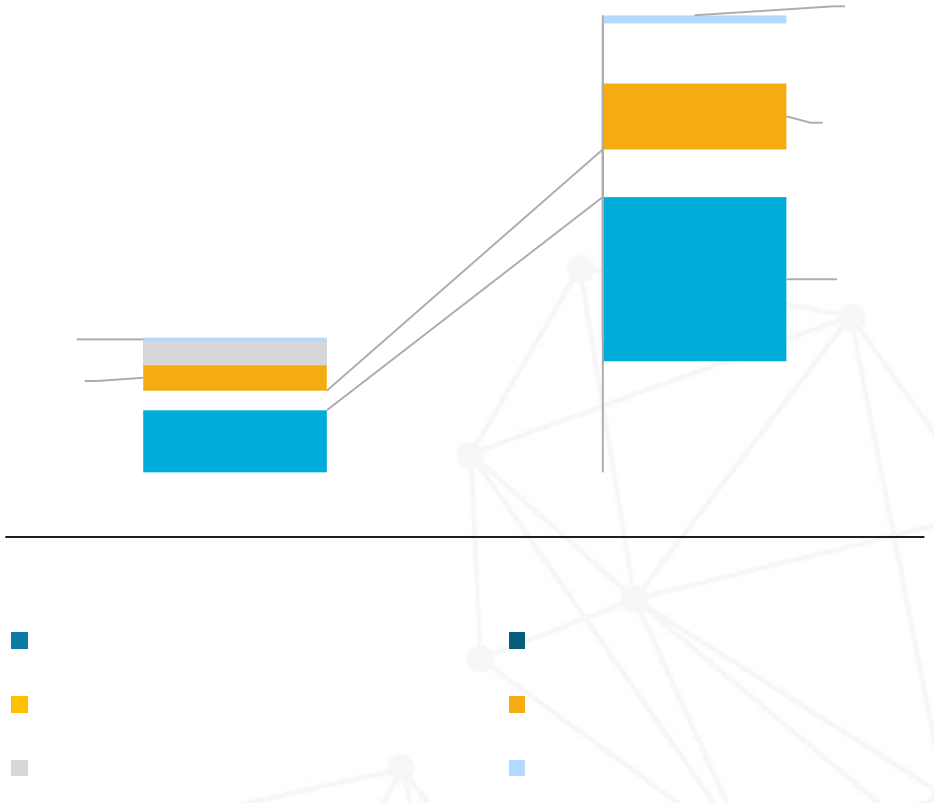


Networking & Communications | Data Processing

Industrial | Consumer Electronics

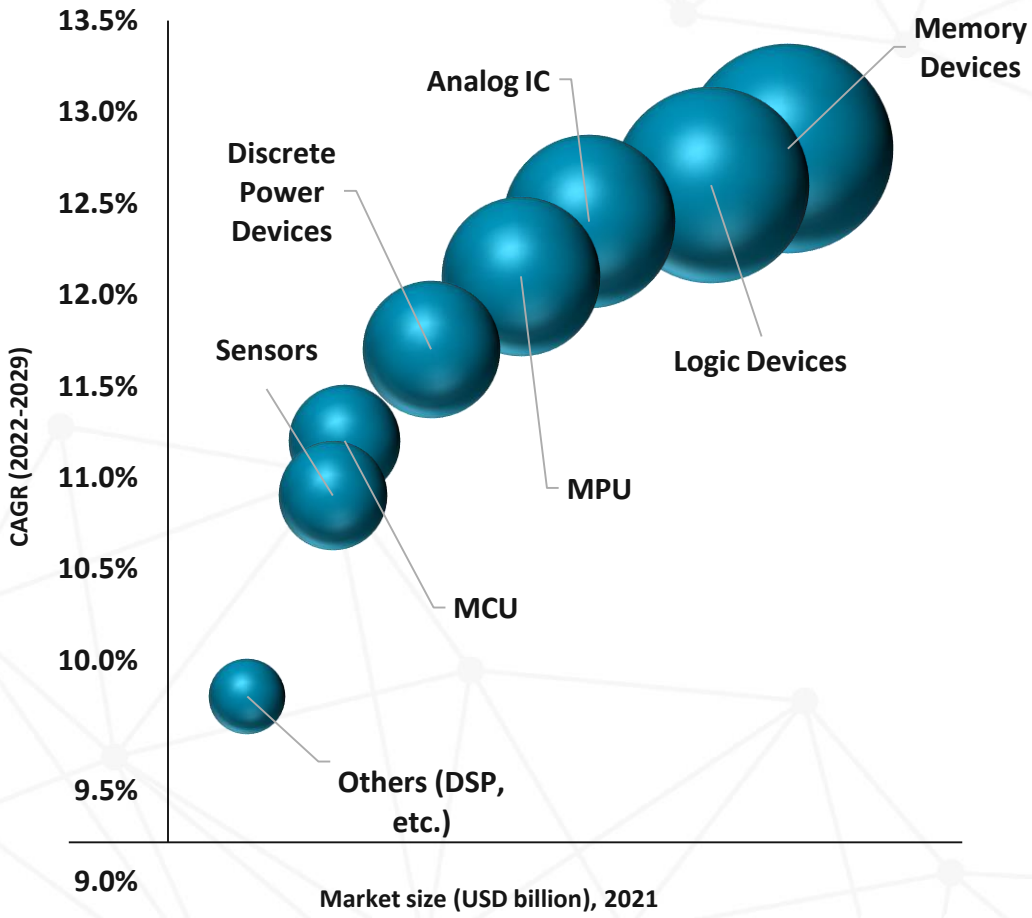
Automotive | Government



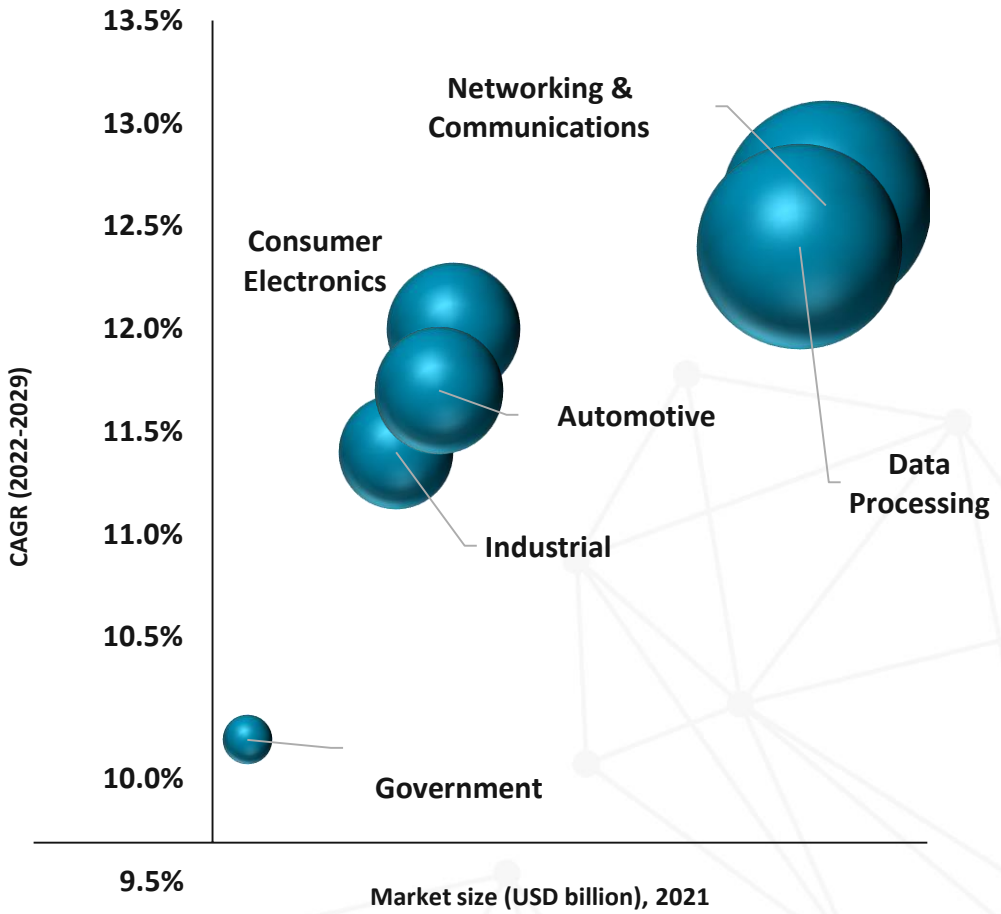


Executive Summary (6/6)

Market Attractiveness, By Component



Market Attractiveness, By Application



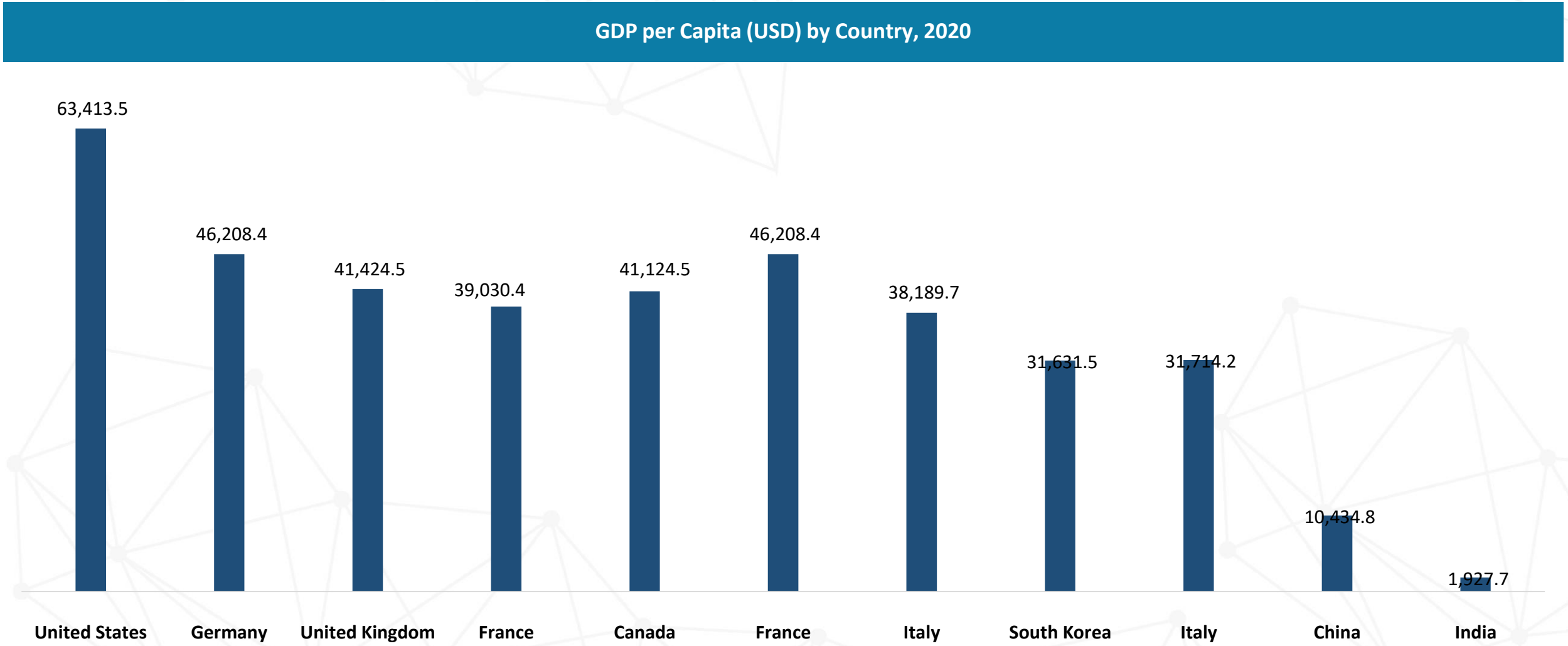
Market Dynamics

Section 03

Macro and Micro Economic Indicators

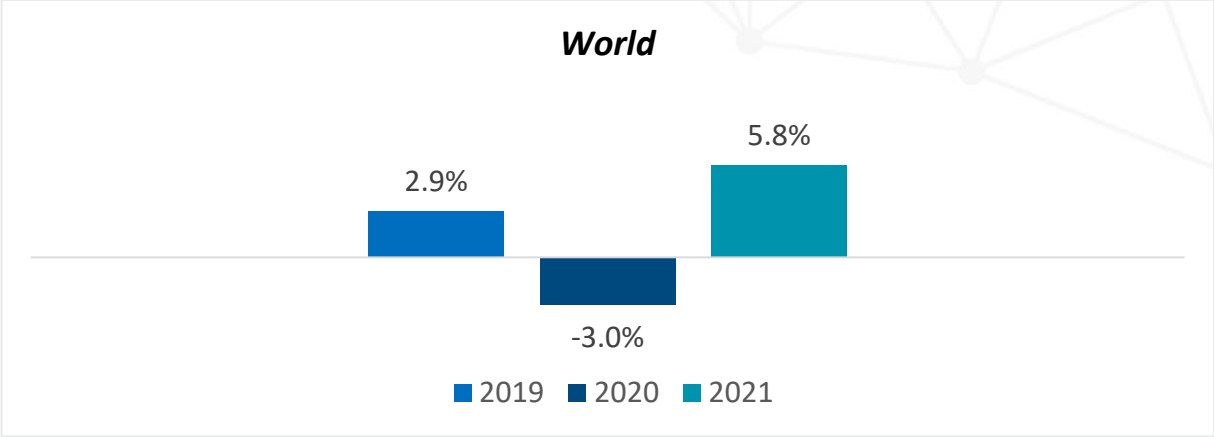
Section 3.1

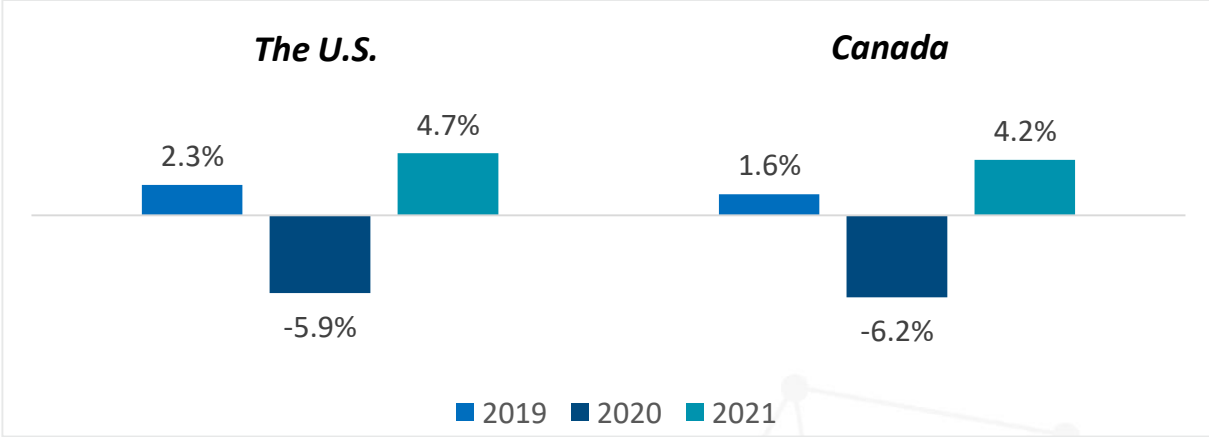
Macro and Micro Economic Indicator (1/6)

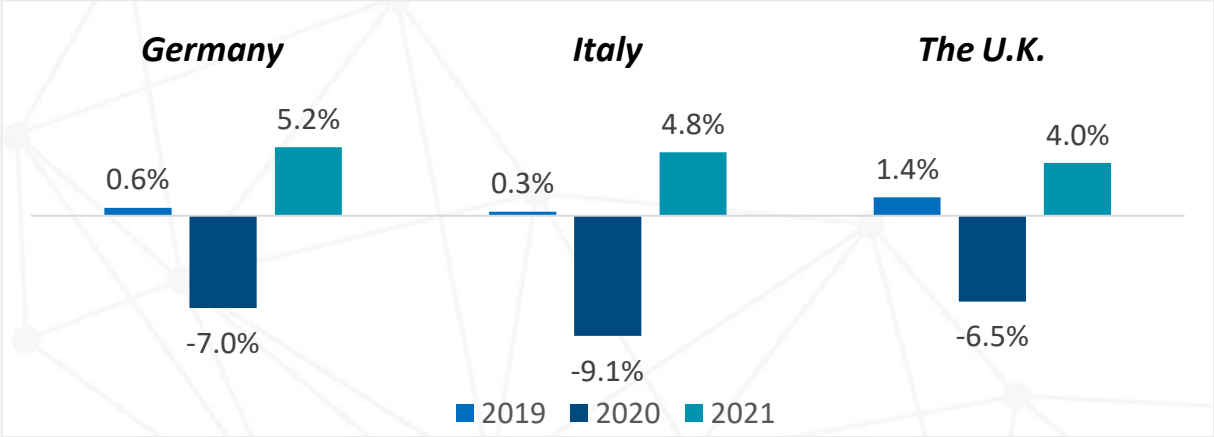


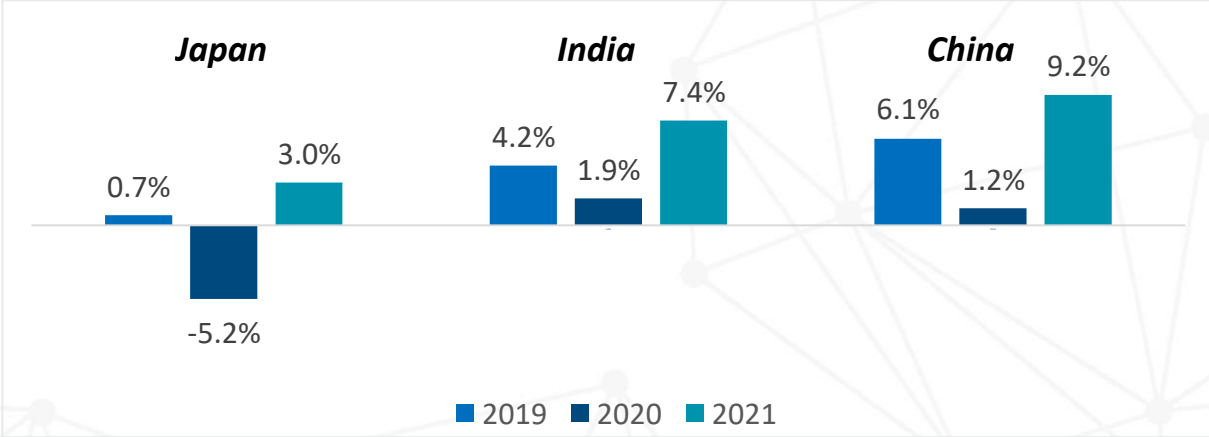
Macro and Micro Economic Indicator (2/6)

Percent Change in Real GDP Growth (%), by Country, 2019 - 2021 (1/2)





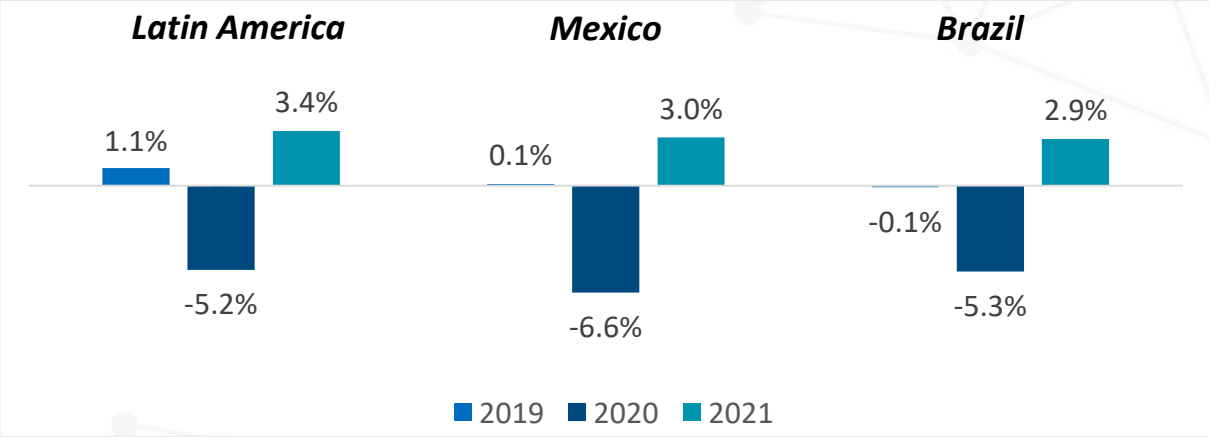


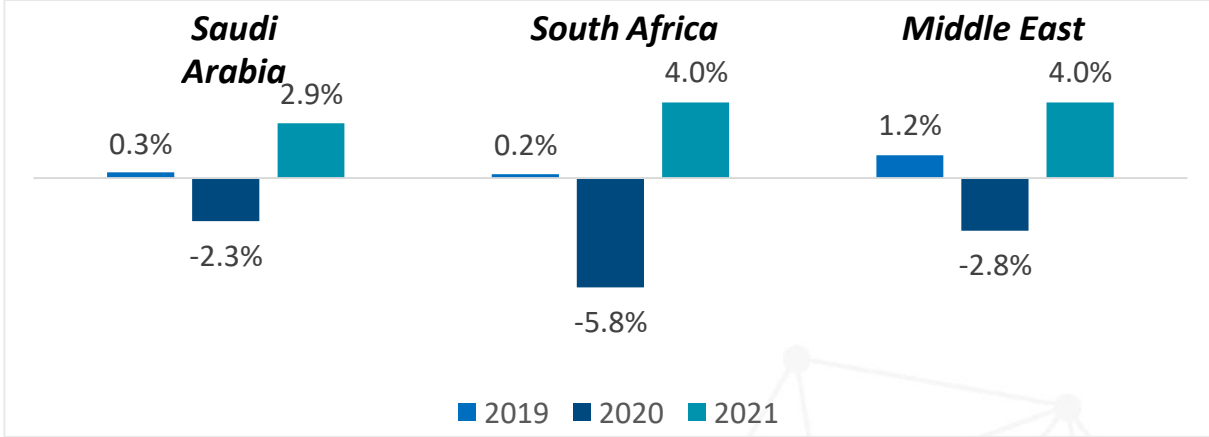


The Graphs Shows the Global Economic Effects of COVID-19

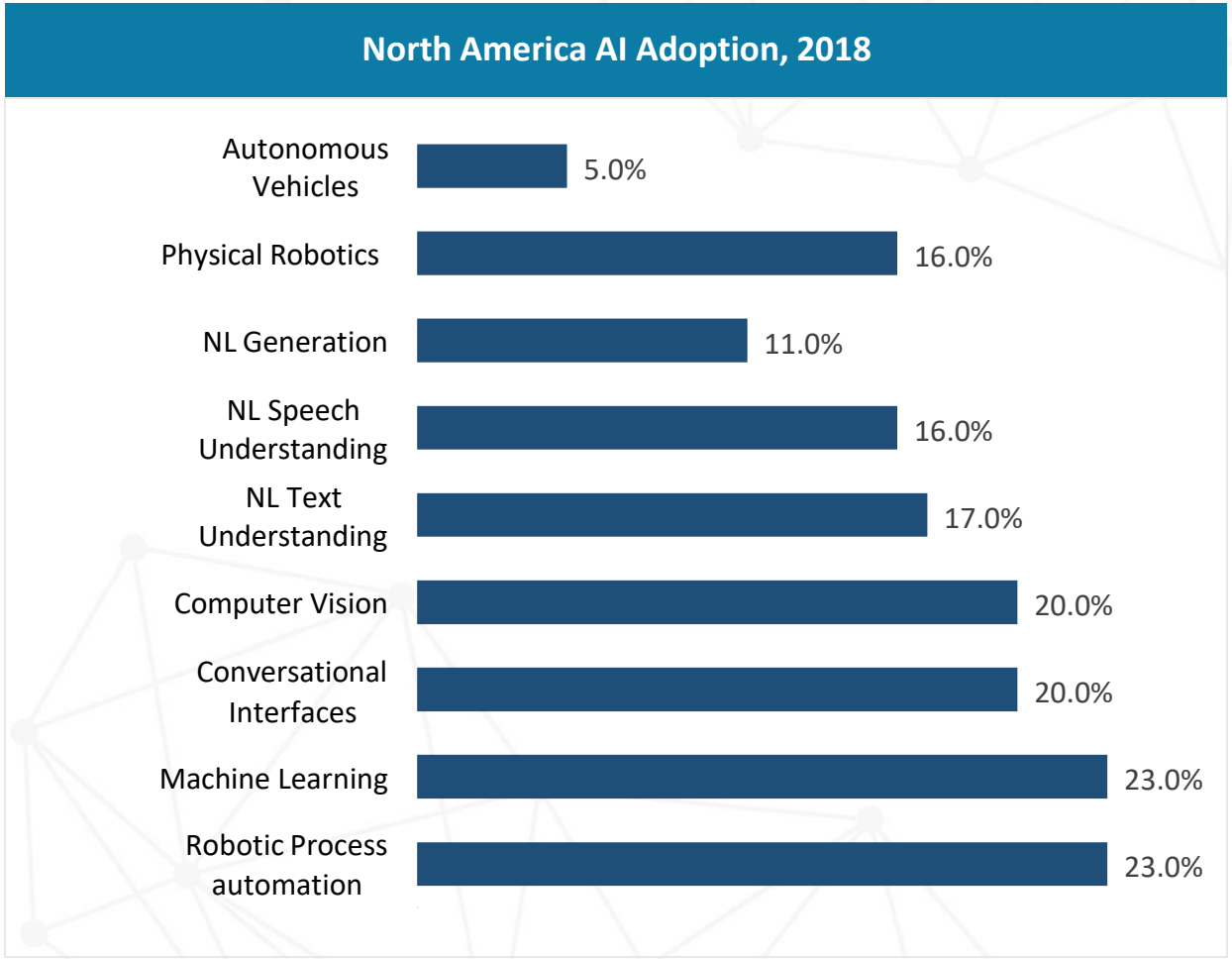
Macro and Micro Economic Indicator (3/6)

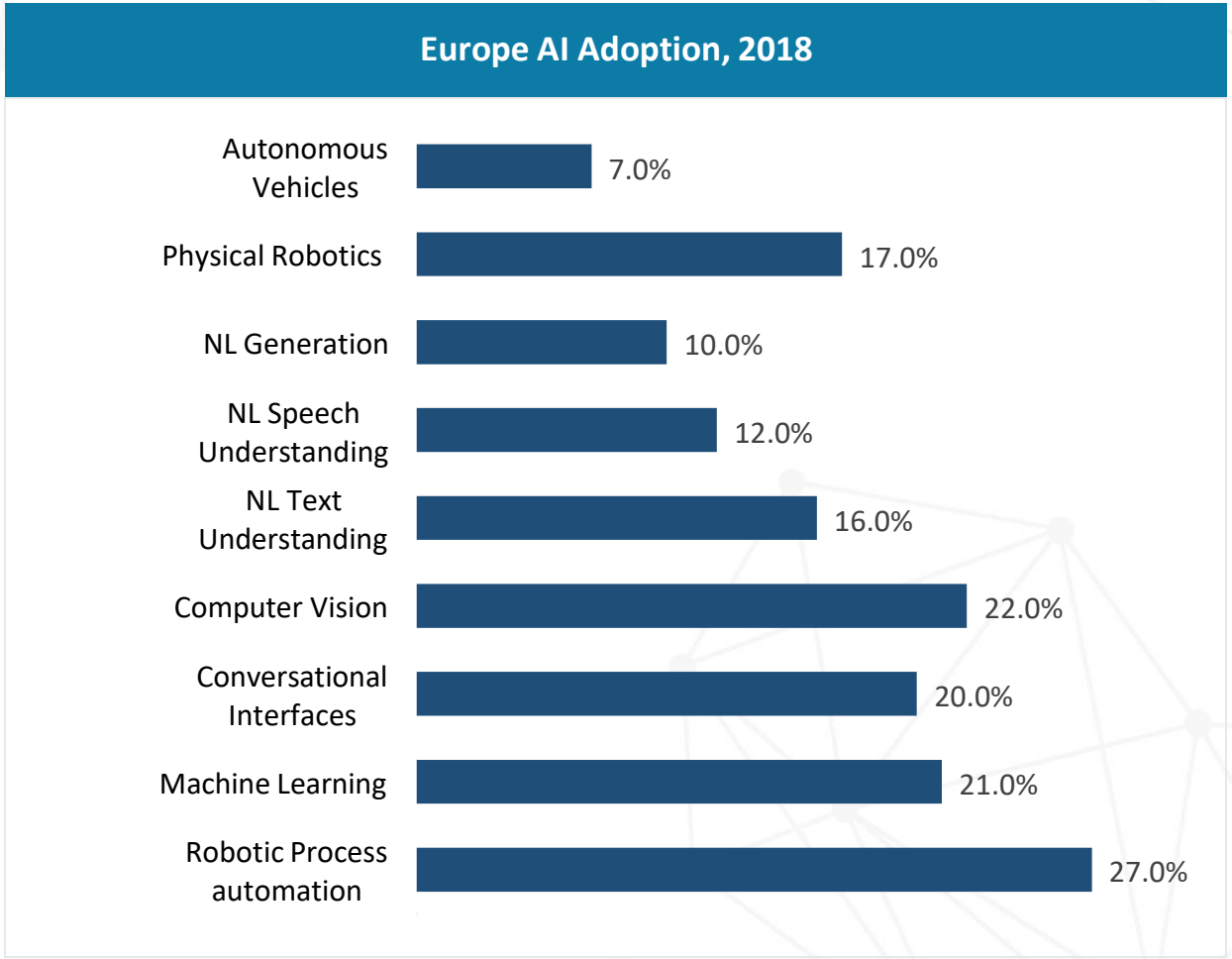
Percent Change in Real GDP Growth (%), by Country, 2019 - 2021 (2/2)





Macro and Micro Economic Indicator (4/6)

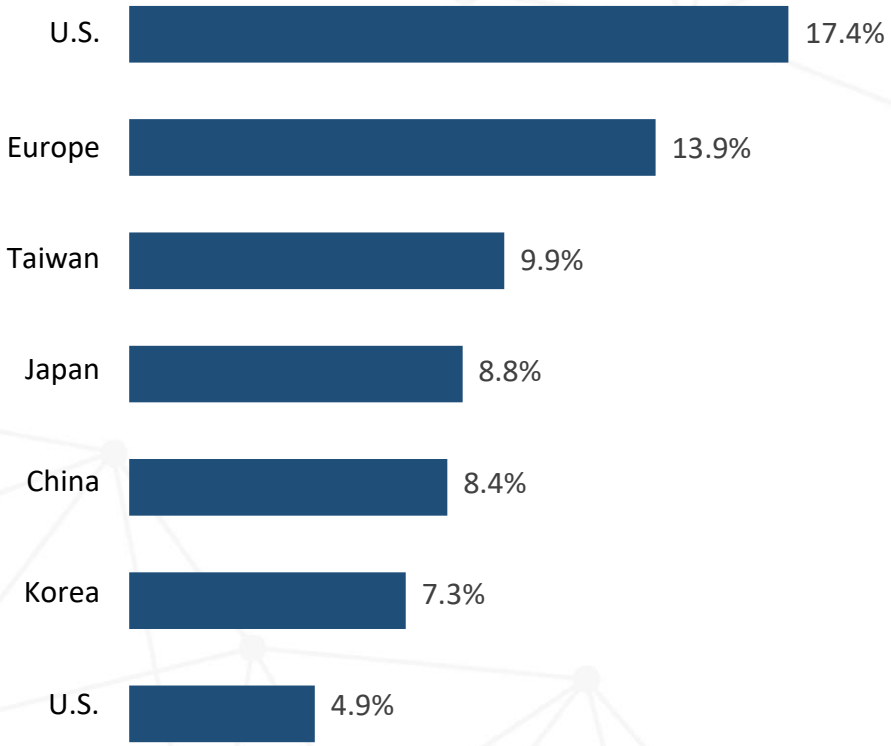




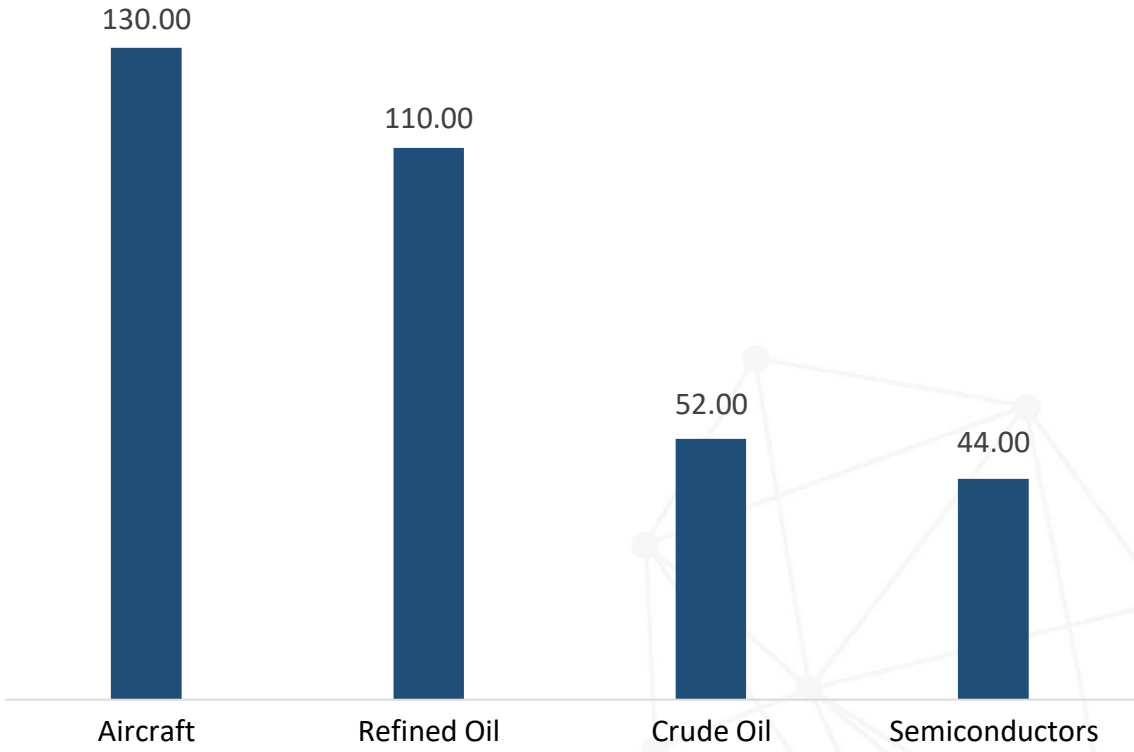
Global AI Adoption: Capabilities by Region (Percent of Respondents), 2018

Macro and Micro Economic Indicator (5/6)

