

***LEVERAGING THE 4TH  
INDUSTRIAL REVOLUTION TO  
AUGMENT THE RELEVANCE AND  
QUALITY OF HIGHER  
EDUCATION OUTCOMES: A  
GLOBAL PERSPECTIVE***

2021 NCHE ANNUAL PUBLIC LECTURE

WINDHOEK, NAMIBIA - 24/2/2021

PROF. FERNANDO BUARQUE, DIC PHD

UNIVERSITY OF PERNAMBUCO – RECIFE, BRAZIL



# *AGENDA*

- Driving questions
- Education and Academia
- 4th Industrial Revolution
- Challenges and Opportunities
- Closing Remarks



Leveraging the 4th Industrial Revolution to Augment the Relevance and Quality of Higher Education Outcomes: A Global Perspective

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# *ACKNOWLEDGMENTS*

- Thanks for the invitation
- Thanks to funding agencies
- Thanks to my Universities



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# RECIFE - BRAZIL

## Some Transatlantic opportunities

- 1) 'Porto Digital' is one of the biggest IT tech-park in Latin America  
<https://www.portodigital.org/home>
- 2) 'Suape Port' is one of the most flexible & modern ports in Latin America  
<https://www.youtube.com/watch?v=uC-pkT5Evus>
- 3) Jeep-Chrysler Plant is one of the most modern car plant in the world  
<https://www.youtube.com/watch?v=jWzVjZcQYkU>



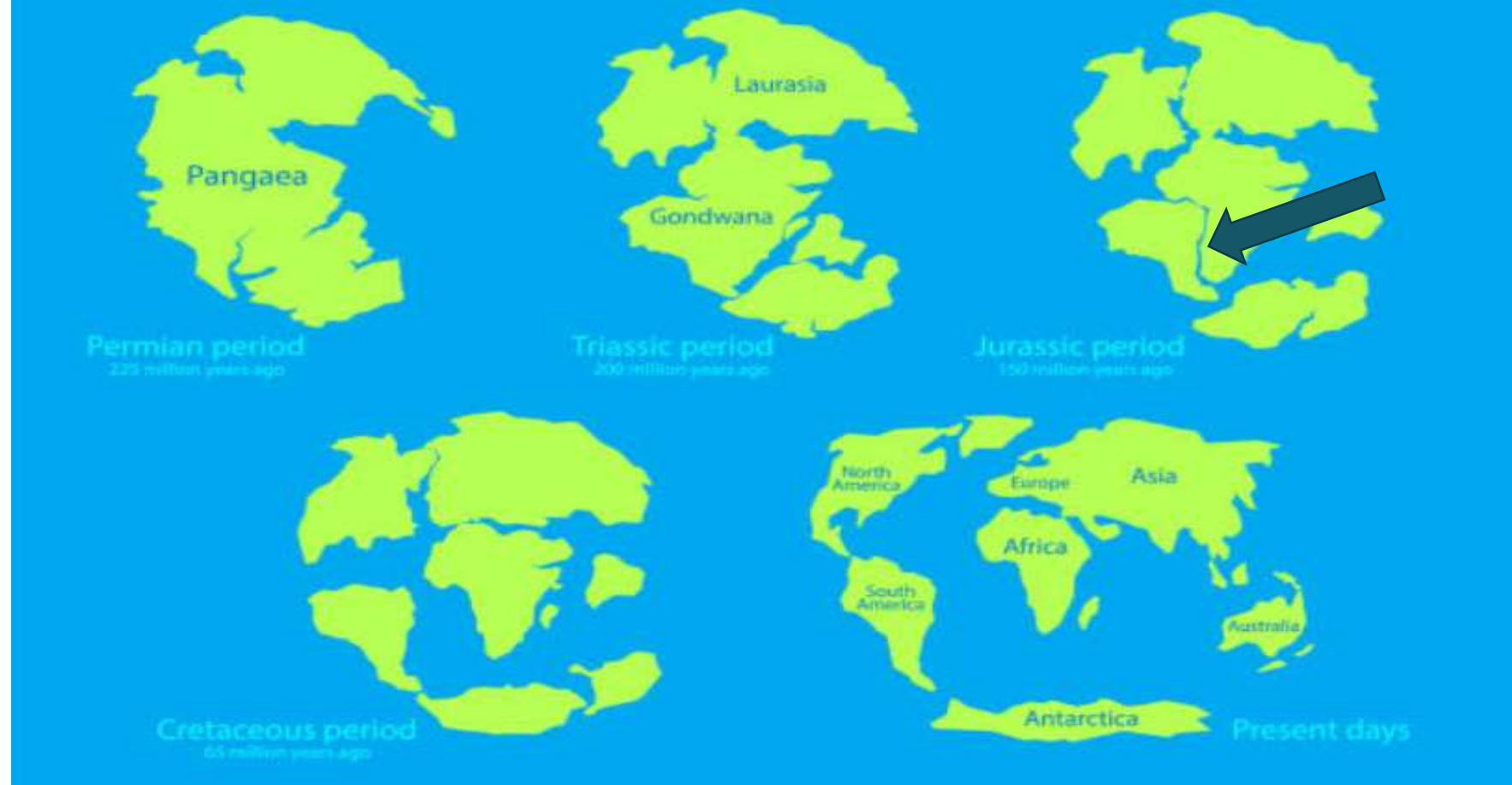
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# CONTINENTAL DRIFT



