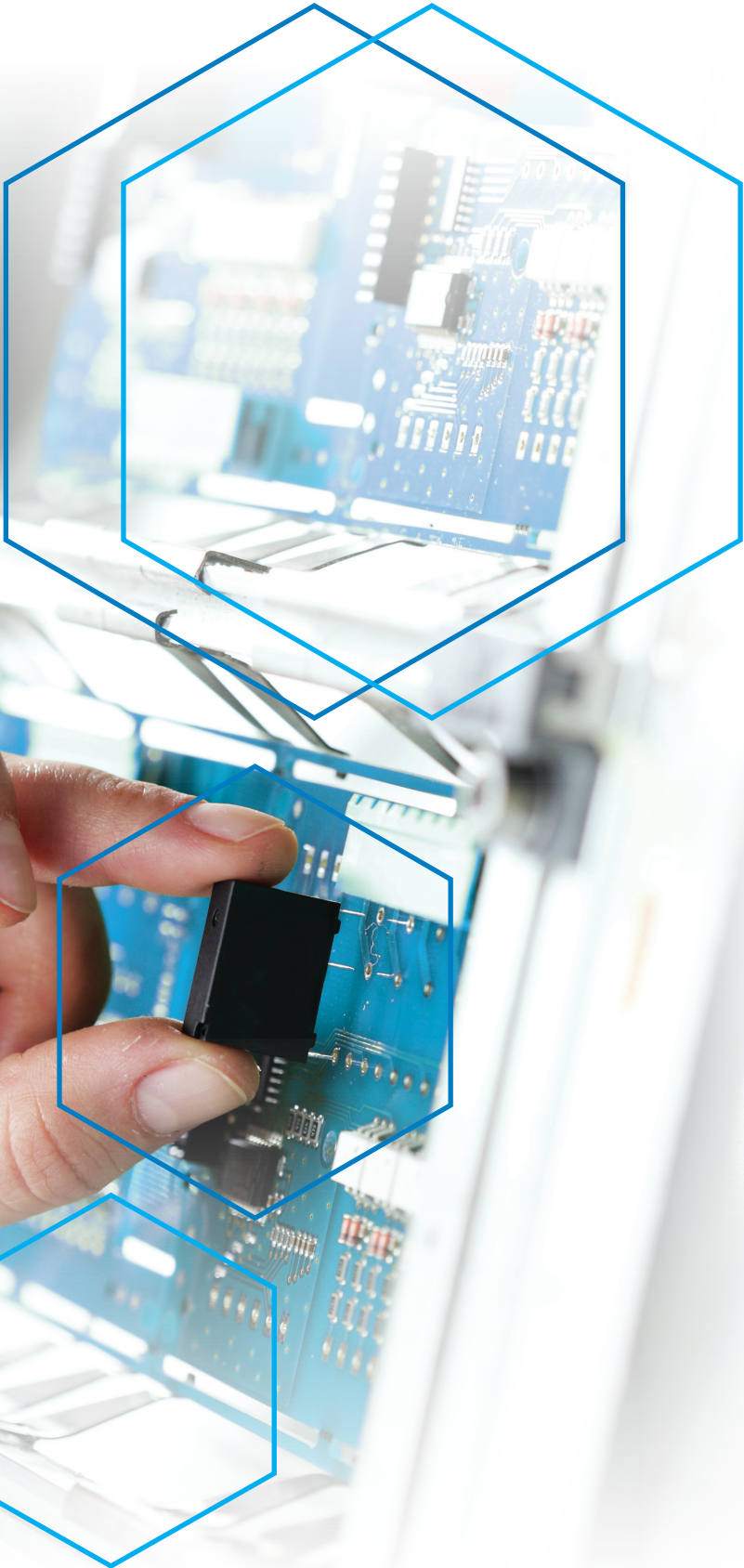


ELECTRONIC INDUSTRY



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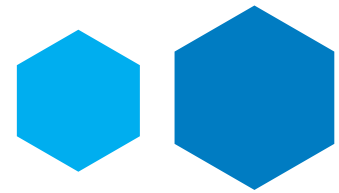
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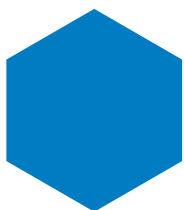
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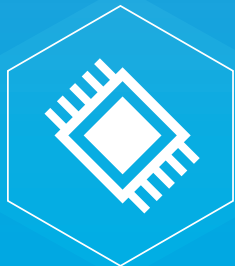
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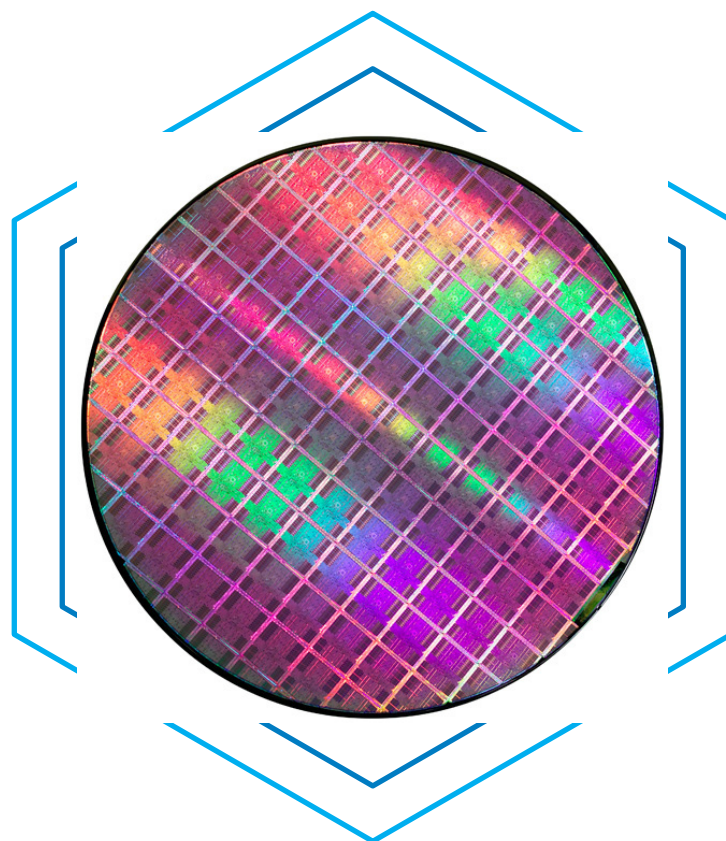
I PRESENTATION



1. PRESENTATION

The purpose of this document is to provide the information required to identify and uphold export and investment opportunities in the Mexican Electronic Industry.

The analysis includes global and national indicators on market-related topics such as production levels, consumption, international trade, foreign direct investment and regulatory framework, among others.



1.1 GLOBAL KEY INDICATORS, 2013¹



Global Production
3,499 BILLION USD



Global Consumption
3,604 BILLION USD



Real CAGR² 2013-2020
6.1%



Real CAGR 2013-2020
6.3%

PRODUCTION SHARE BY REGION 2013



Asia-Pacific
66%



European Union
11%



North America³
16%



Latin America
1%



Rest of the world
6%

SOME OF THE LEADING OEM AND EMS COMPANIES IN THE ELECTRONIC INDUSTRY⁴



Taiwan



United States



South of Korea



Singapore



South of Korea

1. Sources: Global Insight and Datamonitor. 2. Compound Annual Growth Rate. 3. North America includes Canada, United States and Mexico.
4. The importance of the companies is based on their sales.

1.2 INDUSTRY INDICATORS IN MEXICO, 2013⁵



Production 2013
61,771 MILLONES DE
DÓLARES (MDD)



Consumption 2013
69,957



Real CAGR (2013-2020)
5.1%



Real CAGR (2013-2020)
5.9%



Exports
75,393 MDD



Imports
83,579 MDD



Total employees
458,563 PEOPLE



Economic units⁶
945



**FDI in the Electronic Industry
2003-2013**
13,326 MDD



**Share of the Electronic Industry in the FDI
from the Manufacturing Industries**
4.2%



**Share of the Electronic Industry
in the Non-oil Exports**
24.0%



**Main investor countries in the Electronic
Industry, 2003-2013**
UNITED STATES, NETHERLANDS,
SWEDEN AND JAPAN

MEXICO IS:



Exporter of flat screen televisions



Largest exporter of computers

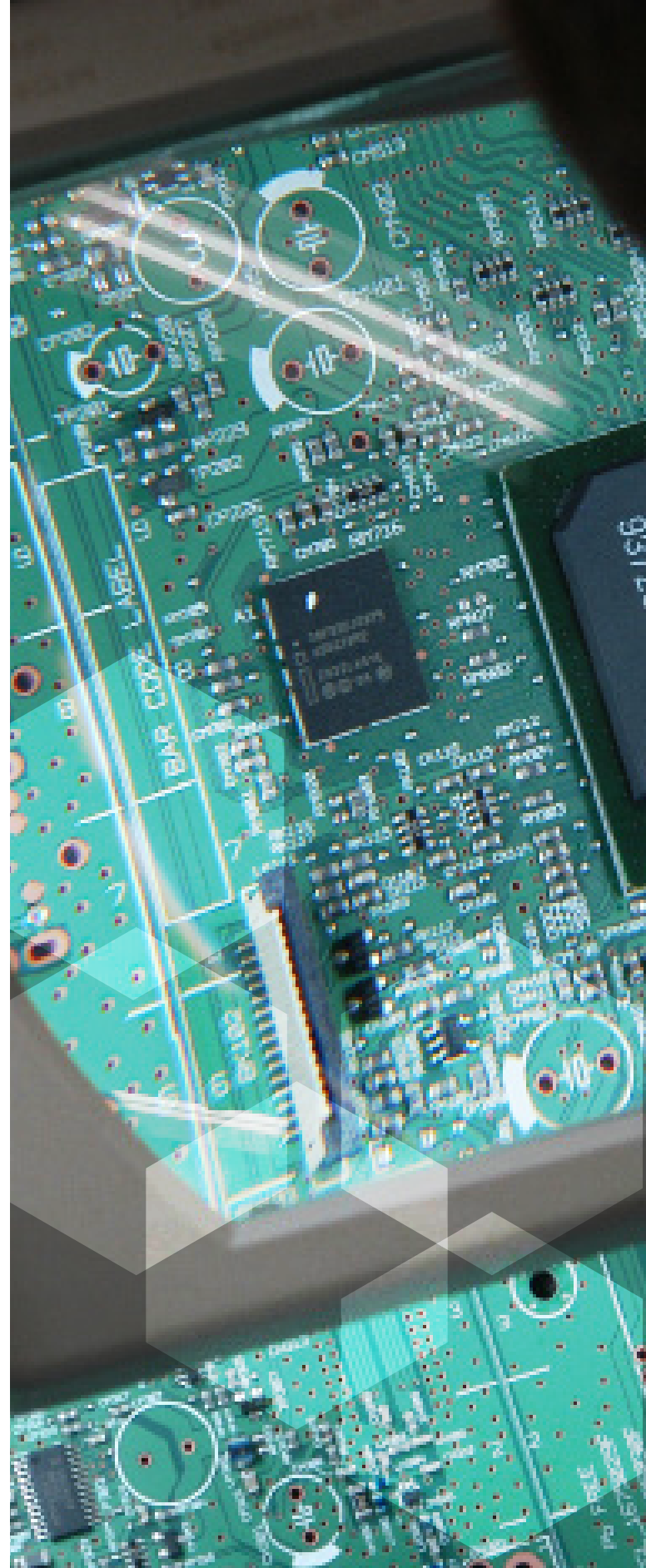
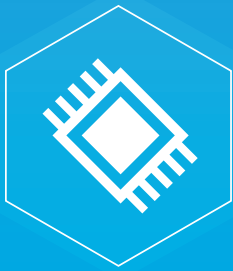


Largest exporter of mobile phones

5. Source: INEGI, Global Insight, Global Trade Atlas and The Secretariat of Economy of Mexico.

6. The term "Economic units" refers to offices, distribution centers and/or manufacturing plants.

II DESCRIPTION OF THE INDUSTRY



2. DESCRIPTION OF THE INDUSTRY

2.1 CLASSIFICATION

Considering the electronic and electrical industries are often confused, it is important to establish the difference between them. A device or component whose main function is to transform electricity into another type of energy is considered electrical while a device or component that processes any type of information is considered electronic.

