

# INDUSTRY 4.0



Ceará Global  
by **nupex**

February Edition - 2024



CÂMARA DE  
COMÉRCIO E  
INDÚSTRIA | BRASIL  
PORTUGAL  
CEARÁ



Federação das Indústrias do Estado do Ceará  
PELO FUTURO DA INDÚSTRIA



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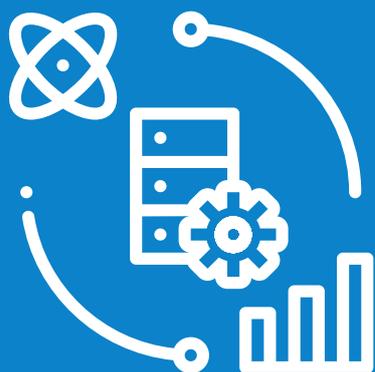


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# Executive Summary



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## EDITORIAL

Welcome to the February 2024 edition of Ceará Global Digital Magazine. In this issue, we delve deeply into the journey of the state of Ceará towards the forefront of Industry 4.0. This edition explores how technological innovation is redefining the contours of the Cearense industrial sector, paving the way for a more connected, efficient, and sustainable future.

This journey begins with the essence of [Industry 4.0 - Fourth Industrial Revolution](#), establishing a theoretical foundation to understand the paradigmatic changes that are reshaping the industry. It then shifts the focus to [small businesses from Ceará](#), unraveling how these pillars of the local economy are adapting to the demands and opportunities presented by new technologies.

The transition to the digital era is a recurring theme in this edition, evidenced by the analysis of how the [Ceará industry in the digital era](#) is reconfiguring itself to thrive in this new environment. The [Ceará 2050 Project](#) emerges as an ambitious plan, reflecting on long-term strategies for the incorporation of advanced technologies into the Cearense industrial fabric.

Innovation is also at the core of the [Deep Techs and Public Policies Seminar](#), which stands out as a catalyst for dialogue and actions towards a robust technological ecosystem in the state. Furthermore, the transformation in the [textile industry](#) is observed, as it reinvents itself through the adoption of Industry 4.0 practices, ensuring its relevance and competitiveness.



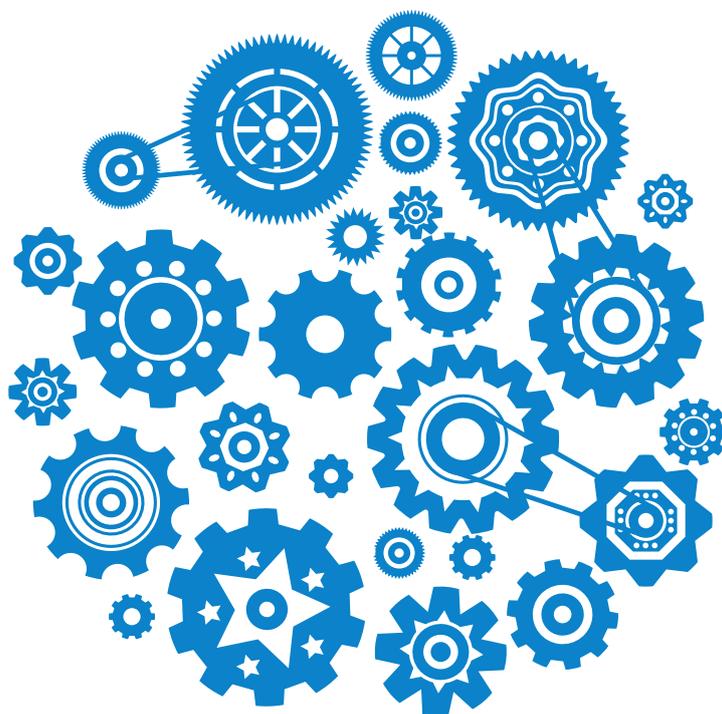
The concept of [smart factories in Ceará](#) illustrates the materialization of the Industry 4.0 concept, where automation and artificial intelligence are key components for increasing production efficiency. Meanwhile, [advanced manufacturing](#) underscores the commitment to innovation and operational excellence.