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# *WHAT WE KNOW*

...that there is a revolution out there



## Annual Report 2015-2016

Download PDF 

"Our world is an interconnected system straining under the burden of its own complexity. The Fourth Industrial Revolution and other factors are combining to make the global environment more unpredictable and difficult to navigate."

<https://www.weforum.org/reports/annual-report-2015-2016>



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# WHAT WE KNOW

...that 169 targets must be pursued (environmental, political and economic challenges) by the year 2030.



<https://www.un.org/sustainabledevelopment/>



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# WHAT WE KNOW

...education promotes employment => independence => quality of life.



## Incheon Declaration and Framework for Action

for the implementation of  
Sustainable Development Goal 4

Ensure inclusive and equitable  
quality education and promote lifelong  
learning opportunities for all

### Preamble

1. We, Ministers, heads and members of delegations, heads of agencies and officials of multilateral and bilateral organizations, and representatives of civil society, the teaching profession, youth and the private sector, have gathered in May 2015 at the invitation of the Director-General of UNESCO in Incheon, Republic of Korea, for the World Education Forum 2015 (WEF 2015)...

... Strengthening policies, plans, legislation, and systems; Emphasizing equity, inclusion, and gender equality; Focusing on quality and learning; Promoting lifelong learning...

<https://unesdoc.unesco.org/ark:/48223/pf0000245656/PDF/245656eng.pdf.multi>

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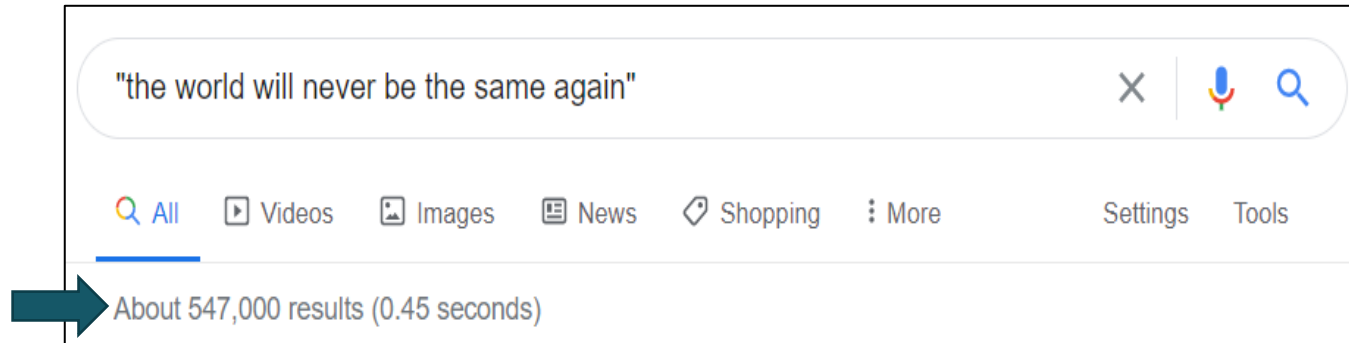
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# WHAT WE KNOW

...after this pandemic (of many), the world will never be the same again.