The North American Industry Classification System (NAICS) 2013 divides the electronic industry into six large subsets:

TABLE 1. DESCRIPTION OF THE ELECTRONIC INDUSTRY BY SUBSECTOR

ISIC REV. 3 CODE	NAICS CLASSIFICATION	SUBSECTOR	DESCRIPTION
D30	3341	Computers and office	Computers, printers, photocopiers, network servers, data storage systems, motherboards, screens, keyboards, peripheral equipment, etc.
D321	3344	Electronic Components	Manufacture of diodes, transistors, thyristors, integrated analog or digital electronic circuits, etc.
D322	3342	Communications	Answering machines, fixed telephones, faxes and mobile telecommunications equipment, including mobile phones.
D323	3343	Audio and video	Audiovisual equipment, including CD and DVD players, hi-fi systems, home theaters, entertainment systems, portable digital audio systems, radios, televisions and video recorders, household and portable video game consoles, among others.
D33	3345 and 3346	Medical equipment, precision, measurement, control and optical devices	Manufacture of medical equipment; measurement, control and navigation instruments, optical instruments, photographic and timekeeping equipment, among others.

Source: ISIC Rev. 3 code and NAICS 2013.

2.2 PRODUCTION CHAIN OF THE ELECTRONIC INDUSTRY

Generally speaking, electronics such as televisions, computer equipment or mobile phones are made with Printed Circuit Assemblies (PCAs), mechanical components (which can be metallic and/or plastic, such as lids, supports, keyboards, screen frames, bases, chassis, etc.), printed material (labels and service guides) and packaging material. PCAs are located inside the electronic product and therefore are not visible to the end-user. In general, they include the following components:

ELECTRONIC COMPONENTS: Electronic components are devices that interconnect to form an electronic circuit.

They can be divided into active components, such as diodes, displays, transistors, microprocessors and integrated circuits, and passive components, such as printed circuit boards (PCBs), connectors, capacitors and inductors.

Active components are designed and manufactured from semiconductor materials (silicon wafers) and micro-mechanical processes (micro-injection, micro-ceramics, micro-die-cutting, micro-machining) and can stimulate, store, control and process electrical signals, among other functions.

In addition, passive components are manufactured from chemical substrates and micro-mechanical processes and complement the functions of active components.

EMBEDDED SOFTWARE: Software is commonly called “embedded” because it is contained in microcontroller-type integrated circuits. Embedded software controls the system to make it complete several functions and tasks.

Embedded software is made with algorithms and instructions that are subsequently installed in microcontroller-type integrated circuits.

PRINTED CIRCUIT BOARDS: While the PCB is a passive component, it will be discussed separately due to its importance.

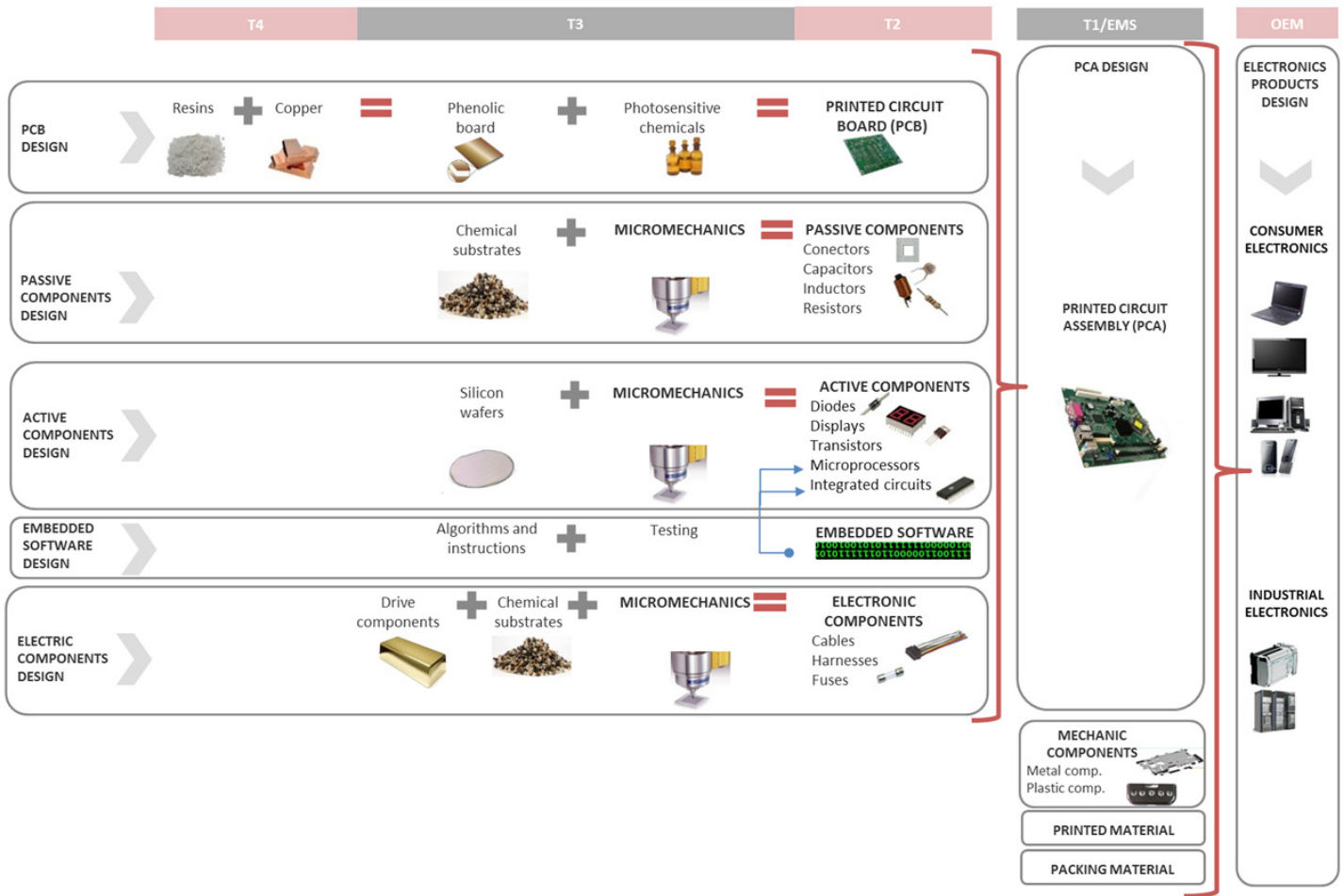
PCBs are boards, usually green, with tracks or engraved pathways to connect electronic components. There are several types of PCBs: single layer, multilayer, high definition multilayer, flexible, etc.

Generally, PCBs are manufactured from a phenolic board made of copper sheets and resins.

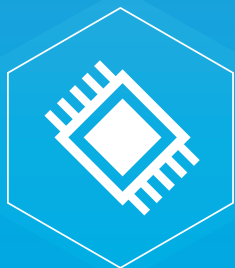
By itself, the phenolic board is not a PCB; it requires photosensitive and corrosive chemicals which are applied to a previously designed “track” diagram on the phenolic board.

ELECTRICAL COMPONENTS: Electrical components include cables, harnesses, switches, fuse and relays, among others, and are manufactured from conductor components, chemical substrates and micro-mechanical processes.

FIGURE 1. PRODUCTION CHAIN OF THE ELECTRONIC INDUSTRY



III GLOBAL
OUTLOOK



3. GLOBAL OUTLOOK⁷

3.1 PRODUCTION

In 2013, the global electronics production reached 3,499 billion USD and is expected to grow at a real Compound Annual Growth Rate (CAGR) of 6.1% between 2013-2020.

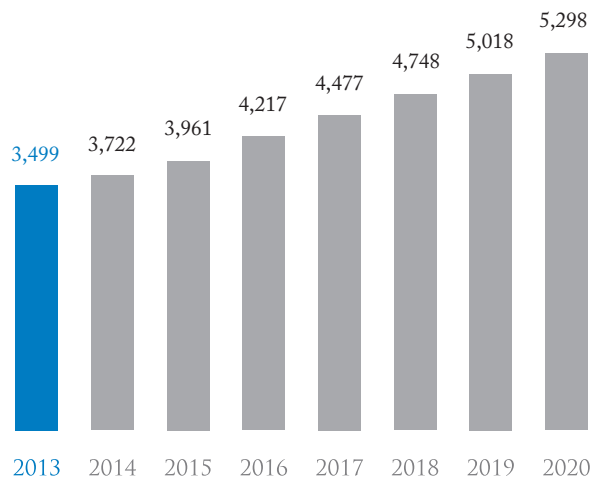
The subsector with the largest production was semiconductors (1,195 billion USD,) with a real CAGR (2013-2020) of 6.6%, while the audio and video sector had a production of 347 billion USD with a real CAGR (2013-2020) of 6.7%.

TABLE 2. GLOBAL PRODUCTION IN THE ELECTRONIC INDUSTRY BY SUBSECTOR, 2013 (BILLION USD)

ISIC REV. 3 CODE	SUBSECTOR	PRODUCTION	SHARE	CAGR (2013-2020)
D321	Semiconductors	1,195	34.1%	6.6%
D33	Medical equipment and precision, measurement, control and optical devices	804	23.0%	4.0%
D30	Computers and office	586	16.7%	5.7%
D322	Communications	568	16.2%	5.6%
D323	Audio and video	347	9.9%	6.7%
Total		3,499	100.0%	6.1%

Source: Global Insight.

