EXECUTIVE SUMMARY

STRATEGIC SECTOR ROUTES 2025



INDUSTRY DEVELOPMENT PROGRAM The population of the State of Ceará is around **8,9**

million inhabitants

Fortaleza © CEARÁ RIO GRAN



covering mountainous landscapes, wilderness and

573km of ravishing coastline

CEARÁ

Fortaleza, the capital, has a concentration of close to 2.6 million people, making it the country's fifth largest city. The consistent climate, averaging 28° Celsius (82° Fahrenheit), and the characteristic hospitality of the people of Ceará make it one of the most sought-after tourist destinations in the country.

The population of the State of Ceará is around 8.9 million inhabitants – larger, for instance, than the population of Austria – and spans the 148,825 km² of its 184 municipalities, covering mountainous landscapes, wilderness and 573 km of ravishing coastline.

Among Brazil's 27 states, Ceará has stood out, in recent decades, as having the highest growth, thanks to the ongoing intensive investments in infrastructure as well as joint actions carried out by government, the productive sector and the academy. The common objective is to increasingly innovate and qualify the business environment. The state's geographic location is highly strategic, being close to the world's largest consumer markets, such as the United States and Europe, with regular cargo ship lines departing from its ports towards destinations in every continent.

Located only 60 km from the capital, Pecém's Industrial and Port Complex stands out because of its offshore port facility, with an infrastructure that receives post-Panamax ships, and is the only Export Processing Zone in operation in the Country. It receives over USD 5 billion in investments in a steelworks complex.

A WORLD OF OPPORTUNITY AWAITING PEOPLE SEEKING TO DO BUSINESS.

Industry **Development** Program

The Federation of Industries of the State of Ceará System (FIEC System) embraces the mission of strengthening the industry and driving the state's economic development, stimulating competitiveness, generating new business and reinforcing institutional bonds. One of the most important steps in this direction is to join efforts with all stakeholders in building, in a participatory manner and with a systemic perspective, strategies and tools for actions capable of promoting the economic development of the state.

Under this premise, the FIEC System implemented the Industry Development Program, with the objective of contributing to a long-term growth strategy, defining the state's main potential areas and the respective Routes to better avail of these differentials, by way of an articulated debate that included private initiatives, public authorities, the academia, society at large and other support entities, fostering and strengthening innovation and sustainability in corporate strategies.

Projects that make up the Industry Development Program are made up of the following action vectors:

- Prospecting the Future for Sector Competitiveness;
- Competitive Intelligence;
- Cooperation and an Environment for Development.

The foundation for the program was established in 2014, with the execution of the project Sectors Bringing Future Prospect to the State of Ceará, with the objective of identifying sectors and areas bringing future prospects for the state's industry and which are capable of making it competitive at national and international levels within a ten-year horizon. The sectors and areas were grouped in 3 categories, as shown in the illustration below.

In providing continuity for the Sectors Bringing Future Prospect to the State of Ceará, with the vision of reinforcing the state's industrial web and to carry on with the process of promoting competitiveness, the FIEC System is implementing the Strategic Sector Routes project.

Sector Drivers of Regional

Development

Electric-metal-mechanics

Non-metallic Minerals

Apparel Furniture

Tourism

Strategic Sectors and Areas

Construction

Creative Economy Sea-Based Economy

Agri-food

Health

Transversal Sectors and Areas

Information and Communication Technology (ICT)

Footwear and Leather



Water

Energy Logistics

Environment

Biotechnology



Strategic Sector Routes – 2025

In order to optimize the delivery process, the 17 sectors identified were grouped into 13 strategic routes, as shown below:



The **Strategic Sector Routes** — 2025 is an initiative of the FIEC System which aims at drafting Roadmaps, i.e., maps defining routes to be covered in order to achieve, in up to 10 years, the potential perceived in each of the sectors and areas identified in the Sectors Bringing Future Prospects, considered to be the most promising for Ceará's industry within the 2025 horizon.