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# *EDUCATION 1.0*

## *(SCHOOL OF ATHENS, CIRCA 383 B.C.E.)*



- No rigid pace
- Free pursuit
- Nature centered
- Generalistic



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# *EDUCATION 2.0*

*(PRUSSIAN CLASSES, CIRCA 1790 C.E.)*



- Fixed pace
- No free pursuit
- Technology centered
- Problem oriented



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# *EDUCATION 3.0*

(?)

Do we have one?  
Fundamentally different from the Prussian style?



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# *NEW EDUCATION 3.0*

## *(AFTER THE PANDEMIC?!)*

### 1.0

- No rigid pace
- Free pursuit
- Nature centered
- Generalistic

### 2.0

- Fixed pace
- No free pursuit
- Technology centered
- Problem oriented

### New 3.0(?)

- Flexible pace
- Variable pursuit
- Human centered (!)
- Solution oriented



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# ROLES OF ACADEMIA

1088—University of Bologna



"Io Studium di Bologna  
nasce dagli studenti e per  
gli studenti"

1810—Humboldt University



"Die Einheit von Lehre und  
Forschung, die Freiheit der  
Wissenschaft und eine  
allseitige Bildung der  
Studenten."

1848—University of Wisconsin



"I shall never be content  
until the beneficent  
influence of the  
University reaches every  
home in the state."  
(1904)

1966—University of Campinas



"A criação da Inova  
mostrou que inovação  
tecnológica é um fator  
chave de  
desenvolvimento."  
(2003)



Education



Research



Service



Tech. Transfer

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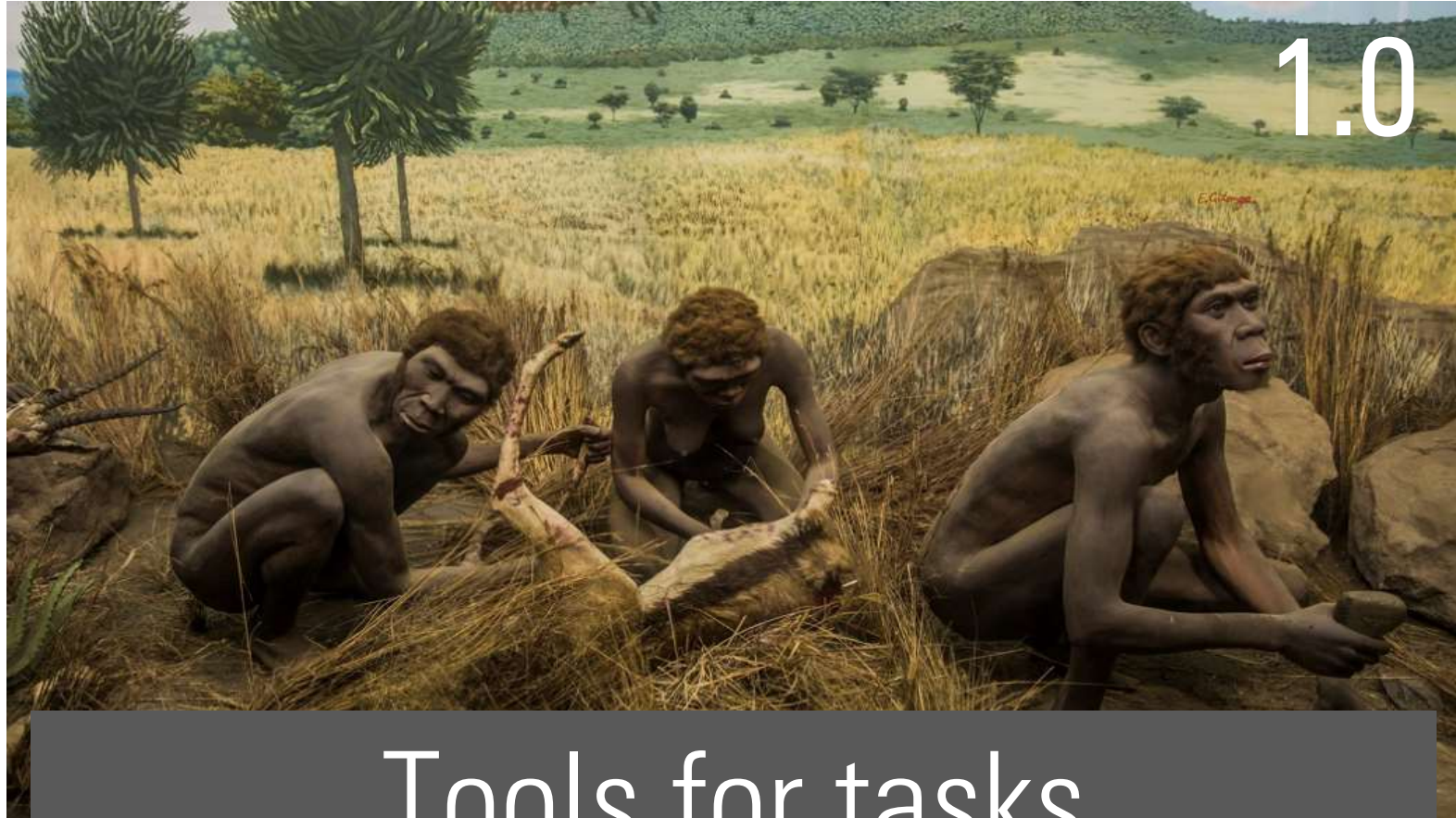
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# *HUMAN REVOLUTIONS*