Last but not least, the edition addresses the [Brazil More Productive Program and Ceará](#), emphasizing the importance of initiatives that seek to increase industrial productivity. Finally, with [Comex 4.0 Ceará](#), it explores the integration of foreign trade operations with the Fourth Industrial Revolution, highlighting the potential for more effective logistics and automated processes.

Each article in this edition not only sheds light on individual initiatives but also weaves a cohesive narrative about Ceará's commitment to positioning itself as a leader in the adoption of Industry 4.0 technologies. In doing so, it not only informs but also inspires readers to actively participate in this transformation.

We appreciate your company on this journey and invite everyone to explore the opportunities and challenges that Industry 4.0 brings to Ceará and the world.

Ceará Global by Nupex Team



# INDUSTRIAL REVOLUTION 4.0 IN CEARÁ

The Industrial Revolution 4.0 is a global trend of automation and data exchange in manufacturing technologies. It involves a range of technologies like Cyber-physical systems (CPS), the Internet of Things (IoT), Cloud computing, and Artificial intelligence (AI).

The implementation in Ceará state is still developing with several initiatives and organizations promoting its adoption with partnerships like The Ceará State Government, The Federation of Industries of the State of Ceará (FIEC), and several universities. Most of these projects aim to support businesses in adopting these technologies, offer training and consulting services to help companies integrate Industry 4.0 technologies, research Industry 4.0, and offer related courses.

Ceará possesses specific opportunities for applying Industry 4.0 technologies across various sectors like agriculture, manufacturing, renewable energy, logistics, and supply chain. Many initiatives, from the government and the private sector, are underway to promote the digital transformation of Ceará's industrial sector. Startups from Ceará are developing innovative solutions for Industry 4.0, such as Inteliagri (smart agriculture) and Neemo (artificial intelligence for the industry).

The University of Fortaleza (Unifor) has the Unifor Hub, which works to promote research, development and technology transfer to industries by integrating digital technologies with the Internet of Things. The Unifor Hub also offers services such as consultancy, training, research and development events, and an industry 4.0 laboratory to test and develop innovative solutions for industry 4.0.



**SOURCE: Unifor Hub**

In Fortaleza , we also have Rapadura Valley, an innovation and technology community that brings together startups, companies, universities, research and innovation centers in the state. They foster collaboration and the development of innovative solutions, mainly in industry 4.0, from hackathons, industry acceleration programs, and observatories to promote industry 4.0 in Ceará.

These efforts aim to position Ceará as a hub for Industry 4.0 in Brazil, leveraging its existing industrial base and skilled workforce. The rise of Industry 4.0 holds significant potential for Ceará, offering several opportunities and advantages: increased productivity and efficiency, new job creation, attracted investment and innovation, enhanced global competitiveness, sustainable practices and inclusion, upskilling and reskilling workforce, and improved living standards.



Ceará's Industry 4.0 initiatives are already starting to show positive results. According to FIEC data, the number of Ceará companies using 4.0 technologies has grown from 12% in 2018 to 35% in 2022. This development is boosting the productivity, competitiveness, and sustainability of Ceará's industry.

By leveraging these strengths and focusing on specific applications, Ceará has the potential to become a leader in implementing Industry 4.0 in Brazil, fostering economic growth, creating high-value jobs and promoting sustainable development in the region. Implementing these technologies in a responsible and inclusive way, Ceará can take advantage of the Fourth Industrial Revolution to create a brighter future for its citizens.

# INTEGRATION OF 4.0 INDUSTRY WITH THE STATE'S FOREIGN TRADE.

October 2023 marked a significant chapter for Ceará's economy, revealing robust growth in exports and establishing Ceará as a leading player in the integration of foreign trade and the adoption of Industry 4.0. This rise is the result of the strategic vision of the Federation of Industries of Ceará (FIEC), which is playing a crucial role in offering the government and the private sector the "Platform for Industrial Development in Ceará".

This audacious initiative, coordinated by renowned economist Lauro Chaves, establishes nine strategic lines to guide public and private actions, highlighting the integration of production chains, improving corporate governance, innovation and increasing added value, the internationalization of industry and the qualification of human capital, among other fundamental aspects.