METHODOLOGY

Backed by the assumptions of the Strategic Prospect and deploying the Roadmapping method, delivering the work of drafting the Strategic Sector Routes – 2025 comprised the following stages:

- Social-economic studies and trends
- Sectors specialist panels
- Electronic queries
- Consolidation of panel outcomes
- Dissemination of publications and articulation

Within this Strategic Routes cycle, which started in 2015, seven publications were released in 2016 – Water, Construction and Non-metallic Minerals, Electric-metal-mechanics, Energy, Logistics, Health Services and Information and Communication Technology. To date, close to 350 specialists have been mobilized coming from the government, private initiative, third sector and the academia, who proposed approximately 3000 short-term (2015-2017), medium-term (2018-2021) and long-term (2022-2025) actions.

The release of the routes for Agri-food, Biotechnology, Creative Economy and Tourism, Sea-based Economy, the Environment and Consumer Goods sectors is foreseen for the second semester of 2017.



Sectors	Base Studies	Specialist Panels	Interviews and systematization of outcomes	Release
ENERGY	\checkmark	\checkmark	\checkmark	\checkmark
ELECTRIC-METAL-MECHANICS	✓	✓	\checkmark	✓
CONSTRUCTION AND NON-METALLIC MINERALS	~	\checkmark	\checkmark	~
(()) INFORMATION AND COMMUNICATION TECHNOLOGY	~	~	\checkmark	~
HEALTH	~	~	\checkmark	✓
LOGISTICS	✓	✓	~	✓
WATER	✓	✓		✓
AGRI-FOOD	<	<	\checkmark	September 2017
BIOTECHNOLOGY	\checkmark	\checkmark	April 2017	September 2017
CONSUMPTION GOODS: FOOTWEAR AND LEATHER, APPAREL, FURNITURE	\checkmark	\checkmark	April 2017	September 2017
SEA-BASED ECONOMY	\checkmark	April 2017	August 2017	September 2017
ENVIRONMENT	\checkmark	April 2017	August 2017	September 2017
	✓	April 2017	August 2017	September 2017

SCHEDULE

Results

Energy Route



Electric-metal-mechanics Route





Construction and Non-metallic Minerals Route



Logistics Route



Health Route



Information and Communication Technology Route



Water Route

Щ	Visions	/isions Critical Factors Actions		Key Technologies
ENERGY ROUTE	WIND ENERGY GENERATION: Leader in innovation, attraction and development of business for the entire wind power generation chain	State Policies Financing Productive Chain Human Resources	122 actions. Highlights: Investment opportunities in wind energy generation and supply of components	 Energy Storage Energy Efficiency Distributed Micro and Mini-generation Nanotechnology New Materials Smart Grid Lining Technology
	SOLAR ENERGY GENERATION: National hub for excellence in innovation, attraction and development of business for the entire solar energy chain	State Policies RD&I Market Human Resources	109 actions. Highlights: Potential for cooperation in quartz refinery and solar panel assembly industries	 Energy Storage Photovoltaic Cell Thermal Solar Collector Energy Efficiency Distributed Micro and Mini-generation Nanotechnology Smart Grid
	ENERGY EFFICIENCY: National reference in energy efficiency with focus on productive processes	State Policies Competitiveness Communication and Marketing Human Resources	111 actions. Highlights: Attraction of investments and partnerships for development and production of efficient equipment and solutions	 Diversification of Energy Matrix Energy Efficiency Waste Management Light Emitting Diode (LED) Smart Grid Hybrid Power System Information and Communication Technology (ICT)
	BIOMASS: National reference in the use of biomass, solid waste and effluents in energy generation	State Policies Financing Culture Technology and Innovation	121 actions. Highlights: Use of biomass, urban solid waste and microalgae	 Biofuel Bio-digestor Biogas Biomass Biotechnology Energy Efficiency Distributed Micro and Mini-generation Nanotechnology Energy Production from Sanitary Landfills Smart Grid
	GAS: Ceará, a state with high availability of gas for industrial purposes	State Policies Financing and Investment Market Infrastructure	84 actions. Highlights: Opportunities for public-private cooperation in establishing a regasification center	 Liquefied Natural Gas regasification Centers (LNG) Energy Efficiency Pipeline Grid Nanotechnology Information and Communication Technology (ICT)