## Tools for tasks

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# *HUMAN REVOLUTIONS*



2.0

## Tools for making tools

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# *HUMAN REVOLUTIONS*



3.0

## Tools for planning the production of tools

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# *HUMAN REVOLUTIONS*



We are the tools – be careful!

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# *ARE HUMAN AND INDUSTRIAL REVOLUTIONS DIFFERENT?*

1.0



2.0



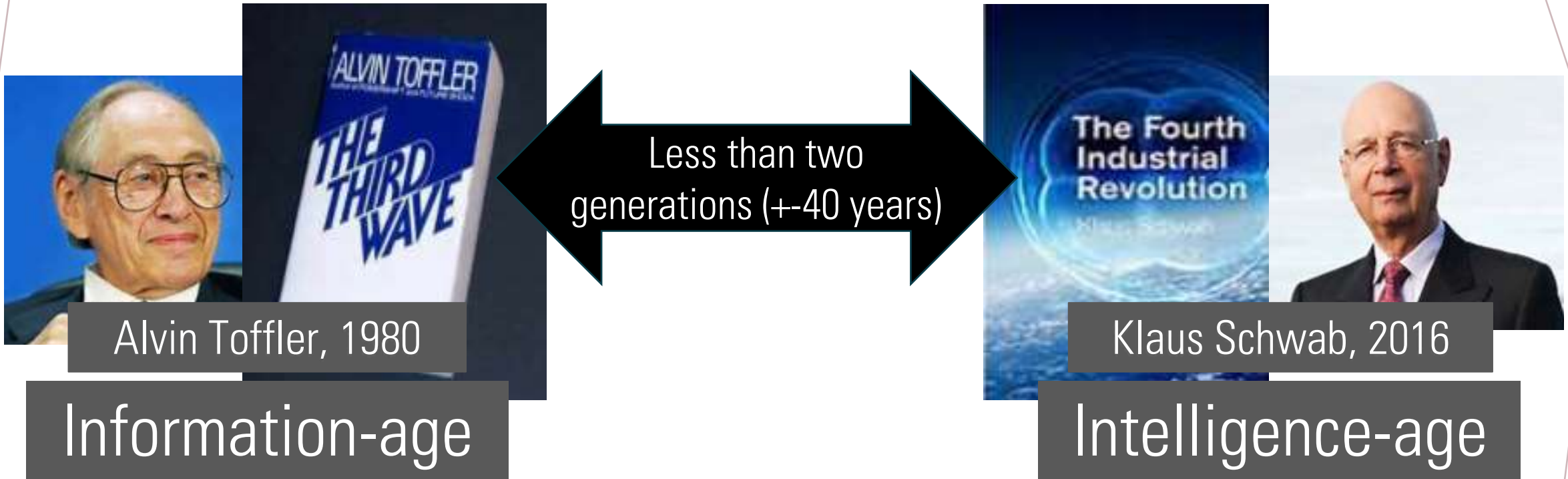
3.0



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# *WHAT IS 4<sup>TH</sup> IR (OR 4<sup>TH</sup> HR)?*