A key point is the quest to internationalize industry, a challenge exacerbated by the Brazilian government's protectionist policies. However, FIEC stresses the importance of breaking with this paradigm and looking at the foreign market as a constant opportunity, not just in times of crisis.

In contrast to Ceará's modest position in the national export ranking, representing just 1% of Brazilian exports and imports, the platform's mission is to transform the state into an Industry 4.0 hub, connected not only to industrial activity, but also to the agricultural, commercial and services sectors.



SOURCE: [www1.sfiec.org.br](http://www1.sfiec.org.br)

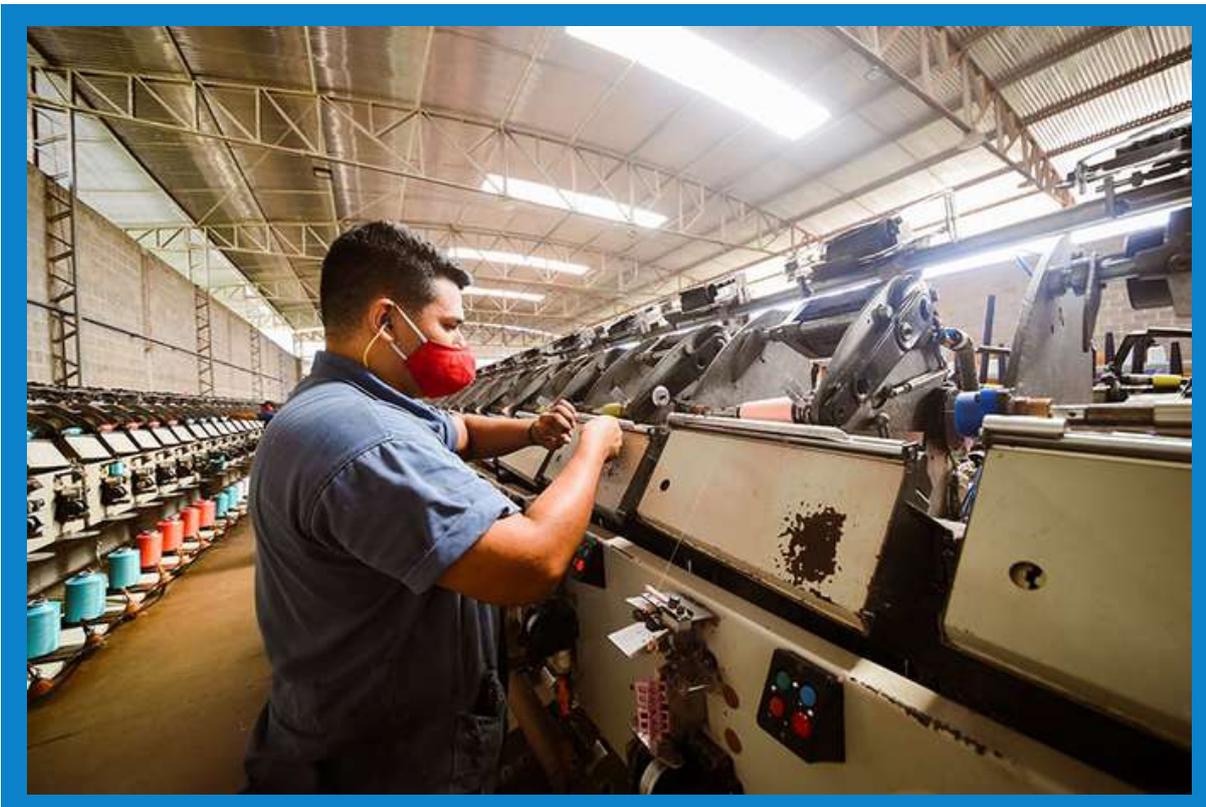


The month of October 2023 not only witnessed significant growth in exports, reaching US\$ 223.08 million, but also demonstrated the state's economic resilience in the face of global challenges. Ceará stood out by overtaking Pernambuco and taking the position of 16th Brazilian state and 3rd in the Northeast in exports, reinforcing its regional and national relevance.