GRAPH 1. FORECAST OF THE GLOBAL PRODUCTION OF THE ELECTRONIC INDUSTRY, 2013-2020 (BILLION USD)

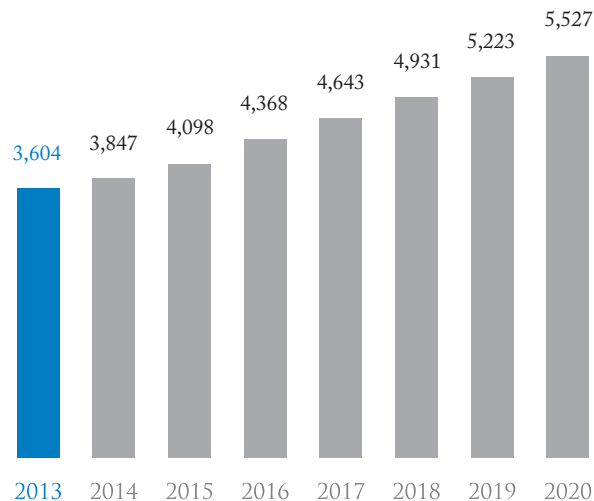


Source: Global Insight.

3.2 CONSUMPTION

The global electronics consumption reached 3,604 billion USD in 2013. It is expected to reach 5,527 billion USD by 2020, with a real CAGR of 6.3% during the 2013-2020 period.

GRAPH 2. FORECAST OF THE GLOBAL CONSUMPTION OF THE ELECTRONIC INDUSTRY, 2013-2020 (BILLION USD)

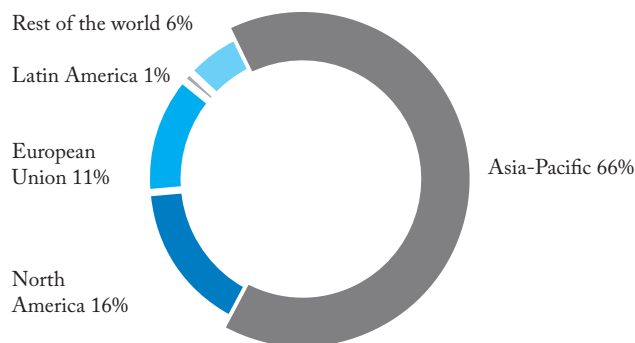


Source: Global Insight.

3.3 GEOGRAPHIC SEGMENTATION

In 2013, the largest worldwide producer was Asia-Pacific with a 66% share of the market, followed by North America and the European Union. In Asia-Pacific are located the three largest producer countries of the industry: China, South Korea and Taiwan.

GRAPH 3. ELECTRONIC INDUSTRY PRODUCTION BY REGION, 2013

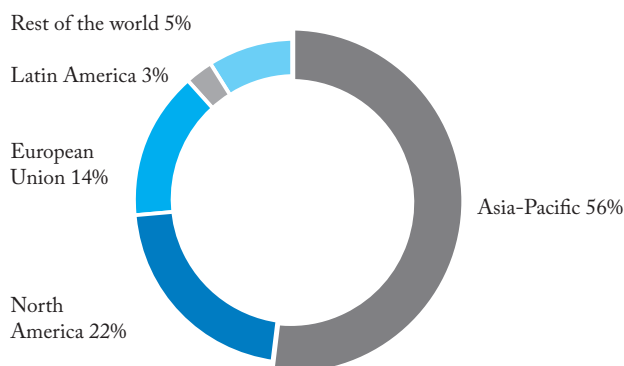


Source: Global Insight.
North America includes Canada, United States and Mexico.

7. Global Insight.

In 2013, Asia-Pacific countries such as China, Japan and Taiwan were the largest consumers of the industry. This contributed to make the region's consumption the highest around the world.

GRAPH 4. ELECTRONIC INDUSTRY CONSUMPTION BY REGION, 2013



Source: Global Insight.
North America includes Canada, United States and Mexico.

3.4 INDUSTRY TRENDS

Electronic products have increasingly shorter life cycles and every day consumers are looking for more functions at lower costs.

Major industry companies are continuously investing in technology to reduce the weight of electronic devices while making them smarter and more user-friendly. They seek to reduce the weight of the device using nanotechnology, which manipulates matter at “nano” scale and enables the manufacture of increasingly smaller and lighter electronic products and components.

In addition, companies are constantly striving to develop electronic technology and components with better data processing capacity. Some examples are RAM memories, microcontrollers and microprocessors, which can store and process data and files generated by computer programs.

The use of interconnected, wireless electronic devices will continue to rise.

Today, scientists are being challenged to develop energy conversion systems that consume less energy but generate more processing power and autonomy. Future energy conversion systems must have less volume and weight but higher performance. LED, CMOS, FET and Mosfet technologies are outstanding examples of this.

Given the growing market demands for permanent reductions in production costs and increasingly flexible and agile manufacturing systems, some original equipment manufacturers (OEM) are now outsourcing manufacturing services to specialized companies known as electronics manufacturing services (EMS), in order to reduce production costs and focus their efforts and resources on the design, innovation, marketing and sale of final products.

By outsourcing manufacturing processes, OEMs can access state-of-the-art technology and production processes, reduce working capital requirements, increase production flexibility and consolidate

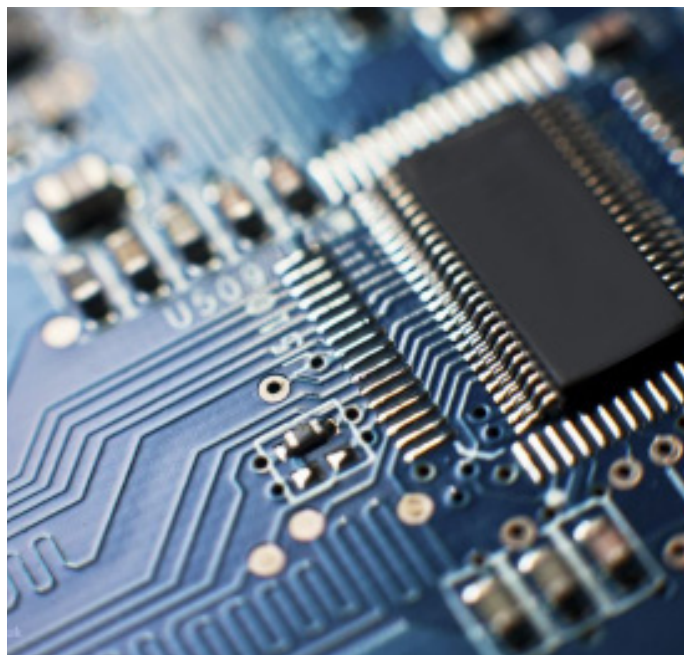
purchases. This is because the burden of unexpected changes in demand is transferred to the contracting companies. OEMs are then able to focus on more strategic/higher value added activities, such as sales, search and management of distribution channels, logistics, marketing, engineering, design and research and development.

The natural evolution of EMS has resulted in the development of original design manufacturers (ODM) which offer manufacturing and assembly services to OEMs and also design and engineering services. This allows OEMs to launch new products onto the market with fewer time and investment requirements. Some examples of these companies are Asus, Quanta, Compal, Wistron, Inventec and High Tech Computer, among others.

BUSINESS MODEL FOR ELECTRONIC DEVICES AND COMPONENTS MANUFACTURING

	DESIGN AND ENGINEERING	MANUFACTURING	SALES AND MANAGEMENT
OEM's Samsung, LG, etc.	✓	✓	✓
EMS Foxconn, Celestica, etc.		✓	
ODM's Wistron, Aus, etc.	✓	✓	

Source: ProMéxico.



3.5 SOME OF THE LEADING COMPANIES IN THE WORLD

The following are some of the leading global companies in the electronic industry:

3.5.1 SAMSUNG ELECTRONICS

It is one of the largest electronics companies in the world, with 215 billion USD in sales in 2013. Its corporate offices are located in Seoul, South Korea and it is the flagship subsidiary of the Samsung Group. The company has presence in 65 countries and has 95,798 employees around the world (2013). Since 2006, it has been the leader in LCD and LED screen and computer chips sales, and since 2009, it has been the leading producer of information technology.

3.5.2 HON HAI PRECISION INDUSTRY (FOXCONN)

This Taiwanese corporation established in 1974 is the global leader in contracted high technology manufacturing processes, specializing in components for the electronic industry. Foxconn is the largest manufacturing company in Taiwan and operates as a contract manufacturing-services company, supplying international leaders in computers, communications and consumer electronics. The company has operations in Mexico, US, UK, Denmark, Hungary, India, China, Japan, and Taiwan.

3.5.3 WISTRON

The company recorded an income of 21 billion USD and employed 57,000 people in 2013. It manufactures computers and consumer electronics, including laptops, desktops, servers, LCD televisions and set-top boxes. It is divided into four business groups: digital consumption, business, mobile and services. Wistron also offers design services, prototypes, compliance and reliability testing and supply chain management. It focuses on providing services to large computer companies such as Dell, Hewlett-Packard and Microsoft. In addition, it is one of the world's largest laptop producers.

3.5.4 INTEL CORPORATION

Intel Corporation is the world's largest manufacturer of integrated circuits for the electronic industry. In 2013, the company recorded 52 billion USD in income and employed 107,600 people. It designs computer components, such as microprocessors, electronic tablets, connectivity products, etc. It operates in four segments.

3.5.5 SHARP CORPORATION

The company recorded an income of 28 billion USD and employed 50,253 people in 2013. Sharp is one of the global leaders in electronic components, hardware, semiconductors and other consumer electronic products. Some of its main products are LCD televisions, mobile phones, microwaves, sound and home cinema systems, air purifying systems, faxes, etc.

3.6. CERTIFICATIONS

3.6.1 INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 9000 is a set of international standards that certify quality practices by specifying standards, procedures, delivery times and service levels. ISO 9000 is sub-divided into ISO 9001:2008, which supplies a series of standardized requirements for the quality management system.

ISO 14000 is an international standard that regulates environmental aspects and is sub-divided into ISO 14001:2004 and ISO 14004:2004. Both regulate the Effective Environmental Management System, whose aim is to help companies reach environmental and economic goals by defining requirements and procedures to establish environmental policy and objectives.

3.6.2 OTHER SAFETY STANDARDS TO ACCESS THE LEADING MARKETS

To gain access to markets such as the United States, Canada and the European Union, electronic components and parts, as well as electricity generation and distribution equipment must comply with the safety standards established by various laboratories. For instance, the US market requires certification from UL (Underwriters Laboratories), while Canada requires the CSA (Canadian Standards Association) certification, Europe the CE marking and Germany certification from Deutsches Institut für Normung (DIN).