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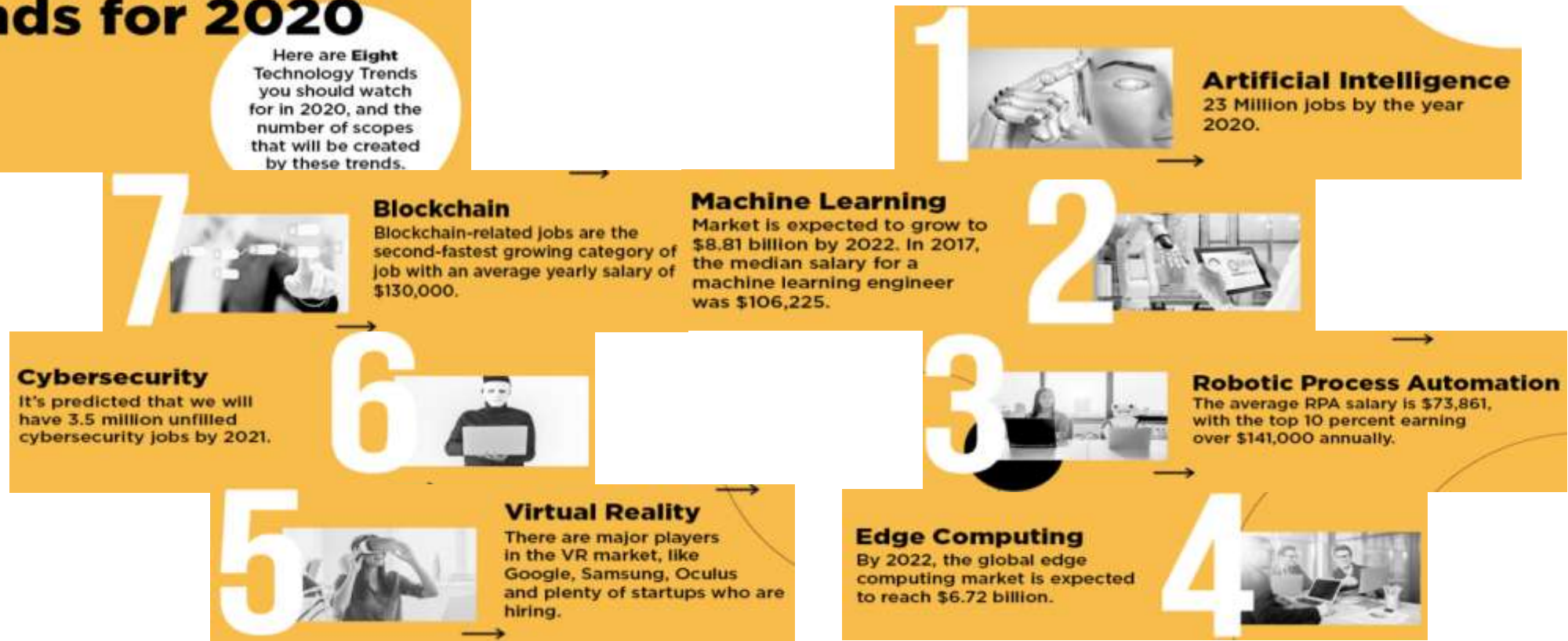


# WHAT DRIVES THE 4<sup>TH</sup> IR?

## Top Technology Trends for 2020

Here are **Eight** Technology Trends you should watch for in 2020, and the number of scopes that will be created by these trends.

Fonte: <https://www.simplilearn.com/top-technology-trends-and-jobs-article>



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# *AI IS THE DRIVER OF THE 4<sup>TH</sup> IR*

Machine learning and AI... will empower and improve every business, every government organization, every philanthropy – basically there's no institution in the world that cannot be improved with machine learning.

Jeff Bezos – CEO, Amazon

A.I. is one of the most important things humanity is working on. It is more profound than, I dunno, electricity or fire.

Sundar Pichai – CEO, Google



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# *CHALLENGES AND OPPORTUNITIES (JOBS)*