Semiconductor Industry Research & Development Spending, By Country, 2018 (% of Sales)



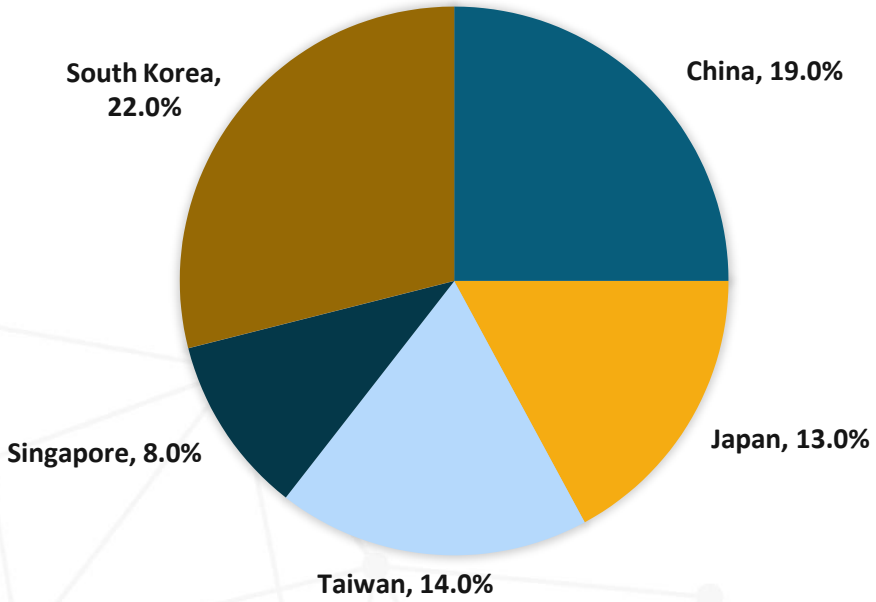
Europe AI Adoption, 2018



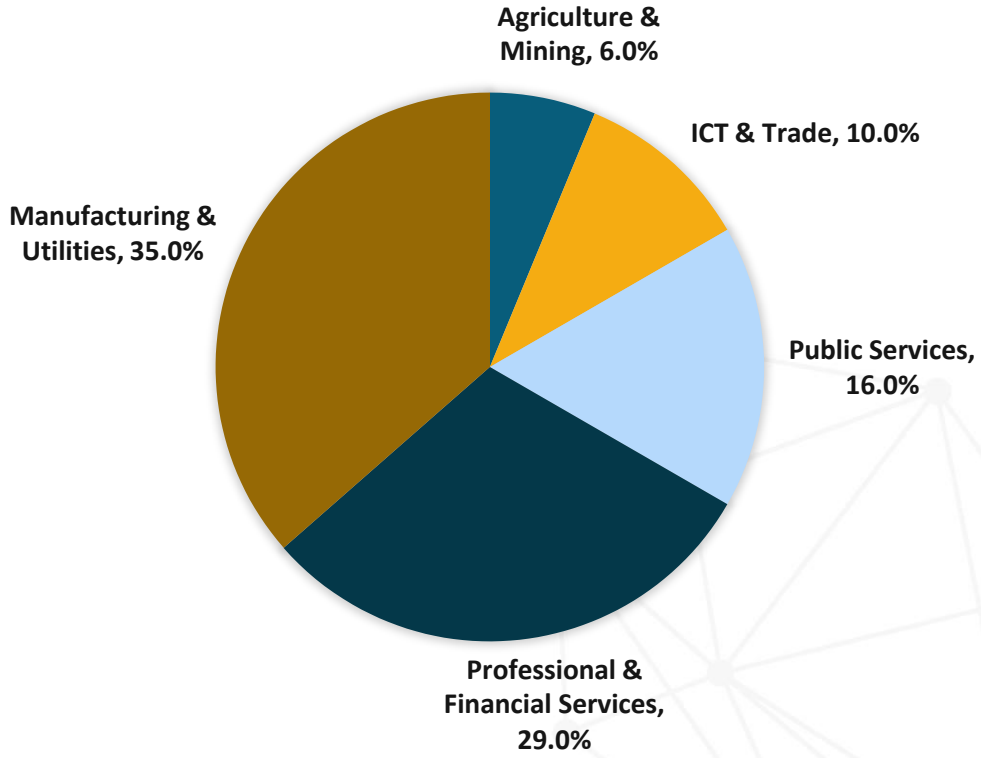
Global AI Adoption: Capabilities by Region (Percent of Respondents), 2018

Macro and Micro Economic Indicator (6/6)

Leading Exporting Countries for U.S. Semiconductor Manufacturing Equipment, 2018 (%)



Global 5G Spending by End-User Vertical Shares (%), 2019



Drivers, Restraints, Opportunities and Trends

Section 3.2

Market Drivers (1/2)

MARKET DRIVERS

Wireless & 5G Communication Technology to Boost the Growth of the Market

- Wireless and 5G technologies are expected to bring in huge transformation in the global semiconductor market. These technologies are expected to usher wide variety of functions from autonomous applications to IoT application. Some examples of the applications for 5G & wireless technologies will be in smart cities, intelligent cars, smart phones, etc. 5G and wireless technologies rely heavily on advanced semiconductor chips and associated technologies, as these are the main feature for fully deploying the technology needed for smart cities and factories, as well as fully autonomous vehicles.
- Furthermore, prominent chip manufacturers along with telecommunication equipment suppliers such as Huawei, Nokia, Ericsson, etc. are expected to introduce various solutions in order to contend for high market share in the 5G technology. The emphasis of these players in the 5G technology is to make sure that the core network, wireless technology, and architecture are able to handle 5G requirements. This will ensure minimum network latency, the uplink rate, along with the number of connections while assisting innovative applications such as advanced computing and networking slicing. Hence, technology advancements of the semiconductors is expected to provide the solution for unlocking the potential of wireless and 5G technology.

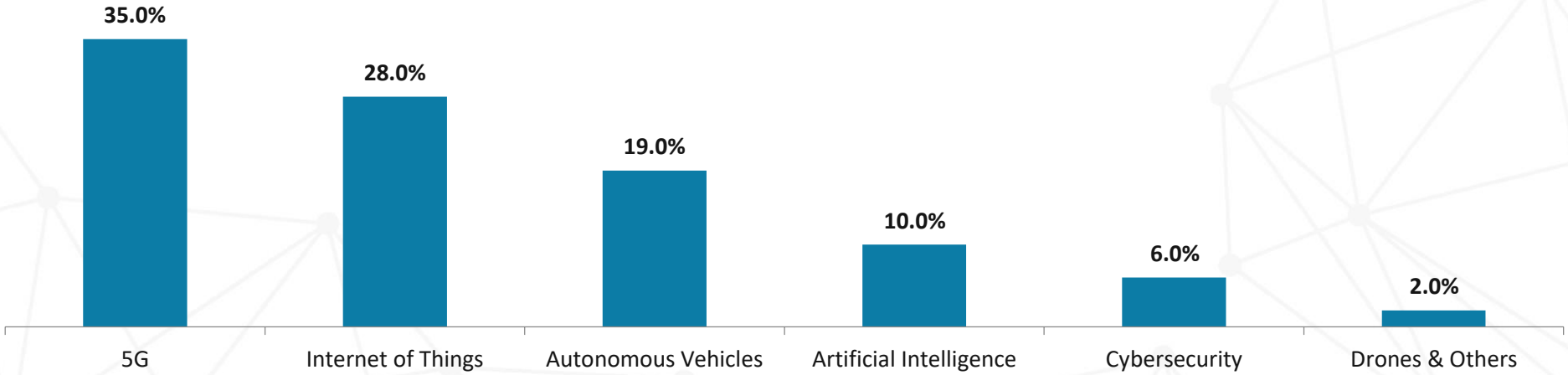
5G Communication Technology Expected to Become Prominent for Semiconductor Market

Market Drivers (2/2)

Universal Regulations & Standards to Magnify Global Growth

- Semiconductor industry is expected to see a huge surge in demand with the continuous emergence of advanced technologies. The growth is expected to get aid with a significant change, in the development and operations of regulations and standard governing authorities.
- The new standards and compliances will open up new markets and demands for the semiconductor market, as the manufacturers are expected to move towards placing bulk orders. This will assist the manufacturers of emerging technologies, as they are investing a lot in the components manufacturing and with formalized standards, therefore, growth of these companies is expected to augment in the coming years.
- The component and technology manufacturers believe that the following applications are expected to have a significant exposure with the new standards and regulations in place:

Regulations & Standards for Following Application Expected to Boost the Semiconductor Market



Market Restraints

Tariff Disruption and Shift in Global Trade to Hamper the Market Growth

- Semiconductor industry is enormously depended upon United States, as U.S. has been a prominent region in the semiconductor market with dominant shares. With the change in the country's leadership, U.S. has started to impose trade restriction with China from 2018 and if it maintains the restriction, the country is expected to suffer a ~16% decrease in their market share. Therefore, increasing tension with China is expected to diminish the dominance of U.S. in the semiconductor market is expected to shift to Asia Pacific in the coming years.
- Furthermore, tariffs are applied to practically all the industrial goods and materials, which are customary for the semiconductor chips. These tariffs are impacting import and export of components, which will directly effect the manufacturing cost of the chips.
- Large enterprises with revenues more than USD 1 billion are expected get to affected, as these companies have huge production volume and global supply chain operations, hence they are expected to have substantial tariff liability. Besides, smaller companies are expected to bear minimal changes in the cost involved with the tariff disruption. The smaller companies have fewer suppliers and the trade is limited to their manufacturing region. Following are the percentages of companies that are expecting to get impacted with disruption in tariffs:

Companies Expecting to get Impacted with the Tariff Disruption

Market Opportunities

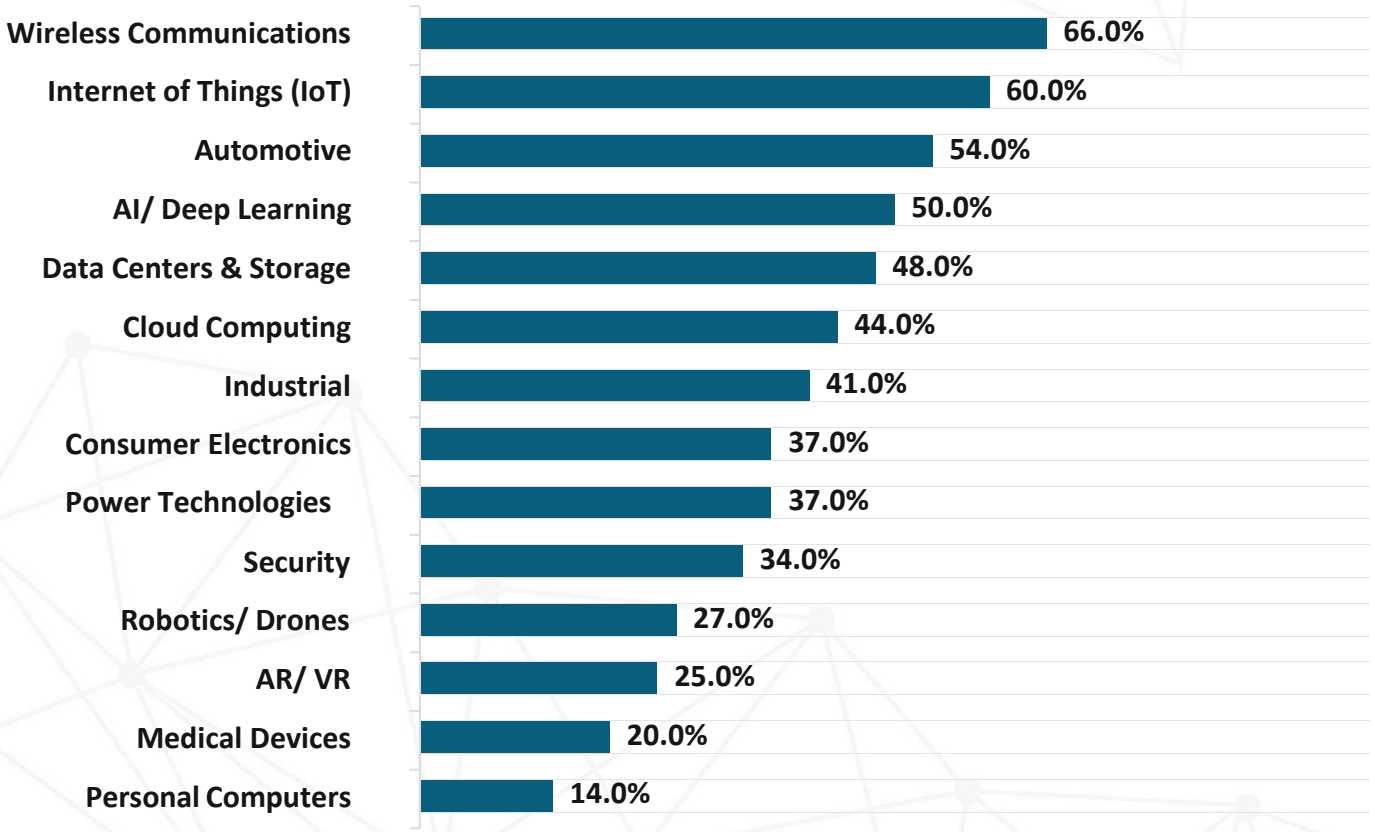
Expansion of Connected Technologies is Creating Multitude Opportunities

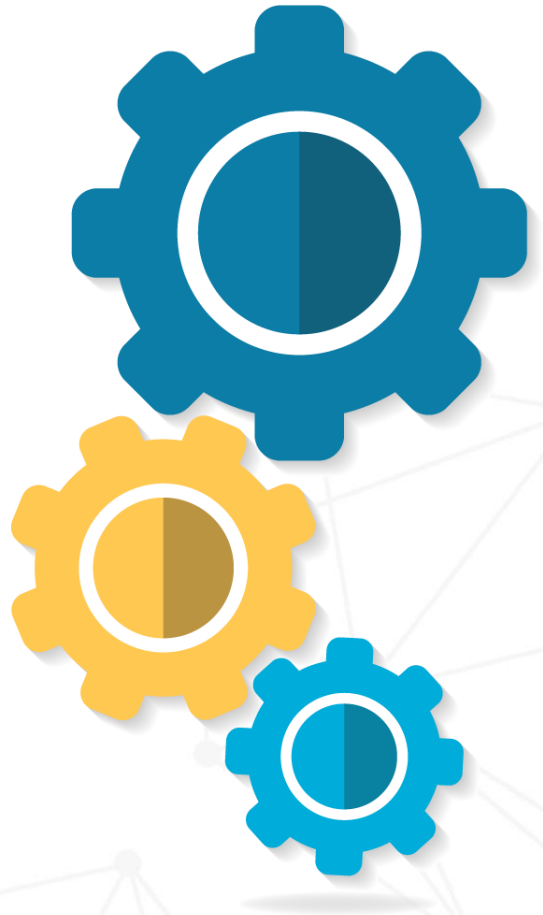
- Connected technologies such as Internet of Things (IoT), and wireless communications are ranked as the most important applications for the semiconductors, and are expected to have huge potential in increasing the market size of the semiconductor market. These technologies converge into a single device or system with advanced semiconductors. Convergence of these technology has created expanded opportunities for the semiconductor manufacturing companies thereby creating a new ecosystem in order to generate increased revenue.
- Also, connected technologies include automotive electronics and industrial electronics as these are expected to be the prominent growing applications in the global semiconductor market. These applications require ICs (Integrated Circuits), sensors and MCUs for their enhanced performance. This demand is owed to the increased use of electronic components for advanced safety features and cutting-edge technologies added to the vehicles. Consumption of semiconductors in automotive electronic components includes infotainment, safety, navigation, fuel efficiency etc. and their application is expected to increase in the coming years.
- Likewise, embedding Artificial Intelligence (AI) into semiconductor has also increased with high demand from the end-use applications such as cloud systems as these are the most predominant applications for these types of chips. This is owed to their increased adoption in data centers in order to enhance the efficiency thereby, reducing the operational cost of the company.
- Furthermore, application of semiconductor in industrial electronics has increased, which includes connectivity for automation, security, transportation, energy management and solid-state lighting. Under which security is the predominant application which requires connectivity. Connected technologies enhances security, energy savings and applications of IoT devices and hence are expected to create extended market opportunity for global semiconductors market.

Market Trends (1/2)

Prominent Factors Prevailing in the Growth of the Market

- Following are the factors which are prevailing the semiconductor market size for the year 2020 :





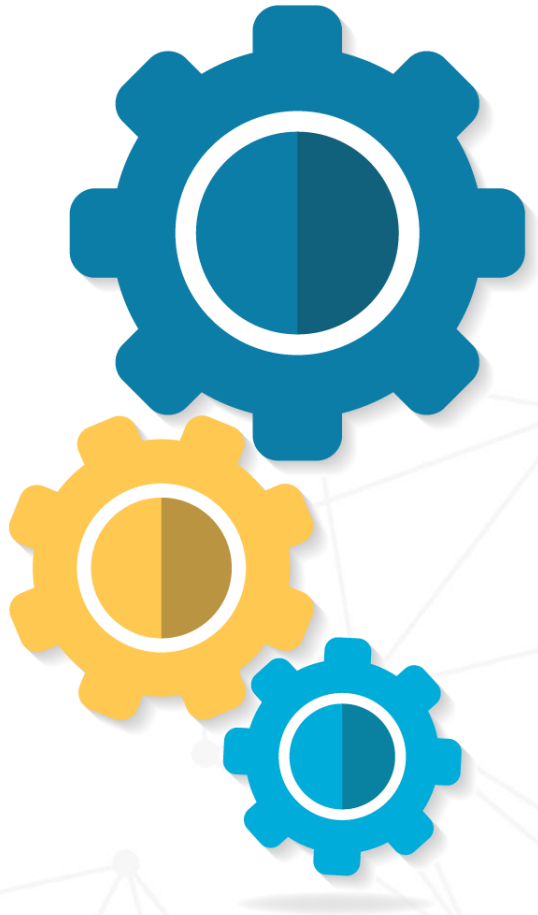
Market Trends (2/2)

Evolution of Chips with Security Features for IoT Devices

- Interconnected devices and connections increase the exposure to security risks and posses a threat to device connected. Multiple leading companies are working towards collaborating their entire ecosystems in order to provide enhanced experiences, services, and security with their products.
- Adding security functionality in a chip is a significant effort taken by the chip manufacturers in order to increase value of the products. In the present connected IoT market, devices are available at low cost, hence these chips enhances the value of the product. Thereby, reducing the cost and requirement of additional components.
- Prominent players in the semiconductor market are associating with companies, which can aid them in embedding security into the chips. This trend is expected to linger and impact the market substantially, as the IoT market expands.
- In the coming years, System on a Chip (SoC) processing chips are expected to handle the security functions via deploying APIs. Companies are expected to adopt this security method in advanced and unconventional IoT based applications.

~23% - 28%

As of 2020, Around 23% - 28% of the companies are working with compliance for providing security with their chips.



Recent Technological Developments

Section 3.3

Recent Technological Developments (1/3)

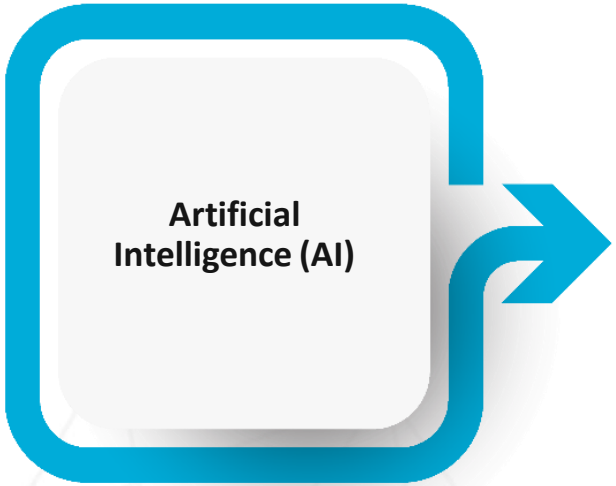
Blockchain Technology

- Blockchain technology has been one of the most significant development in semiconductor industry. It minimizes the cost of transactions and enables traceability and transparency in supply chain processes.
- It is a distributed ledger technology that helps in nurturing environment trust amongst the business partners by creating a shared distributed ledger of information that gives an access to same up-to-date information in real time to every employee.
- For instance, CA, Inc., a subsidiary of Broadcom, has adopted blockchain technology to establish digital trust through business agility, data security and scalability
- Intel Corporation is improving blockchain through technology innovations with 'Intel Software Guard Extensions (Intel SGX)' that helps to improve throughput and consensus efficiency.
- Moreover, the decentralized ledger of blockchain allows increased transparency over the essential data that results in better accountability and traceability within manufacturing process.
- Several potential use case/ business case such as, counterfeit parts identification, provenance tracking of any asset, etc. are influenced from blockchain technology in providing tangible additions in semiconductor industry space.
- Payments recorded on blockchain cannot be fabricated. This in turn, tackles the concern of double spending and possible fraud.

Quantum Computing

- ✓ Semiconductors and its utilization is becoming powerful in the field of quantum information. The quantum computing team in semiconductor manufacturing facility aims to deliver accessible solution with reduced development cost.
- ✓ In semiconductor industry, significant breakthroughs in quantum computing adoption are expected to enable computational abilities applicable across end-use industry verticals. It is attributed to its information processing abilities that improves online security and boost artificial intelligence.
  - ✓ For instance, in October 2019, Samsung Catalyst Fund with Mubadala Investment Company, an investment company headquartered in UAE invested USD 55.0 million in IonQ, Inc., a quantum computing hardware and software company based in the U.S. to accelerate demand and supply of quantum computing.
- ✓ Now-a-days, semiconductors are reasonably fabricated through quantum dot arrays method to build quantum computing systems. It is because; the vertical electrical field roots the quantum dots to optically localize and excite the charge carriers, prompting the different states at defined distances.
- ✓ Considering the above points, time has come to invest in quantum computing to achieve potential for large-scale quantum computation and applications that will revolutionize the semiconductor industry globally.

Recent Technological Developments (2/3)



- ✓ Artificial intelligence (AI) encompasses of technologies ranging from machine learning to natural language processing.
- ✓ AI is probably the most adopted technology by semiconductor manufacturers in the recent years. The reason being, it offers a reliance on hardware as a core enabler of innovation, especially for memory and logic functions. AI integrated circuits improvises the overall semiconductor architecture, while speeding the movement of data more efficiently and with increased power across the memory systems.
- ✓ Escalating demand for AI based semiconductors from both public and private sectors is rapidly driving the development of AI in the semiconductor industry. AI for electric vehicles, advanced driver assistance systems, facial recognition, navigation, personal assistant, etc. is creating ample of market opportunities for the key market players.
- ✓ The United States semiconductor industry is known to be well positioned to lead in the AI technology, as the U.S. government have been investing largely in the semiconductor research and development (R&D) since the last two decades. In the year 2017, the U.S. invested USD 36 billion in in basic semiconductor research, driving the advances in AI applications. In 2017 the Semiconductor Industry Association (SIA) stated that the global AI semiconductor market is expected to reach USD 33 billion by the year 2022 with the compound annual growth rate (CAGR) of59.0%, thus predicting the surge of AI technology in the global semiconductor market over the forecast.
- ✓ Precisely, AI influences the growth of semiconductor industry in enhancing the product manufacturing process and building demand for innovative technologies
    - *For instance, Micron Technology, Inc. is offering high capacity memory and multi-chip packages powered with AI training that is utilized in embedded or cloud in edge devices and mobile.*
- ✓ In addition to it, the next immense technological development is the advancement of chips that support artificial intelligence (AI) technologies. AI-specific semiconductor chips are more powerful and optimized for advanced machine learning algorithms. Chips including, application specific integrated circuits (ASIC), graphics processing unit (GPUs) and field-programmable gate arrays (FPGA) surges demand from several industries.
    - *For instance, in July 2020, Qualcomm Technologies, Inc., a subsidiary of Qualcomm Incorporated introduced 'Qualcomm QCS410' and 'Qualcomm QCS610' system-on-chips (SoCs). These chips are designed for premium camera technology including, powerful machine learning and artificial intelligence features.*
- ✓ Moreover, AI is driving the growth for traditional semiconductor manufacturing companies as well as non-traditional competitors including E-commerce companies moving into the sector. key Manufacturers are collaborating with regional players to digital transform the AI acceptance.
    - *For instance, in July 2020, OmniSci, Inc. collaborated with NVIDIA Corporation and Espando, an IT company in Indonesia to launch center of excellence (CoE) focusing on artificial intelligence and data science.*
- ✓ As manufacturers are backing up the combination of various connectivity option with on-device processing for fast data transfer, AI is becoming transformative experience for semiconductor business.

Recent Technological Developments (3/3)

- ✓ August, 2020: - SAMSUNG introduced ‘silicon-proven 3D IC packaging technology’ for advanced process nodes. Company’s 3D integration technology safeguards through silicon via (TSV) interconnections even at extreme ultraviolet lithography (EUV) process nodes. Samsung is developing the aforesaid technology to bring 3D IC innovation that potentially pushes limitations of semiconductors by addressing the demand of next-generation applications comprising, artificial intelligence, high-performance computing and 5G.
- ✓ October, 2019: - NXP Semiconductors collaborated with Sivers IMA to offer industry-leading 5G-NR (New Radio) solutions. The collaboration is concerning to utilize Sivers IMA’s 5G-NR chip and phased-array antenna and NXP’s highly flexible Layerscape programmable baseband platform.

Impact of COVID-19

Section 3.4

Impact Analysis of COVID-19 on the Global Semiconductor Market (1/5)

Impact of COVID-19 on Semiconductor Market

- Since the onset of COVID-19 in early 2020, semiconductor industry is clearly facing challenges to maintain the global economy across several sectors. The entire semiconductor market is trying to recover the technology industry from the U.S.- China trade war and 2019's down cycle
- The International Data Corporation (IDC) estimates revenue contraction of approximately 6% in 2020 (with 54% of probability) for the global semiconductor market over the forecast period
- Several business functions across automotive, data processing, networking and communications and many more have been adversely affected; this in return, resulted in dawdling of manufacturing sector worldwide

Impact Analysis of COVID-19 on the Global Semiconductor Market (2/5)

Short-term Impact of COVID-19 (1/2)

- In terms of the short term impact of COVID-19 over the semiconductor market, several industrial sectors have been affected at the present situation
- The global manufacturing sector was already decelerating in the year 2019, owing to the trade tensions amongst the dominant countries, and is further projected to decline the manufacturing sector due to economic disruptions triggered by COVID-19
- Following data published by the UNIDO Statistics Division demonstrates the global manufacturing sector output, that is affected by the social and economic lockdowns in the early 2020.
- As per the below mentioned statistics, industrialized countries have registered noticeable decline in the manufacturing sector; thus impeding the global semiconductor market growth in the coming years

Global Manufacturing Output Index with COVID-19 Impact

	China	North America	Europe	East Asia	Rest of World
Oct-19	131.8	103.2	105.6	102.0	113.4
Nov-19	133.4	104.2	105.8	101.0	114.1
Dec-19	134.0	104.3	104.0	103.0	114.2
Jan-20	99.8	104.2	105.5	104.3	103
Feb-20	100.3	104.2	104.9	102.0	102.6

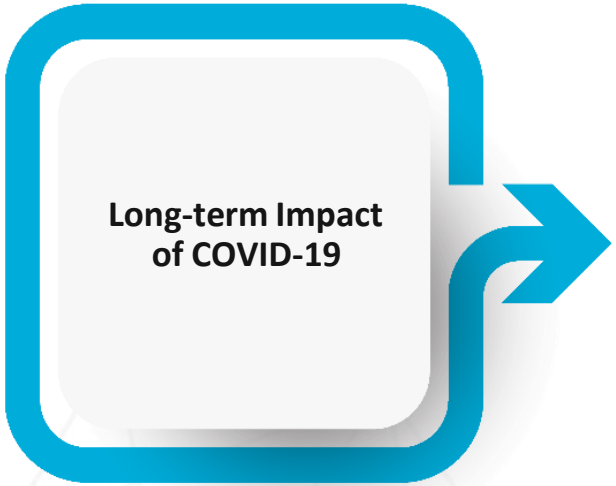
Impact Analysis of COVID-19 on the Global Semiconductor Market (3/5)

Short-term Impact of COVID-19 (2/2)

- The U.S. semiconductor industry continues to maintain its global leadership position in the semiconductor technologies, that are essential for the future automated applications, including quantum computing, artificial intelligence(AI) and wireless high speed networks such as 5G. U.S. also remains the leader in logic devices technology manufacturing, enabling graphics, advanced processors and AI chips.
- However, the COVID-19 pandemic has flattened out and upended the global economy and disrupted worldwide supply chain and logistics business, causing significant market uncertainty
- Rising cost of innovative semiconductor design and manufacturing are continuously posing severe challenges for the competitors in the market

SHORT-TERM IMPACT	INVESTMENTS	PRODUCT DEMAND	PRODUCT SUPPLY
COVID-19	Moderate	High	Low

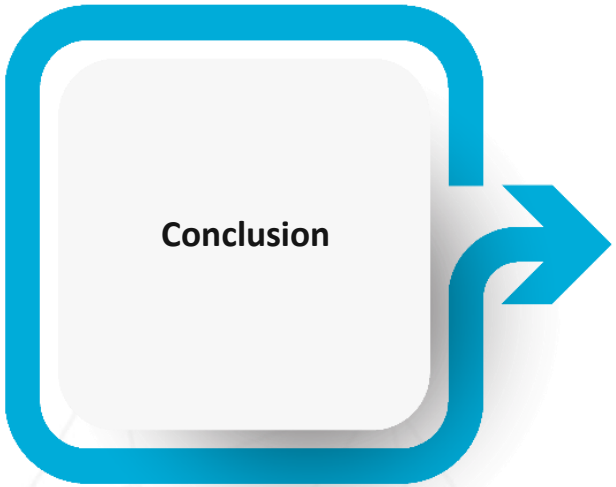
Impact Analysis of COVID-19 on the Global Semiconductor Market (4/5)



- Semiconductor market players are facing difficulties in predicting the future demand as greater amount uncertainty abounds the automotive and industrial sectors, decelerating the GDP growth of developing as well as the developed economies
- As stated by the International Labour Organization (ILO), automotive industry is facing and is anticipated to witness sharp drop in the demand, investments and the production of the vehicles across the world
- The sudden outbreak of COVID-19 in Wuhan, China, that is also known as the “motor city” has severely impacted the automotive production in Asia, as it is the home to auto plants of General Motors, Honda Motor, Nissan Motor, Peugeot Group (PSA), Renault and Toyota Motor, and many more
- According to the European Automobile Manufacturers Association (ACEA), total automotive sales in European Union (EU) have lowered down with 7.4% in January and February 2020. Following are the four major EU automotive markets facing the downfall in the demand:
  - Germany by 9.0%
  - France by 7.8%
  - Italy by 6.8%
  - Spain by 7.3%
- The United Nations Conference on Trade and Development (UNCTAD) has estimated that the 2% of reduction in the export parts from China to other automotive manufacturers in the EU, U.S., Republic of Korea, Japan, and many more, could lead to USD 7 billion of automotive export reduction from these economies to the rest of the world.
- Moreover, the National Association of Automobile Manufacturers of South Africa (NAAMSA) stated that the automotive industry, which contributes 7% of the country’s GDP is experiencing significant decline in the sales, hence expected to affect the automotive application in the semiconductor market over the long term period

LONG-TERM IMPACT	INVESTMENTS	PRODUCT DEMAND	PRODUCT SUPPLY
COVID-19	Moderate	High	Moderate

Impact Analysis of COVID-19 on the Global Semiconductor Market (5/5)



- However, the pandemic has plunged the global economy into potential recession that brings an abrupt stoppage to a decade of continued expansion in the semiconductor market and its related application businesses
- Global merchandise trade values have drastically decreased owing to heavy loss in the investment for automotive, industrial, consumer electronics and many more. Cancellation or delay in long term projects funding has led to heavy economic loss to the investors from developing and developed countries, dawdling the overall market growth in the current situation
- The rising need of work from home has drastically surged the networking and communication, and data processing applications all over the world, therefore expected to lead moderate market growth in the long term process, uplifting the global semiconductor market over the forecast period

Competition Landscape

Section 04

Business Strategies Adopted by Key Players

Section 4.1

Business Strategies adopted by Leading Players (1/3)

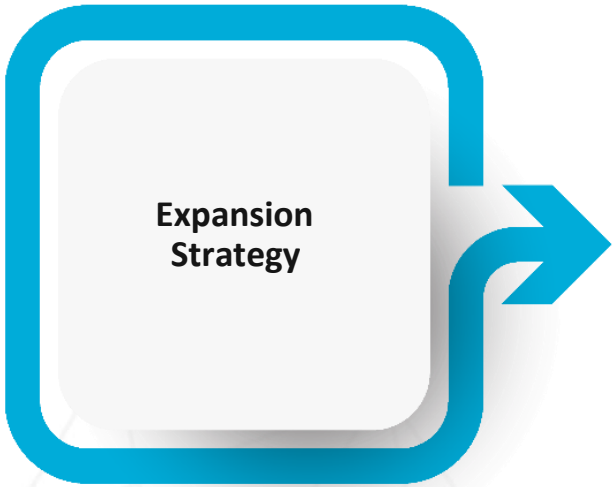
Key Market Indicators

- ✓ Leading players are striving for excellence in semiconductor market by targeting following key indicators: -
  - Strong manufacturing and technology foundation
  - Investment for extended portfolio of embedded processing products
  - Strong sales force
  - Diversity and longevity of products and end-users
- ✓ The foremost focus is on technology foundation and investment approaches that are attributable to achieve expertise in semiconductor industry with artificial intelligence excellence.

Technology Development Strategy

- ✓ Major manufacturers are continuously developing memory semiconductor products in anticipation of demand for advanced information technology (IT), 5G, 3D integration technology and other technologically advanced products.For instance, in 2019, in Germany, Biesse Group inaugurated the innovative 'Ulm Campus' dedicated for cutting edge technology solutions.
  - *In 2019, Samsung Electronics Co., Ltd. Developed sixth-generation V-NAND with 100+ layer single-stack design, third- generation 10-nanometer-class DRAM, EUV process and 108-million-pixel image.*
- ✓ Several manufacturers including, Samsung Electronics Co., Ltd., NXP Semiconductors, Maxim Integrated and others are continuously expanding their market position by fast-tracking technological development as their central strategic element.