At the same time, the survey carried out by the National Confederation of Industry (CNI) and FIEC on Industry 4.0 reveals the interest and challenges faced by companies in Ceará in adopting these technologies. Digital automation emerges as the most adopted technology, while issues such as the high cost and lack of knowledge about the available technologies present challenges to be overcome.

Ceará, guided by FIEC's vision and driven by the pursuit of Industry 4.0, is paving the way for a more dynamic and connected economic future, challenging limits and contributing to the construction of a more favorable scenario for the state's industrial and commercial development.

Let the future come, as FIEC president Ricardo Cavalcante pointed out, because Ceará is determined to lead the next industrial era and consolidate its presence in the global market.



SOURCE: [www1.sfiiec.org.br](http://www1.sfiiec.org.br)



# INDUSTRY 4.0 POSTS

In this post we highlight the definition of Industry 4.0. Which means industrial automation and the integration of different technologies that enable interaction throughout industrial processes. It promotes the development of new products, the digitization of industrial activities, improving processes and increasing productivity



To show the importance of Industry 4.0, we decided to explain in this post how the theme converges with sustainability. The technology helps to promote energy efficiency and waste reduction. Real-time data analysis makes it possible to quickly identify areas for improvement, enabling precise adjustments to optimize energy consumption. In addition, the ability to predict and prevent equipment failures contributes to more responsible practices.



To exemplify the 4.0 revolution, in this post we focus on the Internet of things to optimize logistics, Artificial Inteligence to optimize intern process and Augmented Reality to improve employees training. Which are some of the main technologies adopted by the companies that want to guarantee competitive on the market.



# INDUSTRY 4.0 POSTS

Considering the potential of Ceará to be one of the main hubs of Brazilian Industry, in this post we talked about many projects developed that involves public and private institutions, such as FIEC and SENAI. To achieve the full potential of the state, all of these programs are related to innovation, competitiveness, sustainability, workforce qualification and infrastructure



The More Productive Brazil Program is an initiative of the Brazilian federal government that seeks to increase the productivity of companies by implementing practices and technologies related to Industry 4.0. In this way we discussed in this post the importance of these type of project to promote the economic development, especially in Ceará.



In this post, we highlight how it is possible to add value to Ceará's industries by stimulating innovation, so that the state can become a national leader in the distribution of renewable energy. For this reason, the main theme is Ceará 2050, which is a project aimed at interaction between public and private entities to develop strategies related to the implementation of technology 4.0, which will promote the state's economic growth over the next three decades.



# INDUSTRY 4.0 POSTS

In this post we highlighted the Deep Tech and Public Policy Seminar , which promoted a dialogue about innovation ecosystem, focusing on the application of Deep Techs in key sectors such as agribusiness, industry 4.0 and renewable energies, reinforcing the state's commitment to technological development. The presence of Fabio Feijó, Innovation executive secretary of Ceará, in this event shows how the state is committed with the economic development.



Here in this post there is an example of an important partnership between Aço Cearence, one of the biggest companies in Brazil of steel and it is located in our state, and Atlantico Institute, which is a non-profit science and technology institute with the aim of stimulating innovation through research and innovation.

A study developed by FIEC's Industry Observatory in partnership with CNI shows the potential of renovation of machines used in the Ceará's Industries. The state surpassed the national average in 22%, indicating a greater adoption of advanced technologies in our region.





## JOAQUIM ROLIM

Executive Secretary for Industry at SDE/CE | Energy Coordinator for the Northeast Consortium | Graduated in Electrical Engineering from UFBA | Specialized in Industrial Administration from USP | MBA in Electric Energy Business Management from FGV.

## FÁBIO FEIJÓ

Executive State Secretary for Commerce, Services and Innovation | Management and Leadership certification from MIT Sloan School of Management | Economics degrees from UFC | 25 years of global experience in innovation and business transformation.



For the inaugural issue of 2024, Ceará Global has endeavored to provide its audience with a comprehensive exploration of the concept of Industry 4.0, along with related subjects and themes encompassed within this domain. Additionally, we have offered insights into the current initiatives underway within the state, as well as future perspectives in this area.