<https://www.weforum.org/reports/the-future-of-jobs-report-2020>

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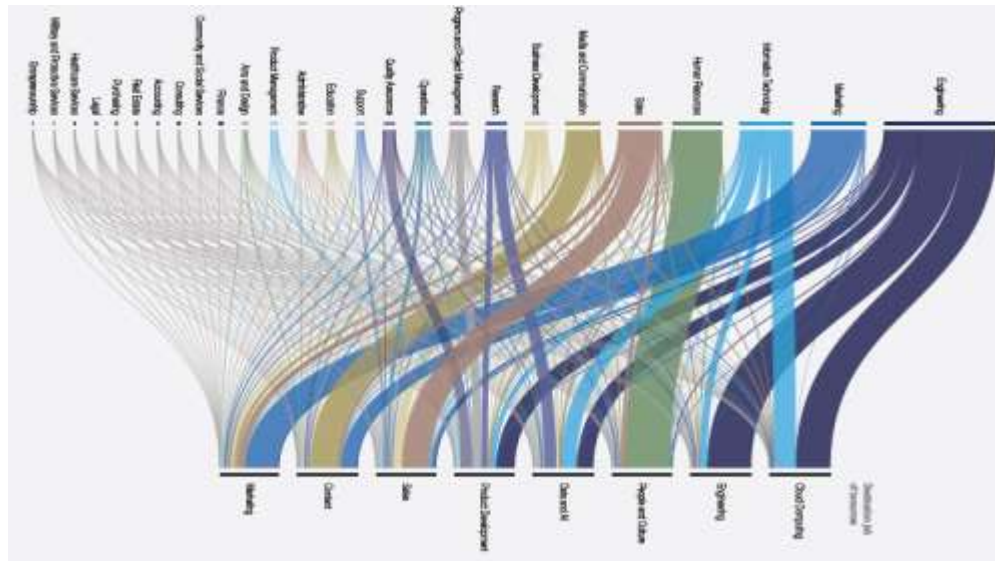
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# CHALLENGES AND OPPORTUNITIES (EDUCATION)



<https://www.weforum.org/reports/the-future-of-jobs-report-2020>

## Top 10 skills of 2025

- Analytical thinking and innovation
- Active learning and learning strategies
- Complex problem-solving
- Critical thinking and analysis
- Creativity, originality and initiative
- Leadership and social influence
- Technology use, monitoring and control
- Technology design and programming
- Resilience, stress tolerance and flexibility
- Reasoning, problem-solving and ideation

### Type of skill

- Problem-solving
- Self-management
- Working with people
- Technology use and development

Source: Future of Jobs Report 2020, World Economic Forum

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# *CHALLENGES AND OPPORTUNITIES (PRIVACY)*



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# CHALLENGES AND OPPORTUNITIES (DEMOCRACY)



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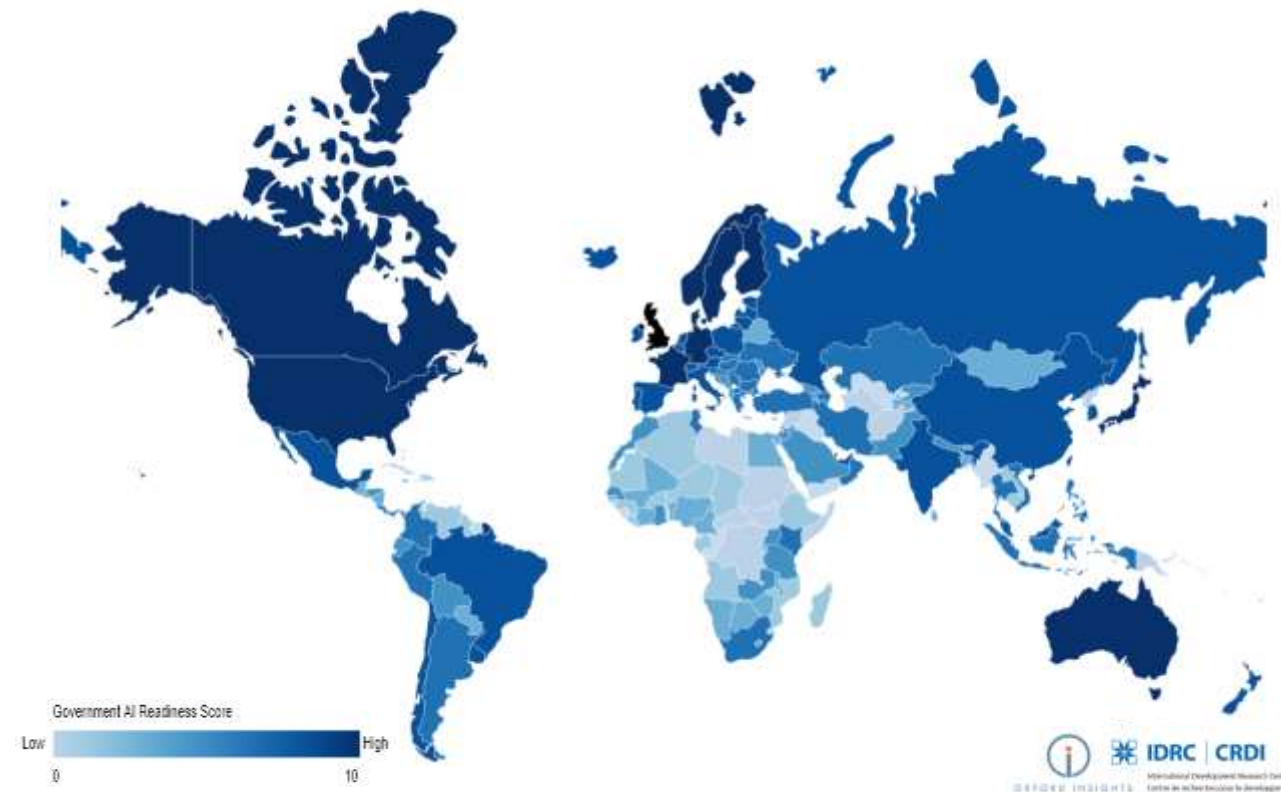
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# *MAJOR HUMAN RACE (AI REDINESS)*



