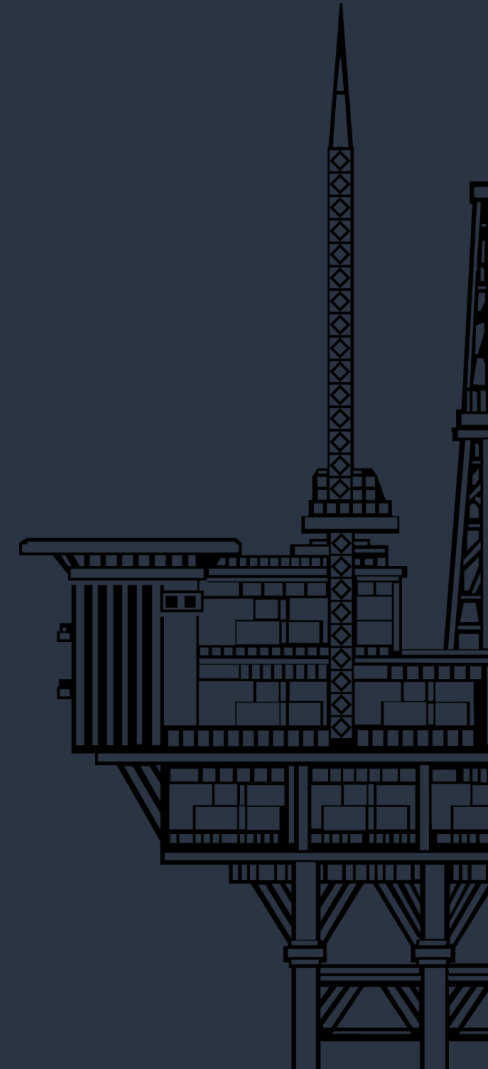


FABRICAÇÃO DIGITAL AVANÇADA

Indústria 4.0

Como chegamos até aqui?
elementos de convergência



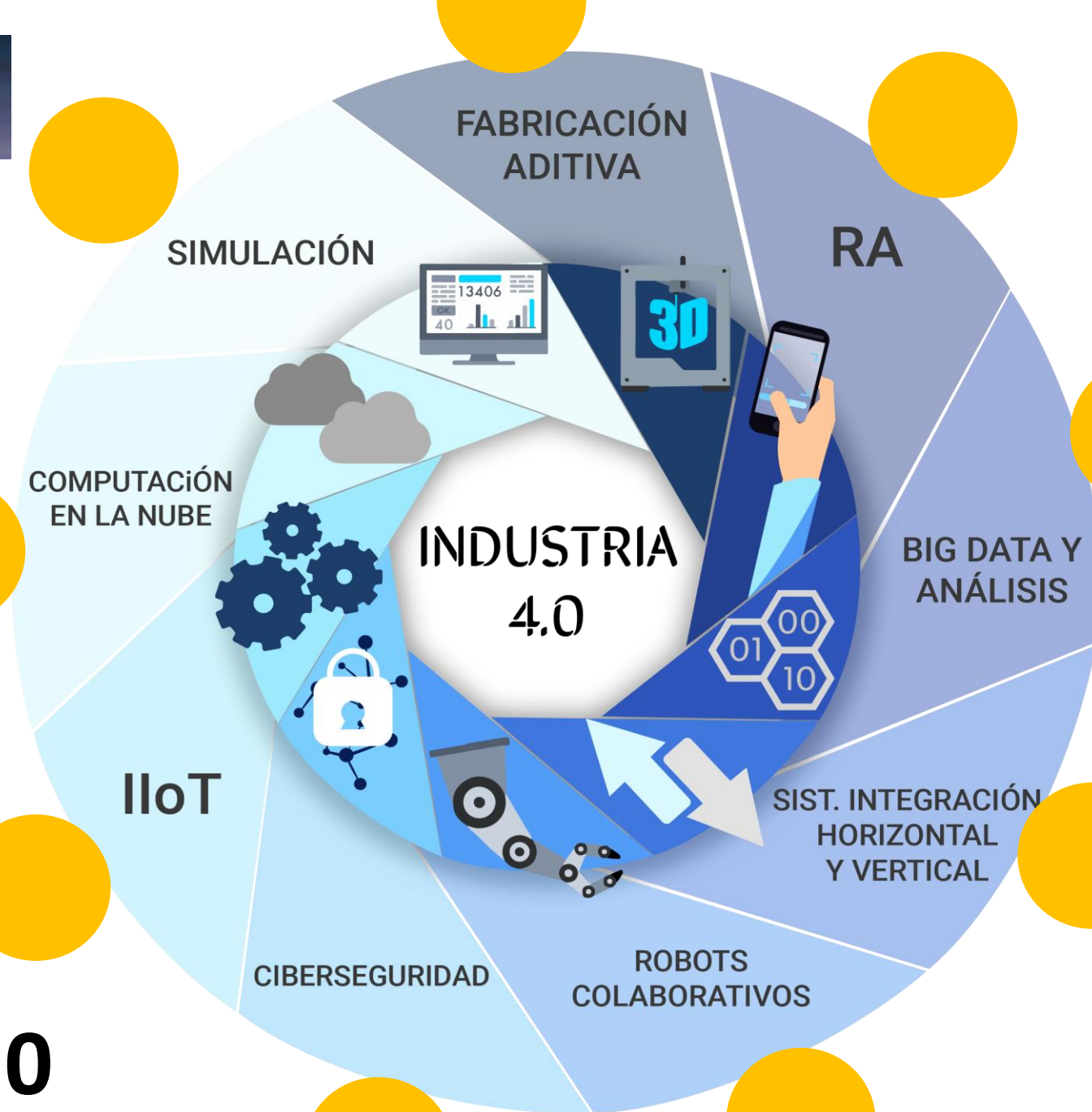
Pontifícia Universidade Católica do Rio de Janeiro