To facilitate our mission, we are delighted to feature, for the first time, interviews with two distinguished guests in this edition: Secretary Joaquim Rolim and Secretary Fábio Feijó. Secretary Joaquim Rolim has provided valuable insights into the significance of Industry 4.0 for the state's industrial landscape, proposed measures for enhancing technological advancement within the state, and more.

Moreover, Secretary Fábio Feijó has elucidated the connections between "Ceará 2050" program and the fourth industrial revolution, in addition to offering an analysis of the recent Deep Tech seminar held in the state and its potential implications.

Emilio Viana Filho | Ceará Global Collaborator



## **What does the concept of Industry 4.0, also known as the fourth industrial revolution, represent for the current industrial scenery of the state of Ceará?**

Industry 4.0 is extremely important, in fact, our strategic plan within the Secretariat of Economic Development (SDE) has a strong focus on Industry 4.0, because we understand that it allows to reach new heights in terms of participation within national industry, even in relation to Gross Domestic Product (GDP) percentage.

The state needs to innovate, it needs to do things differently, and in relation to industry, when it brings new information to the productive sector, to the productive processes, to optimize this production. As such, we understand that it is of fundamental importance. If we keep applying the same information to the same process we will have the same result, if we apply new information, new production models, new production methods, the result will be superior.

## **What are the main strategies adopted by the state to promote Industry 4.0 within local businesses? Which sectors do you consider to be in the vanguard of this transition?**

We had the satisfaction to see that, recently, the “Nova Indústria” program was launched by the Federal Government, which has a strong relation to what we are building here in the SDE, within our project we foresee a strong relationship with the productive sector and, in this case, with FIEC, of which we have been working beside and we know it is an institution always seeking to be ahead, to be at vanguard.

In our program, innovation projects from a partnership with FIEC are planned, also seeking to internationalize products. With this in mind, we must always attempt to add more value to the product, so this work is in our strategic plan, as previously mentioned, and we will surely have better results going forward. Our work here has always been to use data and facts as a basis, as such, this will provide us with more information within the productive sector to aid in the decision making process and the operational and maintenance processes. Because when we have data available, we are able to improve productivity, in areas such as maintenance of machines, product quality, all this will be improved within the project we pretend to develop, as previously mentioned, in partnership with the productive sector.



## **The textile industry already has its prominent place in Ceará. How is the textile industry in Ceará reinventing itself through Industry 4.0, and which technologies are being most effectively applied?**

This modernization process, it involves the whole industrial sector, however, the textile industry in Ceara already has traveled a long road, always seeking to place itself as a competitive product in the market.

For this, Industry 4.0 is fundamental so, yes, the textile sector has sought more and more ways of adding new information to their production process with the aim of producing higher quality products with lower costs and information is essential for this and is heavily related to Industry 4.0.

## **Regarding the adaptation of Small Businesses: what are the biggest challenges that small businesses in Ceará face in adopting Industry 4.0 technologies? How is the government assisting in this transition?**

In a scale, which could be larger, this Industry 4.0 model has been spreading much, in our project, we seek to show those involved in industry and business owners the importance of bringing more information to their productive process.

For example, inserting an additional sensor in a piece of machinery to improve operational capacity or better quality product, this is what we pretend to do, especially for small and micro businesses, who, in many cases, have more difficulty in accessing new technologies. As such, informing and contributing so that these businesses may have access to sources of financial aid and knowledge on how to apply these technologies is one of the ways we pretend on contributing to the development of Industry 4.0 in Ceará.

## **How does the Ceará 2050 Project, launched in 2015, incorporate the concepts and technologies of Industry 4.0 to shape the state's industrial future? In terms of advanced manufacturing, what innovations do you believe will have the greatest impact on the Ceará industry in the coming years?**

Question answered by Secretary Fábio Feijó



Within the Ceará 2050 project, there are many themes, however we have a specific theme which involves a mission of Ceará representing 4% of the national Gross Domestic Product (GPD), currently, according to data from December 2022, the state only represents 2,9% of the Brazilian GDP so for 2050 we compose 4% of the GDP we must grow more than Brazil itself so that we may increase this participation amount from 2% to 4%.