	Visions	Critical Factors	Actions	Key Technologies
ELECTRIC-METAL-MECHANICS ROUTE	<section-header><section-header><text></text></section-header></section-header>	Intellectual Capital Industrial Policy Integration of Players and Entrepreneurship Research, Development and Innovation	134 actions. Highlight: Potential for cooperation in RD&I with local companies	 M2M Communication Home Automation Energy Efficiency Onboard Electronics Open Innovation Modeling and Simulation 3D Printing Industry 4.0 Nanotechnology New Materials Virtual and Augmented Reality Robotics and Automation Cleaner Production Technologies Surface Treatment Electric or Hybrid Vehicles
	OCODS AND SERVICES: Electric-metal-mechanics Sector provider of internationally competitive solutions in goods and services	Technological Development Public Policies International Trade Planning and Management	129 actions. Highlights: Interest in closing international agreements to meet the needs of the productive chain	 Environmental Certification Customization Energy Efficiency Multifunctional Equipment Waste Management High Speed Machining 3D Printing Industry 4.0 Micro-machining Modeling and Simulation Robotics and Automation Smart Appliances Management Software Cleaner Production Technologies
	PRODUCTIVE CHAIN: Electric-metal-mechanics productive chain integrated and driven towards the global market	Governance Human Resources Industrial Policy	131 actions. Highlights: Attraction of investments to meet the demand of the steelworks complex located in the Export Processing Zone (EPZ)	 Densification of the Chain Coopetition Customization Industry 4.0 Open Innovation Flexible and Reconfigurable Production Systems Management Software University-company

-5				
W T	Visions	Critical Factors	Actions	Key Technologies
ND -S ROUTE	<section-header><section-header><section-header><text></text></section-header></section-header></section-header>	Public Policies Market Culture RD&I and Technology Human Resources	127 actions. Highlights: Cooperation in reuse of materials, sustainable methods and deployment of information technologies in construction	 Building Information Modeling (BIM) Sustainable Constructions Home Automation Construction Waste Management 3D Printing Nanotechnology Augmented Reality Virtual Reality Smart Grid Robotics Modular Construction System Clean Technologies
ISTRUCTION AI ALLIC MINERAL	INFRASTRUCTURE WORKS: Reliability and efficiency in the execution of Infrastructure Works in addressing the needs of society	State Policies Project Management Public Administration Technology and Education	124 actions. Highlights: Public-private partnerships in logistics infrastructure works	 Building Information Modeling (BIM) Construction Waste Management Nanotechnology Augmented Reality Virtual Reality Robotics Clean Technologies
CONS NON-META	SPECIALIZED SERVICES IN CONSTRUCTION: Provider of innovative and efficient solutions in specialized construction services	Public Policies Human Resources Market RD&I and Technology	113 actions. Highlights: Fostering startups with services targeted at construction companies	- Building Information Modeling (BIM) - Robotics
	NON-METALLIC MINERALS: Production hub of Non-metallic Minerals with innovation, logistics infrastructure, customization and sustainability	Logistics Infrastructure Public Policies RD&I	127 actions. Highlights: Cooperation and processes for super-exotic granite, phosphate-based products and the use of the quartz reserves for the production of silicon	 Use of Waste Products Energy Efficiency 3D Printing Inter-modality and Multimodality Robotics Nanotechnology Clean Technologies

NanotechnologyClean Technologies

production of silicon

	Vision	Segments	Critical Factors	Actions	Key Technologies
0		AIRWAYS	Infrastructure Human Resources Public Policies Market	77 actions. Highlights: Partnership in management of the Fortaleza International Airport	
LOGISTICS ROUTE	COMPETITIVE AND SUSTAINABLE LOGISTICS WITH INTEGRATION OF MODALS, UPSCALING THE STATE'S DEVELOPMENT POTENTIAL	WATERWAYS	Infrastructure Human Resources Public Policies Market	99 actions. Highlights: Opportunities for cooperation in planning and management of the Industrial and Port Complex of Pecém (CIPP)	- Automation and Robotics - Big Data - Coastal Cabotage - Communication M2M
		CALING THE CALING THE CALING THE	Infrastructure Human Resources Public Policies Market	69 actions. Highlights: Opportunity for establishing and in land re-gasification center and tank yard at CIPP	 Coopetition Mass Customization Multichannel Distribution Intelligent Tags Logistics Hubs 3D Printing Industry 4.0
			Infrastructure Human Resources Public Policies Market	68 actions. Highlights: Potential for multimodal logistics	 Industrialization of Construction Inter-modality and Multimodality Physical Internet Urban Logistics Reverse Logistics Predictive Maintenance New Materials Fourth-party delegation
		COMPETITIVE OF MODALS, L	COMPETITIVE OF MODALS, I	PRODUCTS AND SERVICES	Infrastructure Human Resources Public Policies Technology
		ROADWAY	Infrastructure Human Resources Public Policies Market	100 actions. Highlights: Public-private partnerships (PPPs) in road construction	

