

Innovation and Knowledge Driven Entrepreneurship

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Outline

- **Introduction**
- Innovation
- Knowledge
- Knowledge Economy
- Knowledge Driven Entrepreneurship

Introduction

- Entrepreneurship and Innovation are propelling the economic growth.
- Entrepreneurship measures the capacity of individuals and companies to undertake risk and to accept failure.
- (Technical) Innovation is transferring new ideas into a productive process, creating new products, adding greater value or decreasing the production cost.
- Taken together, Entrepreneurship and Innovation, bring the entrepreneurial skills and the entrepreneurial mindset.

Entrepreneurship + Innovation

- “Entrepreneurship is the identification, evaluation, and exploitation of opportunities” (Shane, 2011, p. 143).
- It develops new business ventures and grow the existing ones.
- In order to succeed, just risk-taking is not enough. Opportunities should be identified and analyzed. Novelty is a necessary condition to succeed in a given economic or social already settled domain.
- Entrepreneurship can exist (barely) without innovation and innovation can be performed outside the entrepreneurial realm, but they blend together and create the innovative entrepreneurship.

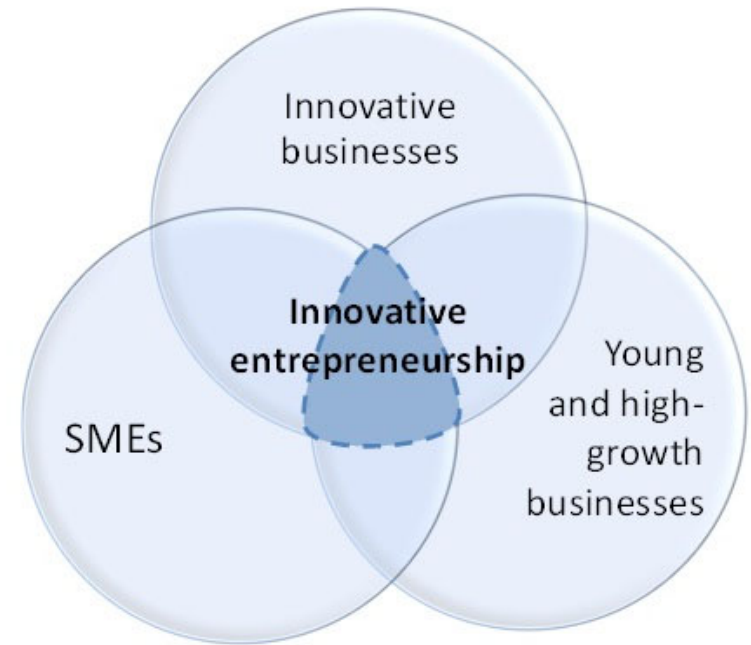
Innovative Entrepreneurship

Important actors:

- SMEs
- Young businesses
- Innovative businesses

Innovation:

- Economic role (contribute to growth)
- Social role (create jobs and reduce poverty)
- Educational role – reach the standards in industry and business.



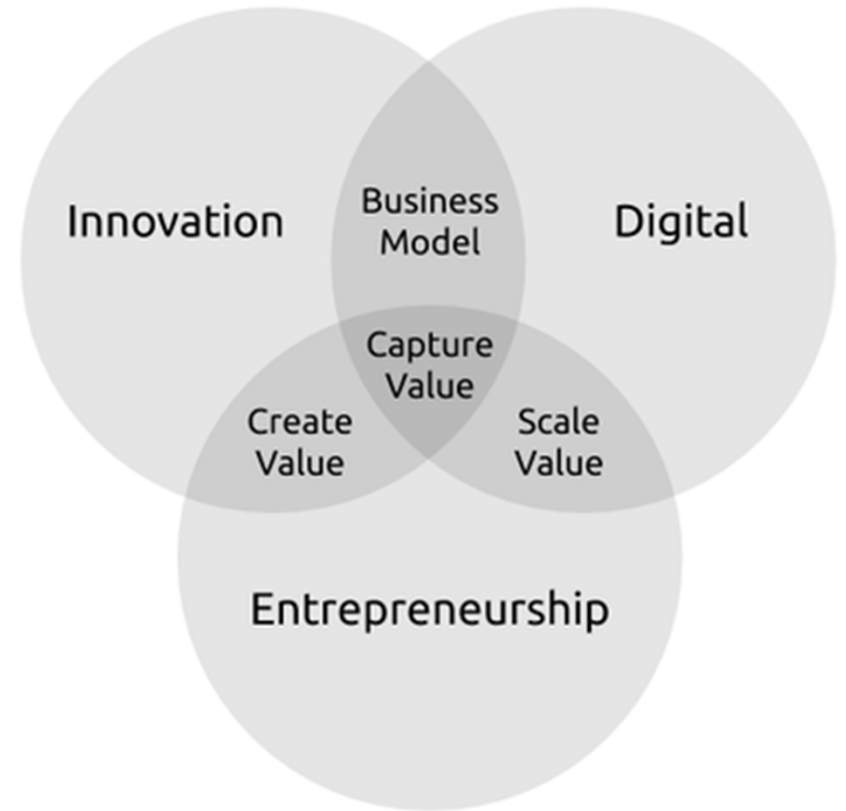
<https://www.innovationpolicyplatform.org/www.innovationpolicyplatform.org/content/innovative-entrepreneurship/index.html>

Digital Innovation Entrepreneurship

Relationships between:

- Entrepreneurship
- Innovation
- Digital

They are the carriers and the
offspring of the
DIGITAL TRANSFORMATION



<https://www.startupcommons.org/about-us.html>

Digital Transformation

- Digitization
- Digitalization
- Digital Transformation

Digital transformation is more than digitalization.