PetroNor
2018

Conferência do setor
de petróleo do N/NE
do Brasil

PUC
RIO





Indústria 4.0

Como chegamos até aqui?
elementos de convergência



12.000 A.C



12.000 A.C



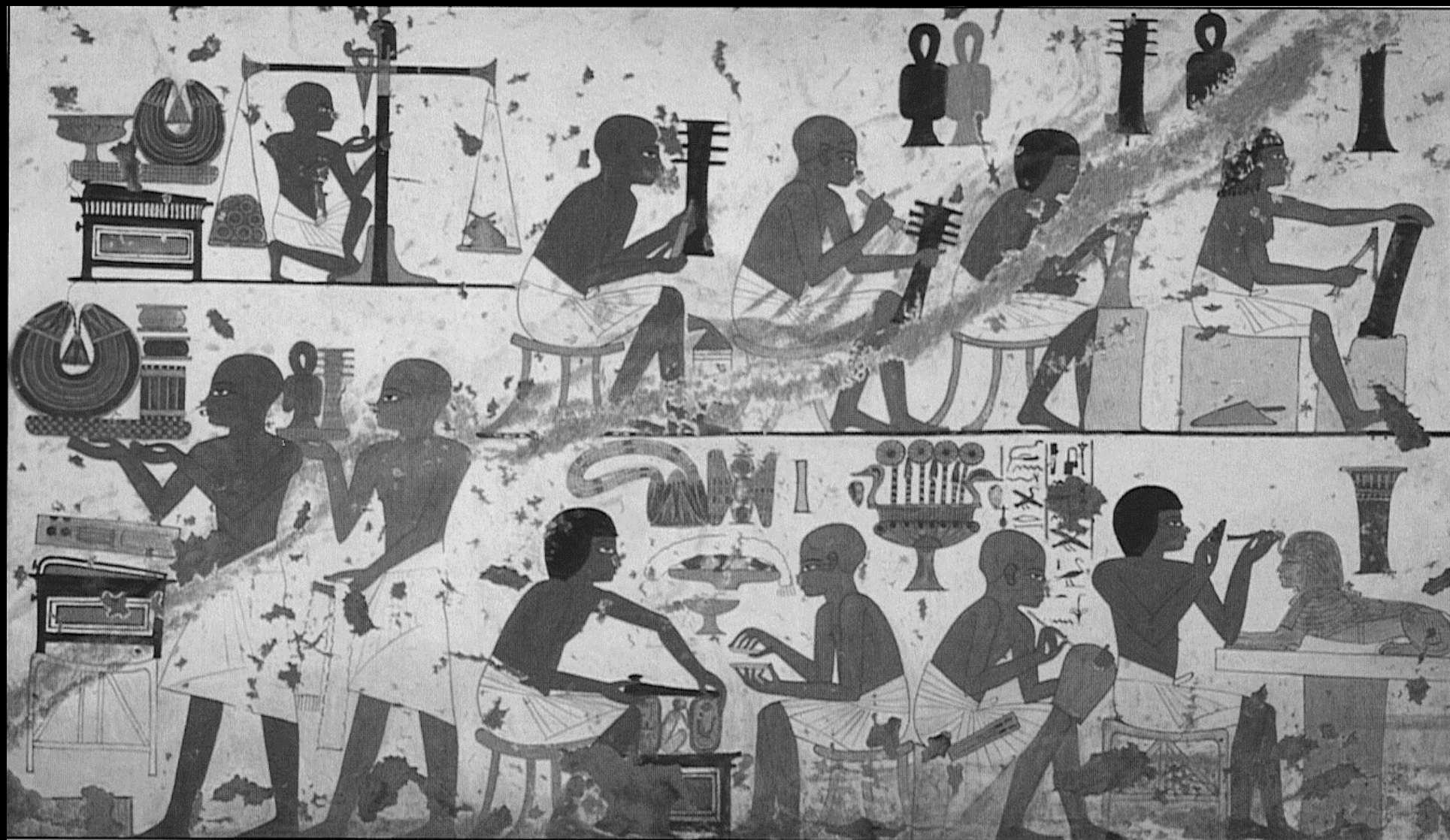
12.000 A.C



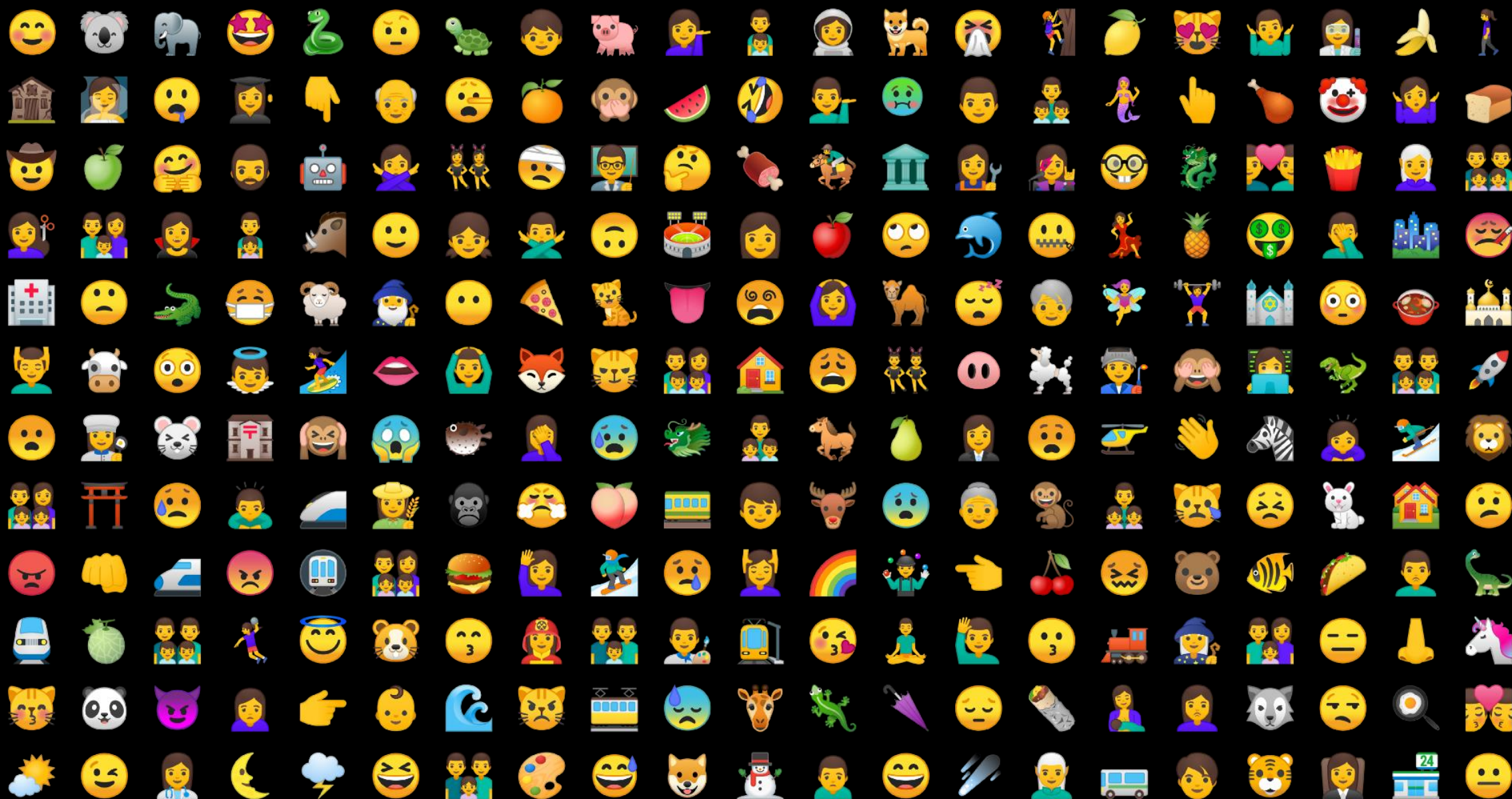
12.000 A.C



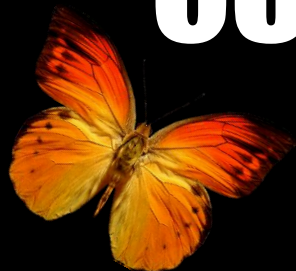
Cuneiformes - Sumérios- 3500 A.C



Egípcios - 3200 A.C



**“o sistema de produção
em vigor influencia o
comportamento social”**



jorge bruno



1500 D.C

produção artesanal





características?

- Empresas?
- Processos?
- Produtos?
- Profissionais?
- As relações?