Business Strategies adopted by Leading Players (2/3)



- ✓ Major manufacturers emphasize on well-built culture of excellence on manufacturing operations and internal control to sustain in the market.
- ✓With sustainability as a base, key players are combining best-of-breed technologies in semiconductor and infrastructure software solutions that is resulting in category-leading business with sustainable operating and financial results across the globe.
  - ○*For instance, In August 2020, SK HYNIX INC., launched PCIe SSD 'SK Hynix Gold P31', the 128-layer NAND Flash-based consumer SSD (that stores data in semiconductor cells) in the United States under the SK hynix brand..*
- ✓Prominent players have prolonged relationship with the suppliers so as to proactively manage product development as well as monitor their financial health.
  - ○*For instance, NVIDIA Corporation utilizes fabless manufacturing strategy by employing best-in-class suppliers for all phases of semiconductor manufacturing process including, water fabricating, assembly, final testing and packaging.*
- ✓*Major manufacturers are continuously developing memory semiconductor products in anticipation of demand for advanced information technology (IT) products.*
  - ○*For instance, In 2019, Samsung Electronics Co., Ltd. Developed sixth-generation V-NAND with 100+ layer single-stack design and third-generation 10-nanometer-class DRAM.*

Business Strategies adopted by Leading Players (3/3)

- ✓ Prominent players are emphasizing on long-term investment activities to maintain liquidity and preserve capital while generating appropriate returns.For instance, in 2019, in Germany, Biesse Group inaugurated the innovative 'Ulm Campus' dedicated for cutting edge technology solutions.
    - *For instance, Texas Instruments focuses on venture capital funds and non-marketable equity securities (carried at fair value across countries) as a long-term investment activity.*
- ✓ Major players are investing in businesses that offers complementary products and services and are acquiring international & regional manufacturers to offer quality assurance to end-users.
    - *For instance, in February 2020, Maxim Integrated invested USD 25 million for new design center in Dublin, Ireland with focus on conducting research and development in analog semiconductor design and product development. The aim is to accelerate semiconductor product innovation in Europe.*
    - *In December 2019, Intel Corporation acquired 'Habana Labs Ltd.', an Israel based artificial intelligence chip maker for nearly USD 2.00 billion. The acquisition strengthens the Intel Corporation's artificial intelligence (AI) portfolio and accelerates the effortin fast-growing AI silicon market.*
    - *For instance, In November 2019, Broadcom Inc. acquired Enterprise Security business of 'Symantec Corporation'. The acquisition boosts the technology infrastructure.*
    - *In October 2019, Micron Technology, Inc. acquired 'FWDNXT', a manufacturer of software and hardware tools for artificial intelligence. By combining with Micron Technology Inc.'s memory chips, FWDNXT allows it to explore deep learning solutions essential for data analytics, principally with edge computing and internet of things.*
    - *In January 2019, Taiwan Semiconductor collaborated with 'EBV Elektronik', a semiconductor distribution specialist in Europe to distribute Taiwan Semiconductor's entire product range including, Diode, Transistor, Photocoupler, Bridge rectifiers, etc. in European Countries. EBV Elektronik is a subsidiary of Avnet, Inc. Apart from collaboration, the Taiwan Semiconductor's products will also available in Asia and the United States through Avnet, Inc.*
    - *In June 2018, SK HYNIX INC. with Bain Capital, a parent company of SK HYNIX INC. in invested approximately USD 3.58 billion to acquire Toshiba Corporation's memory chip unit named as 'Toshiba Memory Corporation'.*

Consolidated SWOT Analysis of Key Players

Section 4.2

Consolidated SWOT Analysis of Key Players (1/2)

STRENGTHS

- Prominent players emphasize on pioneering technological advancement such as, artificial intelligence, 5G etc. in order to gain competitive advantage for continuous future success.
- Key manufacturers have centralized procurement and logistics support that maintains freedom of operation in every assembly line.

WEAKNESSES

- Key manufacturers face difficulties such as, variabilities in commodity prices i.e. instability in raw material process or increased manufacturing price imposed by suppliers on manufacturers, that negatively impacts the inclusive revenue structure.

OPPORTUNITIES

- Accelerated adoption of strategies including, mergers & acquisitions and strategic alliance to enhance artificial intelligence offerings and capitalizing on memory & storage product development, is widening the opportunities to expand semiconductor offerings in the global market.

THREATS

- Failure while overcoming the wide-spread cyber threats and vulnerabilities including, computer malware, phishing and security breaches, is adversely affecting the manufacturing business.

Consolidated SWOT Analysis of Key Players (2/2)

STRENGTHS

- Several players expanding their enterprise offerings with reduced complexity and easier renewal process that is resulting in broad customer base.
- Major players have highlyspecialized manufacturing facilities across the globe.

WEAKNESSES

- Small and medium sized companies find it difficult to cope up with increasing investments in research & development and product development pressure, that results in falling out cost structure alignment with unattainableproduct demand. This, in turn shrunk the technological improvements.

OPPORTUNITIES

- Key players as well as medium sized companies have opportunities to invest in selling analog and embedded semiconductor products, particularly into automotive and industrial markets.

THREATS

- Unexpected negative industrial actions on manufacturing facilities attributed to sudden COVID-19 impact causes disturbance in designing and manufacturing the semiconductor products.

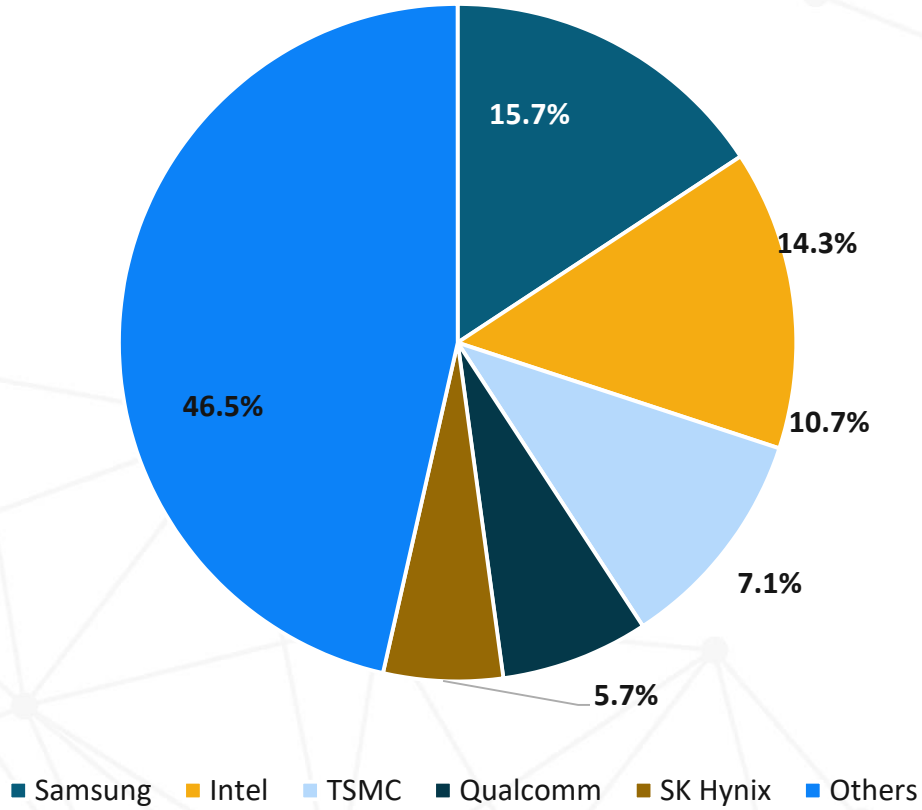
Key Players Market Share Insights and Analysis

Section 4.3

FORTUNE BUSINESS INSIGHTS

Global Market Share Analysis (2021)

Figure : Global Semiconductor Market Share (%), 2021



Analysis

- The market is strongly concentrated as semiconductors are a prerequisite in every electronic product. The market is growing with increasing technological advancements and there are many well-known brands in the market, along with regional players, to cater to the increasing demands.
- Samsung., Intel Corporation, Qualcomm, TSMC, SK Hynix, are considered among the prominent players in the global semiconductor market covering around 53.5% of the market
- The share of these players is owed to their dominant presence in the electronics market, along with their technological developments. End-users incline to purchase semiconductors from them as they have a strong brand name and goodwill in the market. Additionally, these players provide semiconductors on custom requirements as per the need and applications. As a result, the manufacturers have significant opportunities over the forecast period to enhance their business with the production of innovative products.
- Whereas, other players in the market, such as Taiwan Semiconductors, Texas Instruments, Maxim Integrated Products, Inc. and NXP Semiconductors N.V. including other regional & local players, account for 46.5% of the market share. These players are expected to have significant expansion in their business over the forecast period by targeting developing countries & regions. Moreover, by adopting robust business strategies, such as selling the semiconductors at lower prices, and providing them with marginally advanced technology are other factors that are propelling the growth of the market.

Porter’s Five Forces Analysis

Section 4.4

Porter's Five Force Analysis

Bargaining Power of Suppliers

Owing to the high demand from the customers, and presence of multiple service providers, bargaining power of the suppliers is low. Suppliers are improving their facility capability by expanding their service location among other aspects, in order to maintain their market share. Furthermore, continuous changein the market sentiments regarding the customer service also creates a problem for the suppliers toretain their customers.

Threat of New Entrants

The threat of new entrants in the market is high, as the global market is mature. New entrants can prove to be a competition in the market hence making it vulnerable for the existing players to have an extended market share.

Competitive Rivalry

The market has many well established players, which makes it highly competitive. Along with that, there are many regional and local players catering to different countries, which further increases the competition.

Bargaining Power of Buyers

Owed to the presence of various companies end- users have options to negotiate while opting for their products. Furthermore, the market is highly influenced by the customized requirements thus making it much flexible for the companies to service. Hence, the buyers have high bargaining power.

Threat of Substitutes

Semiconductors have no current substitute for them. Furthermore, research & development done by leading players in order to increase the serviceability might result in better technologies, which will enhance the market growth. Therefore, the market is expected to have no threats from the substitutes during the forecast period.

Initiatives Adopted by Asian Countries

Section 4.5

Initiatives Adopted by Asian Countries (1/2)

Country	Initiatives Adopted by Asian Countries
China	• The government of China and Chinese manufacturers are actively attempting to reshape the growth of semiconductor market and both government and private firms are pursuing investment, acquisition and other opportunities across the globe. o For instance, in May 2015, The state Council in China announced 'Made in China 2025' policy that focuses on manufacturing high-end semiconductor and building capabilities suitable for semiconductor manufacturing as a priority segment. The main aim is to see China as a self-sufficient manufacturer for semiconductors by 2025. • Leading global manufacturers are collaborating with local and regional players operating in china to increase the semiconductor industry commitments. o In February 2018, Intel Corporation, as a part of Foreign Direct Investment (FDI) invested in Unigroup Spreadtrum & RDA, a subsidiary of Tsinghua Unigroup to develop 5G strategic modem to deploy 5G network in China in 2019. Unigroup Spreadtrum & RDA is a fabless semiconductor company with advanced technology in communications and chip technology.
Taiwan	• Key manufacturers across Taiwan are implementing partnership programs across semiconductor business segment to provide cutting-edge semiconductor technology. • Governmental bodies are providing funds to semiconductor manufacturers in order to concentrate more on manufacturing, testing, assembly and packaging. o For instance, in June 2020, Taiwan Semiconductor manufacturing company secured federal and state government subsidiary of USD 12.00 billion to build a fabrication facility in Arizona, U.S.

Initiatives Adopted by Asian Countries (2/2)

Country	Initiatives Adopted by Asian Countries

Korea	• The governmental bodies in Korea are establishing manufacturing infrastructures in the semiconductor sector. Also, the government is pursuing the public-private joint development to manufacture advanced artificial intelligence semiconductor products.
	  ○ For instance, in July 2018, Paik Un-gyu, the minister of trade, industry and energy promised approximately USD 1.3 billion fund for development of next-generation chip for semiconductor industry in Korea for coming decade.
	  ○ SK Hynix Inc. is building up four semiconductor fabrication plant in Yongin, South Korea by 2024.
	• Local manufacturers are emphasizing on advancement of CMOS image sensors (CIS), NAND flash memories and power semiconductors that supports domestic firms across Korea.

Japan	• Market players in Japan focuses on fabrication of semiconductors by investing primarily in manufacturing and designing processes to make semiconductor sector as a high cash flow generating business. ○ For instance, in October 2019, Sony Corporation invested approximately USD 910 million to build factory in Nagasaki Prefecture in Japan to manufacture semiconductor image sensors utilized in smartphone camera so as to meet the 5G network demand. • Japan government has trade agreement with the U.S. regarding the growth of semiconductor market in the U.S. as well as in Japan.

Investment by Manufacturers (1/2)

Country	Company Name And Headquarter	Investments
China	ChangXin Memory Technologies, Inc. (Anhui Province, China)	• **December 2019**:The company signed a patent license agreement and patent acquisition agreement with Polaris Innovations Limited related to Dynamic Random Access Memory (DRAM). • **September 2019**: The company invested approximately USD 31.84 billion to build national memory industry base and memory industry cluster in China.
	Beijing ESWIN Technology Group Co., Ltd. (Beijing, China)	• **June 2020**: Beijing ESWIN Technology Group Co., Ltd. Received funding of nearly USD 280 million in 'Series B Funding' from the investors including, Legend Capital and IDG Capital. • **January 2019**: IDG Capital with Broad Vision Funds, Triniti Capital and Beijing Singularity Power Investment Fund completed the investment as 'A Series Funding' to Beijing ESWIN Technology Group Co., Ltd. to raise the fund for Silicon Materials, IC Solutions, and Advanced Packaging & Testing business for semiconductor industry.
	Senscomm Semiconductor Co., Ltd. (Jiangsu Province, China)	• **2019**: Senscomm Semiconductor Co., Ltd. Completed 'Series A funding', led by Hubei Xiaomi Yangtze River Industrial Fund and Glory Capital. The company is utilizing the fund to invest in research and development of system on chip products based on Wi-Fi 6 technology.
	Beijing OnMicro Electronics Co., Ltd. (Beijing, China)	• **February 2020**: Hubei Xiaomi Changjiang Industrial Fund invested in Beijing OnMicro Electronics Co., Ltd. And became limited partner with the company. The investment is boosting the development of system on chip and is generating industry-leading solution for 5Gterminal.

Investment by Manufacturers (2/2)

Country	Company Name And Headquarter	Investments
Taiwan	United Microelectronics Corporation (Hsinchu, Taiwan)	• **June 2018**: United Microelectronics Corporation invested USD 0.52 billion to acquired Japan based Fujitsu Semiconductor Limited. The investment is carried out to form joint venture regarding 300mm wafer foundry process.
Korea	SK HYNIX INC. (Gyeonggi-do, Korea)	• **2019**: SK HYNIX INC. plans to invest USD 0.26 billion that includes, USD 0.17 billion for semiconductor happy fund and USD 0.09 billion for equity investment fund for construction of FAB within the year 2022. • **2018**: SK HYNIX INC. invested USD 75.0 million to acquire 50% stake in Heijin Semiconductor, a Chinese foundry firm to expand SK HYNIX INC.'s foundry business.
	Samsung (Seoul, Korea)	• **November 2019**: Samsung invested USD 20 billion in semiconductor sector with focus on technological strength.
Japan	Renesas Electronics Corporation (Tokyo, Japan)	• **September 2018**: Renesas Electronics Corporation invested USD 7.2 billion to acquire U.S.based Integrated Device Technology Inc. that resulted in strong merger & acquisition activity.
	NEC Corporation (Tokyo, Japan)	• **February 2018**: NEC Corporation increases investment in XON Holdings Proprietary Limited, a South African company to nearly 59.1%. In 2015, the investment was for 25% stake in XON Holdings Proprietary Limited.
	Toshiba Corporation (Tokyo, Japan)	• **September 2017**: Bain Capital with other renowned investors invested in Toshiba Corporation to buy its memory chip business of semiconductor business.

Global Market Analysis, Insights & Forecast

Section 05

FORTUNE BUSINESS INSIGHTS

Key Findings

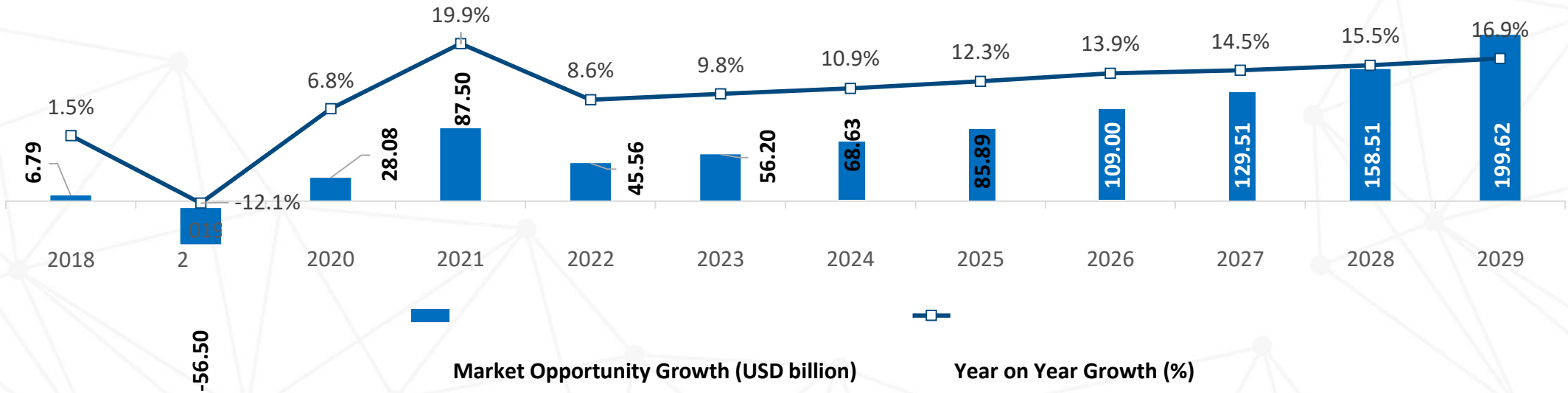
Section 5.1

Global Semiconductor Market Overview

Table : Global Semiconductor Market Value (USD billion) Forecast, 2018 – 2029

Global Semiconductor Market	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Market Value	468.80	412.30	440.38	527.88	573.44	629.64	698.27	784.15	893.15	1,022.66	1,181.17	1,380.79	12.2%

Global Semiconductor Market Opportunity Growth (USD billion) and Year on Year Growth (%) Forecast, 2018 – 2028



By Component

Section 5.2

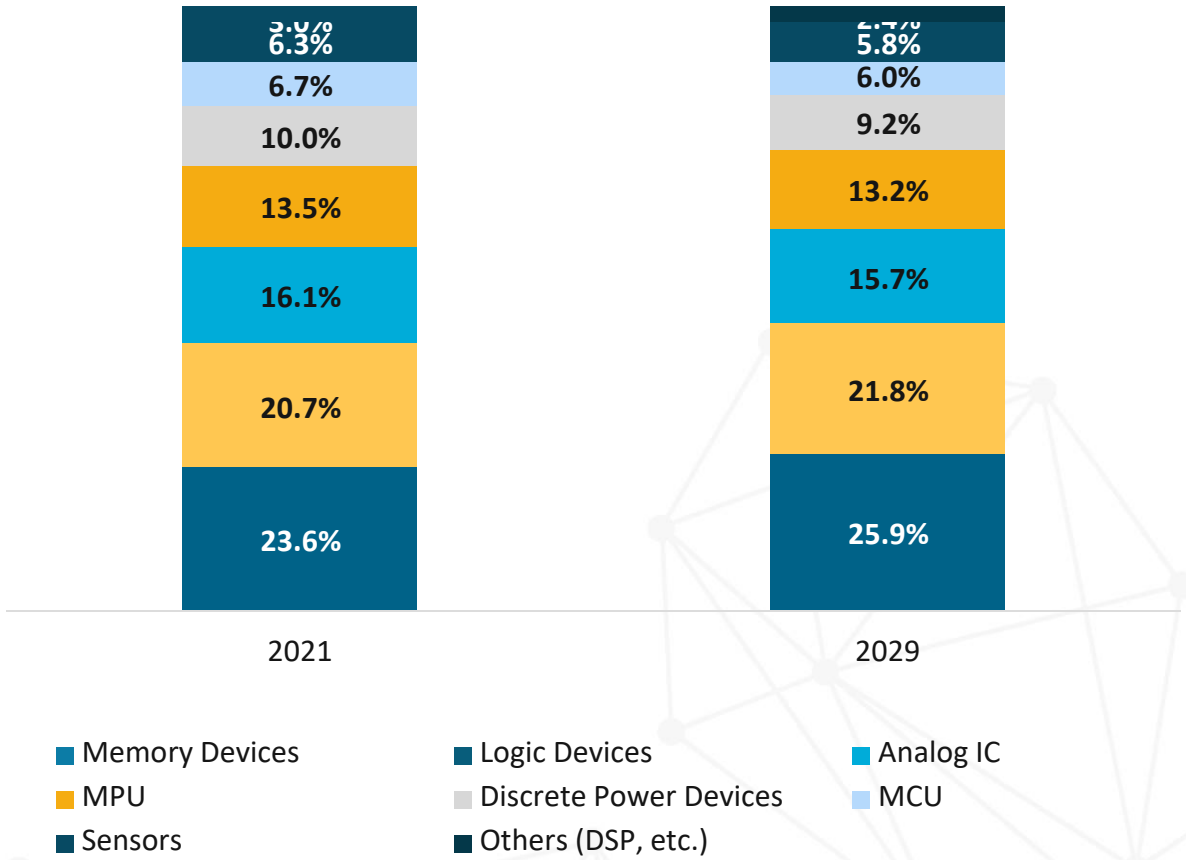
FORTUNE BUSINESS INSIGHTS

Global Market Analysis and Insights, By Components

Key Insights

- Demand for memory devices would grow significantly over the forecast period. The growth is owed by the ongoing technological advancements such as virtual reality and cloud computing in smart end-user devices
- Key market players massive capital spending on the memory devices to support new applications such as enterprise solid-state drives (SSDs), graphics, and other complex, real-time workload functions. Many established market players currently operating across the globe in semiconductor market are making noteworthy investments in Research an Development prospects to inculcate better product diversity and introduce products with better features to increase influx of customers towards its products.
- Logic devices are anticipated to witness progressive market growth in the coming years, with rising demand from the consumer electronics, data processing and networking sector for application-specific integrated circuit (ASIC) and application-specific signal processor (ASSP) logic chips
- The development of novel memory devices integrated with substantial storage capacity and are designed with a robust build quality is the main aspect driving the sales of memory devices across the globe. Additionally, the introduction of advanced electronic devices such as high end mobile phones, gaming laptops is creating noteworthy requirement of memory devices with better processing speed, higher refresh rate and compact design to support the best in class functionality of the devices.

Figure : Global Semiconductor Market Value Share (%), By Components, 2021 & 2029



Global Market Forecast, By Components

Table : Global Semiconductor Market Revenue (USD billion) Forecast, By Components, 2018–2029													
Components	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Memory Devices	108.91	96.36	103.53	124.84	136.41	150.64	168.02	189.77	217.38	250.31	290.74	357.10	12.8%
Logic Devices	96.00	84.76	90.89	109.37	119.26	131.45	146.33	164.95	188.58	216.74	251.27	301.16	12.6%
Analog Devices	74.89	65.99	70.61	84.80	92.29	101.53	112.81	126.93	144.85	166.18	192.31	216.66	12.4%
MPU	63.28	55.62	59.35	71.08	77.14	84.62	93.75	105.17	119.67	136.89	157.95	182.72	12.1%
Discrete Power Devices	47.68	41.76	44.41	53.01	57.34	62.69	69.23	77.41	87.79	100.09	115.11	127.39	11.7%
MCU	32.47	28.31	29.97	35.61	38.35	41.73	45.87	51.05	57.62	65.37	74.80	82.51	11.2%
Sensors	30.48	26.51	28.00	33.18	35.63	38.67	42.38	47.03	52.92	59.85	68.27	80.48	10.9%
Others (DSP, etc.)	15.08	13.00	13.62	15.99	17.02	18.31	19.88	21.85	24.34	27.24	30.73	32.77	9.8%
TOTAL	**468.80**	**412.30**	**440.38**	**527.88**	**573.44**	**629.64**	**698.27**	**784.15**	**893.15**	**1,022.66**	**1,181.17**	**1,380.79**	**12.2%**

By Application

Section 5.3

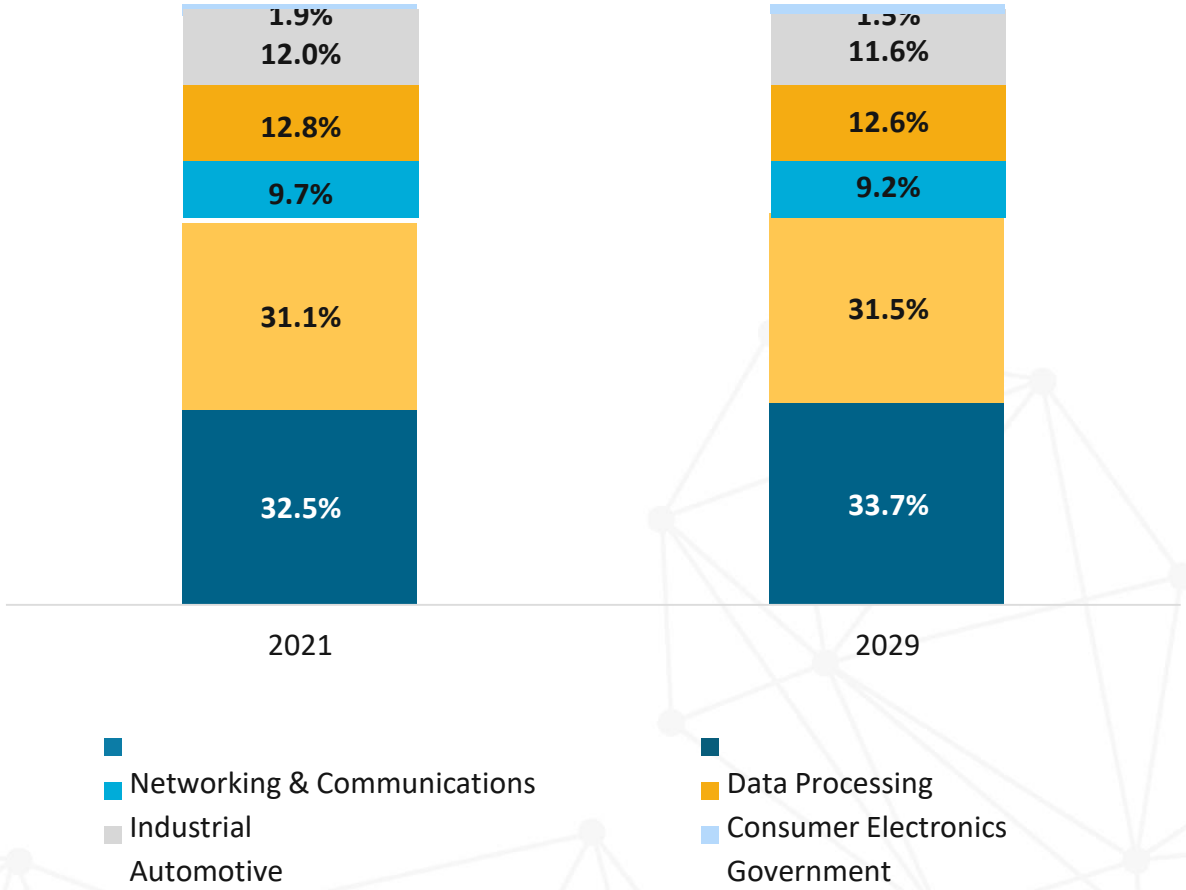
FORTUNE BUSINESS INSIGHTS

Global Market Analysis and Insights, By Application

Key Insights

- Networking and communications is projected to grow at a significant CAGR with increasing demand of smart phones and smart devices around the world.
- The necessity of working from home is notably rising across the developed and developing economies, thus enhancing the demand of semiconductors across this application segment. Prominently, after the outbreak of COVID-19 outbreak there is a considerable surge in working from remote locations owing to the restrictions at office spaces to curb the outbreak. This trend is likely to settle in the corporate culture and is anticipated to pave the way for market development in networking and communications segment
- Data processing has considerably grown since the last two decades owing to the rising amount of data generated every day around the world, overcoming the challenges related to the conventional data drives; propelling the semiconductor market globally. Due to the noticeable shift of most of the industries towards application of digital platforms the demand for semiconductors embedded in the systems capable of better data processing standards is gaining traction. The data processing segment is projected to witness a spurring demand over the slated period of time.
- The development of IoT integrated consumer electronic goods has encouraged the customers to boast the use of these equipment in daily operations providing a decent share to the aforementioned segment in the global market

Figure : Global Semiconductor Market Value Share (%), By Application, 2021 & 2029



Global Market Forecast, By Application

Table : Global Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	150.78	133.10	142.68	171.65	187.14	206.24	229.55	258.72	295.75	339.85	393.94	465.14	12.6%
Data Processing	145.12	127.85	136.79	164.28	178.75	196.59	218.38	245.64	280.25	321.41	371.83	434.47	12.4%
Industrial	46.60	40.69	43.16	51.38	55.40	60.38	66.46	74.08	83.75	95.17	109.08	126.51	11.4%
Consumer Electronics	60.17	52.85	56.36	67.45	73.18	80.24	88.88	99.68	113.37	129.63	149.52	173.81	12.0%
Automotive	56.95	49.89	53.07	63.35	68.54	74.95	82.79	92.59	105.02	119.75	137.74	159.65	11.7%
Government	9.18	7.93	8.32	9.78	10.42	11.22	12.21	13.45	15.01	16.84	19.06	21.21	10.0%
TOTAL	**468.80**	**412.30**	**440.38**	**527.88**	**573.44**	**629.64**	**698.27**	**784.15**	**893.15**	**1,022.66**	**1,181.17**	**1,380.79**	**12.2%**

By Region

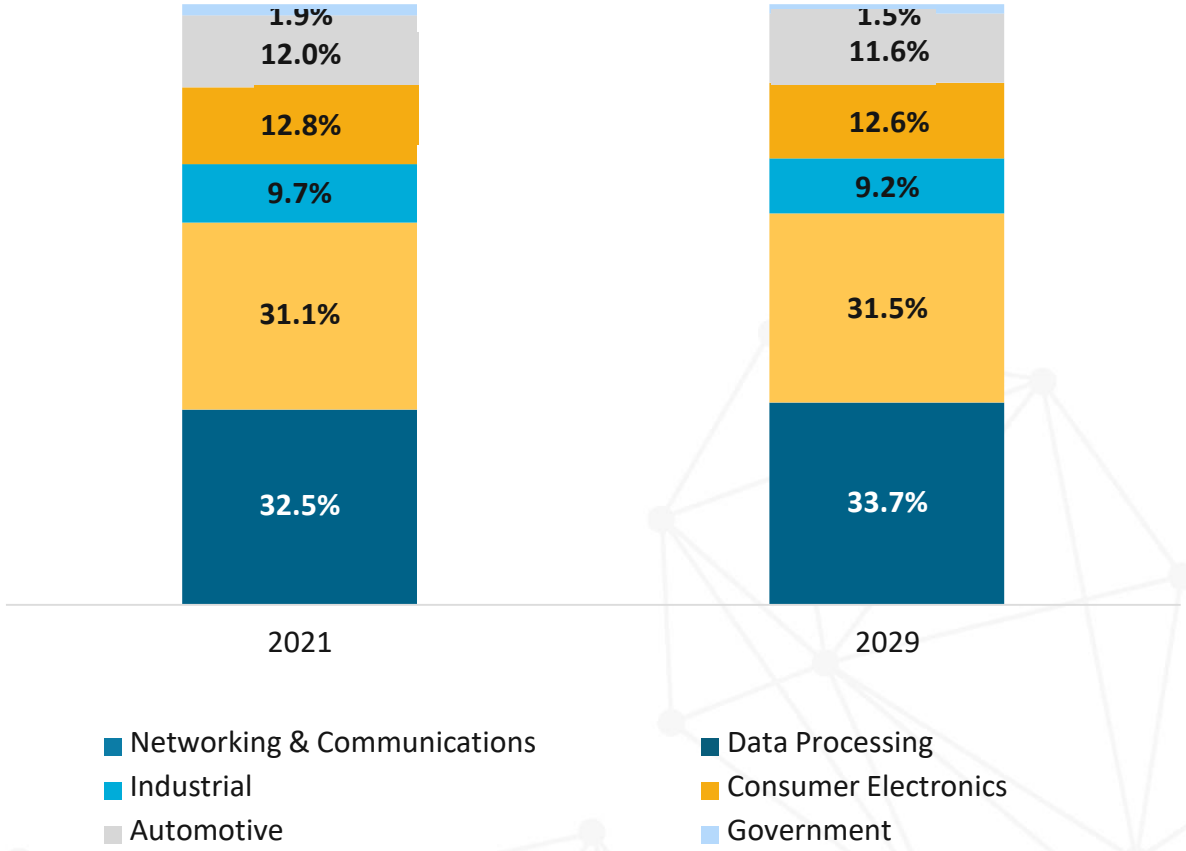
Section 5.4

Global Market Analysis and Insights, By Region

Key Insights

- Asia Pacific holds the largest share and is projected to exhibit the highest growth in the market across the globe. The increasing adoption of high-end technology-based devices, coupled with the minimum electronics prices, is leading to an upswing in the consumption of consumer electronics. Additionally, technological advancements, such as IoT and LTE, support electronics products, thereby allowing the region to dominate the market share.
- China holds the largest share in the global market and is projected to witness a moderate CAGR in the upcoming years, owing to the surging presence of local semiconductor component manufacturers. These local market players tend toward offering a wide range of products at discounted rates in bulk quantity. Thus, it would augment the market growth in China over the forecast period.
- The North America market is estimated to exhibit dynamic growth driven by increasing investments in R&D activities. According to the Semiconductor Industry Association (SIA), the U.S. industry's expenditures in R&D increased at a compound annual growth rate of about 6.6 percent from 1999 to 2019. Expenditures in R&D activities by U.S. companies tend to be consistently high, regardless of cycles in annual sales, which reflects the importance of investing in R&D production. In 2019, the R&D investments totaled USD 39.8 billion.
- The market in Europe will witness substantial growth backed by the telecom and the automotive industry. Companies across the region are investing in innovating new technologies and increasing their production capacities to cater to the surging demand for advanced devices and components in the semiconductor industry. Moreover, the rising consumption of consumer goods across the U.K., France, and Germany will support the growth of this industry in Europe over the forecast timeline.