UNDERWRITERS LABORATORIES (UL) - UL is a company with certifications, tests, inspections, audits, validation and assessment on several industries, such as electronics, chemical energy, electricity and medical devices, among others. For more than a century, UL has certified electronics such as radios, televisions and computers, and currently offers several services for companies that manufacture consumer and industrial electronics and their components..

ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES (IPC) - IPC is an association that specializes in the main areas of the electronic industry: design, printed circuit board manufacture and electronic assemblies.

IPC is responsible for management programs, standards that focus on the needs of the electronic industry, standards for environmental protection and government regulations.

Standards published by IPC have become a global guide for printed circuit board manufacturing, micro-mechanical processes, assemblies, etc.

CANADIAN STANDARDS ASSOCIATION (CSA) - CSA is a Canadian organization made up of industry, government and consumer representatives that develops standards in 57 areas, including electronics, medical devices, telecommunications and industrial equipment.

CSA is accredited by the Standard Council of Canada (SCC), which promotes safety certifications in Canada.

EUROPEAN CONFORMITY (CE) - The CE marking guarantees that a product, whether it was manufactured in Europe or abroad, has been evaluated before coming onto the market and meets safety, health and environmental requirements established by the European Union.

In addition to user safety, the CE marking is aimed at expediting the free circulation of goods in the EU. However, not all products bear the CE marking. There are more than 20 guidelines that establish the product categories that require the CE marking and the standards needed to obtain it.

DEUTSCHES INSTITUT FÜR NORMUNG (DIN) - The German Standardization Institute is the national body that represents German interests in European and International standardization organizations. 90% of standards created by DIN are of international compliance.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) - ASTM is an International standard organization that gathers producers, users and consumers from around the globe, to create voluntary consensus standards. ASTM has more than 30,000 members from 140 countries, who have published more than 12,000 international standards in several industries, including electronics.

TÜV RHEINLAND - The TÜV Rheinland group is a German certification and inspection company that focuses on technology.

COMISIÓN INTERNACIONAL ELECTROTÉCNICA (IEC) - IEC is one of three international sister organizations (IEC, ISO, ITU) and prepares and publishes International standards for electric, electronic and similar technologies.

ESQUEMA DE EVALUACIÓN DE LA CONFORMIDAD PARA EQUIPOS Y COMPONENTES ELECTRÓNICOS (IECEE) - Includes conformity and certification tests for the safety and operation of household equipment, medical devices, lighting and portable tools, among other products.

3.7 TECHNOLOGY STANDARDS

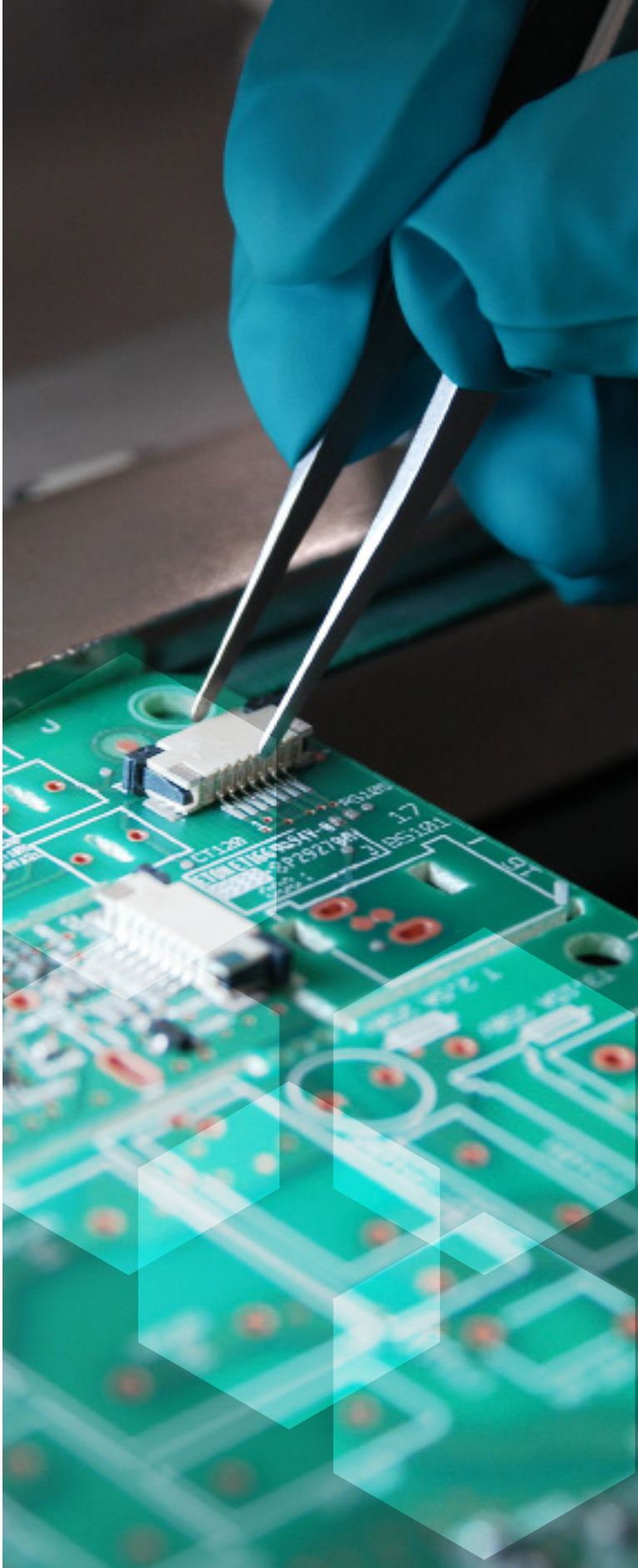
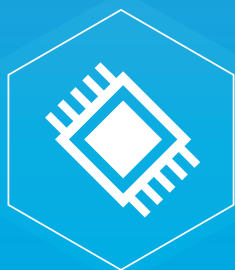
Any company from the electronic or electrical industry wishing to penetrate other markets must consider the technological standards of the target markets and the operation and safety features of the components and systems it intends to sell. The following are some of the technology features and standards to consider:

TABLE 3. EXAMPLES OF TECHNOLOGY STANDARDS IN THE ELECTRONIC INDUSTRY

VARIABLE	NORTH AMERICA	LATIN AMERICA	EUROPE	ASIA
Voltage (Volts)	127	110 / 115 / 120 / 208 / 220 / 230	220	100 / 110 / 120 / 200 / 220 / 230 / 240 / 250
Frequency (Hertz)	60	50 / 60	50	50 / 60
Base	A/B	A/B/C/E/F/I/L/	C/D/E/F/G/J/K/L/	A/B/C/F/I/J/D/M/G/
Operation frequency in telecommunications	GSM 1900	GSM 850	P-GSM 900	GSM 850
Frequency (Megahertz)	GSM 1900	GSM 850	P-GSM 900	GSM 850
Technology in video TX/RX	NTSC	PAL	PAL / SECAM	PAL / SECAM
Reproduction technology	Region 1	Region 4	Region 2	Region 2/5/6 (China)

Source: ProMéxico.

IV THE INDUSTRY
IN MEXICO



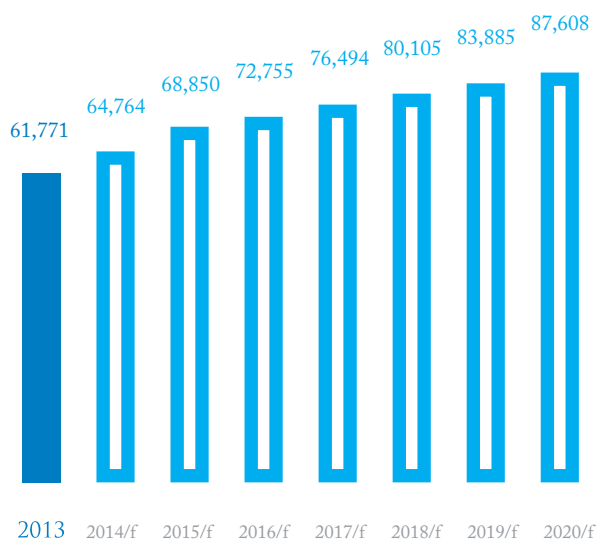
4. THE INDUSTRY IN MEXICO

Mexico is well-positioned globally as an exporter and assembler of electronics. Some of the main electronic companies including Samsung, LG, Toshiba, Foxconn, Flextronics, Intel and others have presence in Mexico. In addition, some of these companies have invested in the country not only in manufacturing plants but also in engineering and design Centers, which employ Mexican engineers. Mexico is especially competitive in the consumer electronics subsector. It ranks as one of the leading exporters of electronics on a global scale, such as flat screen televisions, computers and mobile phones.

4.1 PRODUCTION

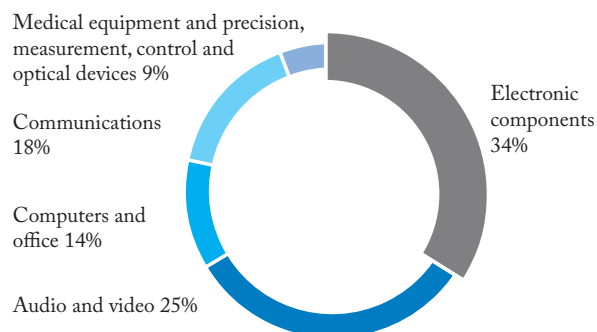
It is estimated that the production value of the electronic industry in Mexico was 61,771 million USD in 2013, and it is expected to record a real CAGR of 5.1% for the 2013-2020 period.

GRAPH 5. FORECAST FOR THE NATIONAL PRODUCTION OF THE ELECTRONIC INDUSTRY, 2013-2020 (MILLION USD)



Source: ProMexico's calculations with information by INEGI and Global Insight. /f: forecast.

GRAPH 6. PRODUCTION OF THE ELECTRONIC INDUSTRY IN MEXICO BY SUBSECTOR, 2013

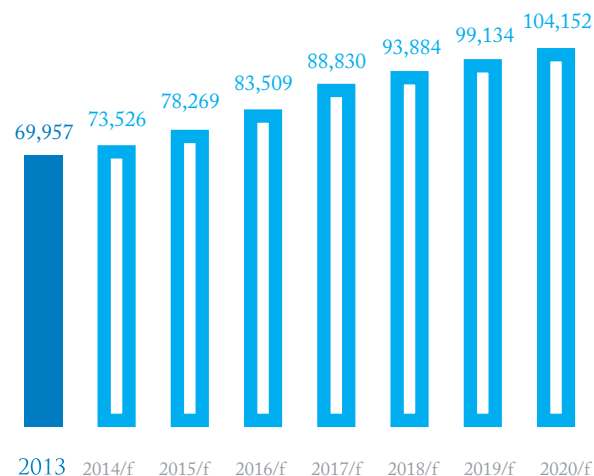


Source: ProMexico with information from INEGI.

4.2 CONSUMPTION

It is estimated that consumption of the electronic industry in Mexico summed 69,957 million USD in 2013 and it is expected to record a real CAGR of 5.9% for the 2013-2020 period.