sistema de produção artesanal



1600 D.C



1600 D.C

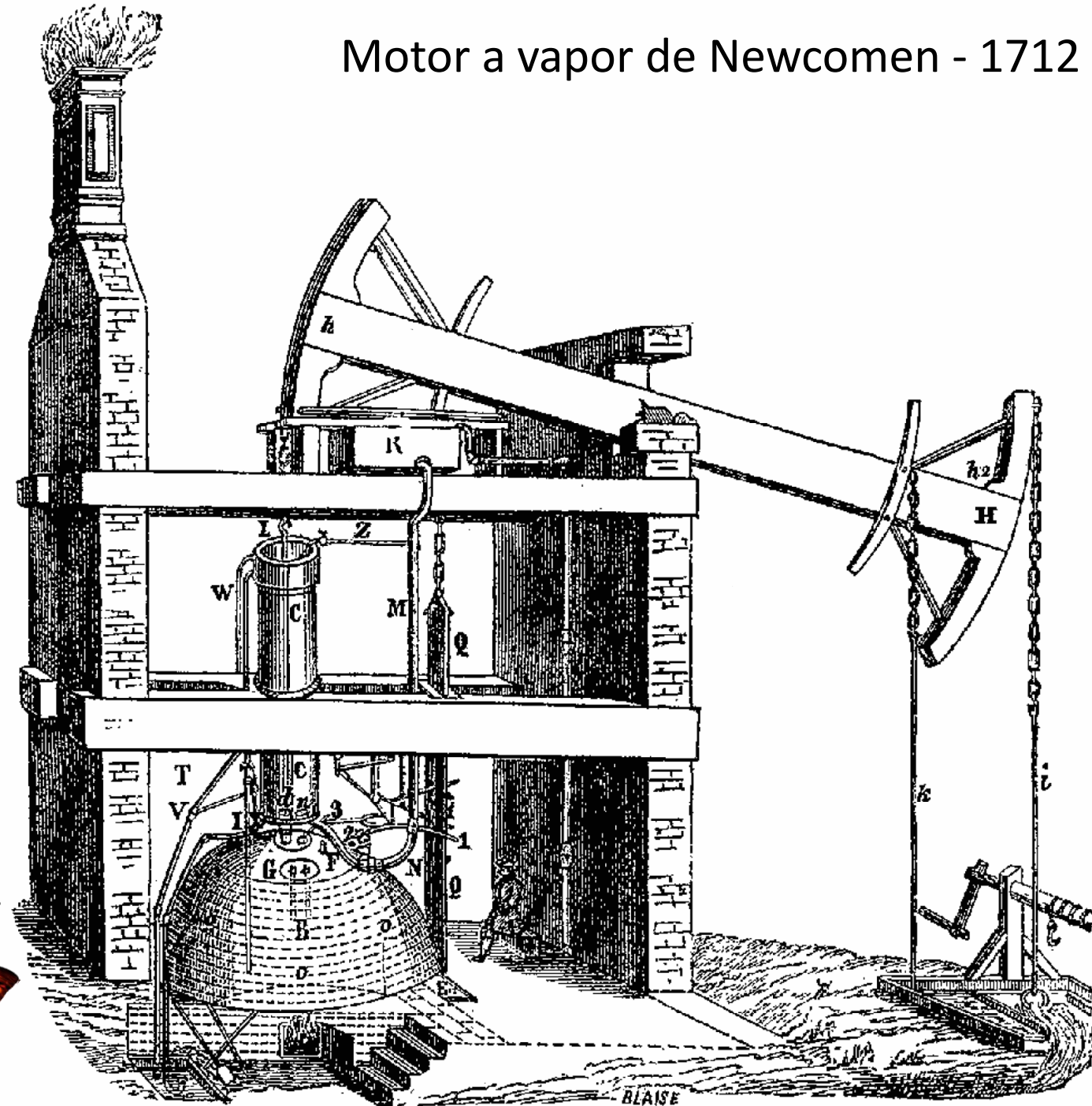


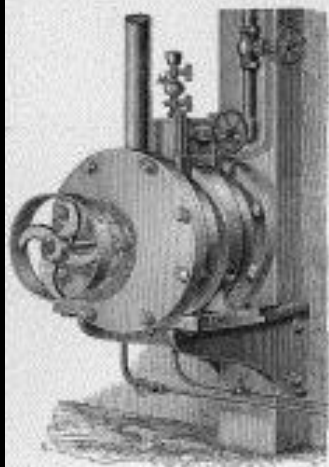
1700 D.C



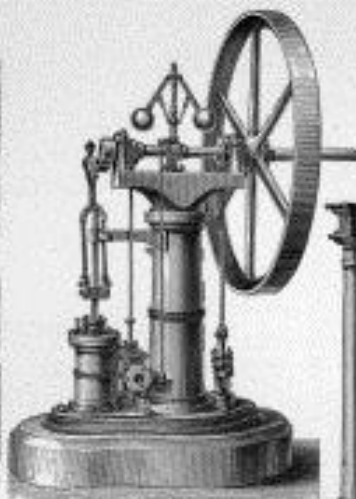
1700 D.C

Motor a vapor de Newcomen - 1712

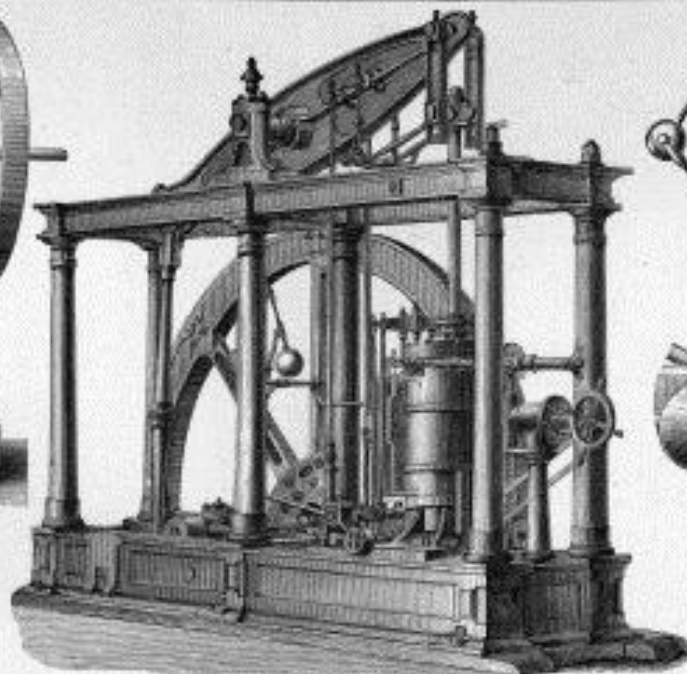




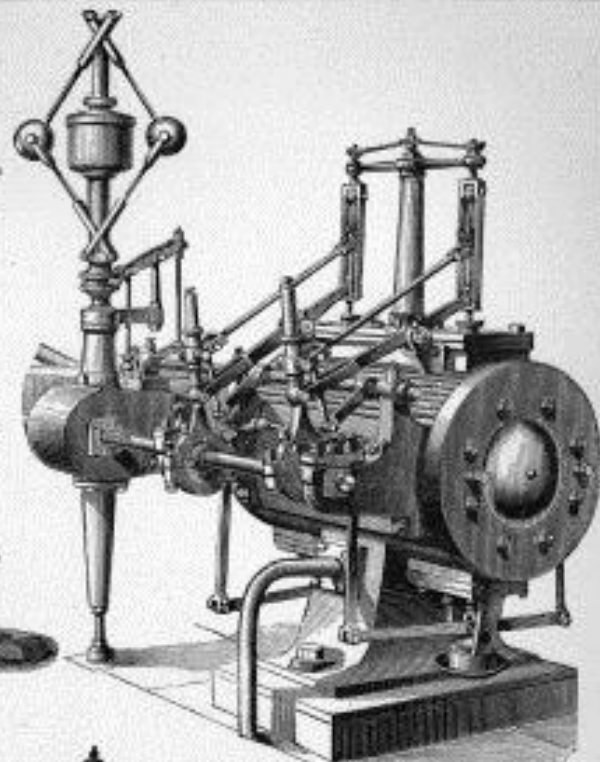
1. Retorcendo Maschine von Cox.



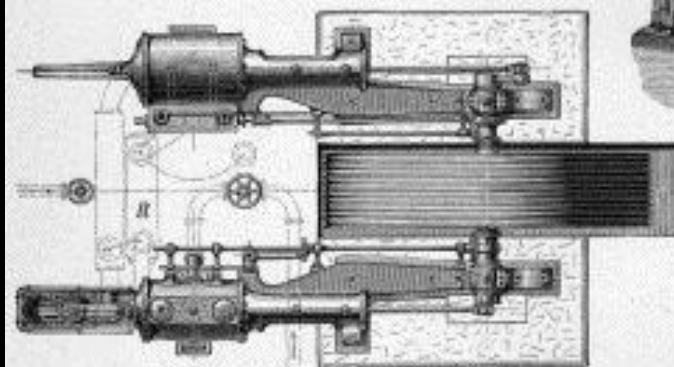
2. Vertikale Maschine.



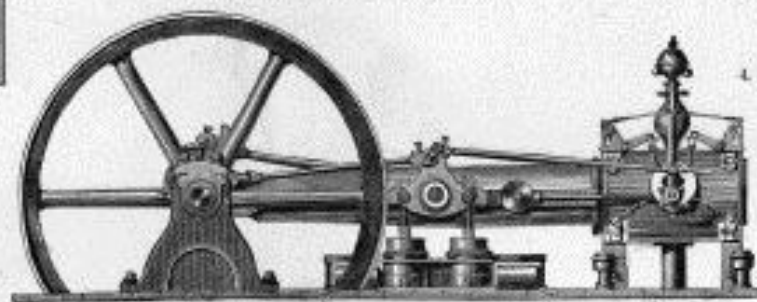
3. Maschine mit Balancier nach Watt.



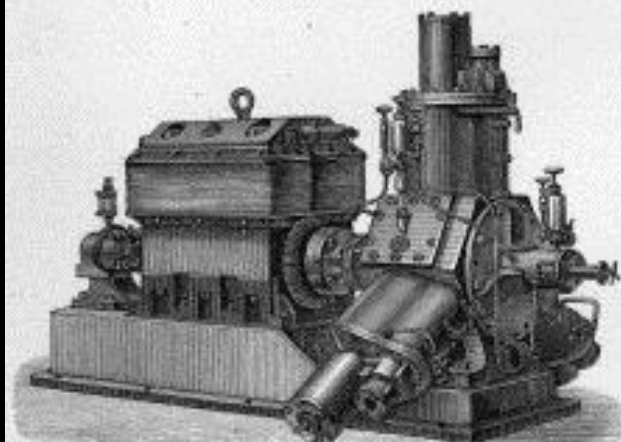
4. Zwangsläufige Ventilsteuerung, System Corliss.



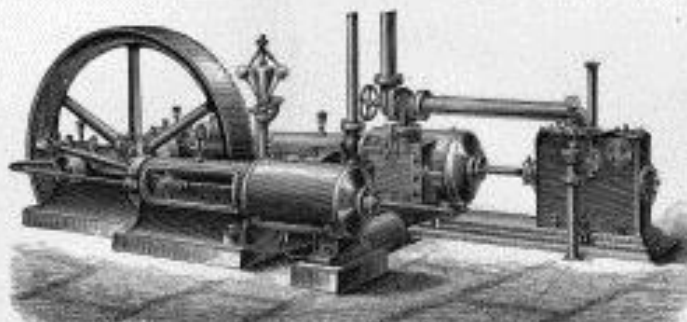
5. Compound-Dampfmaschine von Corliss.