Figure : Global Semiconductor Market Value Share (%), By Region, 2021 & 2029



Global Market Forecast, By Region

Table : Global Semiconductor Market Revenue (USD billion) Forecast, By Region, 2018–2029													
Region	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
North America	103.09	90.63	96.91	116.57	126.60	138.86	153.80	172.57	196.52	225.00	259.72	289.97	12.6%
Europe	59.96	53.19	56.94	68.41	74.49	81.98	91.12	102.57	117.09	134.38	155.56	182.26	13.6%
Asia Pacific	253.29	223.99	240.55	289.92	316.65	349.55	389.73	439.99	503.81	579.90	673.30	791.19	14.0%
Middle East and Africa	37.34	32.29	34.24	40.83	44.01	47.81	52.41	58.09	65.18	73.41	83.26	93.89	11.4%
Latin America	15.12	12.20	11.73	12.15	11.70	11.44	11.20	10.93	10.56	9.97	9.33	23.47	10.5%
TOTAL	**468.80**	**412.30**	**440.38**	**527.88**	**573.44**	**629.64**	**698.27**	**784.15**	**893.15**	**1,022.66**	**1,181.17**	**1,380.79**	**12.2%**

North America Market Analysis, Insights & Forecast

Section 06

North America Market Analysis and Insights, By Country

Figure : North America Semiconductor Market Value (USD billion), by Country, 2021 & 2029

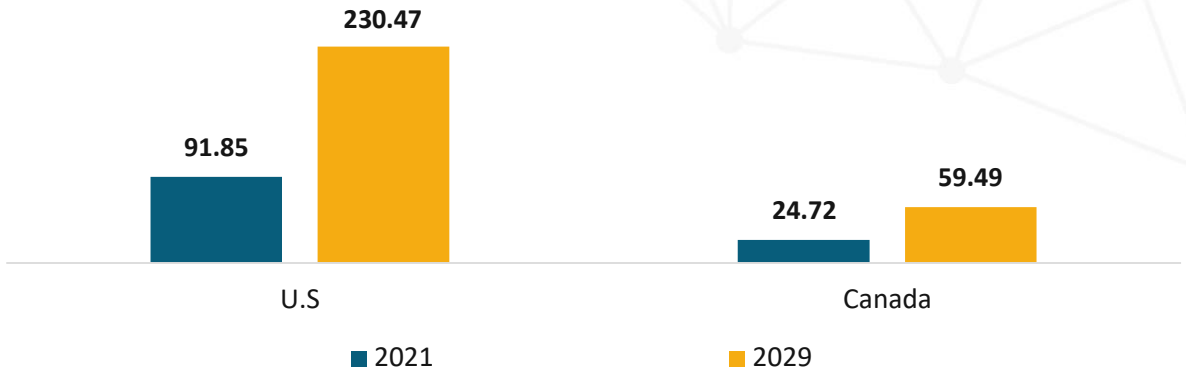
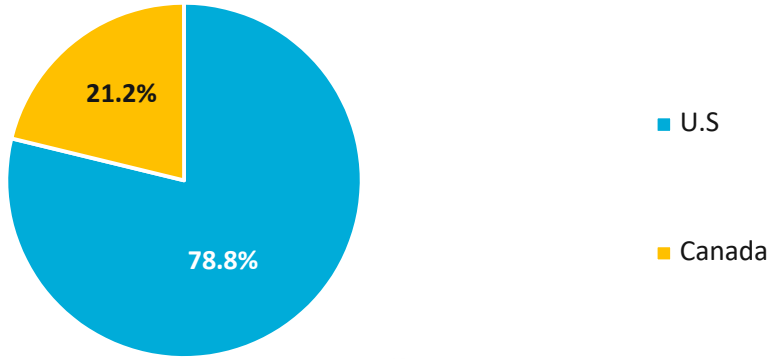


Figure : North America Semiconductor Market Value Share (%), by Country, 2021



Analysis

- North America is projected to hold the largest market share, owing to the invention of the semiconductors in the U.S., with U.S. being the market leader in the semiconductor industry so far. Post lockdown, U.S. had the largest ongoing semiconductor research and development investments of USD 39.8 billion in 2019. As a result, the semiconductor market would create a significant impetus across the region
- Most of the prominent vendors operating in the market have sizable presence in the U.S. is also fueling the semiconductor sales in the region. The heavy use of mobile phones, laptops and increasing consumption of data on internet are the factors which are collectively contributing towards making North America a noteworthy contributor in the global market.
- The companies operating in the technology domain are venturing effectively in the high growth and highly intuitive sectors such as edge computing, reliance of smart devices and 5G services, artificial intelligence, and robotics intensifying the requirement of the semiconductor for numerous applications. The each application has specific requirements augmenting the research in semiconductor manufacturing sector

North America Market Forecast, By Components

Table : North America Semiconductor Market Revenue (USD billion) Forecast, By Components, 2018–2029													
Components	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Memory Devices	25.41	22.47	24.17	29.24	31.94	35.23	39.25	44.29	50.72	58.40	67.79	83.80	14.8%
Logic Devices	21.01	18.55	19.91	24.05	26.22	28.87	32.10	36.16	41.34	47.52	55.06	65.24	13.9%
Analog Devices	17.25	15.20	16.29	19.64	21.37	23.49	26.08	29.32	33.46	38.39	44.41	43.49	10.7%
MPU	13.70	12.04	12.86	15.46	16.78	18.39	20.36	22.83	25.98	29.72	34.28	38.28	12.5%
Discrete Power Devices	10.46	9.15	9.73	11.64	12.57	13.71	15.10	16.85	19.08	21.72	24.93	23.20	9.2%
MCU	8.58	7.48	7.93	9.45	10.17	11.06	12.14	13.49	15.22	17.26	19.74	20.30	10.4%
Sensors	4.55	3.93	4.12	4.86	5.18	5.57	6.04	6.64	7.40	8.28	9.35	11.31	11.8%
Others (DSP, etc.)	2.12	1.82	1.90	2.24	2.37	2.54	2.74	3.00	3.32	3.70	4.16	4.35	9.1%
TOTAL	**103.09**	**90.63**	**96.91**	**116.57**	**126.60**	**138.86**	**153.80**	**172.57**	**196.52**	**225.00**	**259.72**	**289.97**	**12.6%**

North America Market Forecast, By Application

Table : North America Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	31.27	27.62	29.66	35.84	39.10	43.07	47.92	54.00	61.76	71.02	82.33	91.92	13.0%
Data Processing	35.32	31.11	33.33	40.16	43.70	48.02	53.28	59.90	68.33	78.38	90.64	101.20	12.7%
Industrial	13.51	11.80	12.53	14.96	16.14	17.57	19.32	21.52	24.33	27.65	31.69	35.38	11.9%
Consumer Electronics	9.56	8.38	8.93	10.71	11.60	12.69	14.01	15.67	17.79	20.31	23.37	26.10	12.3%
Automotive	12.30	10.76	11.44	13.69	14.79	16.13	17.77	19.83	22.46	25.57	29.35	32.77	12.0%
Government	1.12	0.96	1.01	1.20	1.28	1.38	1.50	1.65	1.84	2.07	2.34	2.61	10.7%
TOTAL	**103.09**	**90.63**	**96.91**	**116.57**	**126.60**	**138.86**	**153.80**	**172.57**	**196.52**	**225.00**	**259.72**	**289.97**	**12.6%**

North America Market Forecast, By Country

Table : North America Semiconductor Market Revenue (USD billion) Forecast, By Country, 2018–2029													
Country	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
U.S.	80.92	71.23	76.26	91.85	99.87	109.68	121.64	136.65	155.81	178.61	206.43	230.47	12.7%
Canada	22.17	19.40	20.65	24.72	26.72	29.17	32.16	35.92	40.71	46.39	53.29	59.49	11.6%
TOTAL	103.09	90.63	96.91	116.57	126.60	138.86	153.80	172.57	196.52	225.00	259.72	289.97	12.6%

U.S. Market Forecast, By Application

Table : U.S. Semiconductor Market Revenue (USD million) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	26.45	23.41	25.20	30.52	33.37	36.84	41.08	46.40	53.19	61.30	71.22	79.51	13.2%
Data Processing	25.03	22.06	23.65	28.52	31.04	34.13	37.90	42.62	48.66	55.84	64.61	72.14	12.8%
Industrial	10.34	9.02	9.57	11.41	12.29	13.37	14.69	16.34	18.44	20.93	23.95	26.73	11.7%
Consumer Electronics	7.76	6.82	7.29	8.77	9.52	10.44	11.56	12.97	14.77	16.90	19.51	21.78	12.6%
Automotive	9.75	8.54	9.10	10.91	11.81	12.91	14.25	15.94	18.09	20.64	23.74	26.50	12.2%
Government	1.59	1.38	1.45	1.72	1.84	1.98	2.16	2.39	2.67	3.00	3.41	3.80	10.9%
TOTAL	**80.92**	**71.23**	**76.26**	**91.85**	**99.87**	**109.68**	**121.64**	**136.65**	**155.81**	**178.61**	**206.43**	**230.47**	**12.7%**

Canada Market Forecast, By Application

Table : Canada Semiconductor Market Revenue (USD million) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	6.99	6.14	6.56	7.89	8.56	9.38	10.39	11.64	13.25	15.16	17.48	19.51	12.5%
Data Processing	7.50	6.57	7.01	8.40	9.09	9.94	10.97	12.27	13.93	15.89	18.28	20.41	12.2%
Industrial	2.75	2.40	2.54	3.02	3.24	3.52	3.86	4.28	4.82	5.46	6.23	6.96	11.5%
Consumer Electronics	1.97	1.72	1.83	2.19	2.37	2.58	2.84	3.17	3.59	4.09	4.69	5.24	12.0%
Automotive	2.51	2.19	2.32	2.76	2.97	3.23	3.54	3.94	4.44	5.04	5.76	6.43	11.6%
Government	0.44	0.37	0.39	0.46	0.49	0.52	0.56	0.61	0.68	0.76	0.85	0.95	10.1%
TOTAL	22.17	19.40	20.65	24.72	26.72	29.17	32.16	35.92	40.71	46.39	53.29	59.49	12.1%

Europe Market Analysis, Insights & Forecast

Section 07

Europe Market Analysis and Insights, By Country

Figure : Europe Semiconductor Market Value (USD billion), by Country, 2021 & 2029

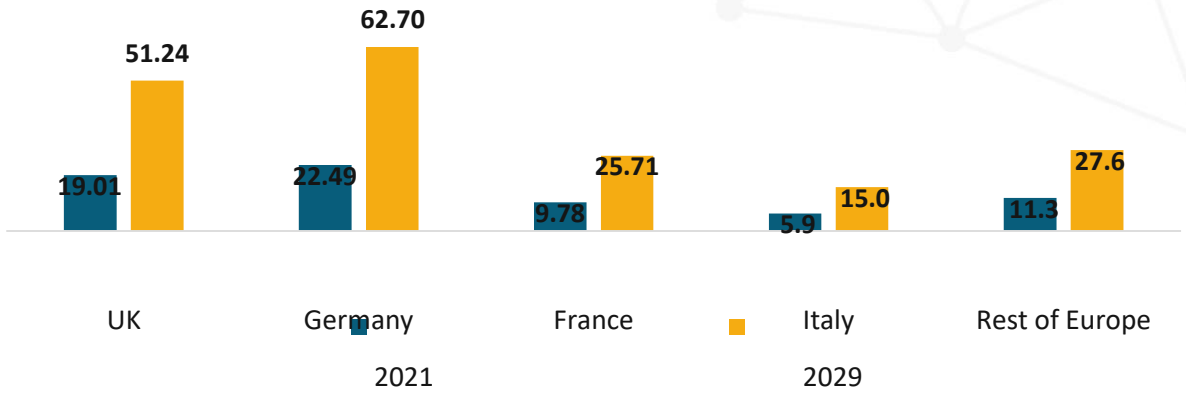
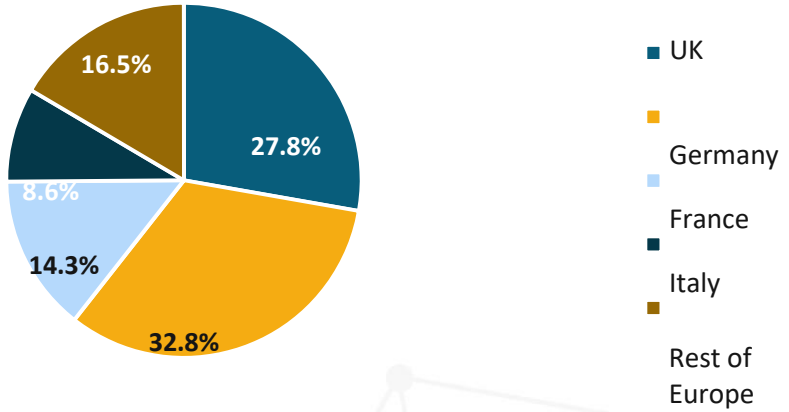


Figure : Europe Semiconductor Market Value Share (%), by Country, 2021



Analysis

- Europe currently stands third in terms of market share comprised by the region. Limited production in of semiconductor chipsets in the region. The mergence of South Korea and Taiwan as the manufacturing superpowers due to continuous developments of the manufacturing hubs in the said countries the Europe slipped third in the tally of regions in the global market. The Europe is looking to invite leading semiconductor manufacturers to invest in Europe and partner with the regional manufacturers to develop sales of semiconductors in the region.
  - For instance, the leading market vendors such as Samsung, Intel and TSMC has declared its plans of making investments of EUR 300 Billion by the end of 2030 in the semiconductor industry in the region of Europe. With collaborated efforts of private entities in the region and favorable government policies the market of Europe is capable of having a steady growth in the market.
- The structural change in the European semiconductor market will provide promising growth to the region. The Europe currently aims to lower the trade deficit by hefty foreign direct investment and increase market competitiveness shown by the European manufacturers elevating their performance in the global market.

Europe Market Forecast, By Component

Table : Europe Semiconductor Market Revenue (USD billion) Forecast, By Component, 2018–2029													
Components	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Memory Devices	14.35	12.80	13.78	16.66	18.24	20.18	22.56	25.53	29.30	33.81	39.36	51.03	15.8%
Logic Devices	12.87	11.45	12.29	14.81	16.18	17.86	19.91	22.47	25.73	29.61	34.38	42.65	14.9%
Analog Devices	8.10	7.19	7.70	9.26	10.09	11.11	12.36	13.92	15.90	18.26	21.16	22.78	12.3%
MPU	9.94	8.80	9.41	11.28	12.26	13.47	14.95	16.80	19.15	21.94	25.36	28.62	12.9%
Discrete Power Devices	6.09	5.38	5.73	6.85	7.43	8.14	9.00	10.09	11.46	13.10	15.09	16.22	11.8%
MCU	5.00	4.40	4.67	5.57	6.02	6.57	7.25	8.09	9.17	10.43	11.98	12.39	10.9%
Sensors	2.43	2.13	2.26	2.68	2.88	3.14	3.45	3.83	4.32	4.90	5.60	6.38	12.0%
Others (DSP, etc.)	1.18	1.03	1.09	1.29	1.39	1.51	1.65	1.83	2.05	2.32	2.64	2.19	6.7%
TOTAL	**59.96**	**53.19**	**56.94**	**68.41**	**74.49**	**81.98**	**91.12**	**102.57**	**117.09**	**134.38**	**155.56**	**182.26**	**13.6%**

Europe Market Forecast, By Application

Table : Europe Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	19.62	17.46	18.76	22.63	24.72	27.31	30.46	34.41	39.42	45.40	52.73	61.79	14.0%
Data Processing	17.53	15.56	16.67	20.05	21.85	24.07	26.78	30.17	34.48	39.60	45.89	53.77	13.7%
Industrial	5.78	5.10	5.43	6.49	7.02	7.68	8.49	9.50	10.78	12.30	14.16	16.59	13.1%
Consumer Electronics	8.20	7.27	7.77	9.32	10.14	11.14	12.37	13.90	15.85	18.17	21.00	24.61	13.5%
Automotive	7.41	6.56	7.00	8.38	9.10	9.99	11.07	12.42	14.14	16.17	18.67	21.87	13.3%
Government	1.42	1.24	1.30	1.54	1.65	1.79	1.96	2.16	2.43	2.74	3.11	3.65	12.0%
TOTAL	**59.96**	**53.19**	**56.94**	**68.41**	**74.49**	**81.98**	**91.12**	**102.57**	**117.09**	**134.38**	**155.56**	**182.26**	**13.6%**

Europe Market Forecast, By Country

Table : Europe Semiconductor Market Revenue (USD billion) Forecast, By Country, 2018–2029													
Country	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
UK	16.58	14.73	15.80	19.01	20.73	22.86	25.45	28.69	32.81	37.71	43.73	51.24	13.8%
Germany	19.32	17.25	18.59	22.49	24.65	27.31	30.55	34.61	39.77	45.94	53.52	62.70	14.3%
France	8.62	7.63	8.15	9.78	10.63	11.67	12.95	14.55	16.58	18.99	21.94	25.71	13.5%
Italy	5.24	4.62	4.92	5.87	6.35	6.95	7.68	8.58	9.74	11.10	12.77	14.96	13.0%
Rest of Europe	10.20	8.95	9.48	11.26	12.12	13.19	14.50	16.13	18.19	20.63	23.60	27.65	12.5%
TOTAL	**59.96**	**53.19**	**56.94**	**68.41**	**74.49**	**81.98**	**91.12**	**102.57**	**117.09**	**134.38**	**155.56**	**182.26**	**13.6%**

U.K. Market Forecast, By Application

Table : U.K. Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	5.46	4.87	5.24	6.33	6.93	7.67	8.57	9.70	11.14	12.85	14.96	17.52	14.2%
Data Processing	4.78	4.26	4.57	5.52	6.03	6.66	7.43	8.39	9.61	11.07	12.86	15.06	14.0%
Industrial	1.63	1.44	1.53	1.83	1.99	2.18	2.41	2.69	3.06	3.49	4.02	4.71	13.1%
Consumer Electronics	2.24	1.99	2.13	2.56	2.79	3.07	3.42	3.85	4.40	5.06	5.86	6.87	13.7%
Automotive	1.97	1.74	1.86	2.23	2.42	2.66	2.95	3.31	3.77	4.32	4.99	5.84	13.4%
Government	0.50	0.44	0.46	0.54	0.58	0.62	0.68	0.74	0.83	0.93	1.05	1.23	11.4%
TOTAL	16.58	14.73	15.80	19.01	20.73	22.86	25.45	28.69	32.81	37.71	43.73	51.24	13.8%

Germany Market Forecast, By Application

Table : Germany Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	6.42	5.76	6.23	7.57	8.33	9.26	10.40	11.83	13.65	15.83	18.52	21.70	14.7%
Data Processing	5.69	5.08	5.49	6.64	7.29	8.09	9.06	10.28	11.82	13.67	15.95	18.69	14.4%
Industrial	1.73	1.53	1.64	1.97	2.14	2.35	2.61	2.94	3.35	3.84	4.44	5.20	13.5%
Consumer Electronics	2.57	2.29	2.47	2.98	3.26	3.61	4.03	4.57	5.24	6.05	7.04	8.25	14.2%
Automotive	2.29	2.03	2.18	2.63	2.87	3.16	3.52	3.97	4.54	5.22	6.05	7.09	13.8%
Government	0.63	0.56	0.59	0.71	0.76	0.83	0.92	1.03	1.17	1.33	1.53	1.79	12.9%
TOTAL	19.32	17.25	18.59	22.49	24.65	27.31	30.55	34.61	39.77	45.94	53.52	62.70	14.3%

France Market Forecast, By Application

Table : France Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	2.82	2.51	2.69	3.24	3.54	3.90	4.35	4.90	5.61	6.45	7.48	8.77	13.8%
Data Processing	2.52	2.23	2.39	2.87	3.12	3.43	3.81	4.29	4.90	5.61	6.50	7.61	13.6%
Industrial	0.83	0.73	0.78	0.92	1.00	1.09	1.20	1.34	1.51	1.72	1.98	2.31	12.8%
Consumer Electronics	1.12	0.99	1.06	1.26	1.37	1.50	1.67	1.87	2.13	2.43	2.81	3.29	13.3%
Automotive	1.00	0.88	0.93	1.12	1.21	1.32	1.46	1.64	1.86	2.12	2.44	2.85	13.1%
Government	0.33	0.29	0.31	0.36	0.39	0.42	0.46	0.51	0.58	0.65	0.75	0.87	12.2%
TOTAL	**8.62**	**7.63**	**8.15**	**9.78**	**10.63**	**11.67**	**12.95**	**14.55**	**16.58**	**18.99**	**21.94**	**25.71**	**13.5%**

Italy Market Forecast, By Application

Table : Italy Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	1.69	1.50	1.60	1.92	2.08	2.29	2.54	2.85	3.25	3.72	4.29	5.03	13.4%
Data Processing	1.51	1.34	1.42	1.70	1.84	2.02	2.24	2.50	2.84	3.25	3.74	4.38	13.2%
Industrial	0.49	0.43	0.45	0.54	0.58	0.62	0.68	0.76	0.86	0.97	1.10	1.29	12.3%
Consumer Electronics	0.72	0.63	0.67	0.80	0.86	0.94	1.04	1.16	1.32	1.50	1.72	2.02	12.9%
Automotive	0.62	0.54	0.57	0.68	0.74	0.80	0.88	0.98	1.11	1.26	1.44	1.69	12.6%
Government	0.22	0.19	0.20	0.23	0.25	0.27	0.30	0.33	0.37	0.41	0.47	0.55	11.7%
TOTAL	5.24	4.62	4.92	5.87	6.35	6.95	7.68	8.58	9.74	11.10	12.77	14.96	13.0%

Asia Pacific Market Analysis, Insights & Forecast

Section 08

Asia Pacific Market Analysis and Insights, By Country

Figure : Asia Pacific Semiconductor Market Value (USD billion), by Country, 2021 & 2029

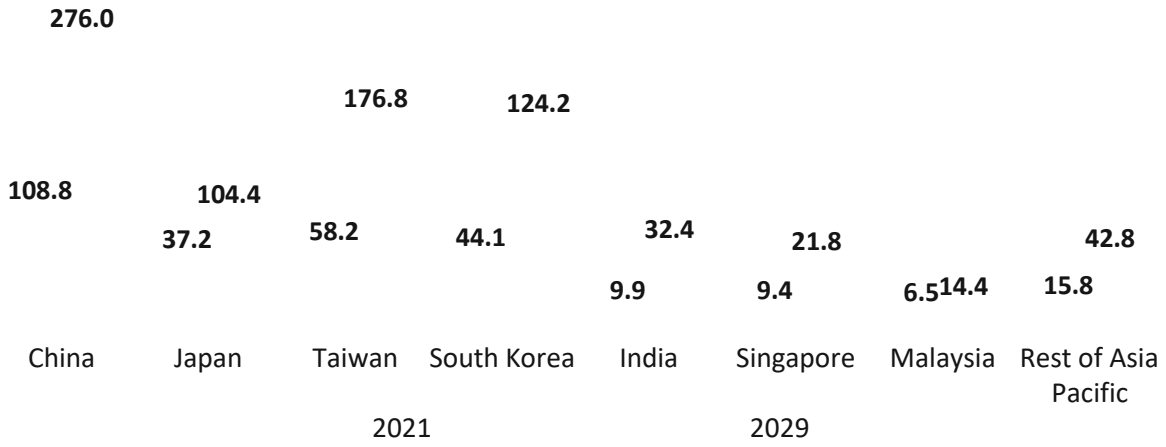
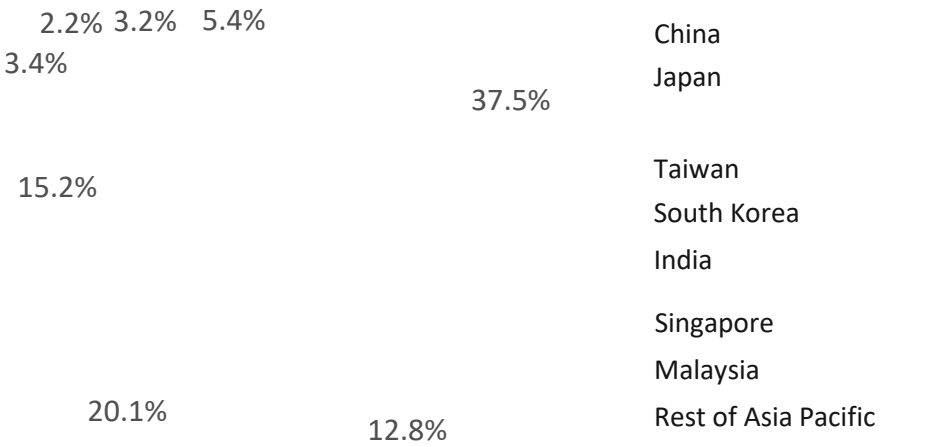
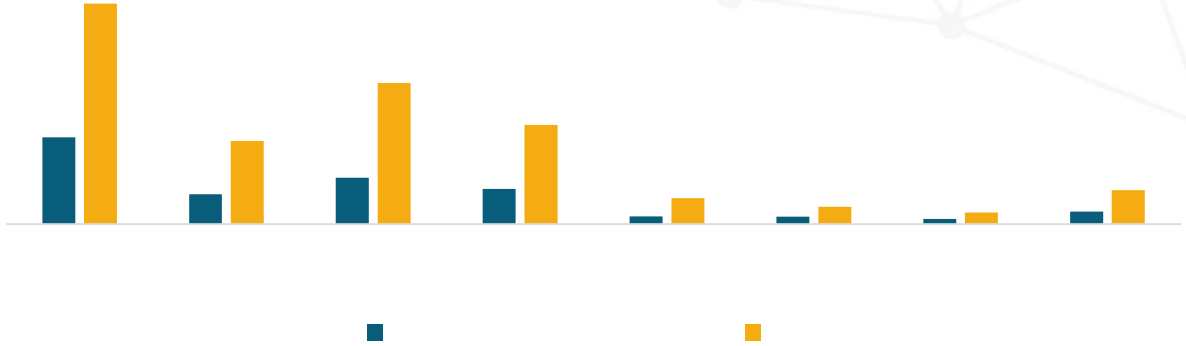


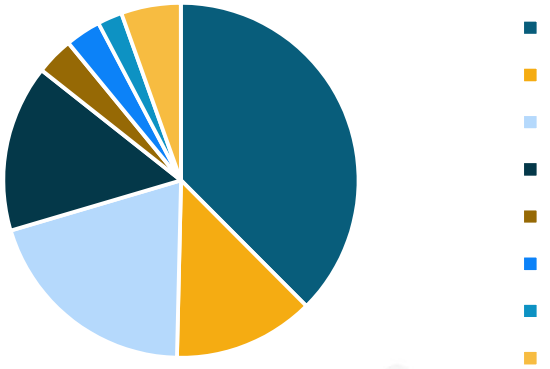
Figure : Asia Pacific Semiconductor Market Value Share (%), by Country, 2021



Analysis

- Asia Pacific is considered to have exponential growth with highest CAGR over the forecast period , owing to growth in the semiconductor industry across China, Taiwan, South Korea, Japan, etc. With respect to the developing countries, 5G infrastructure and embedding technological demand for the smart devices is incredibly increasing than the U.S.; uplifting the market across the region
- The governments of several countries across the regions are providing commendable incentives and are introducing several favorable policies to ensure the bolstering growth of the semiconductor facilities. The countries such as Taiwan, China, and Japan have established a set of policies to encourage customers to set up manufacturing faculties and provide spurring growth for the fabrication facilities.
- Constant development in the technologies has convinced manufacturers to make hefty investments in the research and development programs the developing countries in the region are working extensively to set up 5G connections and are looking to set up fiber optics network across the region to ensure high speed internet across the remote locations and keep the entire region connected. The efforts to strengthen communication network and high speed internet connectivity will reinforce market development prospects.





Asia Pacific Market Forecast, By Component

Table : Asia Pacific Semiconductor Market Revenue (USD billion) Forecast, By Component, 2018–2029													
Components	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Memory Devices	57.34	51.01	55.11	66.81	73.40	81.51	91.41	103.80	119.54	138.39	161.59	191.71	14.7%
Logic Devices	51.62	45.84	49.42	59.80	65.57	72.67	81.35	92.20	105.98	122.46	142.74	168.37	14.4%
Analog Devices	41.38	36.67	39.47	47.68	52.19	57.74	64.52	73.00	83.77	96.63	112.44	132.45	14.2%
MPU	33.13	29.26	31.38	37.77	41.19	45.41	50.56	57.00	65.17	74.91	86.86	101.91	13.8%
Discrete Power Devices	25.74	22.68	24.27	29.15	31.72	34.89	38.76	43.60	49.74	57.04	65.98	77.22	13.6%
MCU	14.09	12.38	13.21	15.81	17.16	18.81	20.83	23.36	26.56	30.37	35.01	40.83	13.2%
Sensors	20.54	17.96	19.07	22.72	24.53	26.76	29.48	32.88	37.19	42.28	48.48	56.25	12.6%
Others (DSP, etc.)	9.44	8.19	8.62	10.17	10.88	11.76	12.83	14.16	15.85	17.82	20.20	22.47	10.9%
TOTAL	**253.29**	**223.99**	**240.55**	**289.92**	**316.65**	**349.55**	**389.73**	**439.99**	**503.81**	**579.90**	**673.30**	**791.19**	**14.0%**

Asia Pacific Market Forecast, By Application

Table : Asia Pacific Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	82.36	73.10	78.79	95.30	104.46	115.73	129.50	146.72	168.59	194.74	226.90	268.45	14.4%
Data Processing	76.86	68.07	73.22	88.37	96.66	106.87	119.33	134.92	154.72	178.35	207.38	244.08	14.1%
Industrial	22.38	19.65	20.95	25.06	27.17	29.78	32.95	36.92	41.95	47.92	55.21	64.40	13.1%
Consumer Electronics	35.41	31.28	33.55	40.38	44.04	48.56	54.07	60.96	69.71	80.13	92.92	109.03	13.8%
Automotive	30.79	27.12	29.02	34.84	37.91	41.69	46.31	52.08	59.40	68.11	78.78	92.17	13.5%
Government	5.48	4.76	5.03	5.96	6.39	6.93	7.58	8.40	9.43	10.65	12.12	13.05	10.7%
TOTAL	**253.29**	**223.99**	**240.55**	**289.92**	**316.65**	**349.55**	**389.73**	**439.99**	**503.81**	**579.90**	**673.30**	**791.19**	**14.0%**

Asia Pacific Market Forecast, By Country

Table : Asia Pacific Semiconductor Market Revenue (USD billion) Forecast, By Country, 2018–2029													
Country	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
China	97.65	85.58	91.08	108.77	117.71	128.73	142.18	159.00	180.32	205.55	236.33	276.05	12.9%
Japan	32.26	28.61	30.81	37.24	40.79	45.16	50.49	57.16	65.63	75.76	88.20	104.44	14.4%
Taiwan	48.61	43.64	47.56	58.17	64.45	72.17	81.59	93.40	108.41	126.47	148.80	176.83	15.5%
South Korea	38.13	33.84	36.48	44.12	48.36	53.58	59.95	67.92	78.04	90.15	105.03	124.22	14.4%
India	8.06	7.31	8.05	9.94	11.11	12.55	14.31	16.52	19.33	22.72	26.93	32.44	16.5%
Singapore	8.62	7.50	7.92	9.38	10.06	10.91	11.94	13.23	14.86	16.78	19.10	21.84	11.7%
Malaysia	6.12	5.29	5.55	6.52	6.95	7.47	8.11	8.92	9.93	11.10	12.52	14.40	11.0%
Rest of Asia Pacific	13.83	12.22	13.11	15.78	17.22	18.99	21.15	23.85	27.29	31.38	36.39	42.76	13.9%
TOTAL	**253.29**	**223.99**	**240.55**	**289.92**	**316.65**	**349.55**	**389.73**	**439.99**	**503.81**	**579.90**	**673.30**	**792.97**	**14.0%**

China Market Forecast, By Application

Table : China Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	32.46	28.56	30.52	36.60	39.76	43.66	48.42	54.36	61.90	70.84	81.77	97.44	13.7%
Data Processing	29.15	25.58	27.27	32.61	35.34	38.71	42.82	47.96	54.47	62.19	71.61	84.19	13.2%
Industrial	8.35	7.27	7.68	9.12	9.80	10.65	11.68	12.98	14.62	16.56	18.91	21.53	11.9%
Consumer Electronics	13.39	11.74	12.50	14.94	16.18	17.71	19.57	21.90	24.85	28.35	32.61	38.09	13.0%
Automotive	11.76	10.26	10.87	12.92	13.92	15.15	16.66	18.54	20.93	23.75	27.18	29.54	11.3%
Government	2.56	2.17	2.24	2.58	2.70	2.84	3.02	3.25	3.54	3.87	4.25	5.24	10.0%
TOTAL	**97.65**	**85.58**	**91.08**	**108.77**	**117.71**	**128.73**	**142.18**	**159.00**	**180.32**	**205.55**	**236.33**	**276.05**	**12.9%**

Japan Market Forecast, By Application

Table : Japan Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	10.53	9.37	10.13	12.29	13.52	15.02	16.86	19.16	22.08	25.58	29.90	35.40	14.7%
Data Processing	9.69	8.60	9.27	11.21	12.29	13.62	15.24	17.27	19.85	22.93	26.73	31.64	14.5%
Industrial	2.92	2.57	2.75	3.29	3.58	3.94	4.37	4.91	5.60	6.41	7.41	8.77	13.7%
Consumer Electronics	4.58	4.05	4.36	5.26	5.76	6.36	7.10	8.03	9.21	10.62	12.35	14.62	14.2%
Automotive	4.05	3.57	3.83	4.61	5.03	5.54	6.17	6.95	7.95	9.13	10.58	12.53	13.9%
Government	0.51	0.45	0.48	0.57	0.62	0.67	0.74	0.83	0.94	1.07	1.23	1.46	13.2%
TOTAL	32.26	28.61	30.81	37.24	40.79	45.16	50.49	57.16	65.63	75.76	88.20	104.44	14.4%

Taiwan Market Forecast, By Application

Table : Taiwan Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	16.25	14.65	16.03	19.69	21.90	24.62	27.95	32.12	37.43	43.84	51.78	61.54	15.9%
Data Processing	14.55	13.07	14.26	17.46	19.36	21.70	24.55	28.13	32.68	38.16	44.94	53.40	15.6%
Industrial	4.34	3.86	4.18	5.07	5.57	6.18	6.93	7.86	9.05	10.46	12.20	14.50	14.7%
Consumer Electronics	7.04	6.31	6.87	8.39	9.29	10.39	11.73	13.41	15.54	18.11	21.28	25.29	15.4%
Automotive	5.95	5.32	5.77	7.03	7.75	8.64	9.72	11.08	12.80	14.87	17.41	20.69	15.1%
Government	0.48	0.42	0.45	0.54	0.59	0.64	0.71	0.80	0.91	1.03	1.19	1.41	13.4%
TOTAL	48.61	43.64	47.56	58.17	64.45	72.17	81.59	93.40	108.41	126.47	148.80	176.83	15.5%