GRAPH 7. FORECAST FOR THE NATIONAL CONSUMPTION OF THE ELECTRONIC INDUSTRY, 2013-2020 (MILLION USD)



Source: ProMexico's calculations with information by INEGI and Global Insight. /f: forecast.

IN 2013, THE SECTOR'S EXPORTS TOTALED 75,393 MILLION USD, REPRESENTING 24% OF NONOIL EXPORTS OF THE COUNTRY.

SOURCE: INEGI AND BANCO DE MÉXICO.

4.3 MEXICO'S INTERNATIONAL TRADE

In 2013, exports from the industry summed 75,393 million USD. Mexican exports were destined mainly to the United States, with an 84% share, followed by Canada, Colombia and the Netherlands.

GRAPH 8. MAIN DESTINATIONS FOR MEXICAN EXPORTS FROM THE ELECTRONIC INDUSTRY, 2013



Source: ProMexico with information from Global Trade Atlas.

TABLE 4. MEXICAN EXPORTS FROM THE ELECTRONIC INDUSTRY, 2013 (MILLION USD)

TARIFF CODE	PRODUCT	EXPORTS 2013 (MILLION USD)	% SHARE IN EXPORTS
8471	Computers	17,401	23.1%
852872	Flat screen televisions	13,755	18.2%
851712	Mobile phones	4,994	6.6%
8518	Microphones, speakers and earphones	1,775	2.4%
	Others	37,468	50%
	Total	75,393	100%

Source: ProMexico with information from Global Trade Atlas.

In 2013, Mexico had a significant share in television and computer global exports. It was the world's leading exporter of flat screens, surpassing highly competitive Asian countries. In addition, it was the fourth largest computer exporter globally.



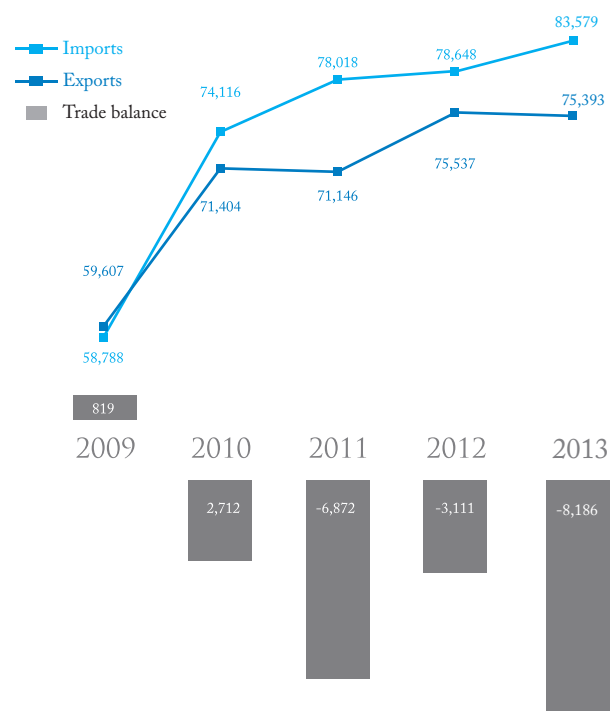
TABLE 5. MAIN PRODUCTS EXPORTED FROM THE ELECTRONIC INDUSTRY, 2013

GLOBAL RANKING	DESCRIPTION
1° lugar	Flat screen television
4° lugar	Computers
4° lugar	Microphones, speakers and earphones
8° lugar	Mobile phones

Source: ProMexico with information from Global Trade Atlas.

Mexican imports from this industry were valued on 83,579 million USD hence there was an 8,186 million USD trade deficit in 2013.

GRAPH 9. INTERNATIONAL TRADE, 2009-2013 (MILLION USD)



Source: ProMexico with information from Global Trade Atlas.

4.4 FOREIGN DIRECT INVESTMENT

Between 2003 and 2013, accumulated foreign direct investment (FDI) in this industry summed 13,326 million USD; the subsector with the highest FDI was communications equipment, followed by computers and office and audio and video equipment.

TABLE 6. FOREIGN DIRECT INVESTMENT IN THE ELECTRONIC INDUSTRY BY SUBSECTOR, 2013 (MILLION USD)

NAICS CLASSIFICATION	SUBSECTOR	FDI	ACCUMULATED FDI 2003-2013
3341	Computers and office	159	3,370
3344	Electronic components	216	3,139
3343	Audio and video	275	3,082
3342	Communications	332	2,749
3345 & 3346	Medical equipment and precision, measurement, control and optical devices	202	986
Total		1,184	13,326

During the same period, the countries with the largest investments in Mexico in the electronic industry were the United States, the Netherlands and Japan.

TABLE 7. FOREIGN DIRECT INVESTMENT IN THE ELECTRONIC INDUSTRY BY COUNTRY OF ORIGIN, 2013 (MILLION USD)

COUNTRY	FDI	ACCUMULATED FDI 2003-2013
United States	599.9	6,775
Netherlands	220.3	3,168
Sweden	-25.5	624
Japan	24.2	548
South Korea	167.8	484
Taiwan	115.5	412
Singapore	52.4	356
Canada	8.2	198
Germany	-1.4	150
Switzerland	9.4	130
Others	13	480
Total	1,184	13,326

Source: The Secretariat of Economy of Mexico.

TABLE 9. RECENT INVESTMENT ANNOUNCEMENTS IN THE ELECTRONIC INDUSTRY IN MEXICO

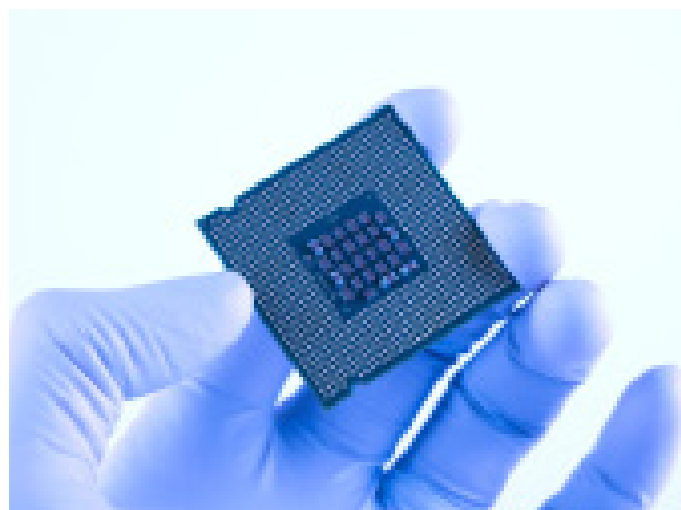
COMPANY	COUNTRY OF ORIGIN	PROJECT	JOBS	FDI (MILLION USD)
Intel	United States	In March 2014 Intel opened The Intel Design Center in the city of Guadalajara. The company invested about 235 million USD and created at least 1,000 jobs. The Center is unique in Latin America, it integrates industry and academia, and opens new design areas in the country.	1,000	235
Plexus	United States	In 2013 Plexus announced an investment of 40 million USD that will generate 740 new jobs. The company declared to be in an expansion phase; when it analyzed its options, Jalisco turned out to be the most convenient location. The new plant will have an area of 265 thousand square meters and will be located in Technology Park in the city of Guadalajara.	740	40
Furukawa	Japan	In 2013, the Japanese company announced the construction of a new plant to fabricate batteries, cables and sensors. The aim is to supply Japanese companies operating in the country.	300	12
Omp Mechron	Italy	OMP announced it will open a plant in Guadalajara to supply the NAFTA zone. The company stated that it will expand its capabilities in Mexico in order to replicate in our country the plants in Usmate (Italy) and Shanghai (China). OMP is specialized in the manufacture and assembly of metal products, including racks and skeletons for servers required in industrial electronics companies.	55	2.6

Source: Printed and electronic media.

The states that received the largest FDI in the period 2003-2013 were: Jalisco, Chihuahua, Baja California and Estado de México.

TABLE 8. FOREIGN DIRECT INVESTMENT IN THE ELECTRONIC INDUSTRY BY DESTINATION STATE, 2013 (MILLION USD)

STATE	FDI	ACCUMULATED FDI 2003-2013
Jalisco	162	2,214
Chihuahua	197	1,921
Baja California	152	1,692
Estado de México	122	1,289
Tamaulipas	286	1,227
Mexico City	150	839
Sonora	31	511
Nuevo León	31	263
Coahuila	27	126
Puebla	10	111
Zacatecas	7	59
Querétaro	0	22
Aguascalientes	0	14
Otros	8	3,039
Total	1,184	13,326



4.5 SOME OF THE LEADING MEXICAN COMPANIES IN THE INDUSTRY

Several world leaders of the electronic industry have operations in Mexico to serve the US and Canadian markets. Nine of the top ten EMS transnationals are located in Mexico.^{8,9}

TABLE 10. SUCCESS STORIES OF THE ELECTRONIC INDUSTRY IN MEXICO

COMPANY	PROJECT	PRESENCE IN MEXICO SINCE
Flextronics	Some of Flextronics' plants are located in the states of: Aguascalientes, Coahuila, Jalisco, Chihuahua and Baja California.	1997
Foxconn	By March 2010 the company had six plants in Mexico. In January 2010, Foxconn purchased Sony's television plant in Mexico.	2002
Samsung	Samsung Electronics Mexico is based in Mexico City and has presence in Veracruz, Guadalajara and Monterrey. In addition it has screen and television production plants in Tijuana.	1995
HP	The company has several production and research and development lines. Mexico is the base for all its distribution operations in Latin America.	1982
Panasonic	The company operates seven plants in Mexico located in Reynosa, Mexicali, Tijuana and Monterrey. In Mexico, Panasonic manufactures a wide range of products such as LCD televisions and electronic car sensors.	1978

Source: Company websites and annual reports.

FIGURE 2. THE LEADING TRANSNATIONALS OF THE ELECTRONICS INDUSTRY IN MEXICO



Source: Company websites and Colliers International.

8. The following EMS have presence in Mexico: Foxconn, Pegatron, Flextronics, Jabil, New Kinpo Group, Sanmina, Celestica, Benchmark Electronics and Universal Scientific Industrial Co. 9. Source: Manufacturer Market Insider.

In 2013, Mexico had 945 economic units¹⁰ dedicated to the electronics industry which employed 458,563 people¹¹. The states with the largest production were: Baja California, Chihuahua, Jalisco, Nuevo León, Tamaulipas, Estado de México, Coahuila, Morelos, Sonora and Aguascalientes.¹²

FIGURE 3. ECONOMIC UNITS OF THE ELECTRONIC INDUSTRY, 2013



Source: ProMexico with data by INEGI.

ProMexico has identified the main 22 cities from the industry distributed in 6 regional poles.

FIGURE 4. DEVELOPMENT POLES IN THE ELECTRONIC INDUSTRY



Source: ProMexico with information from Colliers International.