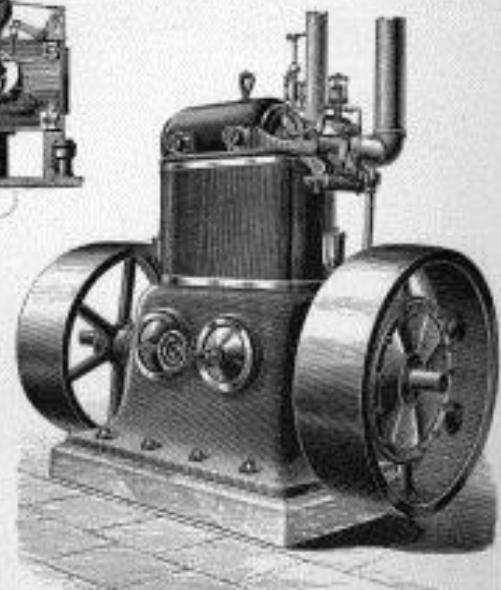
6. Corliss-Dampfmaschine.



7. Brotherhood-Dampfmaschine.

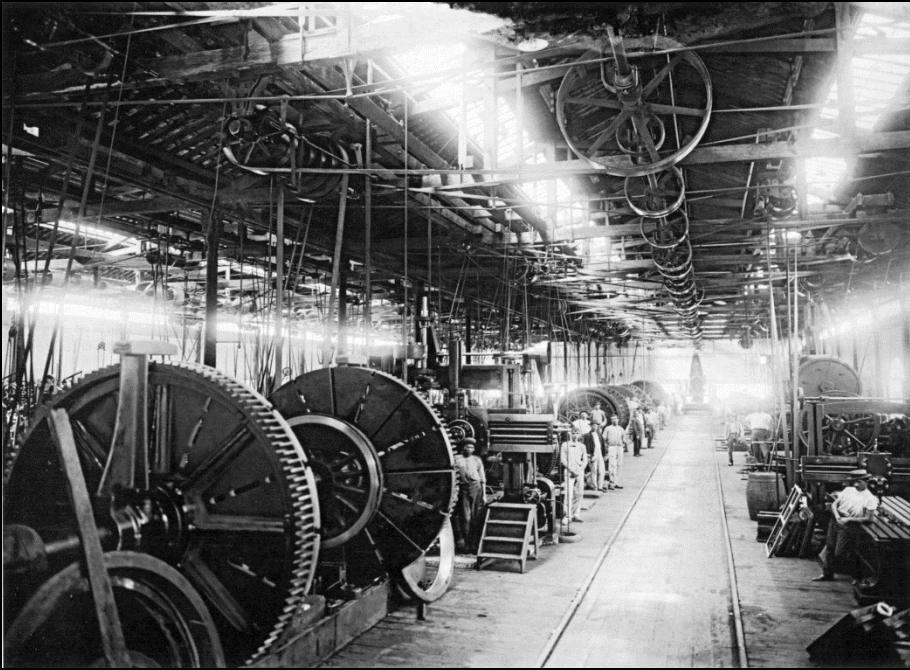


8. Compound-Dampfmaschine von P. A. Swiderski.



9. Westinghouse-Compound-Dampfmaschine.

produção em massa



características?

- Empresas?
- Processos?
- Produtos?
- Profissionais?
- As relações?



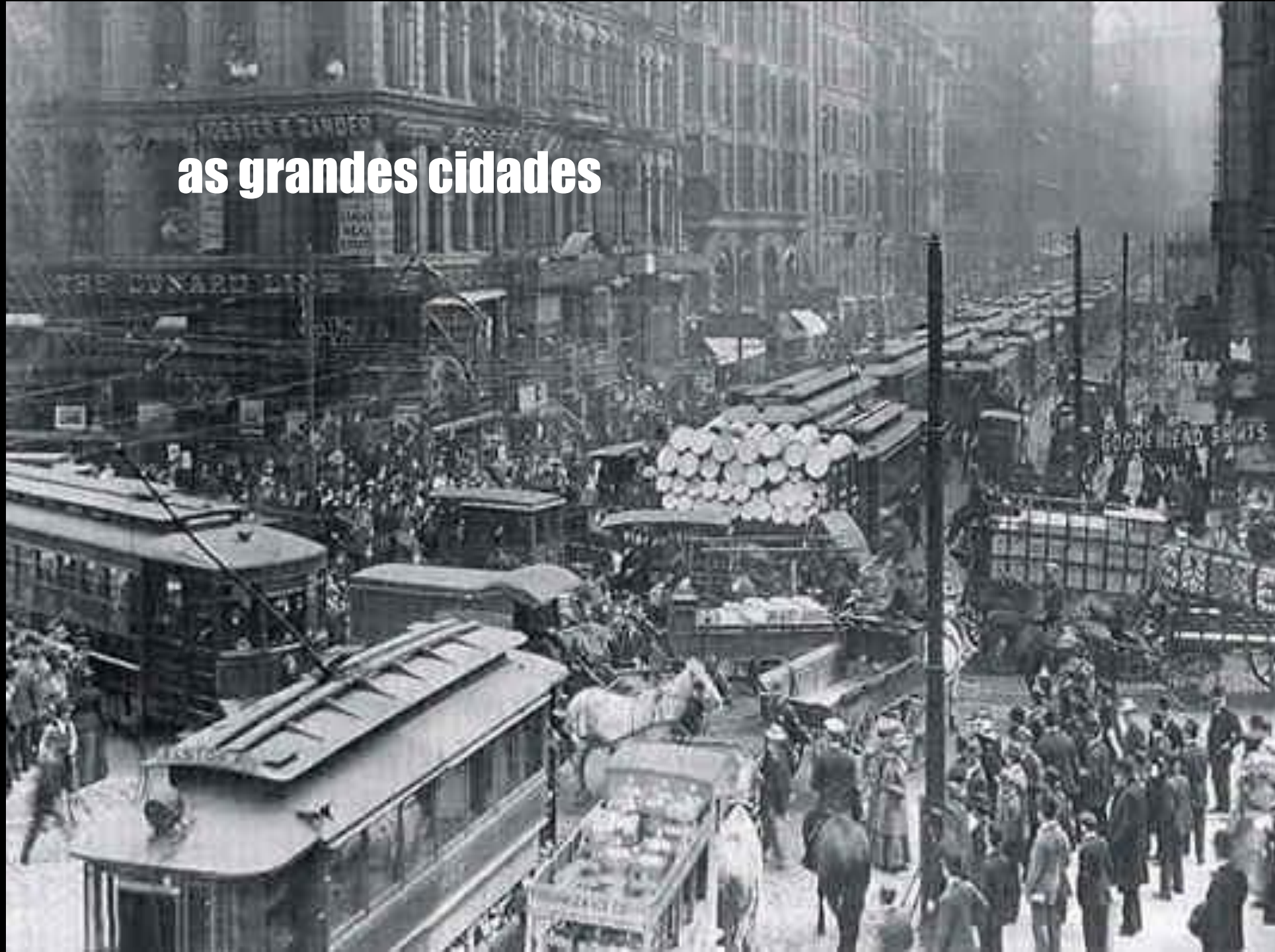
1ª Revolução Industrial (Indústria 1.0) – Em 1784, máquinas movidas a vapor começaram a substituir o ser humano em atividades que exigiam muito esforço ou grande frequência de repetições.



1800 D.C

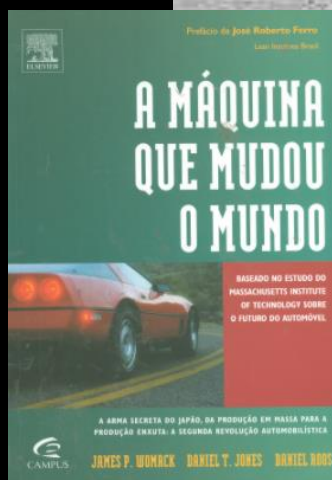


as grandes cidades



grande inventos nesse período

- Cálculo 1680
- Balão ar quente 1783
- Lâmpada a óleo 1784
- Fotografia 1837
- Código Morse 1838
- Borracha vulcanizada 1839
- Máquina de costura 1841
- Geladeira 1842
- Balões dirigíveis 1852
- Aço produzido em massa 1856
- Motor de combustão interna 1859
- Poço de petróleo 1859
- Dinamite 1867
- Máquina de escrever 1868
- Tabela periódica 1871
- Jeans 1873
- Telefone 1876
- Fonógrafo 1877
- Lâmpada incandescente 1879
- Fotográficos cinematográficos 1884
- Motocicleta 1885
- Automóvel 1886
- Câmera fotográfica portátil 1888
- Trator 1892
- Raio X 1895
- Rádio 1896
- Ar condicionado 1902
- Avião (14 Bis) 1906
- **Linha de montagem 1913**
- Tubo iconoscópio 1923
- **Televisão 1928**