South Korea Market Forecast, By Application

Table : South Korea Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	12.78	11.39	12.32	14.96	16.46	18.30	20.56	23.38	26.96	31.26	36.55	43.23	14.8%
Data Processing	11.72	10.41	11.24	13.61	14.93	16.56	18.56	21.05	24.22	28.00	32.67	38.63	14.5%
Industrial	3.63	3.20	3.42	4.11	4.47	4.91	5.45	6.13	6.98	8.00	9.24	10.93	13.6%
Consumer Electronics	5.14	4.56	4.90	5.92	6.48	7.17	8.02	9.07	10.41	12.01	13.97	16.52	14.3%
Automotive	4.48	3.96	4.24	5.11	5.57	6.15	6.84	7.72	8.83	10.15	11.76	13.91	14.0%
Government	0.37	0.33	0.34	0.41	0.44	0.48	0.52	0.58	0.65	0.74	0.84	0.99	12.4%
TOTAL	**38.13**	**33.84**	**36.48**	**44.12**	**48.36**	**53.58**	**59.95**	**67.92**	**78.04**	**90.15**	**105.03**	**124.22**	**14.4%**

India Market Forecast, By Application

Table : India Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	2.73	2.49	2.75	3.41	3.83	4.34	4.97	5.75	6.75	7.97	9.48	11.42	16.9%
Data Processing	2.44	2.22	2.45	3.03	3.39	3.83	4.37	5.05	5.92	6.97	8.27	9.96	16.7%
Industrial	0.70	0.63	0.69	0.85	0.94	1.05	1.19	1.36	1.57	1.83	2.15	2.60	15.7%
Consumer Electronics	1.10	1.00	1.10	1.35	1.51	1.71	1.94	2.24	2.62	3.07	3.64	4.38	16.4%
Automotive	0.90	0.81	0.89	1.09	1.22	1.37	1.56	1.79	2.09	2.44	2.88	3.47	16.1%
Government	0.18	0.16	0.17	0.21	0.23	0.26	0.29	0.33	0.38	0.44	0.51	0.62	15.2%
TOTAL	8.06	7.31	8.05	9.94	11.11	12.55	14.31	16.52	19.33	22.72	26.93	32.44	16.5%

Singapore Market Forecast, By Application

Table : Singapore Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	2.81	2.46	2.60	3.10	3.33	3.63	3.99	4.43	5.00	5.67	6.47	7.40	2.81
Data Processing	2.58	2.25	2.37	2.81	3.02	3.28	3.59	3.98	4.48	5.06	5.77	6.59	2.58
Industrial	0.80	0.69	0.72	0.85	0.90	0.97	1.06	1.16	1.30	1.45	1.64	1.88	0.80
Consumer Electronics	1.15	1.00	1.06	1.25	1.34	1.46	1.59	1.76	1.98	2.23	2.54	2.90	1.15
Automotive	1.08	0.94	0.99	1.16	1.24	1.34	1.47	1.62	1.81	2.04	2.31	2.64	1.08
Government	0.20	0.17	0.17	0.20	0.21	0.23	0.24	0.27	0.29	0.32	0.36	0.41	0.20
TOTAL	8.62	7.50	7.92	9.38	10.06	10.91	11.94	13.23	14.86	16.78	19.10	21.84	8.62

Malaysia Market Forecast, By Application

Table : Malaysia Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	2.04	1.77	1.86	2.20	2.35	2.54	2.77	3.06	3.42	3.85	4.36	5.01	11.4%
Data Processing	1.81	1.57	1.65	1.94	2.07	2.23	2.42	2.66	2.97	3.33	3.75	4.32	11.1%
Industrial	0.55	0.47	0.49	0.58	0.61	0.65	0.70	0.76	0.84	0.93	1.05	1.20	10.2%
Consumer Electronics	0.84	0.73	0.76	0.89	0.95	1.02	1.10	1.21	1.35	1.50	1.69	1.94	10.8%
Automotive	0.72	0.62	0.65	0.76	0.80	0.86	0.93	1.02	1.12	1.25	1.40	1.61	10.4%
Government	0.15	0.13	0.13	0.15	0.16	0.17	0.18	0.20	0.22	0.24	0.27	0.31	9.6%
TOTAL	6.12	5.29	5.55	6.52	6.95	7.47	8.11	8.92	9.93	11.10	12.52	14.40	11.0%

MEA Market Analysis, Insights & Forecast

Section 09

FORTUNE BUSINESS INSIGHTS

MEA Market Analysis and Insights, By Country

Figure : MEA Semiconductor Market Value (USD billion), by Country, 2021 & 2029

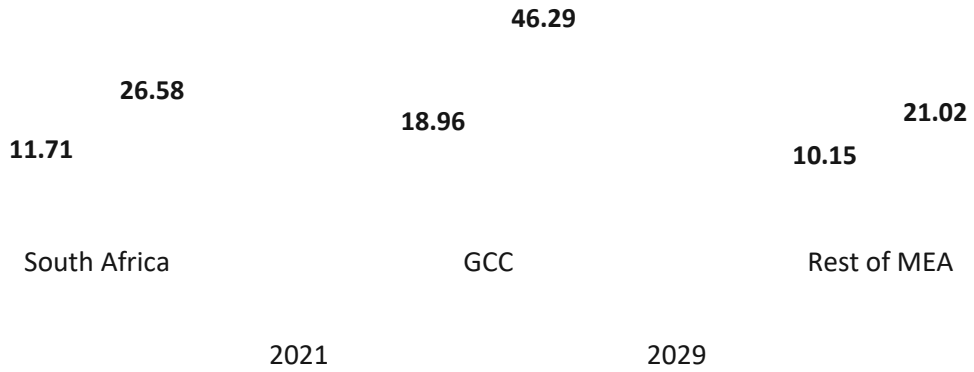
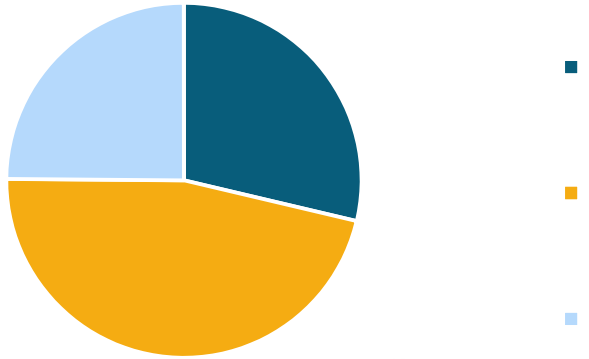


Figure : MEA Semiconductor Market Value Share (%), by Country, 2021

Analysis

- GCC countries are expected to register a hefty chunk of market share in the global market. The investments made by the GCC Countries in investments towards development and manufacturing of computer and electronic equipment is pivoting the market growth at a considerable pace in the market. The countries such as Saudi Arabia and UAE are on the forefront of technology development as well as manufacturing standpoint in the market of Middle East and Africa
  - For instance, in January 2022, Japan based semiconductor manufacturer Yokogawa Electric has finalized its initial proceedings to venture into collaboration with a state owned energy company. Under this collaboration intiative the company will jointly set up an semiconductor manufacturing facility in Saudi Arabia
- UAE is also making a significant contribution in the research and development division to propel forward in innovation and technology and emerge as a emerging and opportunistic market in the global market for semiconductors. According to Mr Al Falasi, Minister of State for Entrepreneurship and SMEs UAE has made staggering investments of USD 1.7bn in the market and are continuously working to increase their engagement in the global landscape.



MEA Market Forecast, By Component

Table : MEA Semiconductor Market Revenue (USD billion) Forecast, By Component, 2018–2029													
Components	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Memory Devices	8.37	7.28	7.77	9.31	10.09	11.03	12.16	13.55	15.28	17.30	19.73	24.41	13.4%
Logic Devices	7.49	6.49	6.90	8.25	8.92	9.72	10.68	11.87	13.36	15.08	17.15	19.91	12.1%
Analog Devices	5.68	4.91	5.21	6.22	6.71	7.29	8.00	8.87	9.96	11.23	12.74	14.37	11.5%
MPU	4.66	4.03	4.27	5.09	5.48	5.95	6.52	7.22	8.09	9.11	10.32	11.08	10.6%
Discrete Power Devices	3.80	3.27	3.46	4.10	4.41	4.77	5.21	5.76	6.43	7.22	8.16	8.45	9.7%
MCU	3.49	3.00	3.16	3.75	4.02	4.34	4.73	5.21	5.81	6.50	7.33	7.23	8.8%
Sensors	2.15	1.84	1.94	2.29	2.45	2.64	2.87	3.16	3.51	3.92	4.41	5.35	11.8%
Others (DSP, etc.)	1.70	1.46	1.53	1.80	1.92	2.07	2.24	2.46	2.73	3.04	3.41	3.10	7.0%
TOTAL	**37.34**	**32.29**	**34.24**	**40.83**	**44.01**	**47.81**	**52.41**	**58.09**	**65.18**	**73.41**	**83.26**	**93.89**	**11.4%**

MEA Market Forecast, By Application

Table : MEA Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	12.44	10.80	11.49	13.75	14.87	16.21	17.83	19.84	22.33	25.24	28.72	34.18	12.6%
Data Processing	11.11	9.63	10.23	12.21	13.19	14.36	15.77	17.51	19.68	22.20	25.23	28.54	11.7%
Industrial	3.55	3.05	3.20	3.79	4.04	4.36	4.73	5.20	5.78	6.45	7.24	8.17	10.6%
Consumer Electronics	4.96	4.29	4.54	5.42	5.83	6.33	6.94	7.68	8.62	9.70	10.99	11.27	9.9%
Automotive	4.58	3.94	4.17	4.95	5.31	5.75	6.28	6.93	7.75	8.70	9.82	10.33	10.0%
Government	0.70	0.59	0.61	0.72	0.76	0.80	0.86	0.93	1.03	1.13	1.25	1.41	9.3%
TOTAL	**37.34**	**32.29**	**34.24**	**40.83**	**44.01**	**47.81**	**52.41**	**58.09**	**65.18**	**73.41**	**83.26**	**93.89**	**11.4%**

MEA Market Forecast, By Country

Table : MEA Semiconductor Market Revenue (USD billion) Forecast, By Country, 2018–2029													
Country	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
South Africa	10.74	9.28	9.83	11.71	12.61	13.68	14.98	16.59	18.59	20.92	23.70	26.58	11.2%
GCC	17.11	14.86	15.83	18.96	20.53	22.41	24.68	27.48	30.97	35.04	39.91	46.29	12.3%
Rest of MEA	9.49	8.15	8.58	10.15	10.86	11.72	12.75	14.02	15.61	17.45	19.64	21.02	9.9%
TOTAL	**37.34**	**32.29**	**34.24**	**40.83**	**44.01**	**47.81**	**52.41**	**58.09**	**65.18**	**73.41**	**83.26**	**93.89**	**11.4%**

South Africa Market Forecast, By Application

Table : South Arica Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	3.55	3.08	3.27	3.91	4.23	4.61	5.06	5.63	6.33	7.15	8.13	9.70	12.6%
Data Processing	3.14	2.72	2.89	3.44	3.72	4.04	4.43	4.92	5.52	6.22	7.06	7.97	11.5%
Industrial	0.95	0.81	0.85	1.00	1.07	1.15	1.25	1.37	1.52	1.69	1.90	1.91	8.7%
Consumer Electronics	1.40	1.21	1.28	1.53	1.64	1.79	1.96	2.17	2.43	2.74	3.11	3.32	10.6%
Automotive	1.36	1.17	1.24	1.47	1.57	1.70	1.86	2.05	2.29	2.56	2.89	3.04	9.9%
Government	0.35	0.29	0.31	0.36	0.38	0.40	0.43	0.46	0.51	0.56	0.62	0.62	7.5%
TOTAL	10.74	9.28	9.83	11.71	12.61	13.68	14.98	16.59	18.59	20.92	23.70	26.58	11.2%

GCC Market Forecast, By Application

Table : GCC Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	5.75	5.02	5.36	6.45	7.01	7.68	8.49	9.49	10.73	12.18	13.93	17.54	14.0%
Data Processing	5.12	4.45	4.75	5.70	6.18	6.75	7.44	8.30	9.36	10.60	12.09	14.03	12.4%
Industrial	1.53	1.32	1.39	1.66	1.78	1.93	2.11	2.33	2.61	2.93	3.31	3.24	8.9%
Consumer Electronics	2.29	1.99	2.11	2.53	2.73	2.98	3.28	3.64	4.10	4.63	5.27	5.55	10.7%
Automotive	2.01	1.74	1.84	2.20	2.37	2.57	2.82	3.12	3.50	3.94	4.47	5.18	11.9%
Government	0.41	0.35	0.37	0.43	0.46	0.50	0.55	0.60	0.67	0.75	0.84	0.74	6.9%
TOTAL	17.11	14.86	15.83	18.96	20.53	22.41	24.68	27.48	30.97	35.04	39.91	46.29	12.3%

Latin America Market Analysis, Insights & Forecast

Section 10

Latin America Market Analysis and Insights, By Country

Figure : Latin America Semiconductor Market Value (USD billion), by Country, 2021 & 2029

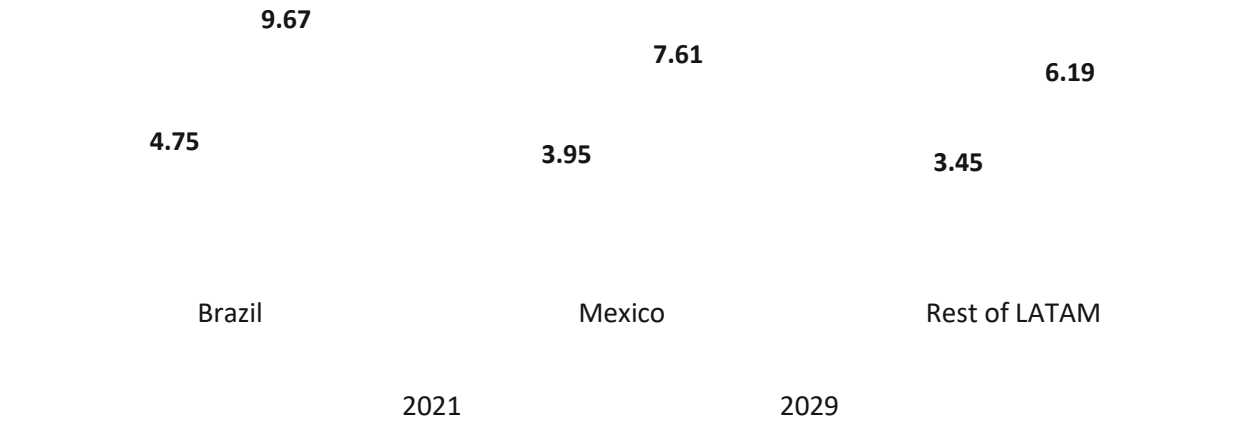
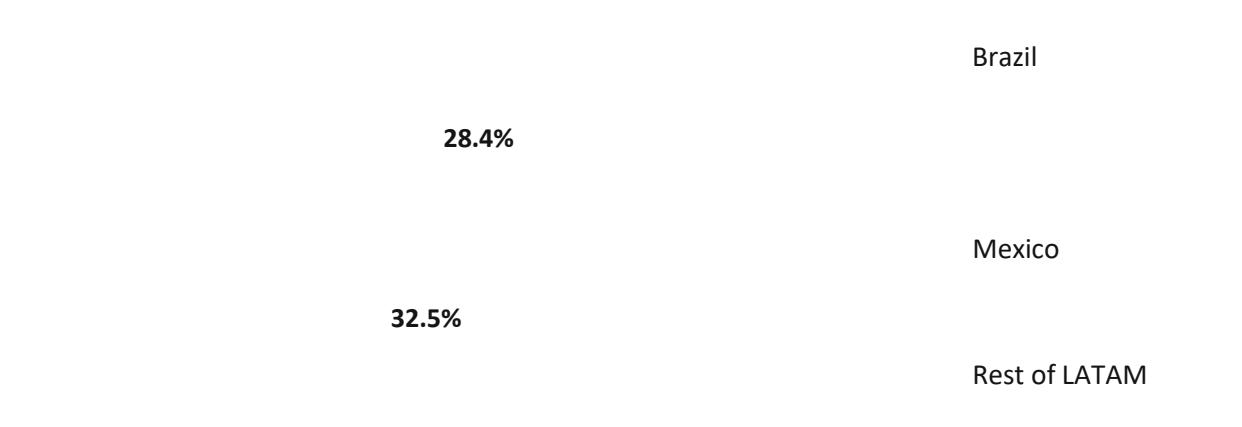


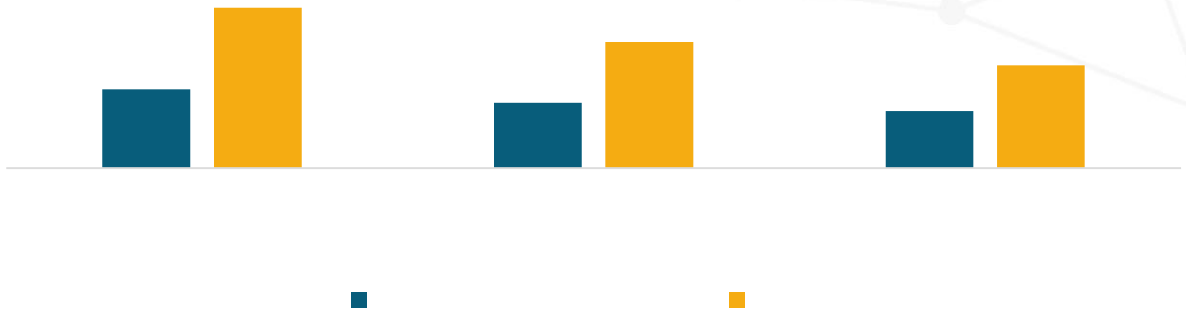
Figure : Latin America Semiconductor Market Value Share (%), by Country, 2021

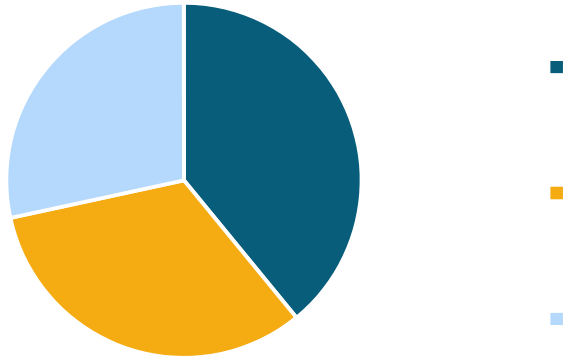


Analysis

- The market in Latin America is experiencing a severe shortage of semiconductor chipsets and is troubling all the stake holders operating in multiple industries across the region. The Brazil and Mexico witnessed considerable decrement in the automotive production mainly due to the industry wide scarce availability of the semiconductor chips in the region. The manufacturers will try and capitalize the situation and are expected to enter in the comparatively lesser competitive market and strengthen the sales footprints in the Latin America region
- Many companies are allocating investment fund for the development of infrastructure and encourage investors as well as manufacturers to venture into semiconductor development and manufacturing in the region of Latin America
  - For instance, in September 2021, BTG Pactual which operates as a Brazil based investment bank has announced a multi market private investment fund allocation for the semiconductor industry.
- There are very limited manufacturers operating in electronic component sector making the market heavily based on imports. Nearly 97% of electronic components utilized in Mexico are procured from import based trade. Thus, investments for research purposes and development of manufacturing clusters in the region are the two main focus points needs to be

addressed in the region of Latin America.





Latin America Market Forecast, By Component

Table : Latin America Semiconductor Market Revenue (USD billion) Forecast, By Component, 2018–2029													
Components	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Memory Devices	3.44	2.80	2.71	2.82	2.74	2.69	2.65	2.61	2.53	2.41	2.27	6.15	12.3%
Logic Devices	3.01	2.44	2.36	2.45	2.37	2.33	2.29	2.24	2.18	2.06	1.94	5.00	11.3%
Analog Devices	2.48	2.01	1.93	2.01	1.94	1.89	1.86	1.82	1.76	1.66	1.56	3.57	9.1%
MPU	1.84	1.49	1.43	1.48	1.42	1.39	1.36	1.33	1.28	1.21	1.13	2.84	10.4%
Discrete Power Devices	1.60	1.28	1.23	1.27	1.21	1.18	1.15	1.12	1.08	1.01	0.94	2.30	9.6%
MCU	1.31	1.05	1.00	1.03	0.98	0.95	0.92	0.90	0.86	0.80	0.75	1.76	8.7%
Sensors	0.80	0.64	0.61	0.62	0.59	0.56	0.54	0.52	0.50	0.46	0.42	1.19	10.6%
Others (DSP, etc.)	0.64	0.51	0.48	0.48	0.46	0.44	0.42	0.40	0.38	0.35	0.32	0.67	5.6%
TOTAL	15.12	12.20	11.73	12.15	11.70	11.44	11.20	10.93	10.56	9.97	9.33	23.47	10.5%

Latin America Market Forecast, By Application

Table : Latin America Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	5.08	4.12	3.97	4.13	3.99	3.91	3.85	3.76	3.65	3.46	3.25	8.80	12.0%
Data Processing	4.30	3.48	3.35	3.47	3.35	3.28	3.22	3.14	3.04	2.88	2.70	6.88	10.8%
Industrial	1.37	1.09	1.05	1.07	1.03	1.00	0.97	0.94	0.90	0.84	0.78	1.97	9.8%
Consumer Electronics	2.02	1.63	1.57	1.62	1.56	1.53	1.49	1.46	1.41	1.33	1.24	2.82	8.8%
Automotive	1.87	1.50	1.44	1.49	1.43	1.39	1.36	1.32	1.27	1.20	1.12	2.51	8.4%
Government	0.48	0.38	0.36	0.36	0.34	0.33	0.32	0.30	0.29	0.26	0.24	0.49	5.3%
TOTAL	15.12	12.20	11.73	12.15	11.70	11.44	11.20	10.93	10.56	9.97	9.33	23.47	10.5%

Latin America Market Forecast, By Country

Table : Latin America Semiconductor Market Revenue (USD billion) Forecast, By Country, 2018–2029													
Country	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Brazil	5.83	4.73	4.56	4.75	4.59	4.51	4.43	4.34	4.21	4.00	3.76	9.67	11.2%
Mexico	4.93	3.97	3.82	3.95	3.81	3.72	3.64	3.55	3.42	3.23	3.03	7.61	10.4%
Rest of Latin America	4.36	3.50	3.35	3.45	3.31	3.21	3.13	3.04	2.92	2.74	2.55	6.19	9.4%
TOTAL	15.12	12.20	11.73	12.15	11.70	11.44	11.20	10.93	10.56	9.97	9.33	23.47	10.5%

Brazil Market Forecast, By Application

Table : Brazil Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	1.93	1.57	1.53	1.59	1.55	1.53	1.51	1.49	1.45	1.38	1.31	3.37	11.7%
Data Processing	1.68	1.36	1.32	1.37	1.33	1.31	1.29	1.27	1.23	1.17	1.10	2.84	11.4%
Industrial	0.53	0.43	0.41	0.42	0.40	0.39	0.38	0.37	0.35	0.33	0.31	0.79	10.2%
Consumer Electronics	0.80	0.65	0.62	0.65	0.63	0.62	0.60	0.59	0.57	0.54	0.51	1.32	11.2%
Automotive	0.70	0.56	0.54	0.56	0.54	0.52	0.51	0.50	0.48	0.45	0.42	1.09	10.7%
Government	0.20	0.16	0.15	0.15	0.14	0.14	0.13	0.13	0.12	0.11	0.10	0.26	8.9%
TOTAL	5.83	4.73	4.56	4.75	4.59	4.51	4.43	4.34	4.21	4.00	3.76	9.67	11.2%

Mexico Market Forecast, By Application

Table : Mexico Semiconductor Market Revenue (USD billion) Forecast, By Application, 2018–2029													
Application	2018H	2019H	2020H	2021A	2022E	2023F	2024F	2025F	2026F	2027F	2028F	2029F	CAGR (2022-2029)
Networking & Communications	1.64	1.33	1.28	1.33	1.29	1.26	1.24	1.22	1.18	1.12	1.05	2.65	10.8%
Data Processing	1.40	1.13	1.09	1.13	1.09	1.07	1.05	1.02	0.99	0.93	0.87	2.20	10.6%
Industrial	0.47	0.38	0.36	0.37	0.35	0.34	0.33	0.32	0.31	0.29	0.27	0.67	9.6%
Consumer Electronics	0.64	0.51	0.49	0.51	0.49	0.48	0.47	0.45	0.44	0.41	0.38	0.97	10.2%
Automotive	0.58	0.46	0.44	0.46	0.44	0.43	0.42	0.40	0.39	0.36	0.34	0.85	10.0%
Government	0.20	0.16	0.15	0.15	0.15	0.14	0.14	0.13	0.13	0.12	0.11	0.27	9.3%
TOTAL	4.93	3.97	3.82	3.95	3.81	3.72	3.64	3.55	3.42	3.23	3.03	7.61	10.4%

Company Profiles

Section 12

Broadcom, Inc. (1/3)

Company Name
Broadcom, Inc.

Year of Establishment
1961

Headquarters
California, United States

Revenue (2021)
USD 27.5 billion

President / CEO/ Founder
Mr. Hock E. Tan

Employee Strength
21,000

Website
www.broadcom.com

Company Overview

- Broadcom, Inc. designs, manufactures and provides solutions for 23 categories of semiconductor and infrastructure software solutions
- For the year 2020 the R&D investments for the company was USD 5 billion
- The company has more than 23,000 patents for it's products
- The company provides solutions for application such as WI-FI ecosystem, Data Center Solution, Broadband Access Solutions, CA Technologies Software, and Automotive Solutions.

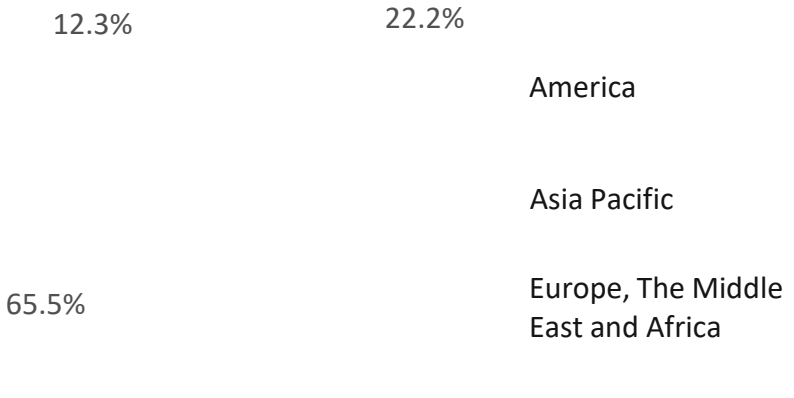
Business Overview

Semiconductor Solutions
Infrastructure Software

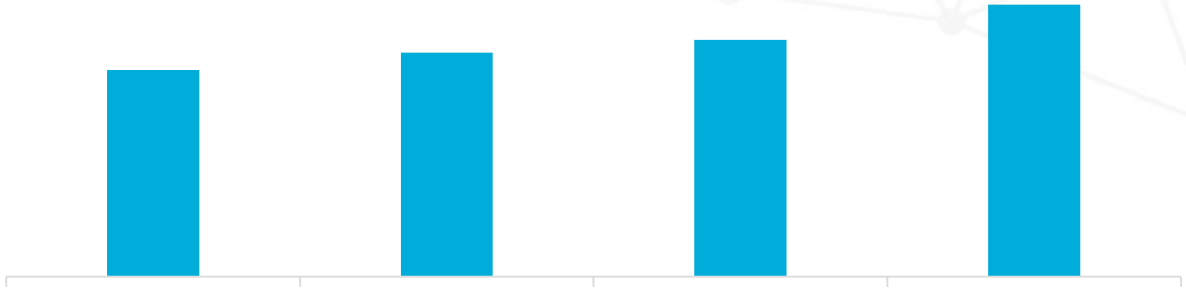
Broadcom, Inc. (2/3)

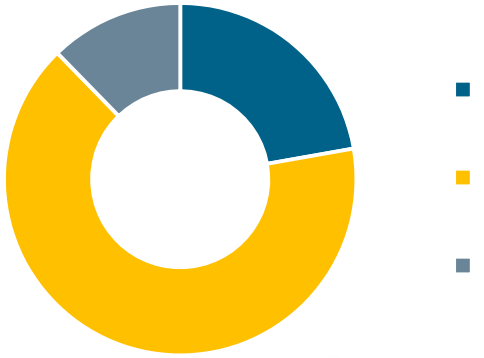
Revenues (USD billion), 2018-2021

Breakdown of Net Sales (%), By Region, 2021



Segmental Market Revenue (USD billion),2021





Broadcom, Inc. (3/3)

Product Portfolio	
Storage and Systems	• Storage Adapters • Controllers • ICs • Fiber Channel Network • PCIe Switches and Bridges
Wireless	• Amplifiers • Filters • RF Components • SoCs and Processors
Wired Connectivity	• Ethernet Connectivity, Switching and PHYs • Broadband: CPE-gateway, Infrastructure and Set top box • Embedded and Networking Processors
Optical Products	• Fiber Optic modules and Components • LEDs and Displays • Motion Control Encoders • Optocouplers and Opto-Isolators • Optical Sensors

Intel Corporation (1/3)

Company Name
Intel Corporation

Year of Establishment
1968

Headquarters
California, United States

Revenue (2021)
USD 79.0 billion

President / CEO/ Founder
Mr. Patrick Gelsinger

Employee Strength
110,600

Website
www.intel.com

Company Overview

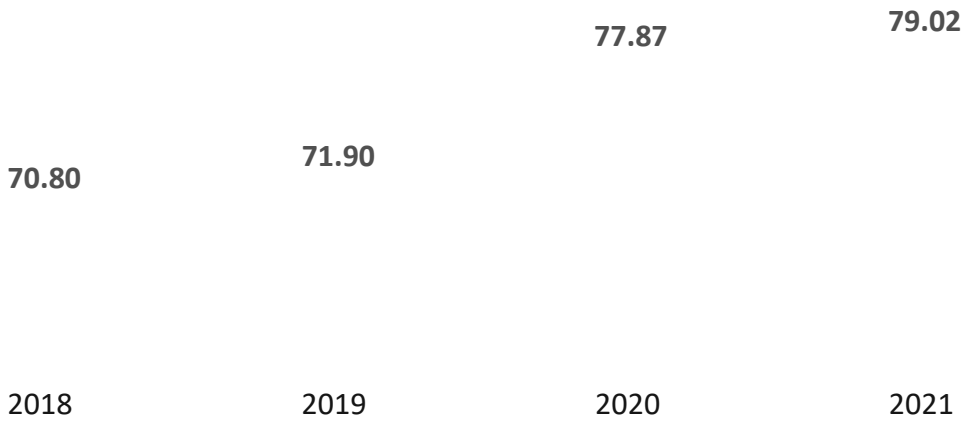
- Intel Corporations is designer, manufacturer and seller of microprocessor solutions around the globe.
- In the year ended 2020 the company invested USD 13.6 billion in Research & Development
- The company is the inventor x86 series of microprocessors, which are found in most of the personal computers.
- Some of the major clients of the company are Dell, Lenevo, and HP Inc.

Business Overview

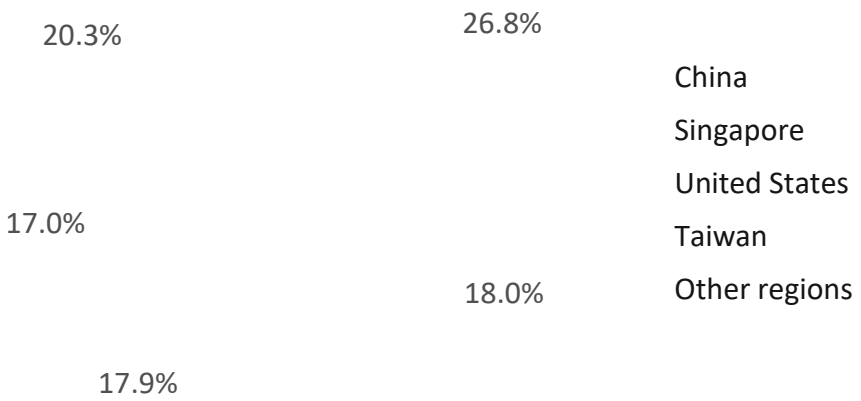
Autonomous Driving	**5G Network**	**Client Connectivity and Client Computing**
Cloud Computing	IoT	AI and Analytics

Intel Corporation (2/3)

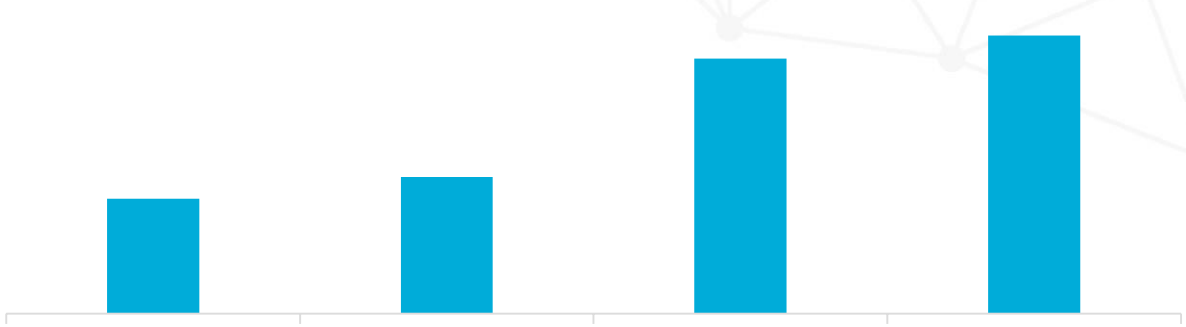
Revenues (USD billion), 2018-2021

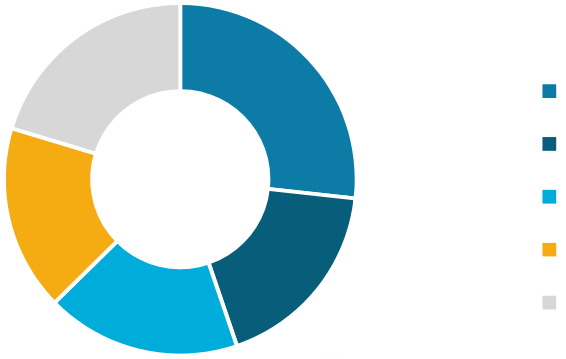


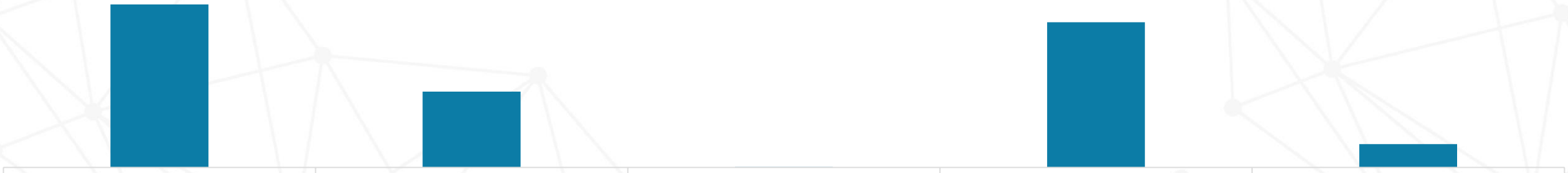
Breakdown of Net Sales (%), By Region, 2021



Segmental Market Revenue (USD billion),2021







Intel Corporation (3/3)

Product Portfolio	
Processors	Structured ASICs
Memory & Storage	System & Devices
Wireless Products	Networking & IO
FPGAs & Programmable Devices	Server Products
Chipsets	Power Solutions

Qualcomm Technologies, Inc. (1/3)

Company Name

Qualcomm Technologies, Inc.