10. Source: INEGI, DENU, 2013. 11. Source: ProMexico with information from INEGI. 12. Source: ProMéxico with information from INEGI.

4.6 CHAMBERS, ASSOCIATIONS AND RESEARCH AND DEVELOPMENT CENTERS

National Chamber of the Electronic, Telecommunications and Information Technology Industry / Cámara Nacional de la Industria Electrónica, de Telecomunicaciones y Tecnologías de la Información (CANIETI)

www.canieti.org

This is a public interest institution in charge of the competitive development of the Electronics, Telecommunications and Information Technology Industry.

Electronics Production Chain / Cadena Productiva de la Electrónica (CADELEC)

www.cadelec.com.mx

This is the agency in charge of facilitating the development and integration of local, national and international companies into the electronic industry supply chain and strategic sectors of the regional and national economy.

National Council of the Maquila and Manufacturing Export Industry / Consejo Nacional de la Industria Maquiladora y Manufacturera de Exportación (CNIMME)

www.cnime.org.mx

This is a private organism created as a non-profit civil association. It currently represents more than 1200 established companies that employ 80% of the maquila workforce. CNIMME is supported by the local representation of 16 associations.

Scientific Research and Higher Education Center of Ensenada / Centro de Investigación Científica y de Educación Superior de Ensenada (CICESE)

www.cicese.edu.mx/index.ph

Tiene como finalidad fortalecer la vinculación con los sectores público, privado y social a través de proyectos de investigación y desarrollo, servicios tecnológicos, de consultoría y programas de capacitación.

Center for Research and Development in Digital Technology / Centro de Investigación y Desarrollo de Tecnología Digital (CITEDI)

www.citedi.mx/

Its goals are to develop, disseminate and transfer basic, applied and high technology development research in electronics and support the training of human resources in graduate programs of excellence. It is located in Baja California.

National Astrophysics, Optics and Electronics Institute / Instituto Nacional de Astrofísica, Óptica y Electrónica (INAOE)

www.inaoep.mx

The Institute performs research, technology development and human resource training activities in the areas of electronic devices, device manufacturing technology and integrated silica circuits, integrated circuit design, CAD development, circuit and VLSI electronic system verification, electronic instruments and communication systems.

Research and Advanced Studies Center of the National Polytechnic Institute / Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional (CINVESTAV)

www.cinvestav.mx/

It has 28 research departments distributed across its nine campuses in Mexico. It performs industry-related research in the areas of telecommunications, information technology, electronic engineering, mechatronics and robotics.

Intel / Jalisco

www.intel.com

This center plays an important role in the development of telecommunications integrated circuits. It was acquired by Intel to broaden the knowledge of the design team with experience in telecommunications, and it focuses on optical design (line of reference card design), support of silica optical products through the development of associate evaluation boards /systems and high speed development.

Industrial Engineering and Development Center / Centro de Ingeniería y Desarrollo Industrial (CIDESI)

www.cidesi.com

It is involved in the research of various lines of knowledge such as industrial mechatronics, automation and control, applied electronics, instrumentation and sensors, advanced software development, etc. It is part of the System of Centers of The National Science and Technology Council.

Center for Research in Advanced Materials (Centro de Investigación en Materiales Avanzados (CIMAV)

www.cimav.edu.mx/

It is headquartered in Chihuahua and has another unit in Monterrey. One of its goals is to transfer knowledge generated in its area of competence (electronics) from the Center to production, academic and social sectors.

Technology Innovation and Transfer Institute / Instituto de Innovación y Transferencia de Tecnología (I2T2)

www.mtycic.org:8080/

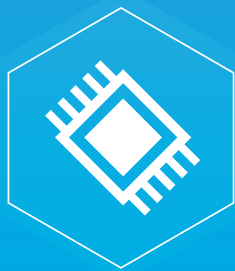
It is responsible for promoting new public policies related to science, technology and innovation to boost the economic and social development of the state of Nuevo León. I2T2 is also in charge of designing and operating financial instruments, funds and infrastructure that enable it to complete its mission of supporting and transferring applied research and technology development towards market needs.

Electronic Standardization and Certification / Normalización y Certificación Electrónica, A.C. (NYCE)

www.nyce.org.mx/

It is a non-profit civil association created in November 1994 by a group of leading companies in the electronics, telecommunications and information technology sectors in Mexico. Their goal is to have an Organization of National jurisdiction that considers their needs both in standardization and certification of compliance with the Official Mexican Standards applicable to their products.

V BUSINESS OPPORTUNITIES





5. BUSINESS OPPORTUNITIES

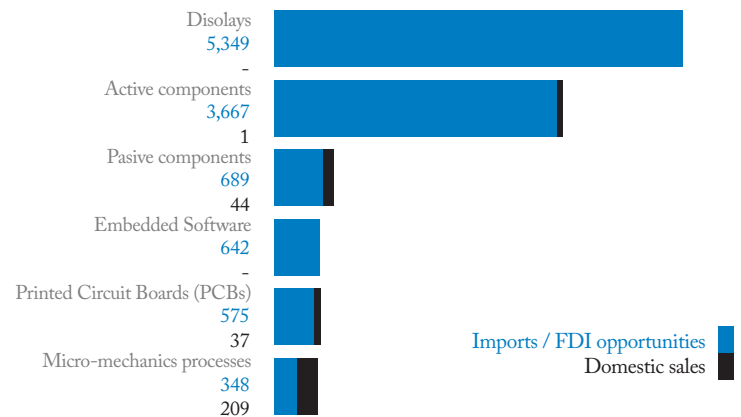
5.1 INVESTMENT OPPORTUNITIES

Mexico's electronic industry specializes in manufacturing electronic products, mainly consumer electronics—televisions, mobile phones and computers. However, only a few Mexican companies design and/or manufacture electronic components and are not enough to satisfy the demand.

ProMexico made a study of the demand for components to manufacture televisions in Mexico. It is estimated that close to 97% of them are imported, opening great investment opportunities.

The most demanded and important families of components for television production in Mexico are: semiconductors, displays, embedded software, passive components, printed circuit boards (PCBs) as well as micro-mechanics processes.¹³

GRAPH 10. DEMAND FOR TELEVISION MANUFACTURING IN MEXICO BY FAMILY OF COMPONENTS, 2013 (MILLION USD)



Source: ProMexico's estimates with data by Global Trade Atlas, 2013.

Another way to estimate the lack of supply of high-technology components required by Mexico's electronic industry is through its imports, from which the most important are active components.

TABLE 11. SOME OF THE MAIN IMPORTS OF SEMICONDUCTORS IN MEXICO, 2013 (MILLION USD)

TARIFF CODE	DESCRIPTION	COUNTRY OF ORIGIN	IMPORTS
8542	Integrated electronic circuits	Costa Rica, Corea del Sur, Malasia y Estados Unidos	13,360
8541	Diodes, transistors and similar semiconductor devices; photosensitive semiconductor devices, including photovoltaic cells, even if they are assembled on modules or panels; light emitting diodes; mounted piezoelectric crystals	China, Malaysia, Japan, United States	2,802

Source: Global Trade Atlas.

The following diagram shows the production chain of the electronic industry; dotted boxes indicate the missing links where we FDI is required.

13. The study only considers the manufacture of televisions for export and uses Global Trade Atlas data.

FIGURE 5. MISSING LINKS IN THE PRODUCTION CHAIN OF THE ELECTRONIC INDUSTRY IN MEXICO



Source: ProMéxico.

5.2 OPPORTUNITIES FOR THE MEXICAN SUPPLY CHAIN

There is an important base of EMS and OEMs established in Mexico which require large quantities of electronic components to complete their supply chain majorly imported, due to a small or no domestic supply.

By developing the supply chain, efforts are done to facilitate EMS and OEMs currently present in Mexico to incorporate Mexican manufacturers of electronic components whenever this is possible.

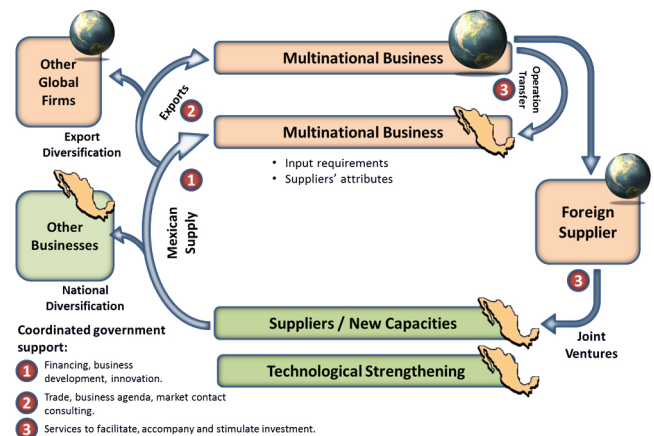
Through its Transnational Business Accompaniment model (ACT), ProMexico seeks to leverage the strong interest of many transnationals established in Mexico to grow their businesses in the country, by increasing the linking of Mexican companies in their supply chains and by encouraging the transfer of operations without or with minimum presence in the country.

The goals are:

- To boost exports by linking suppliers with the operations of the international supply chain of transnational companies.
- To retain and boost reinvestments by transnational companies in Mexico.
- Strengthen production chains through the attraction of FDI from foreign suppliers.

Through business meetings and supply seminars organized by ProMexico and OEMs and EMS located in Mexico, it is seek to integrate Mexican companies from the electronic industry into the supply chains of those companies.

FIGURE 6. PROMEXICO'S ACT MODEL (TRANSNATIONAL BUSINESS ALLIANCE MODEL)



Source: ProMéxico.

In addition to the ACT model, the federal government is willing to support and promote the development of small and medium-sized businesses through the National Entrepreneur Institute (INADEM).

5.3 BUSINESS OPPORTUNITY (INVESTMENT ATTRACTION AND/OR SUPPLY CHAIN LINKING) BY FAMILY OF COMPONENTS

The following table shows a few examples of promotion strategies for some components demanded in Mexico. It is suggested that those families of components of which there is production capacity in Mexico to be chained, while investment should be promoted in the families of components that are missing from the supply chain.