<https://www.oxfordinsights.com/ai-readiness2019>

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# *MAJOR HUMAN CHALLENGE (RESPONSIBLE AI)*

This Fourth Industrial Revolution is, however, fundamentally different. It is characterized by a range of new technologies that are fusing the physical, digital and biological worlds, impacting all disciplines, economies and industries, and even challenging ideas about what it means to be human.

...

However, Schwab also has grave concerns: that organizations might be unable to adapt; governments could fail to employ and regulate new technologies to capture their benefits; shifting power will create important new security concerns; inequality may grow; and societies fragment.

<https://www.weforum.org/about/the-fourth-industrial-revolution-by-klaus-schwab/>

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# MAJOR HUMAN NEEDS (AT 4<sup>TH</sup> IR)



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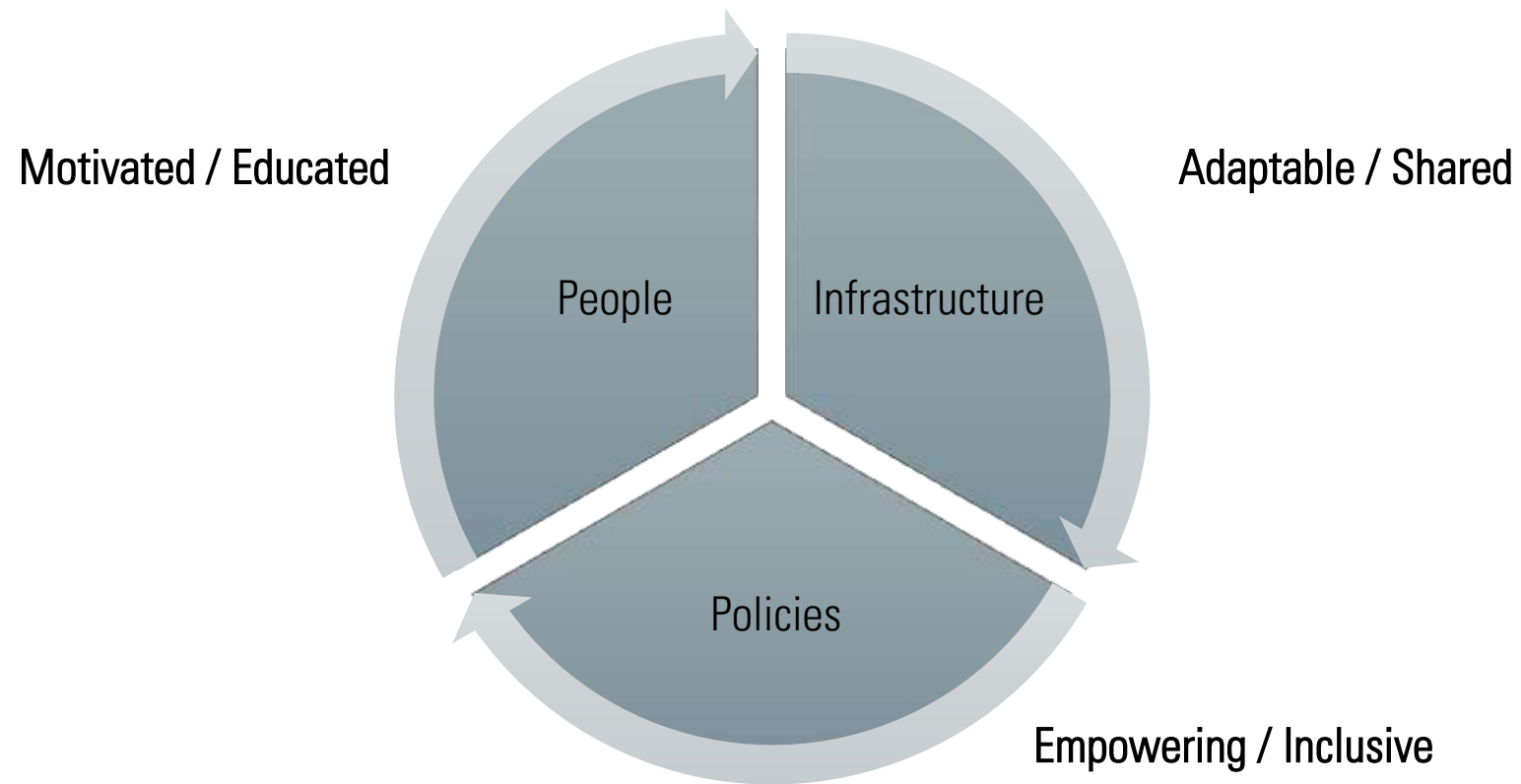
**Perhaps, the new syllabuses / methodologies should  
blend Technology & Humanities towards human needs**