Year of Establishment

1985

Headquarters

California, United States

Revenue (2021)

USD 33.6 billion

President / CEO/ Founder

Mr. Cristiano Amon

Employee Strength

41,000

Website

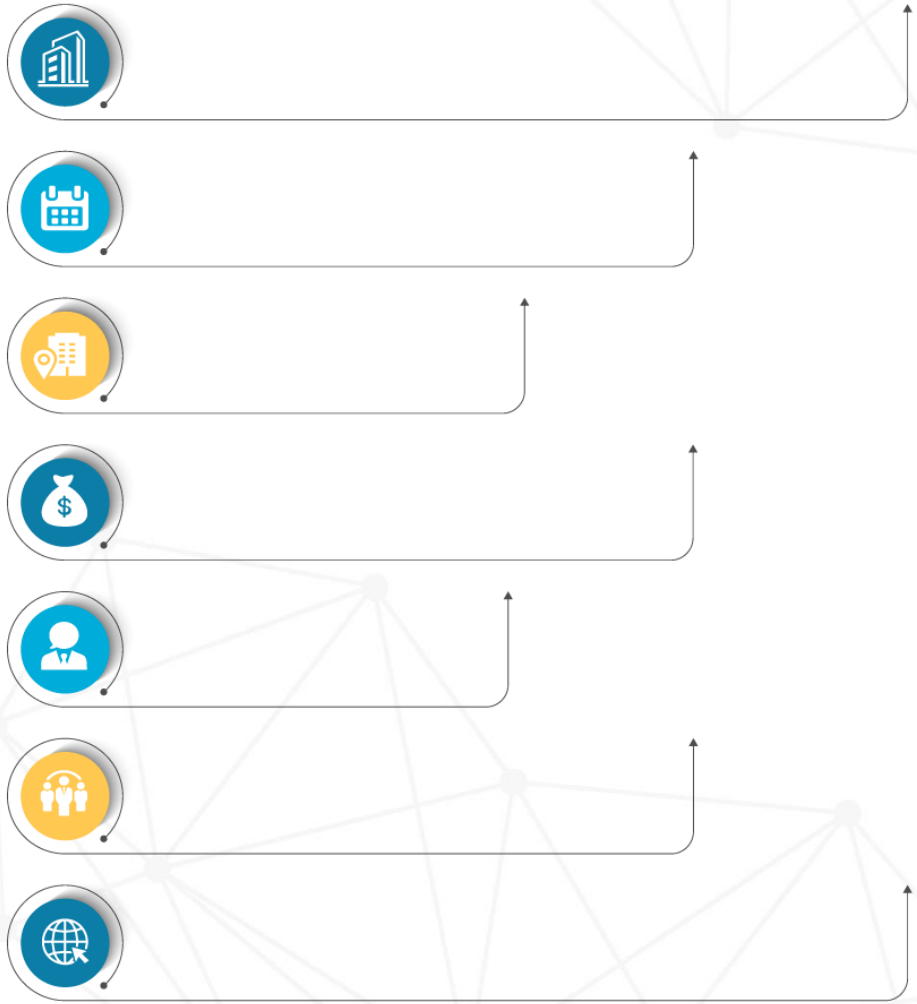
www.qualcomm.com

Company Overview

- Qualcomm Technologies, Inc. is designer, producer and seller of software and hardware solutions.
- Intel invested USD 5.97 billion in Research & Development for the year 2020
- The company has 140,000 patents and patent applications globally
- The company provides applications for products such as Bluetooth, Modem-RF Systems, Processors, and WI-FI.

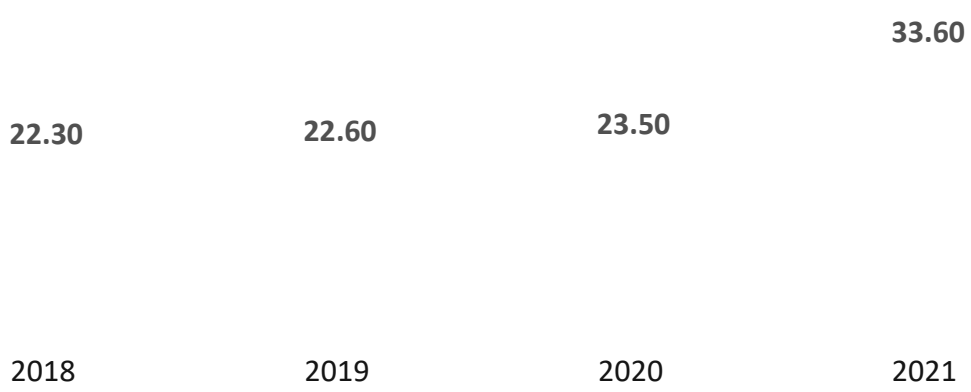
Business Overview

Qualcomm CDMA Technologies	**Qualcomm Technology Licensing**
Qualcomm Strategic Initiatives	

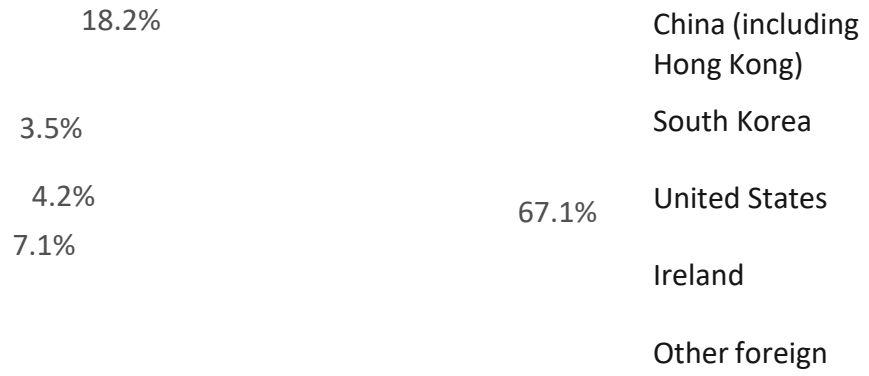


Qualcomm Technologies, Inc. (2/3)

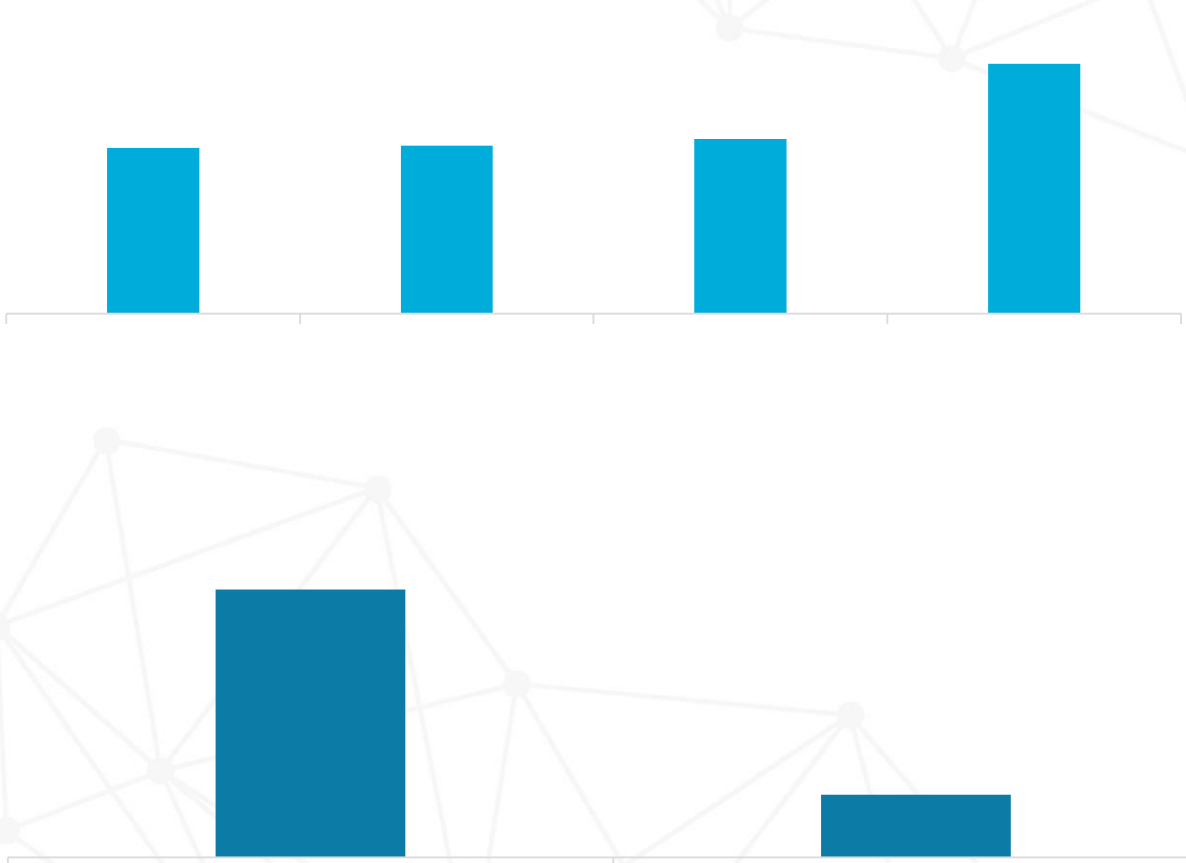
Revenues (USD billion), 2018-2021

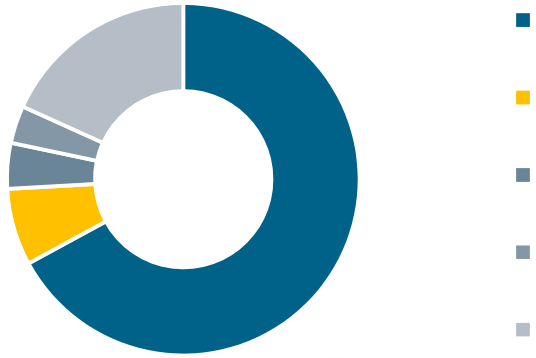


Breakdown of Net Sales (%), By Region, 2021



Segmental Market Revenue (USD billion), 2021





Qualcomm Technologies, Inc. (3/3)

Product Portfolio	
Mobile	VR and AR
Laptop	Consumer Electronics
Camera	Wearables
Automotive	Industrial IoT
Networking	Processors

SK HYNIX INC. (1/3)

Company Name
SK HYNIX INC.

Year of Establishment
1983

Headquarters
Gyeonggi, South Korea

Revenue (2021)
USD 30.1 billion

President / CEO/ Founder
Mr. Lee Seok-Hee

Employee Strength
36,854

Website
www.skhynix.com

Company Overview

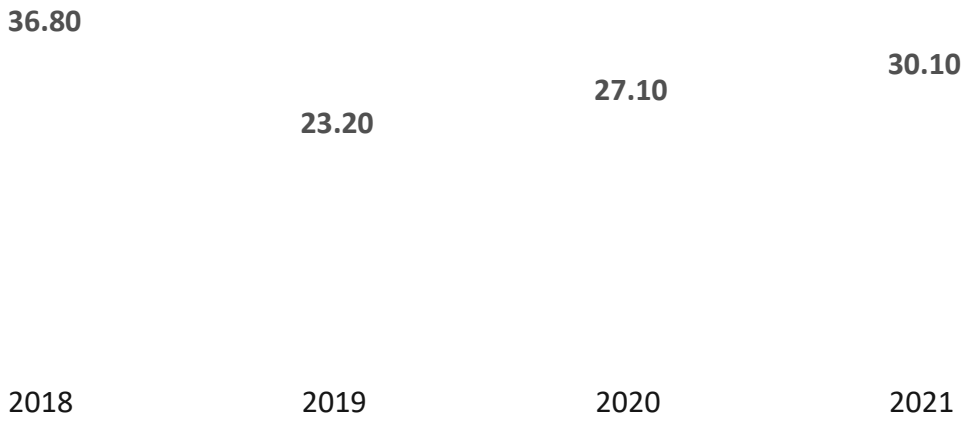
- SK HYNIX INC. is a semiconductor designer, manufacturer and service provider.
- The company invested USD2.7 billion in Research and Development activities in the year 2020.
- The company has 24 sales offices, 4 production sites, and 4 R&D subsidiaries around the world.
- The company provides solutions for products such as Computing, Consumer, Graphics, and Mobile.

Business Overview

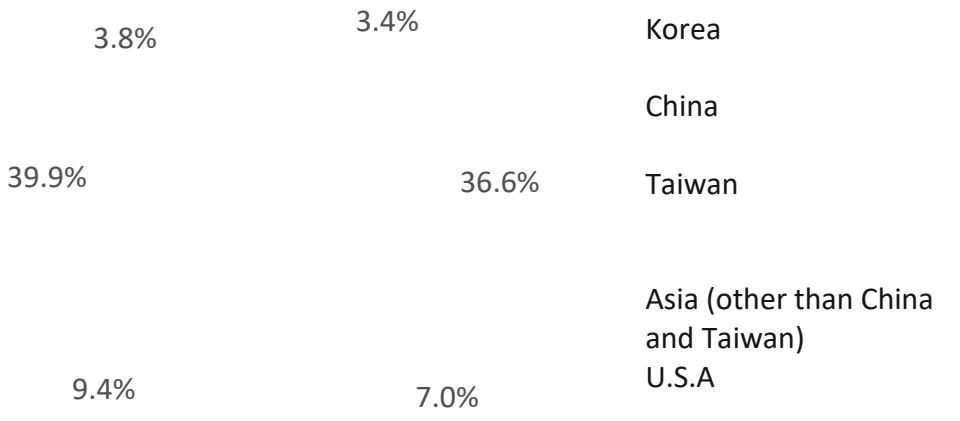
DRAM
NAND Flash

SK HYNIX INC. (2/3)

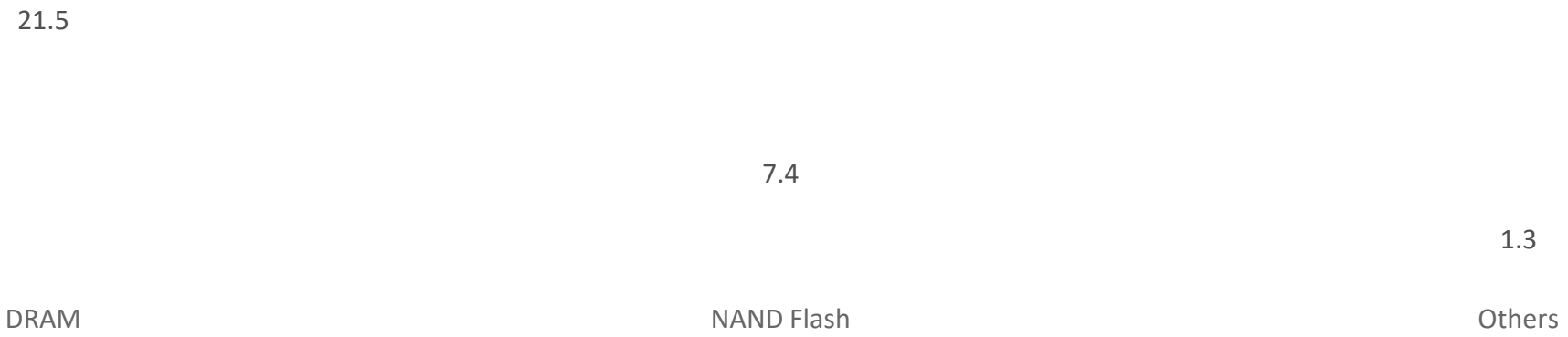
Revenues (USD billion), 2018-2021

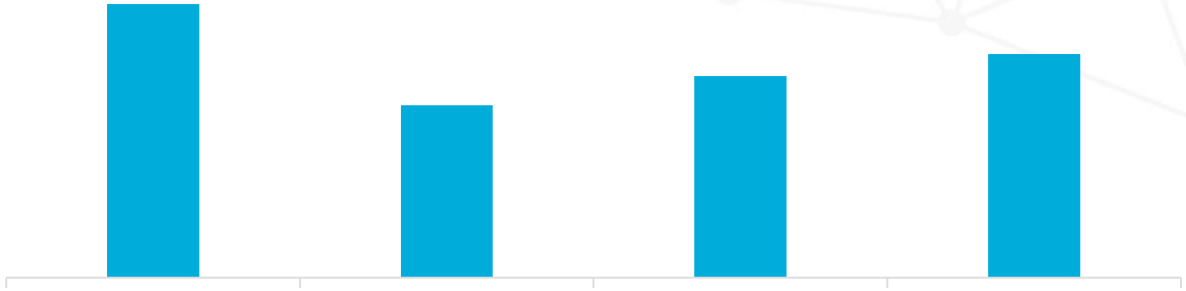


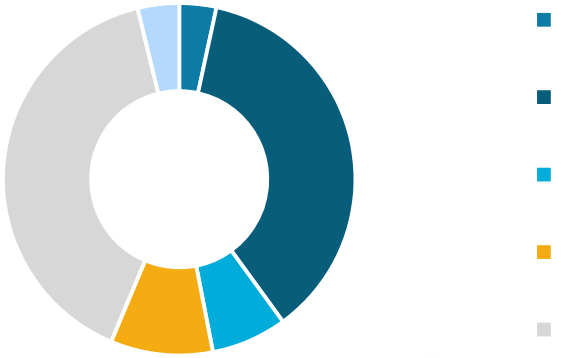
Breakdown of Net Sales (%), By Region, 2021



Segmental Market Revenue (USD billion),2021







SK HYNIX INC. (3/3)

Product Portfolio	
DRAM	• Module • DDR • LPDDR • HBM • GDDR
NAND Storage	• UFS • eMMC
SSD	• Enterprise SSD • Client SSD
Automotive	• uMCP • eMCP
CMOS Image Sensor	• --

Texas Instruments Incorporated (1/3)

Company Name
Texas Instruments Incorporated

Year of Establishment
1930

Headquarters
Texas, United States

Revenue (2021)
USD 14.46 billion

President / CEO/ Founder
Mr. Richard K. Templeton

Employee Strength
30,000

Website
www.ti.com

Company Overview

- Texas Instruments Incorporated designs, manufactures, tests and sells semiconductor solutions.
- The company has around 14 manufacturing facilities present in Asia, North America, and Europe.
- The company invested USD 1.53 billion in R&D for the year 2020
- The company provides solutions for products such as Automotive, Communications, Equipment, Industrial, Personal Electronics, Enterprise Systems, and Technologies

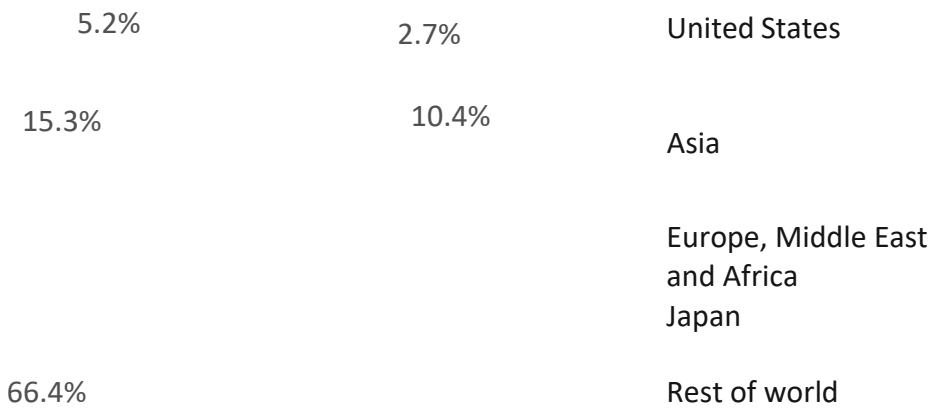
Business Overview

Analog
Embedded Processing

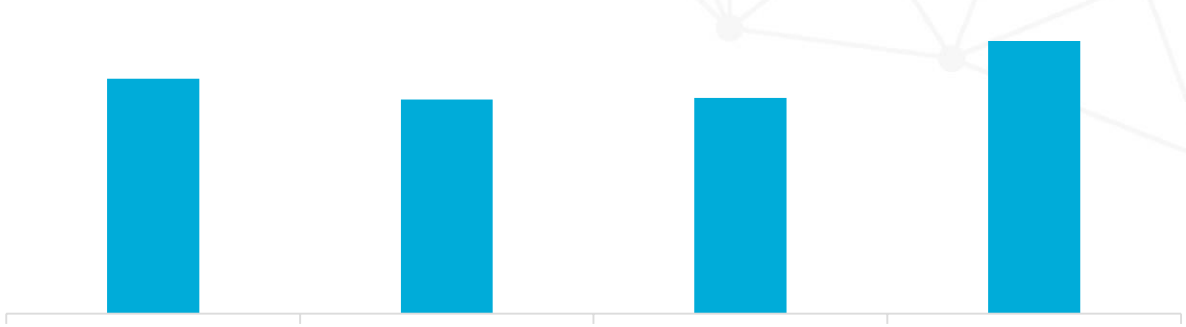
Texas Instruments Incorporated (2/3)

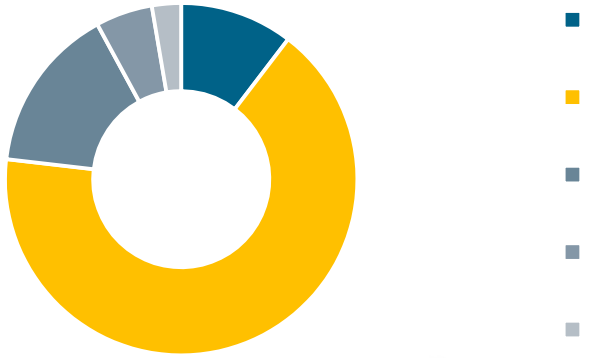
Revenues (USD billion), 2018-2021

Breakdown of Net Sales (%), By Region, 2021



Segmental Market Revenue (USD billion), 2021





Texas Instruments Incorporated (3/3)

Product Portfolio	
Amplifiers	Audio
Clock & Timing	Data Converters
Microcontrollers (MCU)	Power Management
Processors	RF & Microwave
Motor Drivers	Wireless Connectivity
Logic	Sensors

Toshiba Corporation (1/3)

Company Name

Toshiba Corporation

Year of Establishment

1875

Headquarters

Tokyo, Japan

Revenue (2021)

USD 28.6 billion

President / CEO/ Founder

Mr. Satoshi Tsunakawa

Employee Strength

117,300

Website

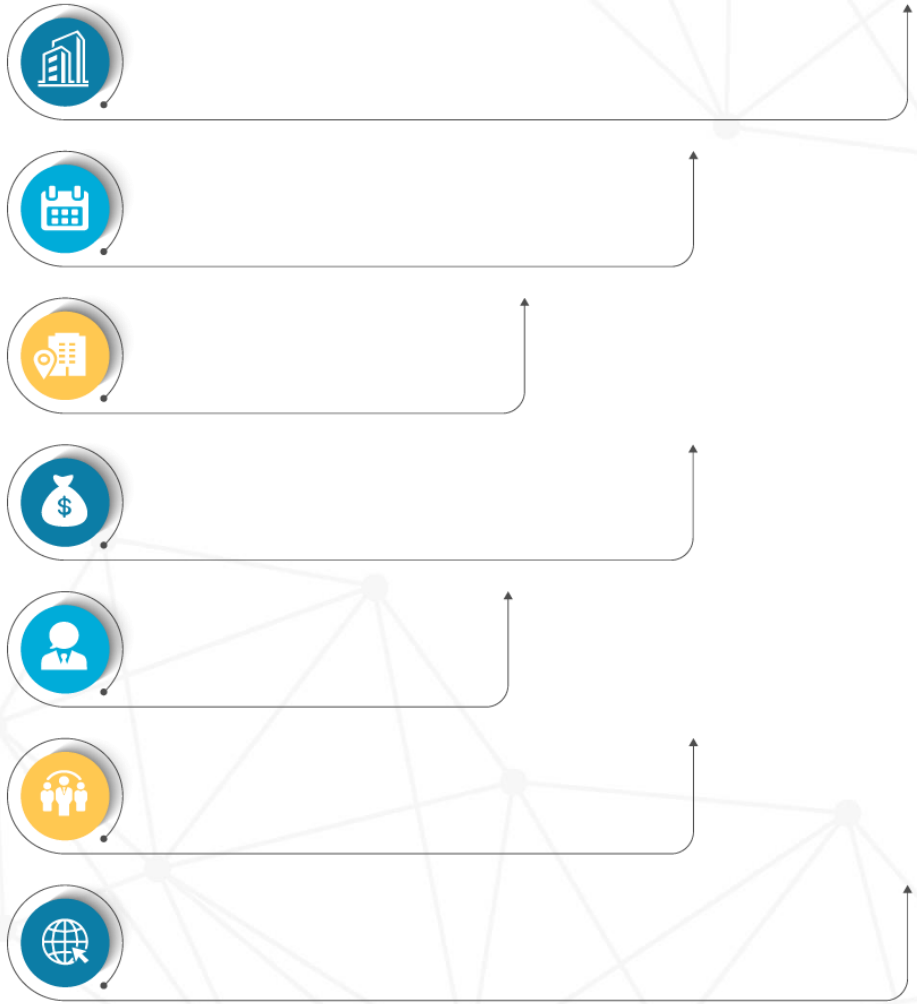
www.toshiba.com

Company Overview

- Toshiba Corporation is designs, manufacturer, and seller of semiconductor solutions.
- The company has global presence and invested USD 1.35 billion in R&D for the year 2020
- The company provides solutions for products such as Communications Equipment, Consumer Electronics, Enterprise Systems, and Technologies.

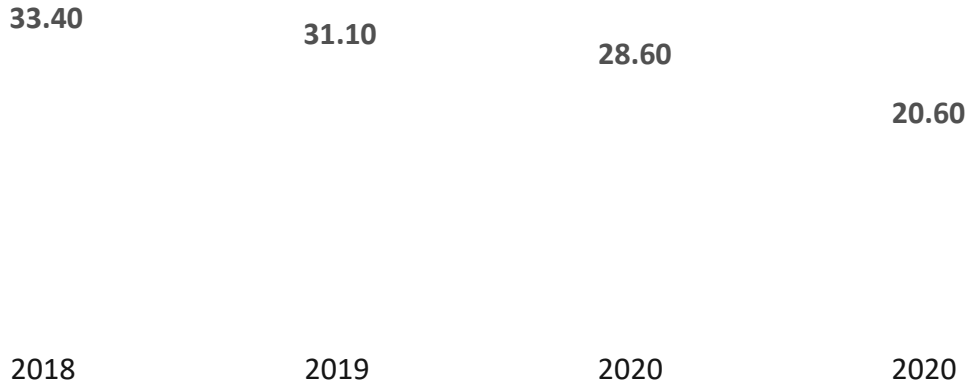
Business Overview

Energy Systems and Solutions	**Infrastructure Systems and Solutions**	**Building Solutions**
Retail and Printing Solutions	Electronic Devices and Storage solutions	Digital Solutions

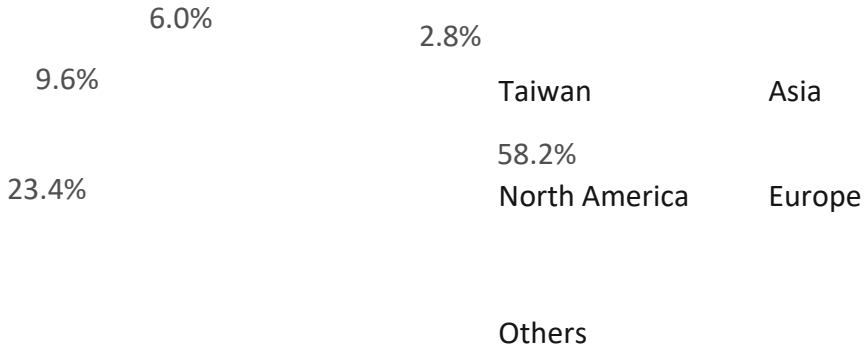


Toshiba Corporation (2/3)

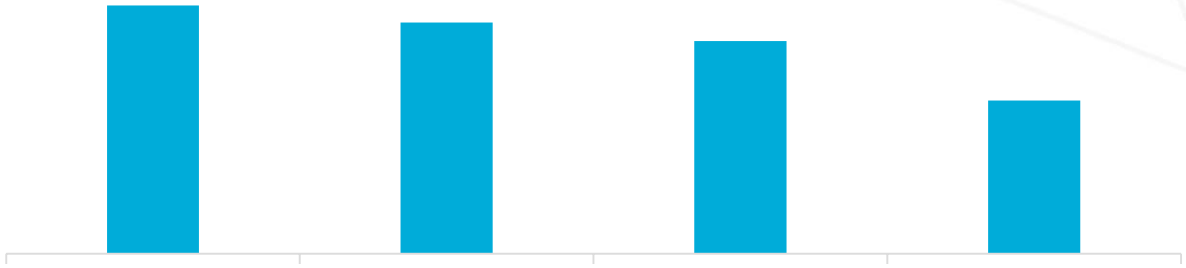
Revenues (USD billion), 2018-2021

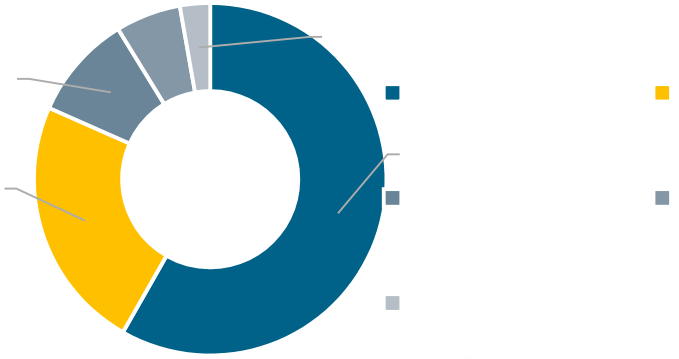


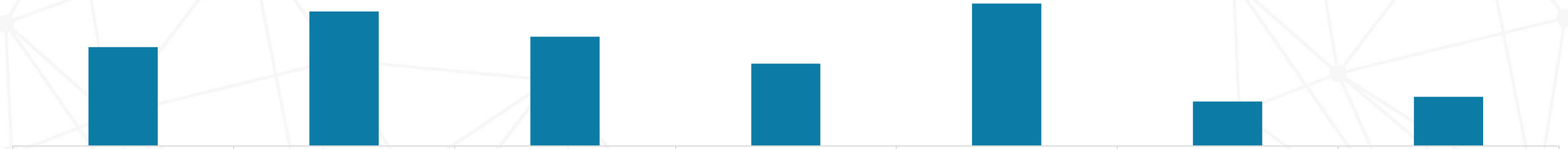
Breakdown of Net Sales (%), By Region, 2021



Segmental Market Share (%), 2021







Toshiba Corporation (3/3)

Product Portfolio	
Power Management ICs	MOSFETs
Optical	Intelligent ICs
Linear ICs	Motor Driver ICs
Diodes	Bipolar Transistors / IGBTs
High Power Devices	Microcontrollers
Sensors	Linear Image Sensors

Micron Technology, Inc. (1/3)

Company Name
Micron Technology, Inc.

Year of Establishment
1978

Headquarters
Idaho, United States

Revenue (2021)
USD 27.04 billion

President / CEO/ Founder
Mr. Sanjay Mehrotra

Employee Strength
43,000

Website
www. micron.com

Company Overview

- Micron Technology, Inc. is a memory & storage solution provider.
- The company has more than 44,000 patents at the end of FY2020, which is 10 percentage more than the number of patients at the end of FY 2019.
- The company has presence in 17 countries with 13 manufacturing units and 14 customer labs and invested around USD 2.3 billion in the year 2020.
- The company provides solutions for applications such as 5G, Automotive, Consumer, Industrial IoT, Mobile, Networking, and Server.