Karl Benz - 1886



William C. Anderson - 1896

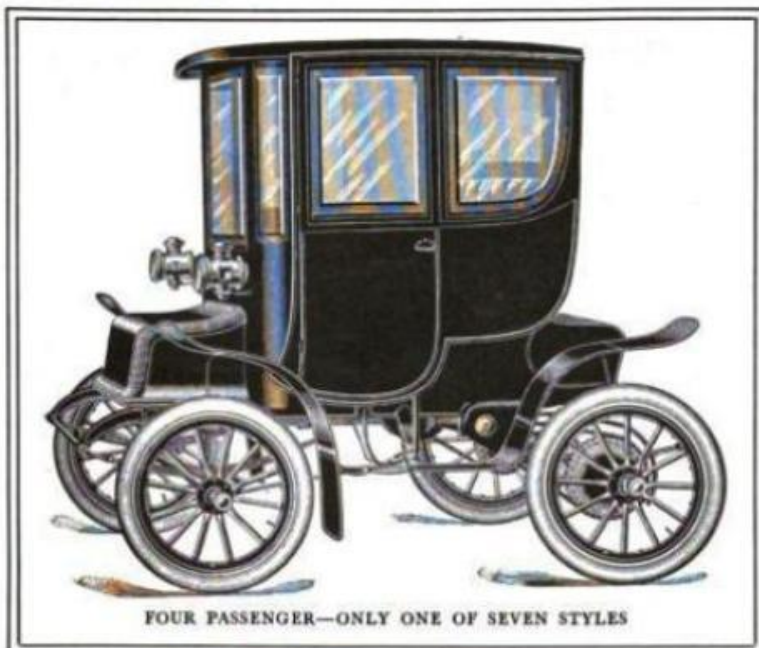
Just A Plain Notice

The DETROIT ELECTRICS

have done more to advance the reputation of electrics than all other makes put together. No one has yet equaled their records and we continue to lead.

1060 MILES OVERLAND A RECORD

Think of going from DETROIT to ATLANTIC CITY all the way on its own power—never once helped.



FOUR PASSENGER—ONLY ONE OF SEVEN STYLES

WE EXHIBIT AT NEW YORK, JANUARY 16-23 AND AT CHICAGO, FEBRUARY 6-13

You have no fear of competition when you represent the wonderful "DETROIT ELECTRIC." Write today about agency.

The ANDERSON CARRIAGE CO.
DETROIT, MICHIGAN

THE
Detroit
ELECTRIC

SOCIETY'S TOWN CAR

THE COSMOPOLITAN CAR

This world-famous car adapts itself to the traffic conditions of every city, whether it be the hills of Kansas City and Seattle or the level boulevards of Pasadena, Chicago and New York.

It is the most popular electric of two continents. It is built by the largest and most expert organization in the electric automobile industry.

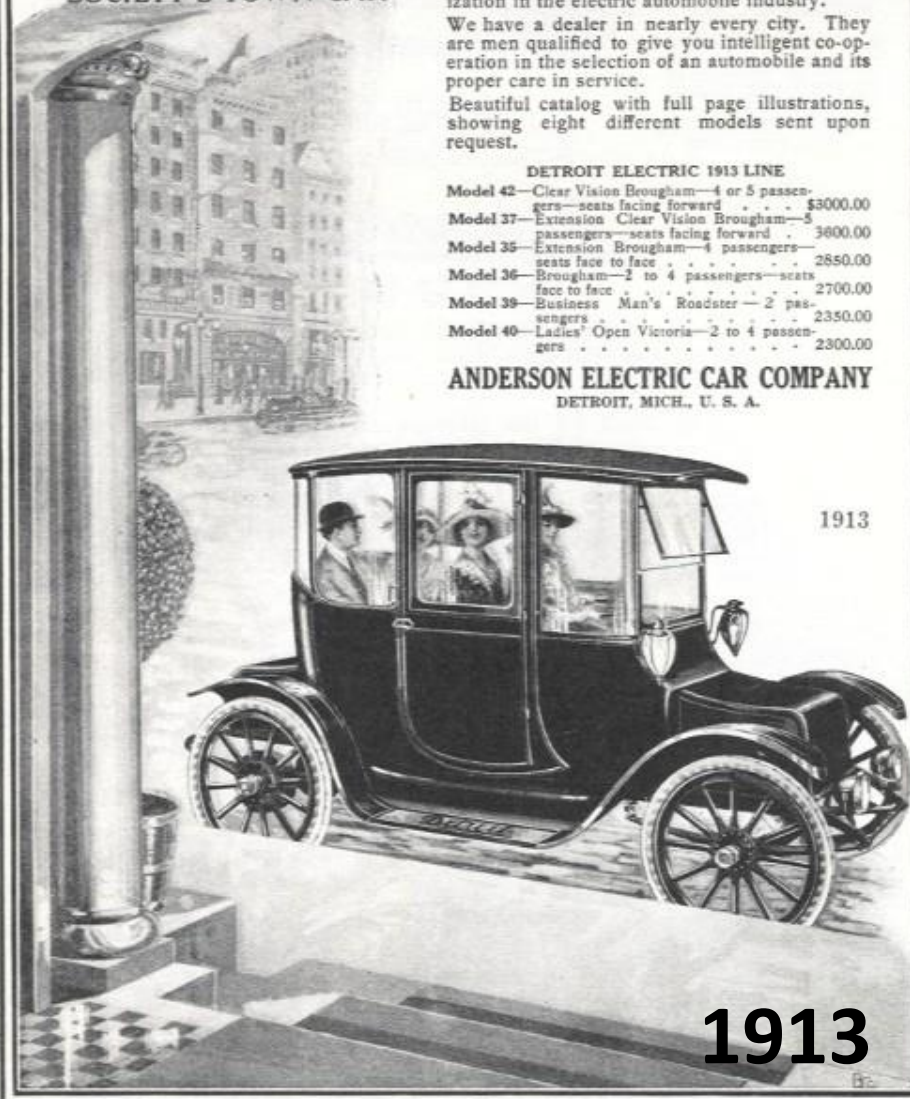
We have a dealer in nearly every city. They are men qualified to give you intelligent co-operation in the selection of an automobile and its proper care in service.

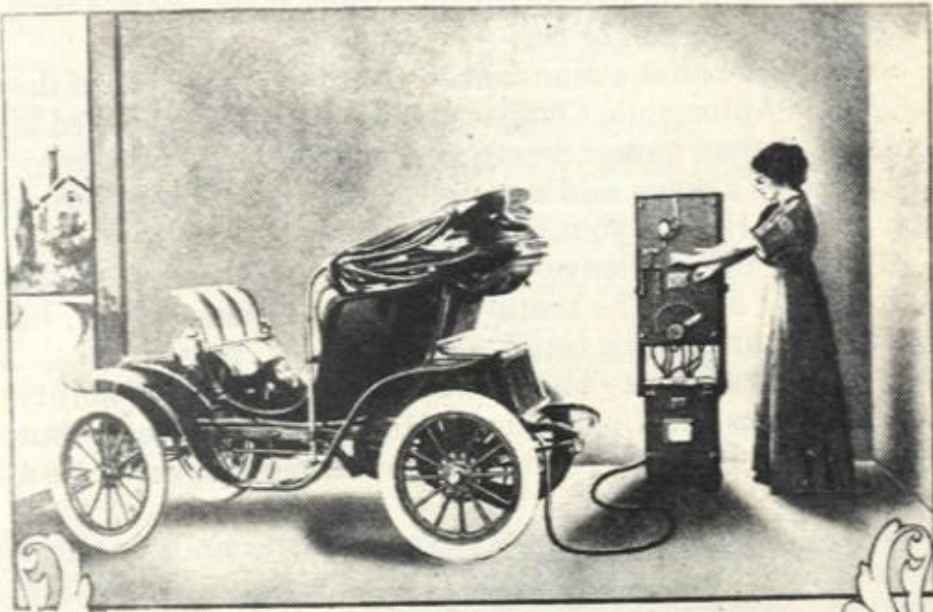
Beautiful catalog with full page illustrations, showing eight different models sent upon request.

DETROIT ELECTRIC 1913 LINE

Model 42—Clear Vision Brougham—4 or 5 passengers—seats facing forward	\$3000.00
Model 37—Extension Clear Vision Brougham—5 passengers—seats facing forward	3600.00
Model 35—Extension Brougham—4 passengers—seats face to face	2850.00
Model 36—Brougham—2 to 4 passengers—seats face to face	2700.00
Model 38—Business Man's Roadster—2 passengers	2350.00
Model 40—Ladies' Open Victoria—2 to 4 passengers	2300.00

ANDERSON ELECTRIC CAR COMPANY
DETROIT, MICH., U. S. A.





There's No Place Like Home For Charging Your Electric

Eight Thousand G-E Rectifiers Are Used for Auto Charging
Because the G-E Rectifier Makes Home Charging Really Practical

G-E Rectifiers can be operated by any man or woman who runs a car.
They save the trouble and expense of frequent trips to the public garage.

They are simple, have no moving parts, require no oil, and take up
little room in the garage.

G-E Rectifiers cost less, are more easily installed, and waste less
current than any other charging device.

You can get the full value from your car by installing a rectifier. The
car will always be at home ready for use when you want it.