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# *POSSIBLE HAPPY-ENDING FORMULAE*



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# THANK YOU!



**Prof. Fernando Buarque**

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eMail: [fbln@ecomp.poli.br](mailto:fbln@ecomp.poli.br)



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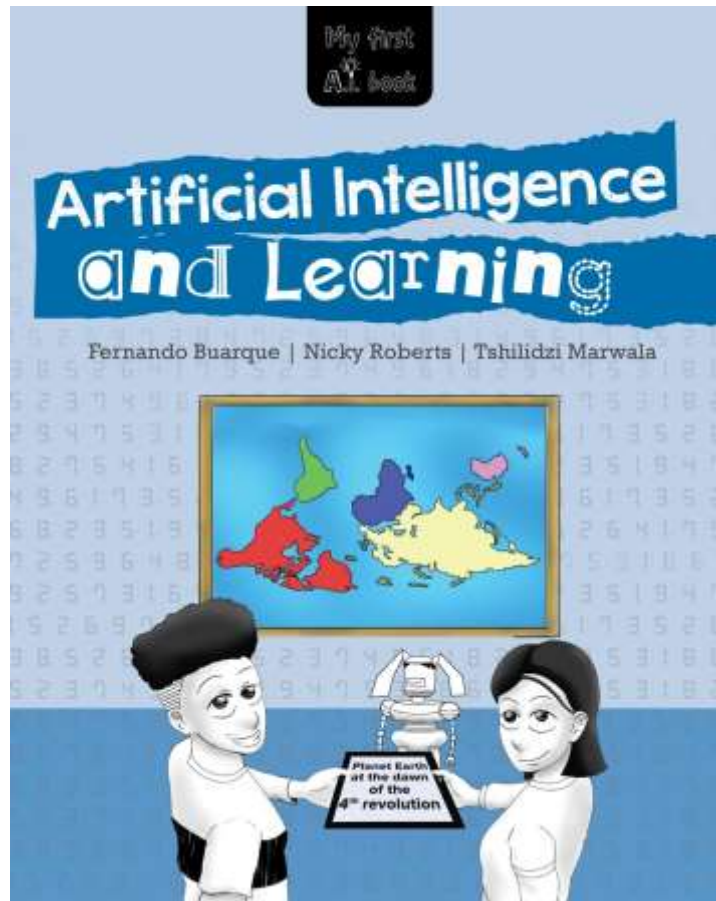
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# LET US TEACH AI TO KIDS YESTERDAY!



## 'MY FIRST AI BOOK' SERIES

<http://my-first-ai-book.org/>



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