E

Л	Visions	Critical Factors	Actions	Key Technologies
	PERSONAL HYGIENE, COSMETICS AND PERFUMERY: Brazilian leadership in personal hygiene, cosmetic and perfumery products developed in an innovative and sustainable manner	Human Resources RD&I Market State Policies	125 actions. Highlights: Use of local biodiversity	 Biodiversity Assets Advances in Cosmetics Packaging Biotechnology Certification Natural Cosmetics Product Innovation Nanotechnology HPCP Market Niches Social-environmental Responsibility in the Productive Chain Cleaner Production Technologies
ROUTE	BIOPHARMACEUTICALS, PHARMACEUTICAL CHEMISTRY AND PHARMACEUTICALS: Integrated, sustainable and competitive biopharmaceutical and pharmaceutical chemistry hub	Human Resources RD&I Productive Chain and Logistics State Policies	140 actions. Highlights: Establishment of a start-up center and multiuser laboratories focused on biopharmaceutics	 Biodiversity Assets Bioethics and Bio-security Biotechnology Pharmaceutical Genetics Nanotechnology Social-environmental Responsibility in the Productive Chain Cleaner Production Technologies
HEALTH F	INSTRUMENTS, MATERIALS AND EQUIPMENT FOR HEALTH SERVICES: Health Services Instrument, Materials and Equipment Industry recognized for its innovation, entrepreneurship and integration of the productive chain	Human Resources RD&I and Technology Market State Policies	100 actions. Highlights: Joint development of applications in biotechnology convergence, in diagnostics equipment, transplants and high accuracy monitoring	 Densification of the Chain Biotechnology NBIC Convergence Coopetition Health Monitoring Devices Medical-hospital Equipment for Health Services Homecare Open Innovation Nanotechnology Robotics University-Company
	INFORMATION AND COMMUNICATION TECHNOLOGY APPLIED TO HEALTH SERVICES: National reference in Information and Communication Technology applied to Health Services	Human Resources RD&I and Technology Market State Policies	97 actions. Highlights: development of RD&I projects in emerging technologies	 Big Data Health Monitoring Devices E-card 3D Printing Internet of Things (IoT) M-health Digital Odontology Virtual and Augmented Reality Health 4.0 Telemedicine Mobile Technologies Waarable Technologies

((Ọ))	Visions	Critical Factors	Actions	Key Technologies
ICATION	INDUSTRIAL APPLICATIONS: National reference in Information and Communication Technology applied to sustainable industrial development	Human Resources State Policies RD&I Market	87 actions. Highlights: Cooperation opportunities in applications targeted at Industry 4.0	 Big Data Cloud Computing M2M Communication Energy Efficiency 3D Printing Industry 4.0 Open Innovation Internet of Things (IoT) Virtual and Augmented Reality Advanced Robotics Cleaner Production Technology
MATION AND COMMUNI TECHNOLOGY ROUTE	<section-header><section-header><text></text></section-header></section-header>	<section-header><text><text><text></text></text></text></section-header>	<section-header> T3 actions. Highlights: Joint development for solutions in the Internet of Things and other emerging technologies</section-header>	 Advances in Software Development Big Data Bring Your Own Device Cyber security Cloud Computing Omnipresent Computing Services Convergence Coopetition Customization Home Automation Wireless Energy 3D Printing Brain-Computer Interface Internet of Things (loT) Natural User Interface (NUI) Virtual and Augmented Reality Smart Appliances Wearable Technologies
INFORMATI TEC	MOBILITY, CONNECTIVITY AND SECURITY: Provider of solutions for high availability and high connection quality demands	Human Resources State Policies RD&I Infrastructure	93 actions. Highlights: Investment opportunities based on the high availability and connection quality resulting from the undersea optic cable grid	 Advances in Software Development Big Data Cyber Security Cloud Computing Omnipresent Computing Services Wireless Power Artificial Intelligence Virtual and Augmented Reality Robotics Cleaner Production Technologies