How will the state of Ceará trail the way to achieve this objective set by Ceará 2050? One of the leverages is through industry 4.0, in other words, it is through introduction of automation, innovation, which will generate improvements to competitiveness within the industry of Ceará in the national and global markets. To improve the competitiveness of industry and manufacturing, it seems that we have only one solution, which is investing and seeking to do more with less, in other words, bring innovation concepts so that industry reinvents itself, improves its competitiveness, increases its earnings and consequently cause Ceará to grow more than Brazil so that we may achieve this goal of Ceará 2050.

So these are the links we have between Ceará 2050 and Industry 4.0, the concept of Industry 4.0 is definitely a major tool for improving the competitiveness of Ceará's industry and consequently generate more income and earnings to businesses, including tax earning, allowing further income to the public sector, and also creating employment and an overall increase in income.

The major themes that should be prevalent in these discussions are the concepts of deep techs, artificial intelligence, internet of things, are some subjects which today are already established and the private sector through FIEC and SDE seek to capture with aim to improve the business and industrial environment of Ceará.

## **Could you tell us more about the impact of the Deep Techs and Public Policies Seminar on industrial innovation in Ceará and what were the main results achieved?**

Question answered by Secretary Fábio Feijó

This deep tech seminar was presented by the SDE, together with Ceará Foundation for Support of Scientific and Technological Development (FUNCAP), in partnership with FIEC and the Secretariat of Science, Technology, and Higher Education (SECITECE), it was a major undertaking by the state government, through its two secretariats (SDE and SECITECE).



The main objective in promoting this seminar was to introduce the theme within the state of Ceará so that business owners, universities and the public sector of Ceara become aware of the opportunities which Deep Techs brings to the economic development and promotion of science and technology within the state. The lessons learnt and results collected from this event were: primarily, the perception of what is "Deep Tech" which refers to highly complex technological innovations, where one takes a longer path than the traditional startup innovation models, and even though it is a longer journey, it brings results to the state and businesses in a more financially sound way, because they are usually disruptive innovations; not-yet-seen innovations. This is a feature of deep tech models.

Starting from this event, we brought awareness to this topic and we, the government, academia and the private sector, through FIEC, began to evaluate how we could organize ourselves so that the state of Ceará could also position itself within this topic of Deep Tech so that we could utilize this concept as a competitive advantage, within the scope of economic development, how this could stimulate businesses to use Deep Tech as leverage for economic development within the state.

### **How is Ceará benefiting from the Brasil Mais Produtivo program and which sectors are seeing the more prevalent gains in productivity?**

Due to us having a strategic plan which is practically ready, we understand that we may get ahead, because our next step is to seek interactions with the Ministry of Development, Industry, Trade, and Services (MDIC), under the leadership of our secretary Salmito Filho, our state Governor Elmano de Freitas and seek forms of align our programs with what they have in the "Nova Indústria" program to see in which ways the state of Ceará can be benefited with resources, guidance, with the implementation of this new industry.

We are seeking precisely to set up this visit to the MDIC in Brasilia so we can present our programs and build this relationship to reconcile the interests and see in which ways we can be benefited with financial aid.



## **In which way does the integration of Industry 4.0 with international logistics benefit international commerce within the state of Ceará?**

Logistics is fundamental in any process, without logistics nothing happens, to bring any product from point A to point B, logistics is involved. If the logistic process is not done in a professional way and with the utilization of information and data, it will have a higher cost.

We understand it is fundamental, including within internationalization processes to have a strong logistical project to synthesize the competitive industry allowing for more and better production, and a focus on this issue of internationalization, to allow businesses who, in many cases aren't aware they're capable of exporting, to have access to international markets.

## **Based on your experience, how can we prepare the state for the fourth industrial revolution in order to make Ceará increasingly global?**

Considering all this work we have been doing, always intensifying it when possible. Ceará Global is an already established brand, which has contributed a much to exposing Ceará abroad, within our strategic plan at SDE we are seeking ways to stimulate interaction between Ceará businesses with other businesses in international markets. We also seek partnerships with FIEC and how to contribute to business owners to have access to new technologies and how they could be able to evaluate and see the benefits they will have with news innovation programs, processes and new technologies. All this, properly aligned with logistical processes will allow produce from Ceará to enter new markets.



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