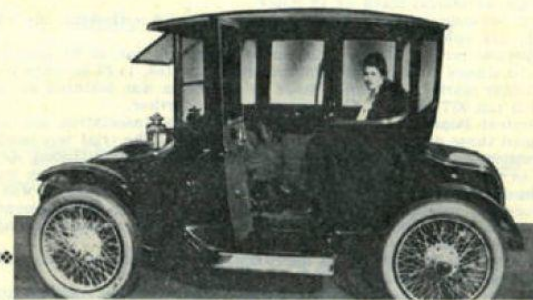
Write for booklet on "Charging the 'Electric' at Home"

General Electric Company

Largest Electrical Manufacturer in the World

Principal Office:
Schenectady, N. Y.

Sales Offices in
All Large Cities



**LADIES, BE PATRIOTIC—drive your own
DETROIT ELECTRIC**

and avoid the use of gasoline, oil and chauffers, now
needed by the government

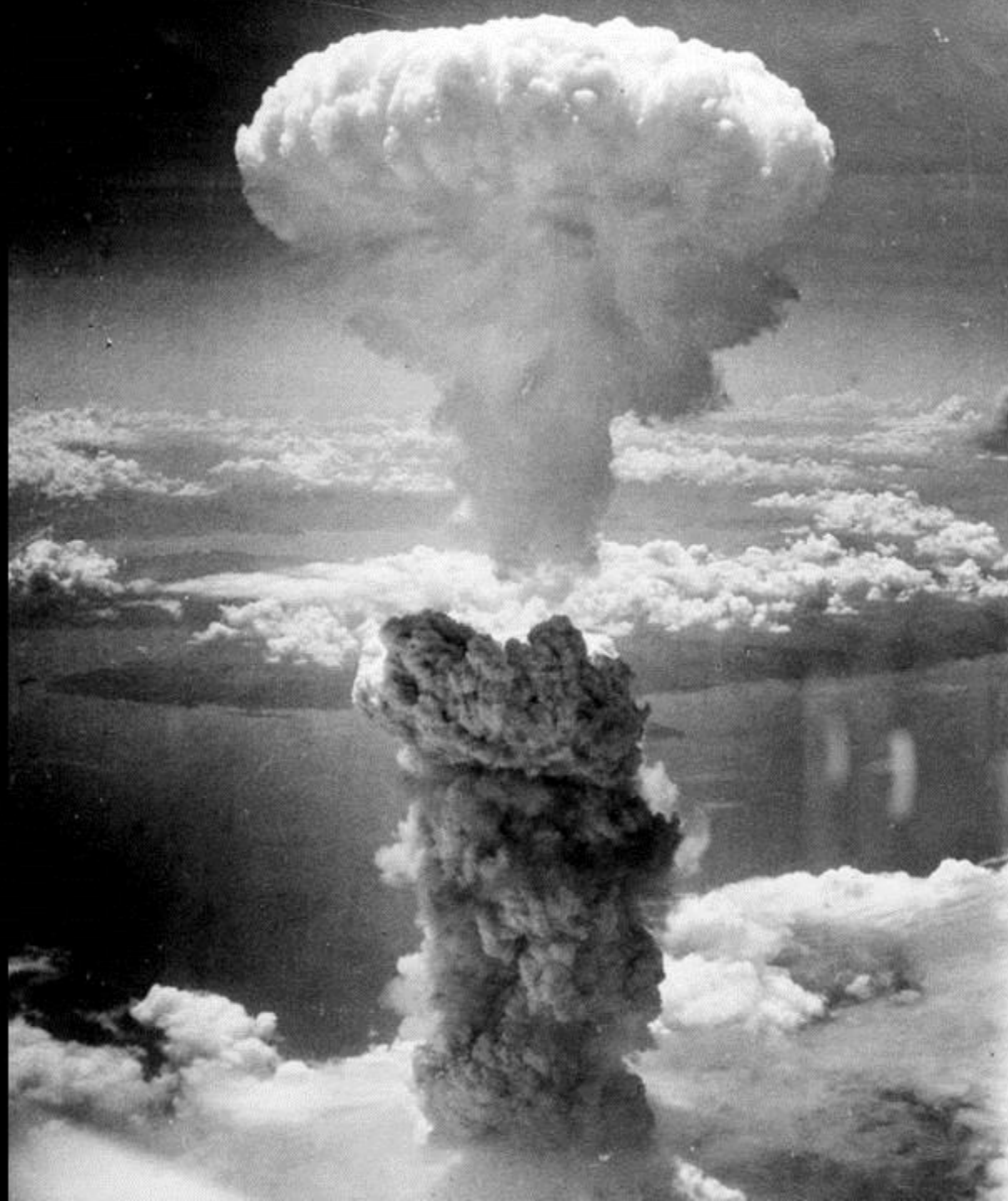
ELECTRIC VEHICLE COMPANY

1512 Eleventh Avenue

Phone East 6



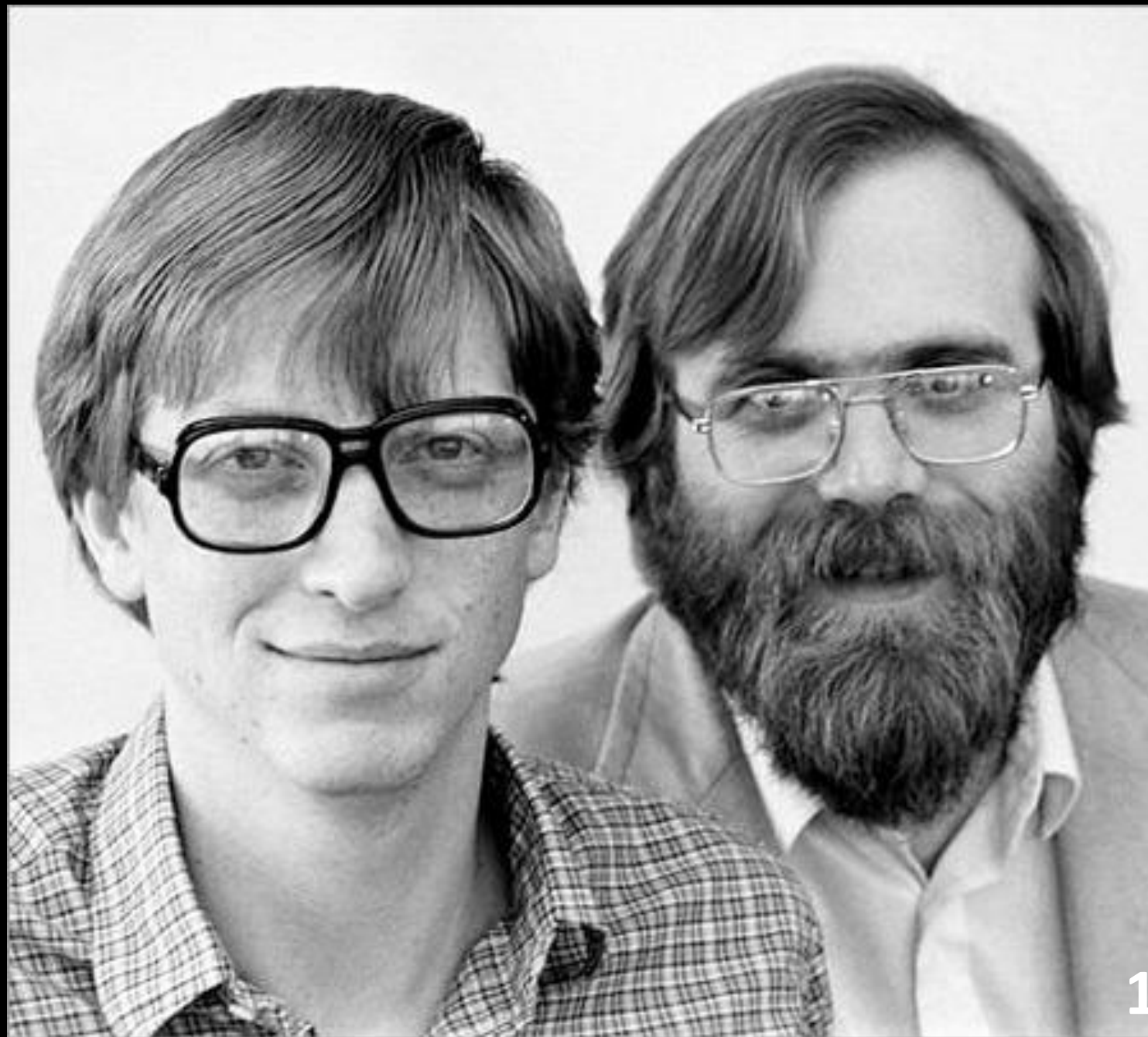
CTRIC 1916



1976

**elemento de
convergência**

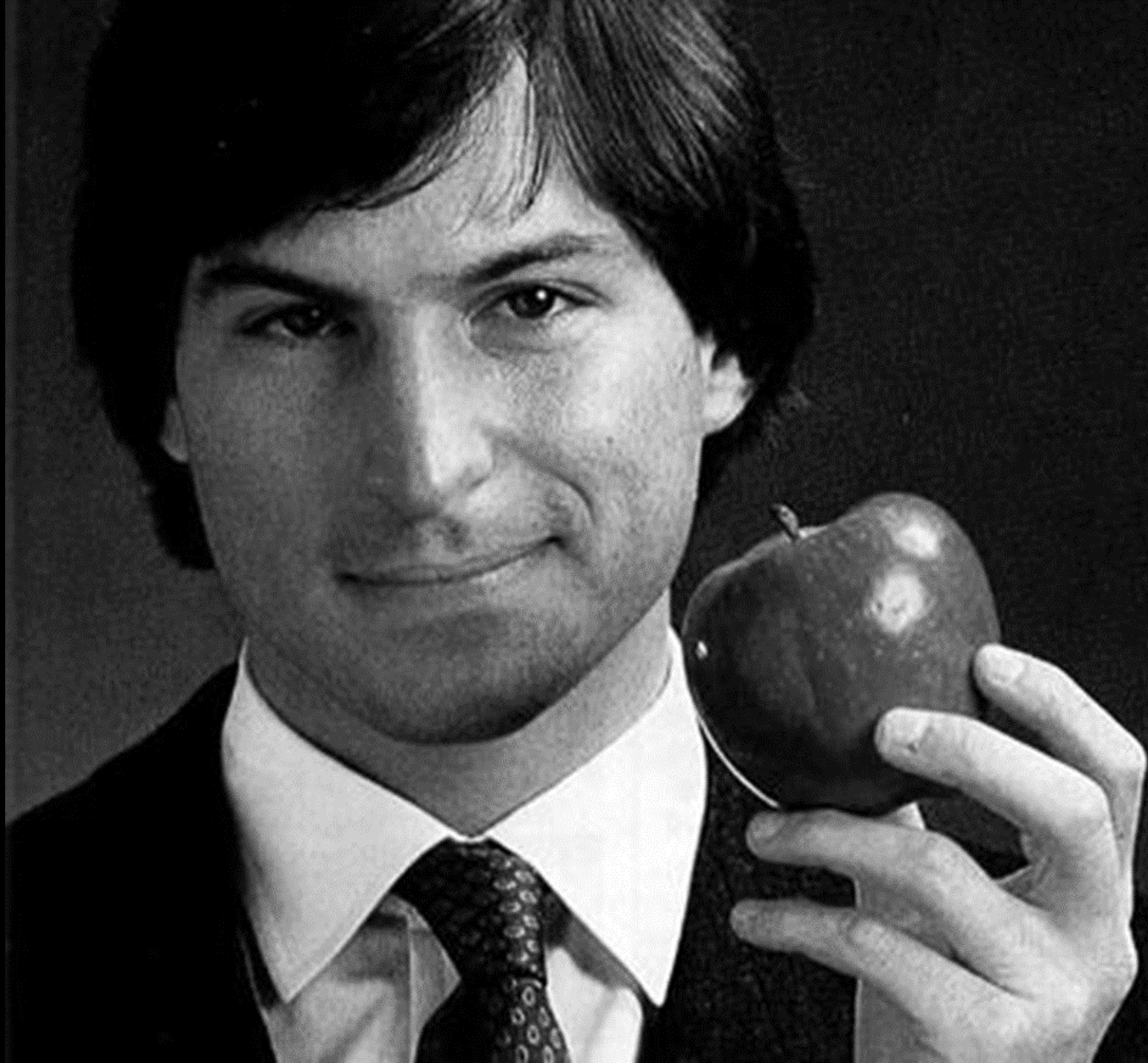




1980



1983



1983



08/1984



1983



1983



Eiji Toyoda - Toyotismo

produção enxuta



características?

- Empresas?
- Processos?
- Produtos?
- Profissionais?
- As relações?

The new Toyota Corolla.
Some people find the left rear window its most beautiful feature.

\$1798* That's the beauty mark you'll find on the sticker of every Corolla Sedan. But the sedan is just one version of a beautiful Corolla price.

Two other Corollas have left rear windows that are just as appealing. The sporty Corolla Fastback at \$1918! The roomy Corolla Wagon at a mere \$1958!

Yet, as inexpensive as it is, the Toyota Corolla doesn't rely on price alone. It has fully reclining bucket seats. It has

thick wall-to-wall nylon carpeting. It has an all-vinyl interior. To make it all the more beautiful.

But one of the most beautiful surprises in the Toyota Corolla is the amount of legroom. There's not an economy car around that comes close.

As for being practical, the Toyota Corolla does a beautiful job there, too. With carpets that snap in and out so you can clean them easily. With front disc brakes for safer stopping. With undercoating to prevent rust, corrosion and noise. With unit