\land	Visions	Critical Factors	Actions	Key Technologies
	WATER SERVICES: Ceará with water services security – quality water in quantity and economic development	Human Resources State Policies Management RD&I and Technology	129 actions. Highlights: Establishment of a desalinization plant at the CIPP	 Precision Agriculture Certification and Seals Condensers Technological Convergence Desalinization Echo-efficient Hydro/Hydraulic Equipment Intelligent Irrigation Nanotechnology Reuse
WATER ROUTE	USE OF VATER: Maganetica Series Seri	Education and Culture State Policies Sustainability RD&I and Technology	124 actions. Highlights: Cooperation for the development and deployment of technologies for the sustainable use of water	 Precision Agriculture Water 4.0 Aquaponics Big Data Certification and Seals M2M Communication Technological Convergence Multi-trophic Cropping Energy Efficiency Echo-efficient Hydric/Hydraulic Equipment Strategies to Prevent Water Loss through Evaporation Nanotechnology Reuse Telemetry Water-pinch
	<section-header><section-header><text></text></section-header></section-header>	State Policies Management Market and Competitiveness RD&I and Technology	<section-header>In the second second</section-header>	 Precision Agriculture Water 4.0 Aquaponics Automation and Robotics Big Data Certification and Seals Closed Cycle M2M Communication Technological Convergence Desalinization Echo-efficient Hydric/Hydraulic Equipment Strategies to Prevent Water Loss through Evaporation Internet of Things (loT) Predictive Maintenance Predictive Maintenance Virtual and Augmented Reality Social-environmental Responsibility in the Productive Chain Reuse Information and Communication Technology (ICT) Filtration Technologies Cleaner Production Technologies Telemetry Water-pinch Water and Augmented Reality

Sector Articulation

The Strategic Sector Routes were built based on strategies to capitalize knowledge stemming from sector specialists, being an important asset in directing the efforts of the government, private initiative, third sector and academia. In this sense, through the implementation of sector master plans, FIEC commits to preserving an ongoing channel of integration with partner entities with the objective of articulating the implementation of the actions planned.

The objective of this articulation project is to contribute by fostering the competitiveness of the strategic sectors of Ceará by means of:

Implementing the sector development strategy with a priority action agenda

᠇᠋᠐᠆᠐᠆ᢕ

Support the establishment of commitments between public and private players in delivering the strategic activities for the segment

Disseminating strategic information for decision-making, product development, delivery of services and planning of sector support institutions

Advisory services to sector governance and leadership by means of projections and in-depth analysis of actions, as well as survey of sector-related initiatives, demand and information

Establishing and monitoring of sector competitiveness indicators and tracking metrics for the implementation of the strategy agenda

Subsidies to match the partner entities service offered to the sector demand levels

INVESTOR SUPPORT





As part of the mission to strengthen industry and promote economic development in Ceará, the Federation of Industries of the State of Ceará (FIEC), through the Investor Support Service, encourages and supports sustainable opportunities for foreign investment in Brazil and, in particular, within the State of Ceará in the different strategic areas of the local economy.

A TEAM OF QUALIFIED CONSULTANTS OFFERS, TO INTERNATIONAL PARTNERS, STRATEGIC INFORMATION IN DRIVING FEASIBILITY FOR ESTABLISHING BUSINESS IN THE COUNTRY, ALSO RENDERING ARTICULATION WITH PUBLIC AND PRIVATE ENTITIES, BY AGGREGATING DATA AND INFORMATION AIMING AT CONTRIBUTING TO THE ESTABLISHMENT OF PARTNERSHIPS. Investor Support Service – International Business Center of Ceará

) +55 85 3421.5421

) cin@sfiec.org.br





promoted by:

Sistema FIEC