TABLE 12. EXAMPLES OF BUSINESS OPPORTUNITIES IN MEXICO (INVESTMENT ATTRACTION/SUPPLY CHAIN LINKING) BY FAMILY OF COMPONENTS

FAMILIES OF COMPONENTS AND PROCESSES DEMANDED IN MEXICO AND EXAMPLES	TECHNOLOGY SOPHISTICATION	PROMOTION STRATEGY
1. PACKAGING MATERIAL		
Plastic bags	Low	Supply chain linking
Cardboard boxes	Low	Supply chain linking
2. PRINTED MATERIAL		
Guides	Low	Supply chain linking
Labels	Low	Supply chain linking
3. PLASTIC COMPONENTS		
Keyboard	Low/Medium	Supply chain linking / Investment attraction
Switch panels	Low/Medium	Supply chain linking / Investment attraction
4. METALLIC COMPONENTS		
Chassis	Low/Medium	Supply chain linking / Investment attraction
Supports	Low/Medium	Supply chain linking / Investment attraction
5. ELECTRICAL COMPONENTS		
Cables and harnesses	Low/Medium	Supply chain linking / Investment attraction
Jumpers	Low/Medium	Supply chain linking / Investment attraction
6. PRINTED CIRCUIT BOARDS		
PCB up to 2 layers	Low/Medium	Supply chain linking / Investment attraction
Multilayer PCB	High	Investment attraction
7. PASSIVE COMPONENTS		
Resistors	Medium	Investment attraction
Capacitors	Medium	Investment attraction
8. SEMICONDUCTORS		
Sensors	High	Investment attraction
Memories	High	Investment attraction
9. SCREENS		
LCD screens	High	Investment attraction
10. DESIGN AND ENGINEERING		
Embedded software	High	Investment attraction
Printed circuit board (PCB) design	High	Investment attraction
11. MICRO MECHANICS		
Micro plastics	High	Investment attraction
Micro die cutting	High	Investment attraction
12. ASSEMBLY		
Printed circuit board assembly	Medium	Supply chain linking
Metallic parts assembly	Low/Medium	Supply chain linking

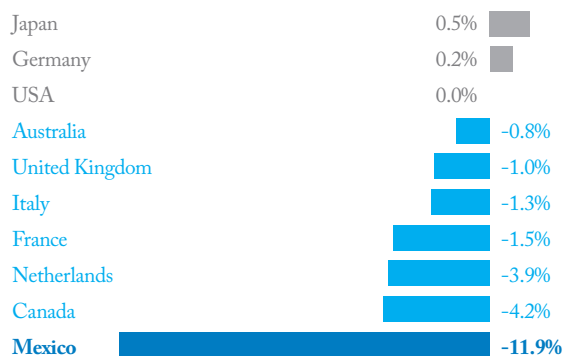
Source: ProMéxico.

5.4 COMPETITIVE ADVANTAGES

5.4.1 COMPETITIVE COSTS

According to KPMG, Mexico offers 11.9% savings in manufacturing costs of electronic equipment and components, compared with the United States.

GRAPH 11. SAVINGS INDEX FOR MANUFACTURING COSTS IN ELECTRONIC EQUIPMENT AND COMPONENTS COMPARED TO THE US 2013



Source: KPMG, Competitive Alternatives 2014.

5.4.2 HUMAN CAPITAL

In 2012, according to National Association of Universities and Institutions of Higher Education's data, 101.7 thousand engineering and technology students graduated from Mexican institutions. From UNESCO's 2010 data, there are 18% more graduates in manufacturing, engineering and construction per capita in Mexico than in the United States.

5.4.3 MARKET ACCESS

Mexico has excellent communication infrastructure. Its road network and railroad system communicates the interior part of the country, the north and south borders, making connections between the United States, Guatemala and Belize, and the west and east coasts, joining the sea ports on the Pacific Ocean with those on the Gulf of Mexico and the Caribbean Sea, at the Atlantic Ocean.

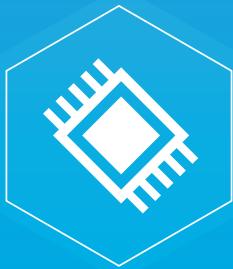
Furthermore, there are many internal distribution terminals or "dry ports" communicated with the main sea ports, helping to reduce costs and expediting the transportation of goods.

Records of 2013 show that 5.2 million of trucks and 66.5 million of vehicles crossed the US-Mexican border, through its 54 crossings. Mexico has 9 formal border crossings in the south (8 with Guatemala and 1 with Belize).

Mexico has:

- 76 open airports (12 for domestic traffic and 64 for international and domestic transportation).
- 117 sea ports (49 cabotage ports and 68 grand cargo and cabotage ports).
- 27 thousand kilometers of railroads.
- More than 370 thousand kilometers of roads.

VI LEGAL FRAMEWORK



6. LEGAL FRAMEWORK

6.1 FEDERAL PROGRAMS

DRAWBACK

The program provides beneficiary exporters the opportunity to get a return on the general import tax paid on goods that are incorporated to export goods, or on the import of goods that are returned in the same condition or have undergone repairs or alterations.

PROSEC

This instrument is aimed to companies that produce specific goods and enables them to import with preferential ad-valorem tariffs. The imported goods shall be used in the manufacture of other products, regardless of whether the produced goods are exported or destined for the domestic market.

IMMEX

This operation program was created to simplify procedures and requirements for the maquila regime. It enables companies to temporarily import the goods required in an industrial or service process to produce, transform or repair foreign goods imported temporarily for later export. The beneficiaries of this program are selected by The Secretariat of Economy of Mexico.

6.2 OTHER INVESTOR SERVICES

Shelters Services allow businesses to start operations easily. They issue the necessary permits to begin operations without having to worry about customs, legality and administrative topics.

The services include staff management, licenses and permits, accounting and tax services, customs procedures, operation and maintenance services, transportation and logistics services, among others.

6.3 MEXICAN STANDARDS AND CERTIFICATIONS

Mexican Official Standards / Normas Oficiales Mexicanas (NOMs) are mandatory technical standards that regulate products or processes that could mean a risk to humans, animals, plants or the environment in general.

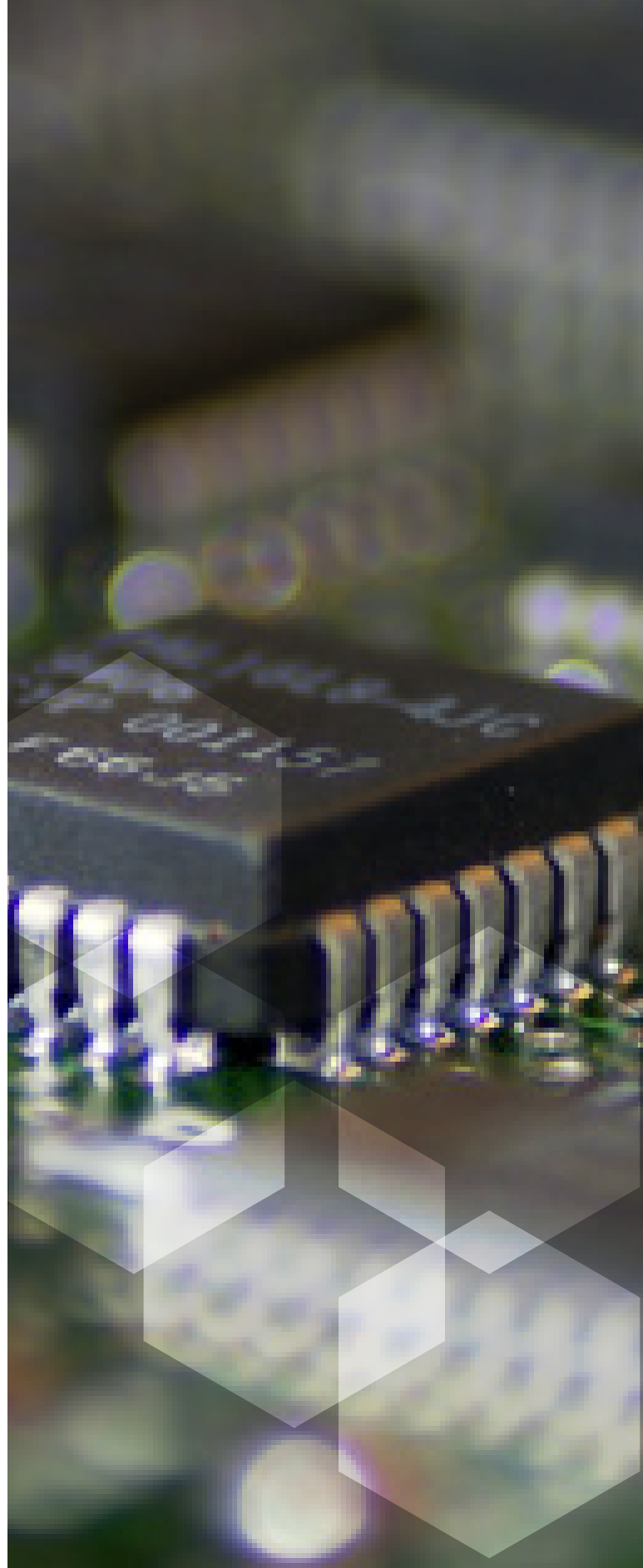
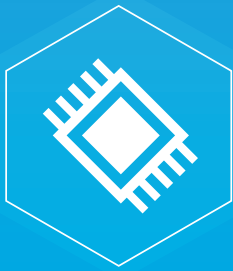
In addition, Mexican Standard/ Normas Mexicanas (NMX) are developed by a National Normalization Organism or by The Secretariat of Economy of Mexico. NMX establish minimum quality requirements for products and services, in order to protect and guide consumers. Its use is voluntary, except for cases in which the producer manifests their products, processes or services are in conformity with them.

TABLE 13. NOMS FOR THE ELECTRONIC INDUSTRY

STANDARD (NOM)	PRODUCTS OR PROCESSES	REQUIREMENT
NOM -001-SCFI	Household electronic devices fed by various sources of electricity	Safety requirement and testing methods for approval of type.
NOM-016-SCFI	Electronic office devices fed by various sources of electricity	Safety requirements and testing methods
NOM-019-SCFI	Data processing equipment	Data processing equipment security requirements
NOM-024-SCFI	Electronic products	Commercial information for packaging, instructions and warranties, electric and household appliances
NMX-1-011-NYCE-2003	Copying and/or duplicating machines for document reproduction	-
NMX-1-046-NYCE-2001	Desk and/or portable electronic calculators	-
NMX-1-062-NYCE-2002	Audio and video and musical instruments for household and commercial use and similar	Safety requirements
NMX-1-063-NYCE-2002	Battery chargers	Safety requirements
NMX-1-163-NYCE-2003	Electronic uninterruptible power systems	-

Source: The Secretariat of Economy of Mexico.