construction and a lined trunk to prevent rattles and squeaks. And with a very practical sealed lubrication system to end chassis lube forever.

An economy car that comes loaded. That's the real beauty of the Toyota Corolla.

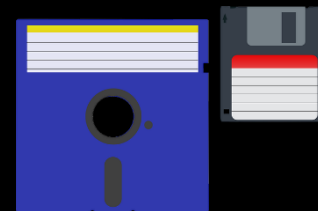
And with the beautiful price of \$1798* we can't blame you for being attracted to the left rear window.

TOYOTA
We're quality oriented



protocolo

TCP-IP (1969)





Tim Berners-Lee

Físico britânico e Professor do MIT

World Wide Web

The WorldWideWeb (W3) is a wide-area hypermedia information retrieval initiative aiming to give universal access to a large universe of documents. Everything there is online about W3 is linked directly or indirectly to this document, including an executive summary of the project, Mailing lists , Policy , November's W3 news , Frequently Asked Questions .

What's out there?

Pointers to the world's online information, subjects , W3 servers, etc.

Help

on the browser you are using

Software Products

A list of W3 project components and their current state. (e.g. Line Mode ,X11 Viola , NeXTStep , Servers , Tools , Mail robot , Library)

Technical

Details of protocols, formats, program internals etc

Bibliography

Paper documentation on W3 and references.

People

A list of some people involved in the project.

History

A summary of the history of the project.

How can I help ?

If you would like to support the web..

Getting code

Getting the code by anonymous FTP , etc



28 de junho de 2007



2007



2010

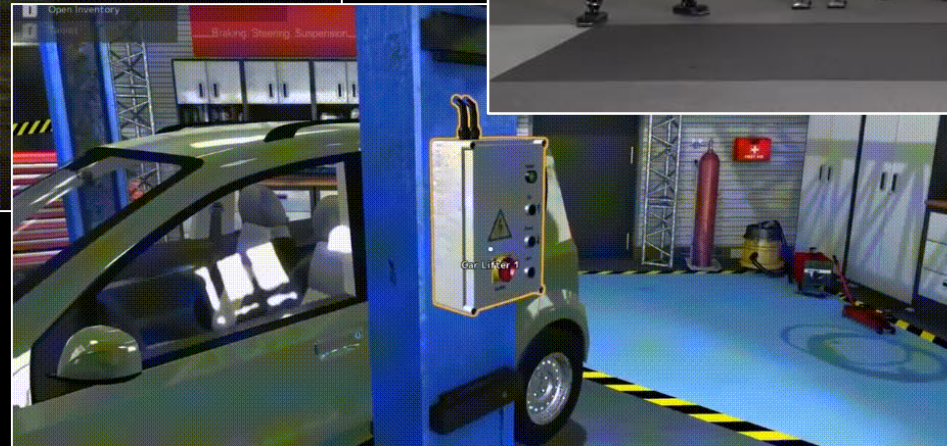




Indústria 4.0

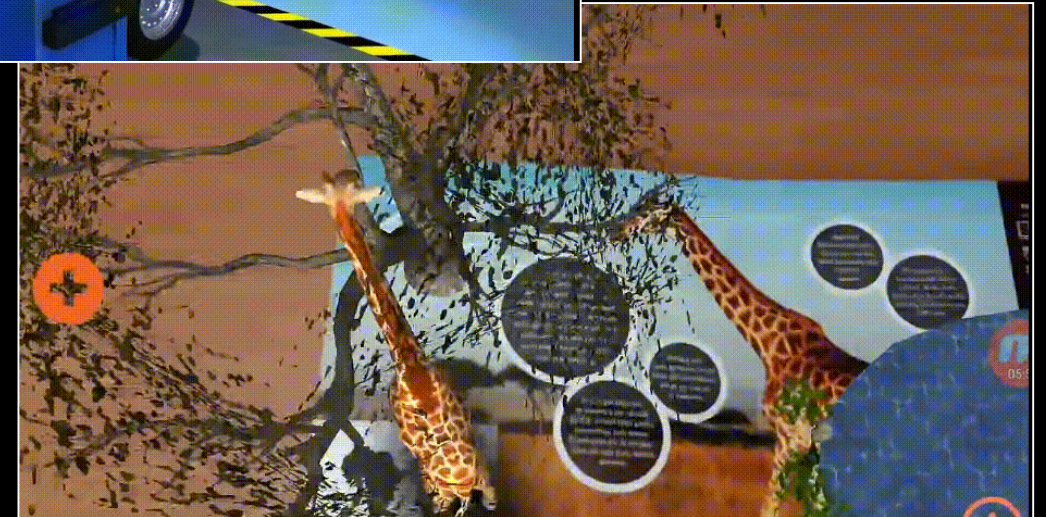
2011

produção digital



características?