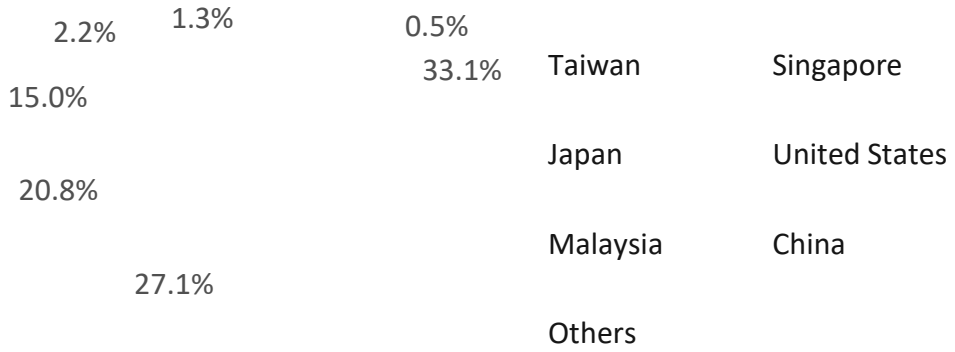
Business Overview

CNBU	SBU
MBU	EBU

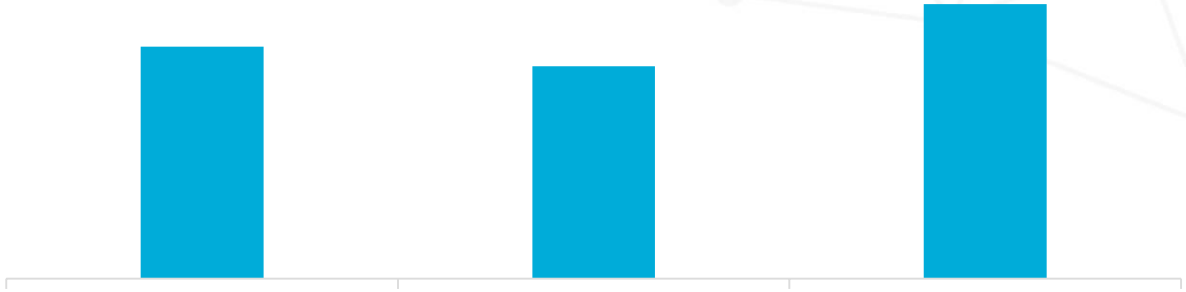
Micron Technology, Inc. (2/3)

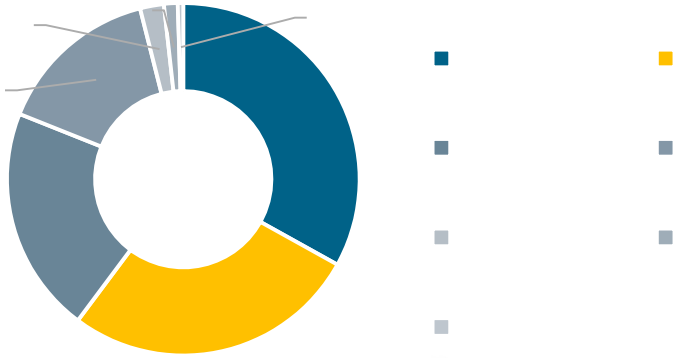
Revenues (USD million), 2019-2021

Breakdown of Net Sales (%), By Region, 2021



Segmental Market Revenue (USD million),2021





Micron Technology, Inc. (3/3)

Product Portfolio	
DRAM	DRAM Modules
Managed NAND	Multichip Packages
NAND Flash	NOR Flash
Memory Cards	SSDs
Graphic Memory	Storage

NVIDIA Corporation (1/3)

Company Name

NVIDIA Corporation

Year of Establishment

1993

Headquarters

California, United States

Revenue (2021)

USD 26.91 billion

President / CEO/ Founder

Mr. Jen-Hsun Huang

Employee Strength

14,226

Website

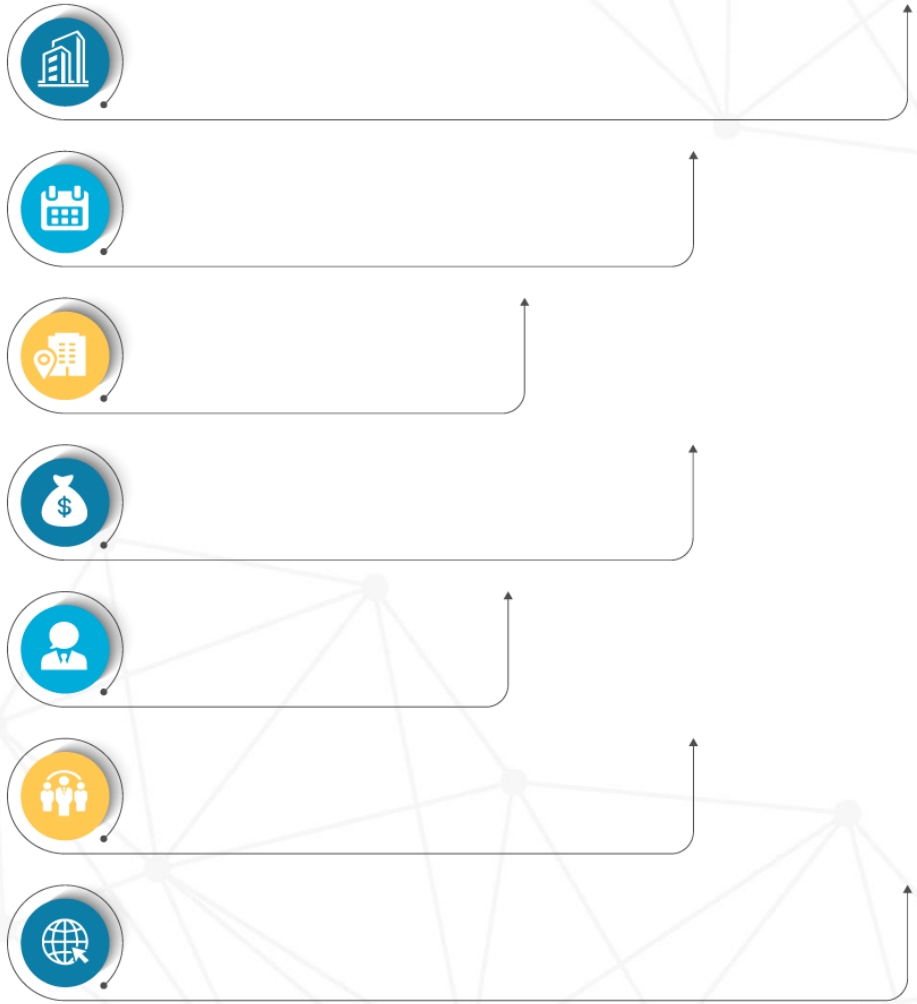
www.nvidia.com

Company Overview

- NVIDIA Corporation is a computer graphic designer and processor solution provider
- The company invested USD 2.8 billion for Research and Development activities in the year 2020.
- Some of the latest projects that the company is handling is self driving cars, super computer, etc.
- The company provides solution to the following industries, namely game development, healthcare, education & research, industrial, media & entertainment, public sector, retail, smart cities, super computing, telecommunications, transportation, etc.

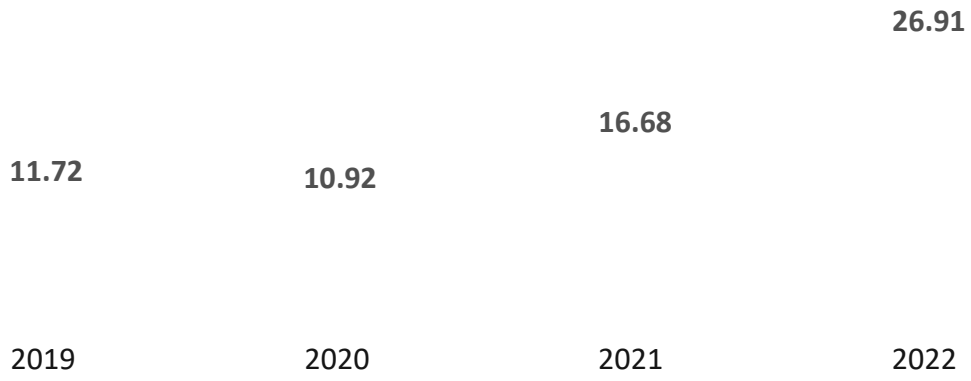
Business Overview

GPU
Tegra Processor

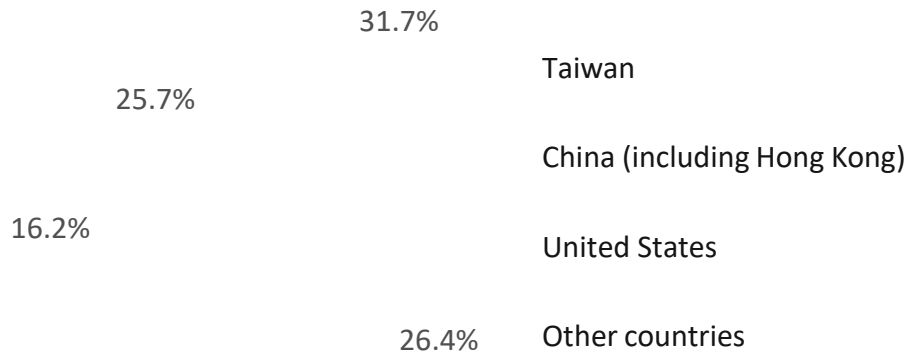


NVIDIA Corporation (2/3)

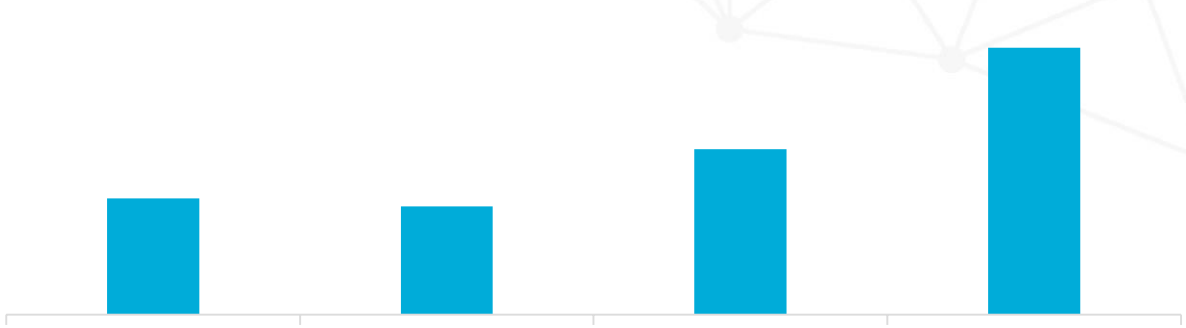
Revenues (USD billion), 2019-2022

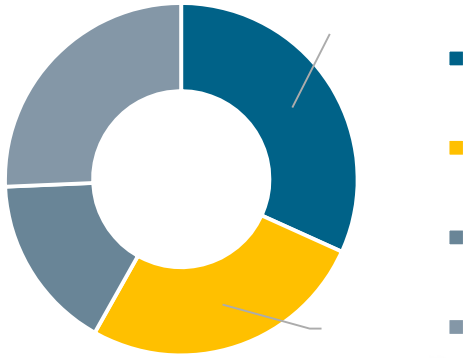


Breakdown of Net Sales (%), By Region, 2022



Segmental Market Revenue (USD billion), 2022





NVIDIA Corporation (3/3)

Product Portfolio	
Graphic Cards	Laptops
G-Sync Monitors	Desktop Workstations
DGX Stations	Cloud and Data Center
GPU	Networking
Embedded Systems	Autonomous Machines
Self Driving Cars	Design and Visualization

NXP Semiconductors (1/3)

Company Name

NXP Semiconductors

Year of Establishment

2006

Headquarters

Eindhoven, The Netherlands

Revenue (2021)

USD 11.06 billion

President / CEO/ Founder

Mr. Kurt Sievers

Employee Strength

31,078

Website

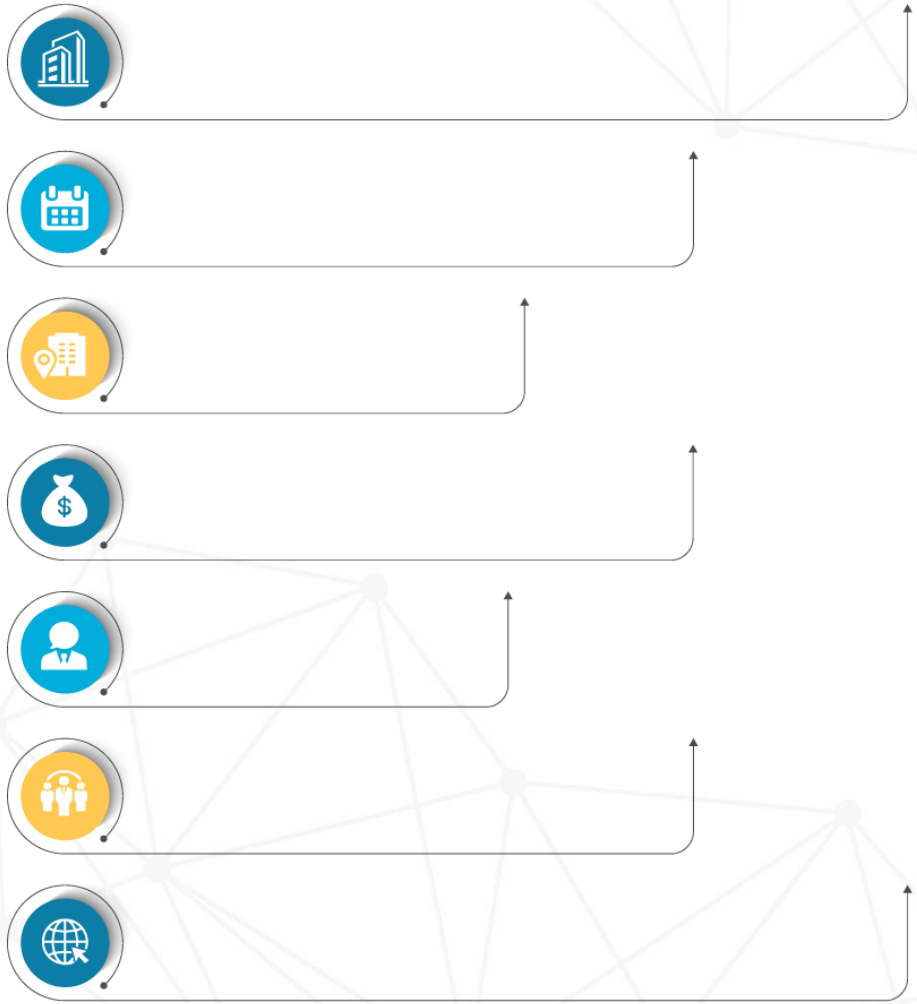
www.nxp.com

Company Overview

- NXP Semiconductors has a combined experience of 60 years with 11,000+ engineers.
- The company has presence in more than 30 countries, with ~9,000 patents globally.
- The company provides solution to the following applications:
  - Automotive
  - Mobile
  - Industrial
  - Smart City
  - Communication Infrastructure

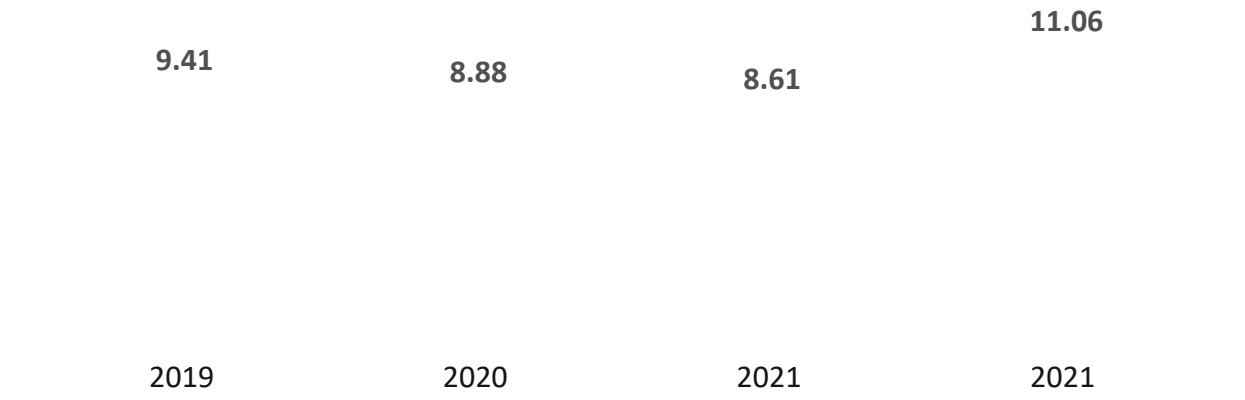
Business Overview

Automotive	**Industrial and IoT**
Mobile	Communication Infrastructure and Others

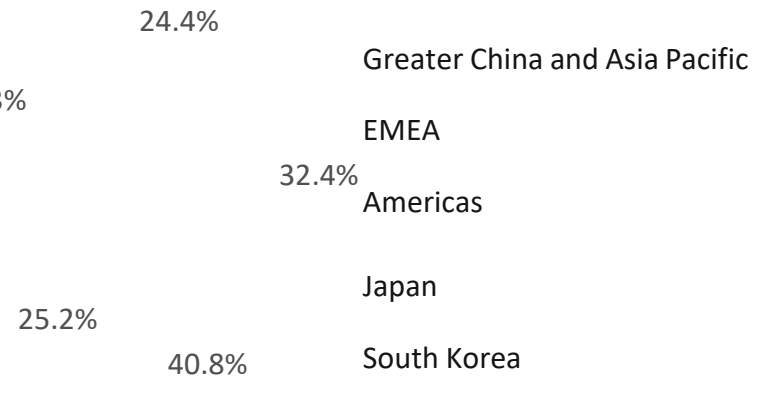


NXP Semiconductors (2/3)

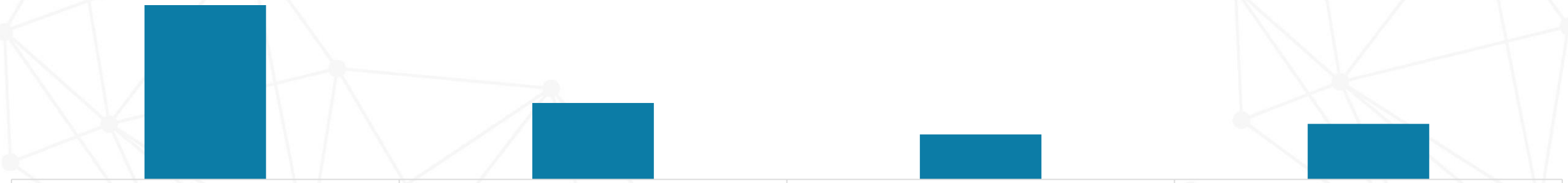
Revenues (USD billion), 2019-2021



Breakdown of Net Sales (%), By Region, 2021



Segmental Market Revenue (USD billion), 2021



NXP Semiconductors (3/3)

Product Portfolio	
Arm Processors	Arm MCUs
Audio	Interfaces
Power Management	RF
RFID/NFC	Security and Authentication
Sensors	Wireless Connectivity

Taiwan Semiconductors (1/3)

Company Name

Taiwan Semiconductors

Year of Establishment

1979

Headquarters

Hsinchu, Taiwan

Revenue (2021)

USD 49.2 billion

President / CEO/ Founder

Mr. Wang Shiu Ting

Employee Strength

1,494

Website

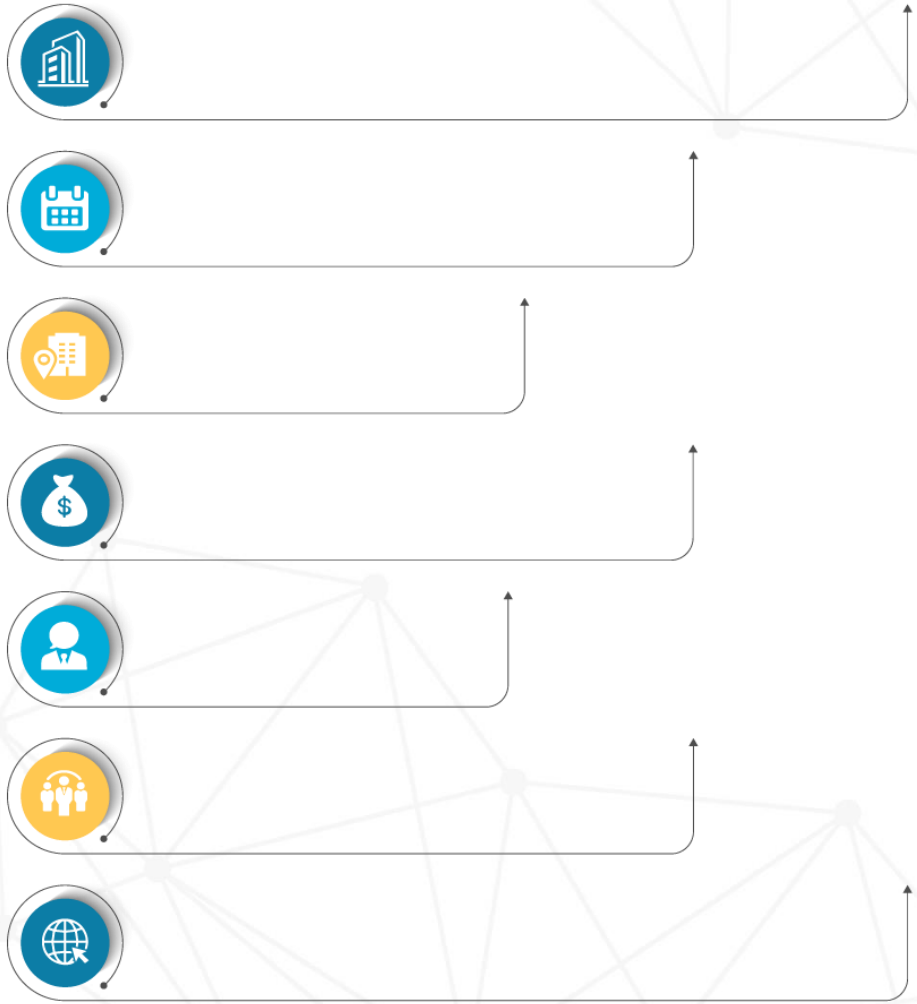
www.taiwansemi.com

Company Overview

- Taiwan Semiconductor is a manufacturer and seller of various electronic component solutions.
- The company has around 20 offices globally, which includes its sales office and manufacturing facilities.
- The company provides solutions for products such as AEC-Q Qualified, Diodes, Protection Devices, ICs, and MOSFETs.

Business Overview

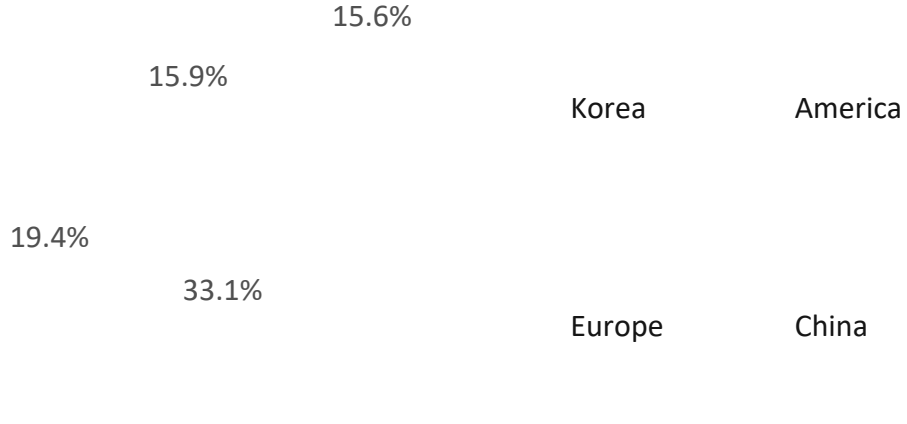
Rectifiers
Bar Coders



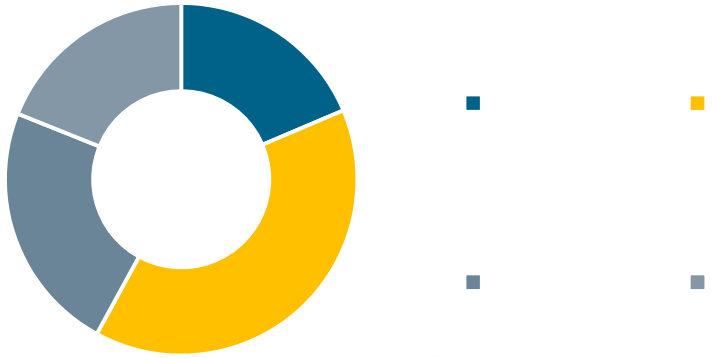
Taiwan Semiconductors (2/3)

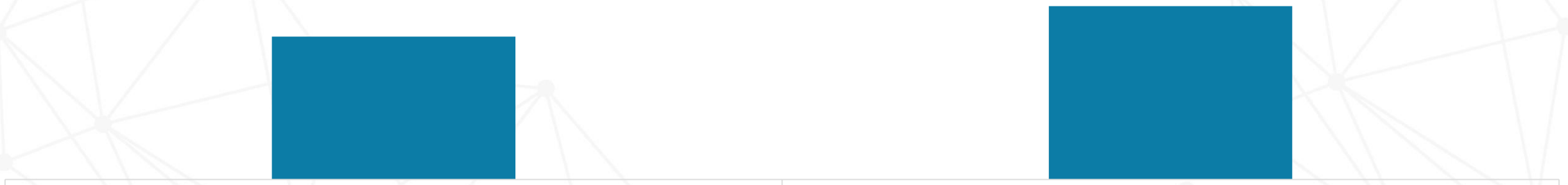
Revenues (USD billion), 2019-2021

Breakdown of Net Sales (%), By Region, 2021



Segmental Market Revenue (%), 2021





Taiwan Semiconductors (3/3)

Product Portfolio	
Discrete Devices	• Bridge Rectifiers • Diode • DIAC and Thyristor • ESD Protection • MOSFET • Transistor
Power ICs	• Amplifier and Comparator • Analog IC • Linear Voltage Regulator • Switching Regulator • Voltage Reference • Half Effect Sensor • Lighting IC

SAMSUNG (1/3)

Company Name

SAMSUNG

Year of Establishment

1969

Headquarters

Suwon-si, South Korea

Revenue (2021)

USD 196.2 billion

President / CEO/ Founder

Dr. Kinam Kim

Employee Strength

104,043

Website

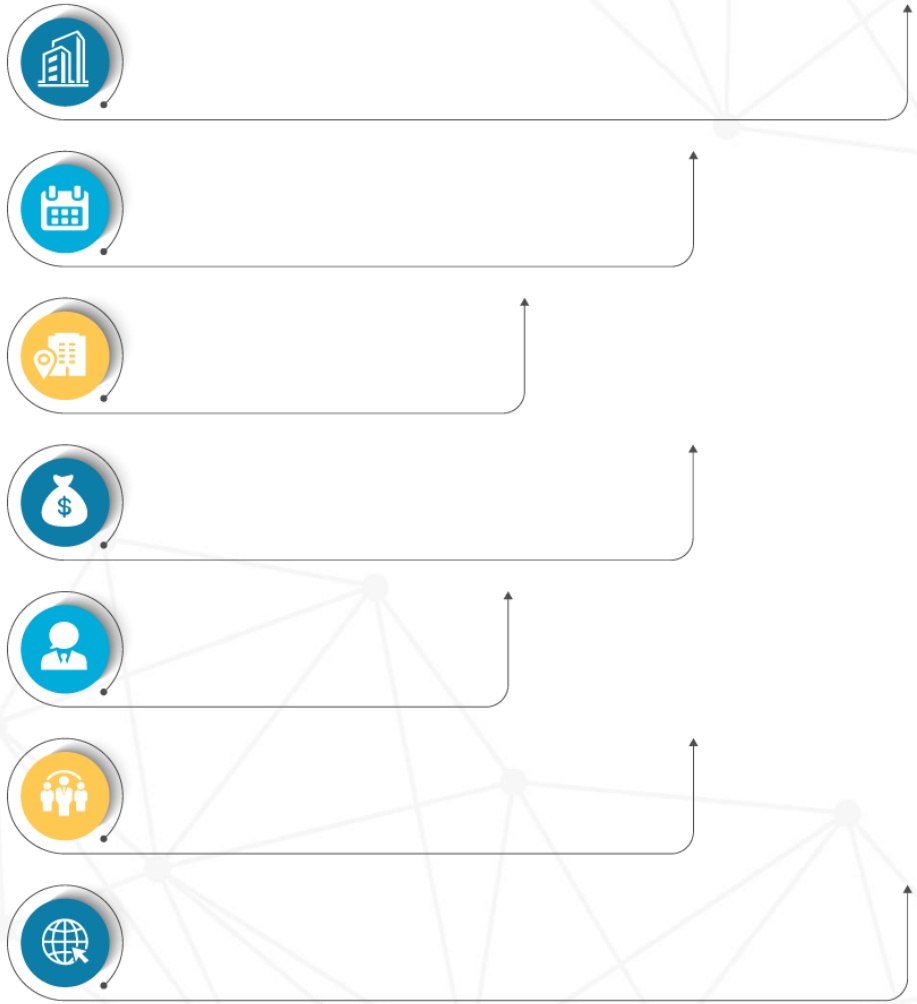
www.samsung.com

Company Overview

- SAMSUNG is a component service, TCO solution and technical service provider in a semiconductor industry.
- The company provides solutions for following applications:
  - Mobile
  - Server & Network
  - Personal Computer
  - TV & Gaming
  - Automotive

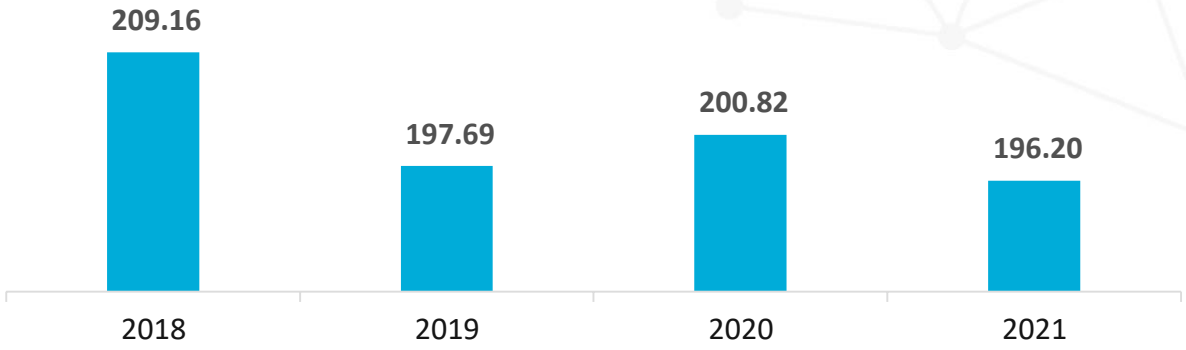
Business Overview

CE(Consumer Electronics)	**IM(Information technology & Mobile communications)**
DS(Device Solutions)	Harman

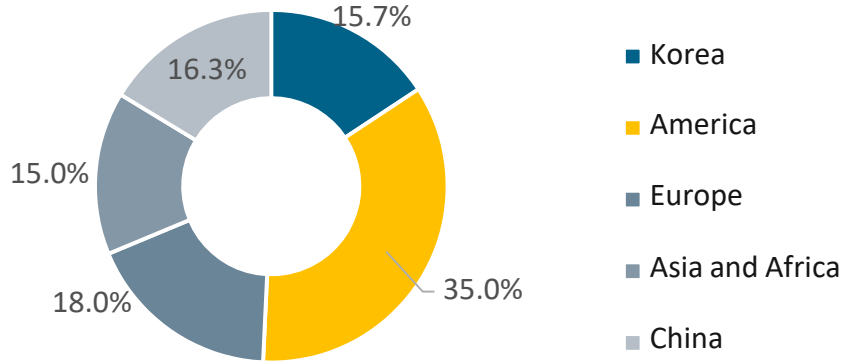


SAMSUNG (2/3)

Revenues (USD billion), 2018-2021



Breakdown of Net Sales (%), By Region, 2021



Segmental Market Revenue (USD billion), 2021

SAMSUNG (3/3)

Product Portfolio	
DRAM	eStorage
Image Sensor	SSD
Processor	MCP
Display IC	Power IC
Mobile	Home Appliance
Computing	Sound Devices

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Global Semiconductor Industry Market (USD Bn)									
Year	2018	2019	2020	2021	2022	2023	2024	2025	2026
Revenue	468,80	412,30	440,38	527,88	573,44	629,64	698,27	784,15	893,15

Global Semiconductor Industry Market, By Components (USD Bn)									
Components	2018	2019	2020	2021	2022	2023	2024	2025	2026
Memory Devices	108,91	96,36	103,53	124,84	136,41	150,64	168,02	189,77	217,38
Logic Devices	96,00	84,76	90,89	109,37	119,26	131,45	146,33	164,95	188,58
Analog IC	74,89	65,99	70,61	84,80	92,29	101,53	112,81	126,93	144,85
MPU	63,28	55,62	59,35	71,08	77,14	84,62	93,75	105,17	119,67
Discrete Power Devices	47,68	41,76	44,41	53,01	57,34	62,69	69,23	77,41	87,79
MCU	32,47	28,31	29,97	35,61	38,35	41,73	45,87	51,05	57,62
Sensors	30,48	26,51	28,00	33,18	35,63	38,67	42,38	47,03	52,92
Others (DSP, etc.)	15,08	13,00	13,62	15,99	17,02	18,31	19,88	21,85	24,34
Total	468,80	412,30	440,38	527,88	573,44	629,64	698,27	784,15	893,15

Global Semiconductor Industry Market, By Application (USD Bn)									
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026
Networking & Communications	150,78	133,10	142,68	171,65	187,14	206,24	229,55	258,72	295,75
Data Processing	145,12	127,85	136,79	164,28	178,75	196,59	218,38	245,64	280,25
Industrial	46,60	40,69	43,16	51,38	55,40	60,38	66,46	74,08	83,75
Consumer Electronics	60,17	52,85	56,36	67,45	73,18	80,24	88,88	99,68	113,37
Automotive	56,95	49,89	53,07	63,35	68,54	74,95	82,79	92,59	105,02
Government	9,18	7,93	8,32	9,78	10,42	11,22	12,21	13,45	15,01
Total	468,80	412,30	440,38	527,88	573,44	629,64	698,27	784,15	893,15

Global Semiconductor Industry Market, By Region (USD Bn)									
Region	2018	2019	2020	2021	2022	2023	2024	2025	2026
North America	103,09	90,63	96,91	116,57	126,60	138,86	153,80	172,57	196,52

Europe	59,96	53,19	56,94	68,41	74,49	81,98	91,12	102,57	117,09
Asia Pacific	253,29	223,99	240,55	289,92	316,65	349,55	389,73	439,99	503,81
Middle East and Africa	37,34	32,29	34,24	40,83	44,01	47,81	52,41	58,09	65,18
Latin America	15,12	12,20	11,73	12,15	11,70	11,44	11,20	10,93	10,56
Total	468,80	412,30	440,38	527,88	573,44	629,64	698,27	784,15	893,15

2027	2028	2029	CAGR(2022-2029)
1.022,66	1.181,17	1.380,79	12,2%

2027	2028	2029	CAGR(2022-2029)
250,31	290,74	357,10	12,8%
216,74	251,27	301,16	12,6%
166,18	192,31	216,66	12,4%
136,89	157,95	182,72	12,1%
100,09	115,11	127,39	11,7%
65,37	74,80	82,51	11,2%
59,85	68,27	80,48	10,9%
27,24	30,73	32,77	9,8%
1.022,66	1.181,17	1.380,79	12,2%

2027	2028	2029	CAGR(2022-2029)
339,85	393,94	465,14	12,6%
321,41	371,83	434,47	12,4%
95,17	109,08	126,51	11,4%
129,63	149,52	173,81	12,0%
119,75	137,74	159,65	11,7%
16,84	19,06	21,21	10,0%
1.022,66	1.181,17	1.380,79	12,2%

2027	2028	2029	CAGR(2022-2029)
225,00	259,72	289,97	12,6%

134,38	155,56	182,26	13,6%
579,90	673,30	791,19	14,0%
73,41	83,26	93,89	11,4%
9,97	9,33	23,47	10,5%
1.022,66	1.181,17	1.380,79	13,4%

North America Semiconductor Industry Market (USD Bn)										
Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Revenue	103,09	90,63	96,91	116,57	126,60	138,86	153,80	172,57	196,52	225,00