VII CONCLUSIONS



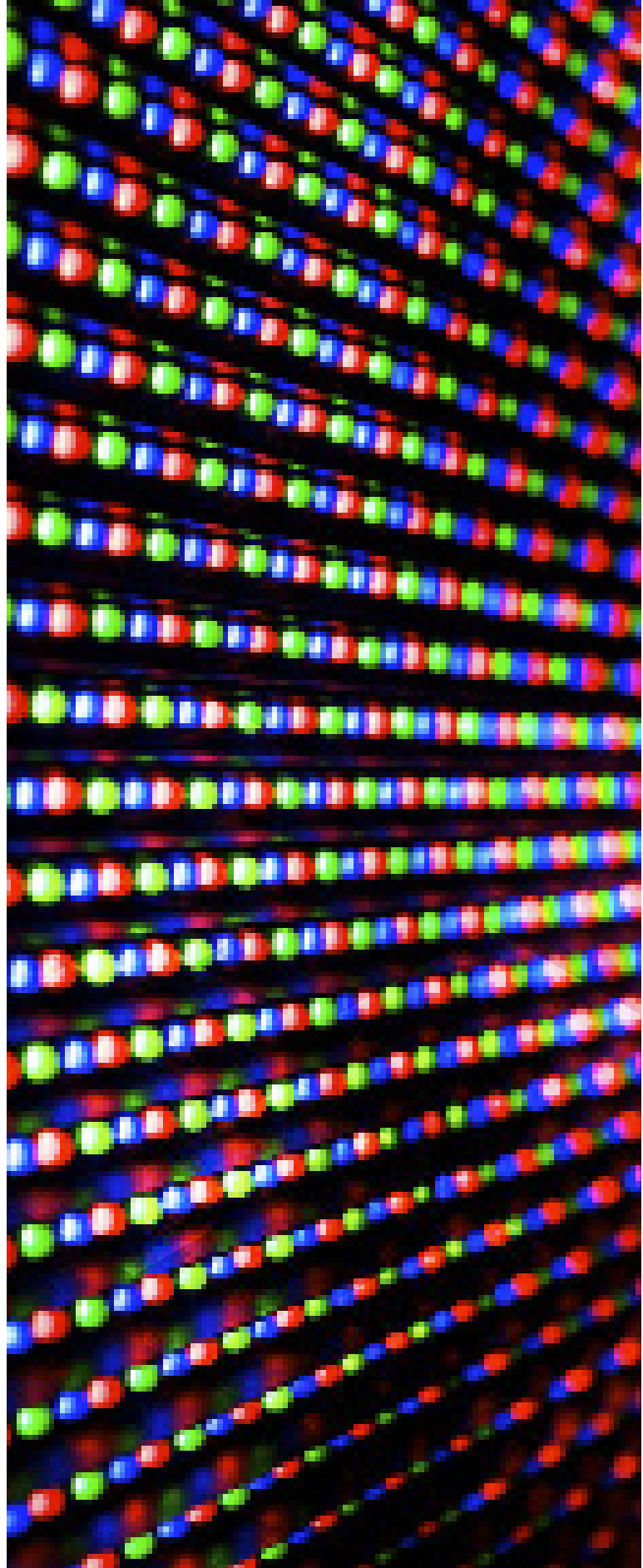
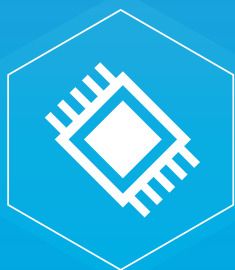
7. CONCLUSIONS

Mexico's electronic industry has grown to become one of the country's primary industries. Mexico is one of the leading exporters and assemblers in the world; nine of the top ten transnationals are located in Mexico, positioning it as an important investment destination. In terms of trade, Mexico is the leading exporter of flat screens, the fourth largest exporter of computers and the eight largest exporter of mobile phones globally. Furthermore, it is one of the main suppliers to the United States and Canada.

The industry's performance could be improved by attracting foreign direct investment in processes and electronic components that are currently missing from the industry's supply chain. There are great business opportunities to boost the production of highly technological components. Therefore, the promotion of international business is crucial for the growth of the industry in the country.

Finally, some of the reasons for investing in Mexico are the significant savings due to low manufacturing and labor costs, exchange rate stability and reduction in storage and transportation costs. Moreover, manufacturing in Mexico is a guarantee of quality, because of the country's highly skilled workforce and the fact that Mexican products comply with international quality and safety standards. Mexican manufacturing has UL, CSA, CE and DIN certifications.

VIII GLOSSARY

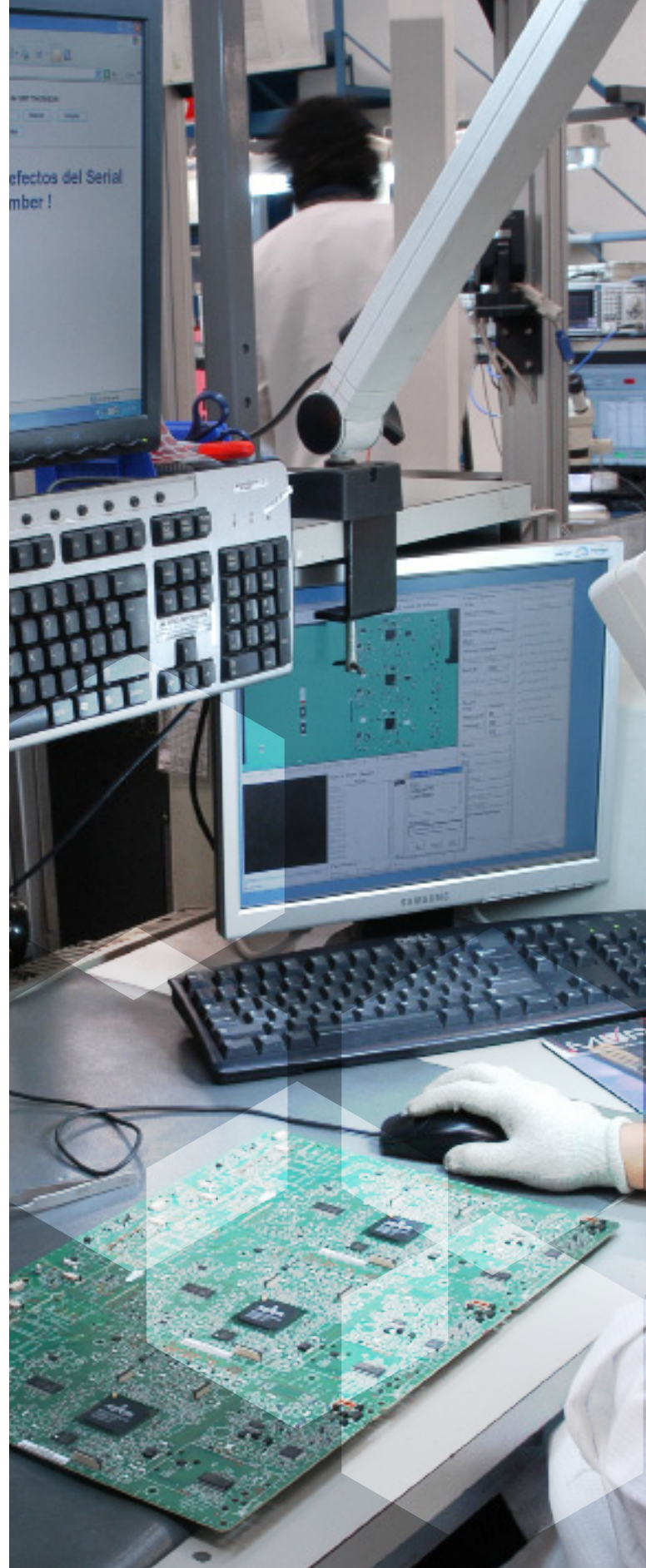
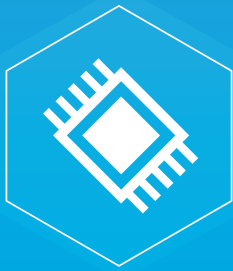


8. GLOSSARY

- **Active component:** electronic amplifiers and/or processors that are usually based on semiconductor technology. They generally have a non-linear behavior, that is, the relationship between tension applied and current demanded is not linear.
- **Passive component:** components that do not produce amplification and work to control electricity by contributing to improve the operation of active elements. They are divided into three groups: resistors, capacitors, coils and inductors.
- **Semiconductors:** elements that behave like conductors or insulators depending on several factors such as electric or magnetic field, pressure, radiation or surrounding temperature.
- **Resistor:** electronic component designed to introduce a specific electric resistance between two points of a circuit.
- **Capacitor:** device that stores electric charge. The capacitor is composed by two conductors in close proximity, separated by an insulator so that they can have the same charge with opposite signs.
- **Inductor:** passive component of an electric circuit that, due to the self-induction phenomenon, stores energy in the form of a magnetic field.
- **Embedded software:** software that is embedded or resides in different subsystems in the micro-controllers of different computer sub-systems, mobile phones, medical devices, computer accessories, household appliances, etc.
- **Printed circuit board (PCB):** used to mechanically support and electrically connect electronic components using conductive pathways, paths or signals embossed on laminated copper sheets.
- **Liquid crystal display (LCD):** is a display for flat screens, electronic visualization screens or video screens that uses the properties of light to modulate liquid crystals.
- **Light-emitting diode (LED):** is a semiconductor diode that emits light.



IX APPENDIX



9. APPENDIX

TABLE 14. THE WORLD'S TOP 50 EMS, 2013

	EMS	Country of origin
1	* Hon Hai Precision Industry (Foxconn)	Taiwan
2	* Pegatron	Taiwan
3	* Flextronics	Singapore
4	* Jabil	United States
5	* New Kinpo Group	Taiwan
6	* Sanmina	United States
7	* Celestica	Country of origin
8	* Benchmark Electronics	United States
9	Shenzhen Kaifa Technology	China
10	* Universal Scientific Industrial Co., Ltd. (USI)	China
11	*Plexus	United States
12	Venture	Singapore
13	UMC Electronics	Japan
14	SIIX	Japan
15	Zollner Elektronik Group	Germany
16	Sumitronics	Japan
17	Beyonics Technology	Singapore
18	*Asteelflash	France
19	Global Brands Manufacture (GBM)	Taiwan
20	*Kimball Electronics Group	United States
21	Integrated Micro-Electronics, Inc.	Philippines
22	Fabrinet	Thailand
23	3CEMS Group	China
24	Enics	Switzerland
25	WKK Technology Ltd.	Hong Kong

	EMS	Country of origin
26	*Creation Technologies	Canada
27	VIDEOTON Holding	Hungary
28	éolane	France
29	VTech Communications	Hong Kong
30	Wong's International (Holdings) Limited	Hong Kong
31	V.S. Industry	Malaysia
32	*Ducommun LaBarge Technologies	United States
33	ALL CIRCUITS	France
34	*OnCore Manufacturing	United States
35	*Di-Nikko Engineering	Japan
36	*Neways Electronics International	The Netherlands
37	*Hana Microelectronics	Thailand
38	*PartnerTech	Sweden
39	*KeyTronicEMS	United States
40	Computime Limited	Hong Kong
41	Nippon Manufacturing Service	Japan
42	Selcom Elettronica	Italy
43	Orient Semiconductor Electronics	Taiwan
44	Kitron	Norway
45	*SMTC	Canada
46	SMT Technologies	Malaysia
47	SVI	Thailand
48	Scanfil EMS	Finland
49	LACROIX Electronics	France
50	Sparton	United States

Source: Manufacturer Market Insider.

*Companies established in Mexico.