- Empresas?
- Processos?
- Produtos?
- Profissionais?
- As relações?





Qual é o elemento de convergência agora?

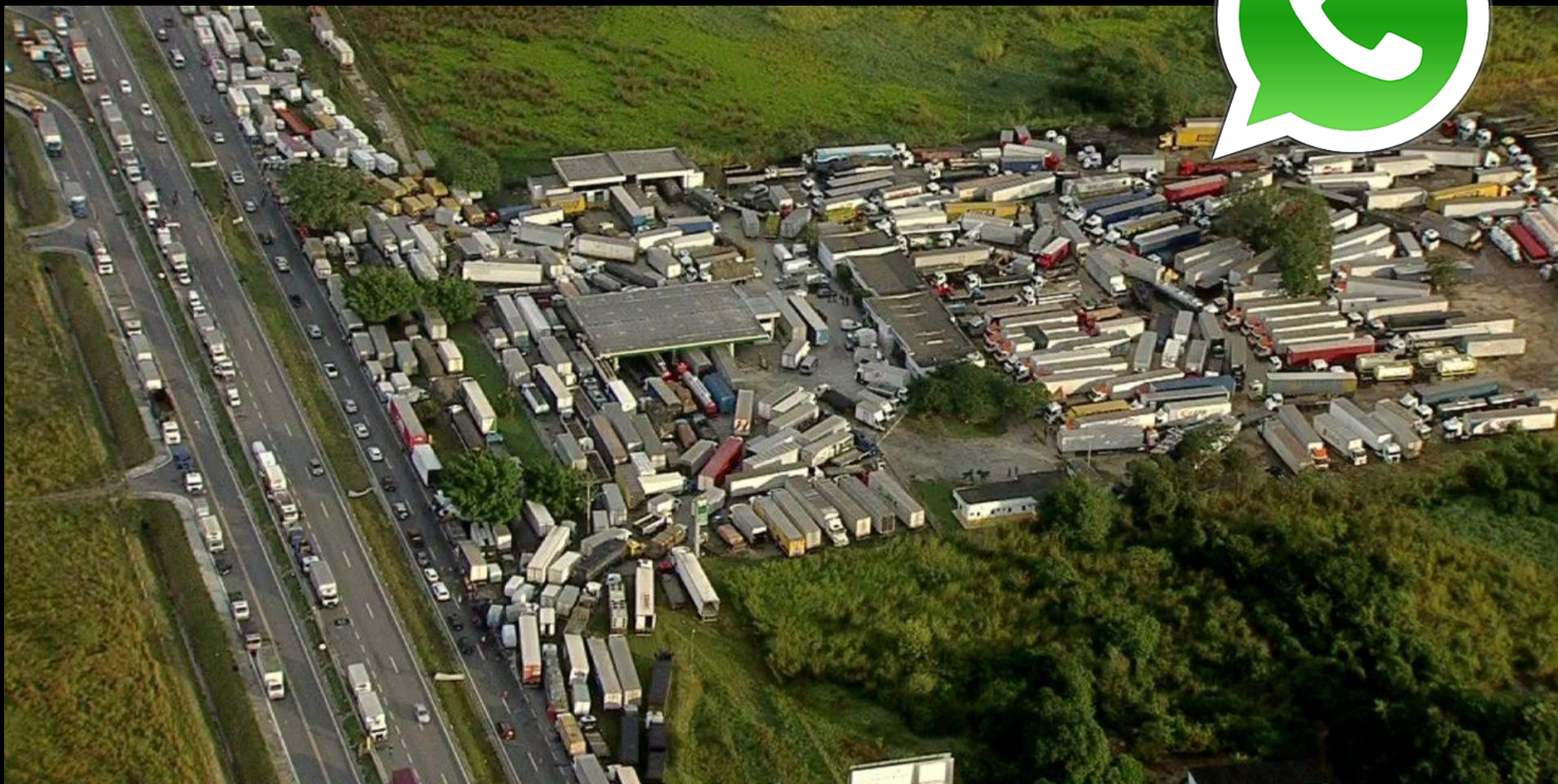


Zheng Jiajia



Sophia
Cidadã Saudita

2017



2018

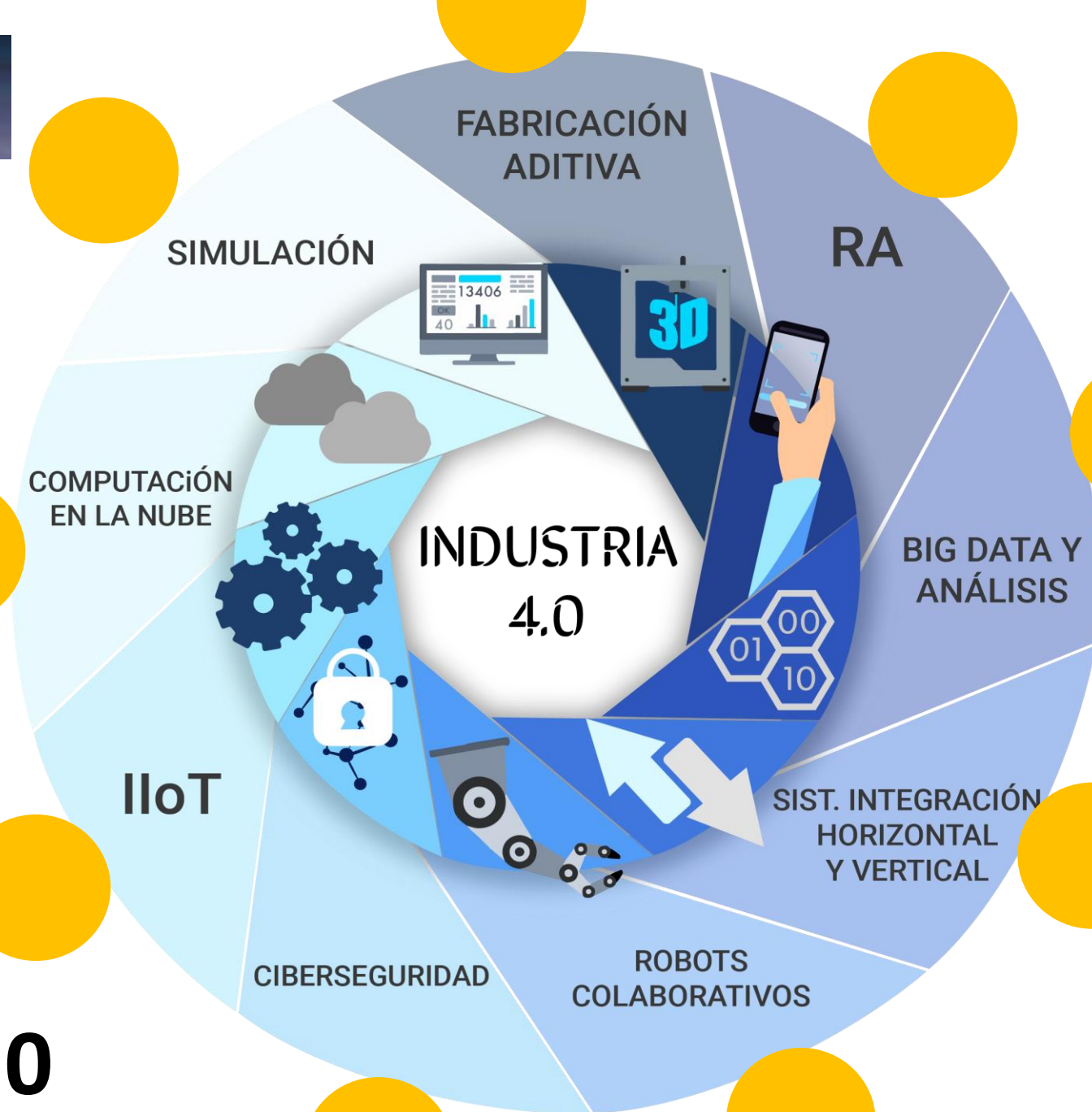


2018



Qual é o elemento de convergência agora?

2018



Indústria 4.0



2018

FABRICAÇÃO DIGITAL AVANÇADA

Obrigado!

Jorge Bruno
(21) 99339-5539