North America Semiconductor Industry Market, By Components (USD Bn)										
Components	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Memory Devices	25,41	22,47	24,17	29,24	31,94	35,23	39,25	44,29	50,72	58,40
Logic Devices	21,01	18,55	19,91	24,05	26,22	28,87	32,10	36,16	41,34	47,52
Analog IC	17,25	15,20	16,29	19,64	21,37	23,49	26,08	29,32	33,46	38,39
MPU	13,70	12,04	12,86	15,46	16,78	18,39	20,36	22,83	25,98	29,72
Discrete Power Devices	10,46	9,15	9,73	11,64	12,57	13,71	15,10	16,85	19,08	21,72
MCU	8,58	7,48	7,93	9,45	10,17	11,06	12,14	13,49	15,22	17,26
Sensors	4,55	3,93	4,12	4,86	5,18	5,57	6,04	6,64	7,40	8,28
Others (DSP, etc.)	2,12	1,82	1,90	2,24	2,37	2,54	2,74	3,00	3,32	3,70
Total	103,09	90,63	96,91	116,57	126,60	138,86	153,80	172,57	196,52	225,00

North America Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	31,27	27,62	29,66	35,84	39,10	43,07	47,92	54,00	61,76	71,02
Data Processing	35,32	31,11	33,33	40,16	43,70	48,02	53,28	59,90	68,33	78,38
Industrial	13,51	11,80	12,53	14,96	16,14	17,57	19,32	21,52	24,33	27,65
Consumer Electronics	9,56	8,38	8,93	10,71	11,60	12,69	14,01	15,67	17,79	20,31
Automotive	12,30	10,76	11,44	13,69	14,79	16,13	17,77	19,83	22,46	25,57
Government	1,12	0,96	1,01	1,20	1,28	1,38	1,50	1,65	1,84	2,07
Total	103,09	90,63	96,91	116,57	126,60	138,86	153,80	172,57	196,52	225,00

North America Semiconductor Industry Market, By Country (USD Bn)										
Country	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027

U.S.	80,92	71,23	76,26	91,85	99,87	109,68	121,64	136,65	155,81	178,61
Canada	22,17	19,40	20,65	24,72	26,72	29,17	32,16	35,92	40,71	46,39
Total	103,09	90,63	96,91	116,57	126,60	138,86	153,80	172,57	196,52	225,00

U.S. Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	26,45	23,41	25,20	30,52	33,37	36,84	41,08	46,40	53,19	61,30
Data Processing	25,03	22,06	23,65	28,52	31,04	34,13	37,90	42,62	48,66	55,84
Industrial	10,34	9,02	9,57	11,41	12,29	13,37	14,69	16,34	18,44	20,93
Consumer Electronics	7,76	6,82	7,29	8,77	9,52	10,44	11,56	12,97	14,77	16,90
Automotive	9,75	8,54	9,10	10,91	11,81	12,91	14,25	15,94	18,09	20,64
Government	1,59	1,38	1,45	1,72	1,84	1,98	2,16	2,39	2,67	3,00
Total	80,92	71,23	76,26	91,85	99,87	109,68	121,64	136,65	155,81	178,61

Canada Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	6,99	6,14	6,56	7,89	8,56	9,38	10,39	11,64	13,25	15,16
Data Processing	7,50	6,57	7,01	8,40	9,09	9,94	10,97	12,27	13,93	15,89
Industrial	2,75	2,40	2,54	3,02	3,24	3,52	3,86	4,28	4,82	5,46
Consumer Electronics	1,97	1,72	1,83	2,19	2,37	2,58	2,84	3,17	3,59	4,09
Automotive	2,51	2,19	2,32	2,76	2,97	3,23	3,54	3,94	4,44	5,04
Government	0,44	0,37	0,39	0,46	0,49	0,52	0,56	0,61	0,68	0,76
Total	22,17	19,40	20,65	24,72	26,72	29,17	32,16	35,92	40,71	46,39

2028	2029	CAGR(2022-2029)
259,72	289,97	12,6%

2028	2029	CAGR(2022-2029)
67,79	83,80	14,8%
55,06	65,24	13,9%
44,41	43,49	10,7%
34,28	38,28	12,5%
24,93	23,20	9,2%
19,74	20,30	10,4%
9,35	11,31	11,8%
4,16	4,35	9,1%
259,72	289,97	12,6%

2028	2029	CAGR(2022-2029)
82,33	91,92	13,0%
90,64	101,20	12,7%
31,69	35,38	11,9%
23,37	26,10	12,3%
29,35	32,77	12,0%
2,34	2,61	10,7%
259,72	289,97	12,6%

2028	2029	CAGR(2022-2029)

206,43	230,47	12,7%
53,29	59,49	11,6%
259,72	289,97	12,6%

2028	2029	CAGR(2022-2029)
71,22	79,51	13,2%
64,61	72,14	12,8%
23,95	26,73	11,7%
19,51	21,78	12,6%
23,74	26,50	12,2%
3,41	3,80	10,9%
206,43	230,47	12,7%

2028	2029	CAGR(2022-2029)
17,48	19,51	12,5%
18,28	20,41	12,2%
6,23	6,96	11,5%
4,69	5,24	12,0%
5,76	6,43	11,6%
0,85	0,95	10,1%
53,29	59,49	12,1%

Europe Semiconductor Industry Market (USD Bn)										
Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Revenue	59,96	53,19	56,94	68,41	74,49	81,98	91,12	102,57	117,09	134,38

Europe Semiconductor Industry Market, By Components (USD Bn)										
Components	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Memory Devices	14,35	12,80	13,78	16,66	18,24	20,18	22,56	25,53	29,30	33,81
Logic Devices	12,87	11,45	12,29	14,81	16,18	17,86	19,91	22,47	25,73	29,61
Analog IC	8,10	7,19	7,70	9,26	10,09	11,11	12,36	13,92	15,90	18,26
MPU	9,94	8,80	9,41	11,28	12,26	13,47	14,95	16,80	19,15	21,94
Discrete Power Devices	6,09	5,38	5,73	6,85	7,43	8,14	9,00	10,09	11,46	13,10
MCU	5,00	4,40	4,67	5,57	6,02	6,57	7,25	8,09	9,17	10,43
Sensors	2,43	2,13	2,26	2,68	2,88	3,14	3,45	3,83	4,32	4,90
Others (DSP, etc.)	1,18	1,03	1,09	1,29	1,39	1,51	1,65	1,83	2,05	2,32
Total	59,96	53,19	56,94	68,41	74,49	81,98	91,12	102,57	117,09	134,38

Europe Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	19,62	17,46	18,76	22,63	24,72	27,31	30,46	34,41	39,42	45,40
Data Processing	17,53	15,56	16,67	20,05	21,85	24,07	26,78	30,17	34,48	39,60
Industrial	5,78	5,10	5,43	6,49	7,02	7,68	8,49	9,50	10,78	12,30
Consumer Electronics	8,20	7,27	7,77	9,32	10,14	11,14	12,37	13,90	15,85	18,17
Automotive	7,41	6,56	7,00	8,38	9,10	9,99	11,07	12,42	14,14	16,17
Government	1,42	1,24	1,30	1,54	1,65	1,79	1,96	2,16	2,43	2,74
Total	59,96	53,19	56,94	68,41	74,49	81,98	91,12	102,57	117,09	134,38

Europe Semiconductor Industry Market, By Country (USD Bn)										
Country	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027

UK	16,58	14,73	15,80	19,01	20,73	22,86	25,45	28,69	32,81	37,71
Germany	19,32	17,25	18,59	22,49	24,65	27,31	30,55	34,61	39,77	45,94
France	8,62	7,63	8,15	9,78	10,63	11,67	12,95	14,55	16,58	18,99
Italy	5,24	4,62	4,92	5,87	6,35	6,95	7,68	8,58	9,74	11,10
Rest of Europe	10,20	8,95	9,48	11,26	12,12	13,19	14,50	16,13	18,19	20,63
Total	59,96	53,19	56,94	68,41	74,49	81,98	91,12	102,57	117,09	134,38

UK Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	5,46	4,87	5,24	6,33	6,93	7,67	8,57	9,70	11,14	12,85
Data Processing	4,78	4,26	4,57	5,52	6,03	6,66	7,43	8,39	9,61	11,07
Industrial	1,63	1,44	1,53	1,83	1,99	2,18	2,41	2,69	3,06	3,49
Consumer Electronics	2,24	1,99	2,13	2,56	2,79	3,07	3,42	3,85	4,40	5,06
Automotive	1,97	1,74	1,86	2,23	2,42	2,66	2,95	3,31	3,77	4,32
Government	0,50	0,44	0,46	0,54	0,58	0,62	0,68	0,74	0,83	0,93
Total	16,58	14,73	15,80	19,01	20,73	22,86	25,45	28,69	32,81	37,71

Germany Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	6,42	5,76	6,23	7,57	8,33	9,26	10,40	11,83	13,65	15,83
Data Processing	5,69	5,08	5,49	6,64	7,29	8,09	9,06	10,28	11,82	13,67
Industrial	1,73	1,53	1,64	1,97	2,14	2,35	2,61	2,94	3,35	3,84
Consumer Electronics	2,57	2,29	2,47	2,98	3,26	3,61	4,03	4,57	5,24	6,05
Automotive	2,29	2,03	2,18	2,63	2,87	3,16	3,52	3,97	4,54	5,22
Government	0,63	0,56	0,59	0,71	0,76	0,83	0,92	1,03	1,17	1,33
Total	19,32	17,25	18,59	22,49	24,65	27,31	30,55	34,61	39,77	45,94

France Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	2,82	2,51	2,69	3,24	3,54	3,90	4,35	4,90	5,61	6,45
Data Processing	2,52	2,23	2,39	2,87	3,12	3,43	3,81	4,29	4,90	5,61
Industrial	0,83	0,73	0,78	0,92	1,00	1,09	1,20	1,34	1,51	1,72
Consumer Electronics	1,12	0,99	1,06	1,26	1,37	1,50	1,67	1,87	2,13	2,43
Automotive	1,00	0,88	0,93	1,12	1,21	1,32	1,46	1,64	1,86	2,12
Government	0,33	0,29	0,31	0,36	0,39	0,42	0,46	0,51	0,58	0,65
Total	8,62	7,63	8,15	9,78	10,63	11,67	12,95	14,55	16,58	18,99

Italy Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	1,69	1,50	1,60	1,92	2,08	2,29	2,54	2,85	3,25	3,72
Data Processing	1,51	1,34	1,42	1,70	1,84	2,02	2,24	2,50	2,84	3,25
Industrial	0,49	0,43	0,45	0,54	0,58	0,62	0,68	0,76	0,86	0,97
Consumer Electronics	0,72	0,63	0,67	0,80	0,86	0,94	1,04	1,16	1,32	1,50
Automotive	0,62	0,54	0,57	0,68	0,74	0,80	0,88	0,98	1,11	1,26
Government	0,22	0,19	0,20	0,23	0,25	0,27	0,30	0,33	0,37	0,41
Total	5,24	4,62	4,92	5,87	6,35	6,95	7,68	8,58	9,74	11,10

2028	2029	CAGR(2022-2029)
155,56	182,26	13,6%

2028	2029	CAGR(2022-2029)
39,36	51,03	15,8%
34,38	42,65	14,9%
21,16	22,78	12,3%
25,36	28,62	12,9%
15,09	16,22	11,8%
11,98	12,39	10,9%
5,60	6,38	12,0%
2,64	2,19	6,7%
155,56	182,26	13,6%

2028	2029	CAGR(2022-2029)
52,73	61,79	14,0%
45,89	53,77	13,7%
14,16	16,59	13,1%
21,00	24,61	13,5%
18,67	21,87	13,3%
3,11	3,65	12,0%
155,56	182,26	13,6%

2028	2029	CAGR(2022-2029)

43,73	51,24	13,8%
53,52	62,70	14,3%
21,94	25,71	13,5%
12,77	14,96	13,0%
23,60	27,65	12,5%
155,56	182,26	13,6%

2028	2029	CAGR(2022-2029)
14,96	17,52	14,2%
12,86	15,06	14,0%
4,02	4,71	13,1%
5,86	6,87	13,7%
4,99	5,84	13,4%
1,05	1,23	11,4%
43,73	51,24	13,8%

2028	2029	CAGR(2022-2029)
18,52	21,70	14,7%
15,95	18,69	14,4%
4,44	5,20	13,5%
7,04	8,25	14,2%
6,05	7,09	13,8%
1,53	1,79	12,9%
53,52	62,70	14,3%

2028	2029	CAGR(2022-2029)
7,48	8,77	13,8%
6,50	7,61	13,6%
1,98	2,31	12,8%
2,81	3,29	13,3%
2,44	2,85	13,1%
0,75	0,87	12,2%
21,94	25,71	13,5%

2028	2029	CAGR(2022-2029)
4,29	5,03	13,4%
3,74	4,38	13,2%
1,10	1,29	12,3%
1,72	2,02	12,9%
1,44	1,69	12,6%
0,47	0,55	11,7%
12,77	14,96	13,0%

Asia Pacific Semiconductor Industry Market (USD Bn)										
Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Revenue	253,29	223,99	240,55	289,92	316,65	349,55	389,73	439,99	503,81	579,90

Asia Pacific Semiconductor Industry Market, By Components (USD Bn)										
Components	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Memory Devices	57,34	51,01	55,11	66,81	73,40	81,51	91,41	103,80	119,54	138,39
Logic Devices	51,62	45,84	49,42	59,80	65,57	72,67	81,35	92,20	105,98	122,46
Analog IC	41,38	36,67	39,47	47,68	52,19	57,74	64,52	73,00	83,77	96,63
MPU	33,13	29,26	31,38	37,77	41,19	45,41	50,56	57,00	65,17	74,91
Discrete Power Devices	25,74	22,68	24,27	29,15	31,72	34,89	38,76	43,60	49,74	57,04
MCU	14,09	12,38	13,21	15,81	17,16	18,81	20,83	23,36	26,56	30,37
Sensors	20,54	17,96	19,07	22,72	24,53	26,76	29,48	32,88	37,19	42,28
Others (DSP, etc.)	9,44	8,19	8,62	10,17	10,88	11,76	12,83	14,16	15,85	17,82
Total	253,29	223,99	240,55	289,92	316,65	349,55	389,73	439,99	503,81	579,90

Asia Pacific Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	82,36	73,10	78,79	95,30	104,46	115,73	129,50	146,72	168,59	194,74
Data Processing	76,86	68,07	73,22	88,37	96,66	106,87	119,33	134,92	154,72	178,35
Industrial	22,38	19,65	20,95	25,06	27,17	29,78	32,95	36,92	41,95	47,92
Consumer Electronics	35,41	31,28	33,55	40,38	44,04	48,56	54,07	60,96	69,71	80,13
Automotive	30,79	27,12	29,02	34,84	37,91	41,69	46,31	52,08	59,40	68,11
Government	5,48	4,76	5,03	5,96	6,39	6,93	7,58	8,40	9,43	10,65
Total	253,29	223,99	240,55	289,92	316,65	349,55	389,73	439,99	503,81	579,90

Asia Pacific Semiconductor Industry Market, By Country (USD Bn)										
Country	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027

China	97,65	85,58	91,08	108,77	117,71	128,73	142,18	159,00	180,32	205,55
Japan	32,26	28,61	30,81	37,24	40,79	45,16	50,49	57,16	65,63	75,76
Taiwan	48,61	43,64	47,56	58,17	64,45	72,17	81,59	93,40	108,41	126,47
South Korea	38,13	33,84	36,48	44,12	48,36	53,58	59,95	67,92	78,04	90,15
India	8,06	7,31	8,05	9,94	11,11	12,55	14,31	16,52	19,33	22,72
Singapore	8,62	7,50	7,92	9,38	10,06	10,91	11,94	13,23	14,86	16,78
Malaysia	6,12	5,29	5,55	6,52	6,95	7,47	8,11	8,92	9,93	11,10
Rest of Asia Pacific	13,83	12,22	13,11	15,78	17,22	18,99	21,15	23,85	27,29	31,38
Total	253,29	223,99	240,55	289,92	316,65	349,55	389,73	439,99	503,81	579,90

China Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	32,46	28,56	30,52	36,60	39,76	43,66	48,42	54,36	61,90	70,84
Data Processing	29,15	25,58	27,27	32,61	35,34	38,71	42,82	47,96	54,47	62,19
Industrial	8,35	7,27	7,68	9,12	9,80	10,65	11,68	12,98	14,62	16,56
Consumer Electronics	13,39	11,74	12,50	14,94	16,18	17,71	19,57	21,90	24,85	28,35
Automotive	11,76	10,26	10,87	12,92	13,92	15,15	16,66	18,54	20,93	23,75
Government	2,56	2,17	2,24	2,58	2,70	2,84	3,02	3,25	3,54	3,87
Total	97,65	85,58	91,08	108,77	117,71	128,73	142,18	159,00	180,32	205,55

Japan Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	10,53	9,37	10,13	12,29	13,52	15,02	16,86	19,16	22,08	25,58
Data Processing	9,69	8,60	9,27	11,21	12,29	13,62	15,24	17,27	19,85	22,93
Industrial	2,92	2,57	2,75	3,29	3,58	3,94	4,37	4,91	5,60	6,41
Consumer Electronics	4,58	4,05	4,36	5,26	5,76	6,36	7,10	8,03	9,21	10,62

Automotive	4,05	3,57	3,83	4,61	5,03	5,54	6,17	6,95	7,95	9,13
Government	0,51	0,45	0,48	0,57	0,62	0,67	0,74	0,83	0,94	1,07
Total	32,26	28,61	30,81	37,24	40,79	45,16	50,49	57,16	65,63	75,76

Taiwan Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	16,25	14,65	16,03	19,69	21,90	24,62	27,95	32,12	37,43	43,84
Data Processing	14,55	13,07	14,26	17,46	19,36	21,70	24,55	28,13	32,68	38,16
Industrial	4,34	3,86	4,18	5,07	5,57	6,18	6,93	7,86	9,05	10,46
Consumer Electronics	7,04	6,31	6,87	8,39	9,29	10,39	11,73	13,41	15,54	18,11
Automotive	5,95	5,32	5,77	7,03	7,75	8,64	9,72	11,08	12,80	14,87
Government	0,48	0,42	0,45	0,54	0,59	0,64	0,71	0,80	0,91	1,03
Total	48,61	43,64	47,56	58,17	64,45	72,17	81,59	93,40	108,41	126,47

South Korea Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	12,78	11,39	12,32	14,96	16,46	18,30	20,56	23,38	26,96	31,26
Data Processing	11,72	10,41	11,24	13,61	14,93	16,56	18,56	21,05	24,22	28,00
Industrial	3,63	3,20	3,42	4,11	4,47	4,91	5,45	6,13	6,98	8,00
Consumer Electronics	5,14	4,56	4,90	5,92	6,48	7,17	8,02	9,07	10,41	12,01
Automotive	4,48	3,96	4,24	5,11	5,57	6,15	6,84	7,72	8,83	10,15
Government	0,37	0,33	0,34	0,41	0,44	0,48	0,52	0,58	0,65	0,74
Total	38,13	33,84	36,48	44,12	48,36	53,58	59,95	67,92	78,04	90,15

India Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	2,73	2,49	2,75	3,41	3,83	4,34	4,97	5,75	6,75	7,97
Data Processing	2,44	2,22	2,45	3,03	3,39	3,83	4,37	5,05	5,92	6,97
Industrial	0,70	0,63	0,69	0,85	0,94	1,05	1,19	1,36	1,57	1,83
Consumer Electronics	1,10	1,00	1,10	1,35	1,51	1,71	1,94	2,24	2,62	3,07

Automotive	0,90	0,81	0,89	1,09	1,22	1,37	1,56	1,79	2,09	2,44
Government	0,18	0,16	0,17	0,21	0,23	0,26	0,29	0,33	0,38	0,44
Total	8,06	7,31	8,05	9,94	11,11	12,55	14,31	16,52	19,33	22,72

SIngapore Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	2,81	2,46	2,60	3,10	3,33	3,63	3,99	4,43	5,00	5,67
Data Processing	2,58	2,25	2,37	2,81	3,02	3,28	3,59	3,98	4,48	5,06
Industrial	0,80	0,69	0,72	0,85	0,90	0,97	1,06	1,16	1,30	1,45
Consumer Electronics	1,15	1,00	1,06	1,25	1,34	1,46	1,59	1,76	1,98	2,23
Automotive	1,08	0,94	0,99	1,16	1,24	1,34	1,47	1,62	1,81	2,04
Government	0,20	0,17	0,17	0,20	0,21	0,23	0,24	0,27	0,29	0,32
Total	8,62	7,50	7,92	9,38	10,06	10,91	11,94	13,23	14,86	16,78

Malaysia Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	2,04	1,77	1,86	2,20	2,35	2,54	2,77	3,06	3,42	3,85
Data Processing	1,81	1,57	1,65	1,94	2,07	2,23	2,42	2,66	2,97	3,33
Industrial	0,55	0,47	0,49	0,58	0,61	0,65	0,70	0,76	0,84	0,93
Consumer Electronics	0,84	0,73	0,76	0,89	0,95	1,02	1,10	1,21	1,35	1,50
Automotive	0,72	0,62	0,65	0,76	0,80	0,86	0,93	1,02	1,12	1,25
Government	0,15	0,13	0,13	0,15	0,16	0,17	0,18	0,20	0,22	0,24
Total	6,12	5,29	5,55	6,52	6,95	7,47	8,11	8,92	9,93	11,10

2028	2029	CAGR(2022-2029)
673,30	791,19	14,0%

2028	2029	CAGR(2022-2029)
161,59	191,71	14,7%
142,74	168,37	14,4%
112,44	132,45	14,2%
86,86	101,91	13,8%
65,98	77,22	13,6%
35,01	40,83	13,2%
48,48	56,25	12,6%
20,20	22,47	10,9%
673,30	791,19	14,0%

2028	2029	CAGR(2022-2029)
226,90	268,45	14,4%
207,38	244,08	14,1%
55,21	64,40	13,1%
92,92	109,03	13,8%
78,78	92,17	13,5%
12,12	13,05	10,7%
673,30	791,19	14,0%

2028	2029	CAGR(2022-2029)

236,33	276,05	12,9%
88,20	104,44	14,4%
148,80	176,83	15,5%
105,03	124,22	14,4%
26,93	32,44	16,5%
19,10	21,84	11,7%
12,52	14,40	11,0%
36,39	42,76	13,9%
673,30	792,97	14,0%

2028	2029	CAGR(2022-2029)
81,77	97,44	13,7%
71,61	84,19	13,2%
18,91	21,53	11,9%
32,61	38,09	13,0%
27,18	29,54	11,3%
4,25	5,24	10,0%
236,33	276,05	12,9%

2028	2029	CAGR(2022-2029)
29,90	35,40	14,7%
26,73	31,64	14,5%
7,41	8,77	13,7%
12,35	14,62	14,2%

10,58	12,53	13,9%
1,23	1,46	13,2%
88,20	104,44	14,4%

2028	2029	CAGR(2022-2029)
51,78	61,54	15,9%
44,94	53,40	15,6%
12,20	14,50	14,7%
21,28	25,29	15,4%
17,41	20,69	15,1%
1,19	1,41	13,4%
148,80	176,83	15,5%

2028	2029	CAGR(2022-2029)
36,55	43,23	14,8%
32,67	38,63	14,5%
9,24	10,93	13,6%
13,97	16,52	14,3%
11,76	13,91	14,0%
0,84	0,99	12,4%
105,03	124,22	14,4%

2028	2029	CAGR(2022-2029)
9,48	11,42	16,9%
8,27	9,96	16,7%
2,15	2,60	15,7%
3,64	4,38	16,4%

2,88	3,47	16,1%
0,51	0,62	15,2%
26,93	32,44	16,5%

2028	2029	CAGR(2022-2029)
6,47	7,40	12,1%
5,77	6,59	11,8%
1,64	1,88	11,0%
2,54	2,90	11,6%
2,31	2,64	11,4%
0,36	0,41	10,0%
19,10	21,84	11,7%

2028	2029	CAGR(2022-2029)
4,36	5,01	11,4%
3,75	4,32	11,1%
1,05	1,20	10,2%
1,69	1,94	10,8%
1,40	1,61	10,4%
0,27	0,31	9,6%
12,52	14,40	11,0%

Middle East & Africa Semiconductor Industry Market (USD Bn)										
Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Revenue	37,34	32,29	34,24	40,83	44,01	47,81	52,41	58,09	65,18	73,41

Middle East & Africa Semiconductor Industry Market, By Components (USD Bn)										
Components	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Memory Devices	8,37	7,28	7,77	9,31	10,09	11,03	12,16	13,55	15,28	17,30
Logic Devices	7,49	6,49	6,90	8,25	8,92	9,72	10,68	11,87	13,36	15,08
Analog IC	5,68	4,91	5,21	6,22	6,71	7,29	8,00	8,87	9,96	11,23
MPU	4,66	4,03	4,27	5,09	5,48	5,95	6,52	7,22	8,09	9,11
Discrete Power Devices	3,80	3,27	3,46	4,10	4,41	4,77	5,21	5,76	6,43	7,22
MCU	3,49	3,00	3,16	3,75	4,02	4,34	4,73	5,21	5,81	6,50
Sensors	2,15	1,84	1,94	2,29	2,45	2,64	2,87	3,16	3,51	3,92
Others (DSP, etc.)	1,70	1,46	1,53	1,80	1,92	2,07	2,24	2,46	2,73	3,04
Total	37,34	32,29	34,24	40,83	44,01	47,81	52,41	58,09	65,18	73,41

Middle East & Africa Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	12,44	10,80	11,49	13,75	14,87	16,21	17,83	19,84	22,33	25,24
Data Processing	11,11	9,63	10,23	12,21	13,19	14,36	15,77	17,51	19,68	22,20
Industrial	3,55	3,05	3,20	3,79	4,04	4,36	4,73	5,20	5,78	6,45
Consumer Electronics	4,96	4,29	4,54	5,42	5,83	6,33	6,94	7,68	8,62	9,70
Automotive	4,58	3,94	4,17	4,95	5,31	5,75	6,28	6,93	7,75	8,70
Government	0,70	0,59	0,61	0,72	0,76	0,80	0,86	0,93	1,03	1,13
Total	37,34	32,29	34,24	40,83	44,01	47,81	52,41	58,09	65,18	73,41

Middle East & Africa Semiconductor Industry Market, By Country (USD Bn)										
Country	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027

South Africa	10,74	9,28	9,83	11,71	12,61	13,68	14,98	16,59	18,59	20,92
GCC	17,11	14,86	15,83	18,96	20,53	22,41	24,68	27,48	30,97	35,04
Rest of MEA	9,49	8,15	8,58	10,15	10,86	11,72	12,75	14,02	15,61	17,45
Total	37,34	32,29	34,24	40,83	44,01	47,81	52,41	58,09	65,18	73,41

South Africa Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	3,55	3,08	3,27	3,91	4,23	4,61	5,06	5,63	6,33	7,15
Data Processing	3,14	2,72	2,89	3,44	3,72	4,04	4,43	4,92	5,52	6,22
Industrial	0,95	0,81	0,85	1,00	1,07	1,15	1,25	1,37	1,52	1,69
Consumer Electronics	1,40	1,21	1,28	1,53	1,64	1,79	1,96	2,17	2,43	2,74
Automotive	1,36	1,17	1,24	1,47	1,57	1,70	1,86	2,05	2,29	2,56
Government	0,35	0,29	0,31	0,36	0,38	0,40	0,43	0,46	0,51	0,56
Total	10,74	9,28	9,83	11,71	12,61	13,68	14,98	16,59	18,59	20,92

GCC Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	5,75	5,02	5,36	6,45	7,01	7,68	8,49	9,49	10,73	12,18
Data Processing	5,12	4,45	4,75	5,70	6,18	6,75	7,44	8,30	9,36	10,60
Industrial	1,53	1,32	1,39	1,66	1,78	1,93	2,11	2,33	2,61	2,93
Consumer Electronics	2,29	1,99	2,11	2,53	2,73	2,98	3,28	3,64	4,10	4,63
Automotive	2,01	1,74	1,84	2,20	2,37	2,57	2,82	3,12	3,50	3,94
Government	0,41	0,35	0,37	0,43	0,46	0,50	0,55	0,60	0,67	0,75
Total	17,11	14,86	15,83	18,96	20,53	22,41	24,68	27,48	30,97	35,04

2028	2029	CAGR(2022-2029)
83,26	93,89	11,4%

2028	2029	CAGR(2022-2029)
19,73	24,41	13,4%
17,15	19,91	12,1%
12,74	14,37	11,5%
10,32	11,08	10,6%
8,16	8,45	9,7%
7,33	7,23	8,8%
4,41	5,35	11,8%
3,41	3,10	7,0%
83,26	93,89	11,4%

2028	2029	CAGR(2022-2029)
28,72	34,18	12,6%
25,23	28,54	11,7%
7,24	8,17	10,6%
10,99	11,27	9,9%
9,82	10,33	10,0%
1,25	1,41	9,3%
83,26	93,89	11,4%

2028	2029	CAGR(2022-2029)

23,70	26,58	11,2%
39,91	46,29	12,3%
19,64	21,02	9,9%
83,26	93,89	11,4%

2028	2029	CAGR(2022-2029)
8,13	9,70	12,6%
7,06	7,97	11,5%
1,90	1,91	8,7%
3,11	3,32	10,6%
2,89	3,04	9,9%
0,62	0,62	7,5%
23,70	26,58	11,2%

2028	2029	CAGR(2022-2029)
13,93	17,54	14,0%
12,09	14,03	12,4%
3,31	3,24	8,9%
5,27	5,55	10,7%
4,47	5,18	11,9%
0,84	0,74	6,9%
39,91	46,29	12,3%

Latin America Semiconductor Industry Market (USD Bn)										
Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Revenue	15,12	12,20	11,73	12,15	11,70	11,44	11,20	10,93	10,56	9,97

Latin America Semiconductor Industry Market, By Components (USD Bn)										
Components	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Memory Devices	3,44	2,80	2,71	2,82	2,74	2,69	2,65	2,61	2,53	2,41
Logic Devices	3,01	2,44	2,36	2,45	2,37	2,33	2,29	2,24	2,18	2,06
Analog IC	2,48	2,01	1,93	2,01	1,94	1,89	1,86	1,82	1,76	1,66
MPU	1,84	1,49	1,43	1,48	1,42	1,39	1,36	1,33	1,28	1,21
Discrete Power Devices	1,60	1,28	1,23	1,27	1,21	1,18	1,15	1,12	1,08	1,01
MCU	1,31	1,05	1,00	1,03	0,98	0,95	0,92	0,90	0,86	0,80
Sensors	0,80	0,64	0,61	0,62	0,59	0,56	0,54	0,52	0,50	0,46
Others (DSP, etc.)	0,64	0,51	0,48	0,48	0,46	0,44	0,42	0,40	0,38	0,35
Total	15,12	12,20	11,73	12,15	11,70	11,44	11,20	10,93	10,56	9,97

Latin America Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	5,08	4,12	3,97	4,13	3,99	3,91	3,85	3,76	3,65	3,46
Data Processing	4,30	3,48	3,35	3,47	3,35	3,28	3,22	3,14	3,04	2,88
Industrial	1,37	1,09	1,05	1,07	1,03	1,00	0,97	0,94	0,90	0,84
Consumer Electronics	2,02	1,63	1,57	1,62	1,56	1,53	1,49	1,46	1,41	1,33
Automotive	1,87	1,50	1,44	1,49	1,43	1,39	1,36	1,32	1,27	1,20
Government	0,48	0,38	0,36	0,36	0,34	0,33	0,32	0,30	0,29	0,26
Total	15,12	12,20	11,73	12,15	11,70	11,44	11,20	10,93	10,56	9,97

Latin America Semiconductor Industry Market, By Country (USD Bn)										
Country	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027

Brazil	5,83	4,73	4,56	4,75	4,59	4,51	4,43	4,34	4,21	4,00
Mexico	4,93	3,97	3,82	3,95	3,81	3,72	3,64	3,55	3,42	3,23
Rest of LATAM	4,36	3,50	3,35	3,45	3,31	3,21	3,13	3,04	2,92	2,74
Total	15,12	12,20	11,73	12,15	11,70	11,44	11,20	10,93	10,56	9,97

Brazil Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	1,93	1,57	1,53	1,59	1,55	1,53	1,51	1,49	1,45	1,38
Data Processing	1,68	1,36	1,32	1,37	1,33	1,31	1,29	1,27	1,23	1,17
Industrial	0,53	0,43	0,41	0,42	0,40	0,39	0,38	0,37	0,35	0,33
Consumer Electronics	0,80	0,65	0,62	0,65	0,63	0,62	0,60	0,59	0,57	0,54
Automotive	0,70	0,56	0,54	0,56	0,54	0,52	0,51	0,50	0,48	0,45
Government	0,20	0,16	0,15	0,15	0,14	0,14	0,13	0,13	0,12	0,11
Total	5,83	4,73	4,56	4,75	4,59	4,51	4,43	4,34	4,21	4,00

Mexico Semiconductor Industry Market, By Application (USD Bn)										
Application	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Networking & Communications	1,64	1,33	1,28	1,33	1,29	1,26	1,24	1,22	1,18	1,12
Data Processing	1,40	1,13	1,09	1,13	1,09	1,07	1,05	1,02	0,99	0,93
Industrial	0,47	0,38	0,36	0,37	0,35	0,34	0,33	0,32	0,31	0,29
Consumer Electronics	0,64	0,51	0,49	0,51	0,49	0,48	0,47	0,45	0,44	0,41
Automotive	0,58	0,46	0,44	0,46	0,44	0,43	0,42	0,40	0,39	0,36
Government	0,20	0,16	0,15	0,15	0,15	0,14	0,14	0,13	0,13	0,12
Total	4,93	3,97	3,82	3,95	3,81	3,72	3,64	3,55	3,42	3,23

2028	2029	CAGR(2022-2029)
9,33	23,47	10,5%

2028	2029	CAGR(2022-2029)
2,27	6,15	12,3%
1,94	5,00	11,3%
1,56	3,57	9,1%
1,13	2,84	10,4%
0,94	2,30	9,6%
0,75	1,76	8,7%
0,42	1,19	10,6%
0,32	0,67	5,6%
9,33	23,47	10,5%

2028	2029	CAGR(2022-2029)
3,25	8,80	12,0%
2,70	6,88	10,8%
0,78	1,97	9,8%
1,24	2,82	8,8%
1,12	2,51	8,4%
0,24	0,49	5,3%
9,33	23,47	10,5%

2028	2029	CAGR(2022-2029)

3,76	9,67	11,2%
3,03	7,61	10,4%
2,55	6,19	9,4%
9,33	23,47	10,5%

2028	2029	CAGR(2022-2029)
1,31	3,37	11,7%
1,10	2,84	11,4%
0,31	0,79	10,2%
0,51	1,32	11,2%
0,42	1,09	10,7%
0,10	0,26	8,9%
3,76	9,67	11,2%

2028	2029	CAGR(2022-2029)
1,05	2,65	10,8%
0,87	2,20	10,6%
0,27	0,67	9,6%
0,38	0,97	10,2%
0,34	0,85	10,0%
0,11	0,27	9,3%
3,03	7,61	10,4%