It requires an extended amount of digital technology adoption (digitalization), but more than this, the integration and cultural adoption of it.

Digital Disruptions

Digital Transformation gives dramatical changes in businesses:

- Electronic reading and selling of reading materials (severely diminishing of printed media and books businesses)
- On-demand services (Uber transportation vs taxis)
- Subscription market for video and audio (Netflix, Spotify, etc...)
- Online learning (Coursera, Udemy)
- e-Commerce (Shopify)
- Online Marketplaces (Amazon, eBay, Alibaba)

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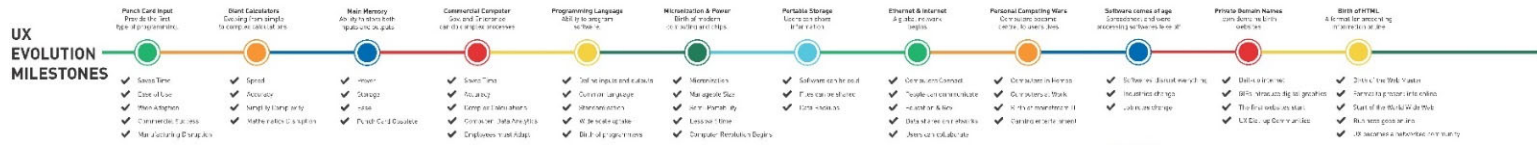
Innovation and Research

- As stated before, Innovation is regarded as the process of introducing something new (idea, method, process, device) or the subject/result of this action.
- This implies research not just to supply the invention/initial idea, but also to develop it, through:
 - Market Research
 - Competitive Research
 - Feasibility & Requirements Research
- Once developed, good Research and Innovation will leave landmarks in evolution, because they will change the landscape of human development.

Computing Disruption



HISTORY OF UX EVOLUTION TIMELINE FOR COMPUTER AGE



BIRTH OF COMPUTING

1801 Punched Cards Input
The first punched cards were used to control the loom.

1822 World First Computer
Charles Babbage's Analytical Engine was the first computer.

1836 The Turing Machine
Alan Turing's Turing Machine was the first computer.

1841 29 Equations
Charles Babbage's Difference Engine No. 2 was the first computer.

1843-1944 Electronic Numerical Integrator and Calculator
ENIAC was the first computer.

1890 Punch Card System
Herman Hollerith's punch card system was the first computer.

1937 No. 2200s, Cams, Belts or Shells
IBM's No. 2200 was the first computer.

1947 The Transistor
John Bardeen, Walter Brattain, and William Shockley discovered the transistor.

1953 Consumer Language
IBM's Business Data Processing Language was the first computer.

1954 Program Language
FORTRAN was the first computer.

1955 The Modern Computer
IBM's System/360 was the first computer.

1959 The Computer Chip
Intel's Intel 4004 was the first computer.

1962 An Interconnected Network
ARPANET was the first computer.

1969 The Computer Chip
Intel's Intel 700 was the first computer.

1970 The Modern Computer
IBM's System/370 was the first computer.

1971 Floppy Disk
IBM's 8-inch floppy disk was the first computer.

1973 Ethernet
Robert Metcalfe and Dennis M. Buxton discovered Ethernet.

1974-1977 Personal Computer
Apple II, Commodore PET, etc. were the first computers.

1976 Apple
Apple II was the first computer.

1977 Radio Shack
Radio Shack TRS-80 was the first computer.

1978 IBM Computer
IBM PC was the first computer.

1978 VisiCalc
VisiCalc was the first computer.

1981 IBM Computer
IBM PC was the first computer.

1983 Apple's Lisa
Apple Lisa was the first computer.

1985 Apple's Mac
Apple Macintosh was the first computer.

1986 Desktop 800
IBM's Desktop 800 was the first computer.

1987 Virtual Reality
Jaron Lanier's VPL Inc. was the first computer.

1988 Commercial dot-up
Commodore's Amiga was the first computer.

1989 World Wide Web
Tim Berners-Lee's World Wide Web was the first computer.

1990 HTML
Tim Berners-Lee's HTML was the first computer.

1992 World Wide Web
Tim Berners-Lee's World Wide Web was the first computer.

1992 NINET
NINET was the first computer.

1992 World Wide Web
Tim Berners-Lee's World Wide Web was the first computer.

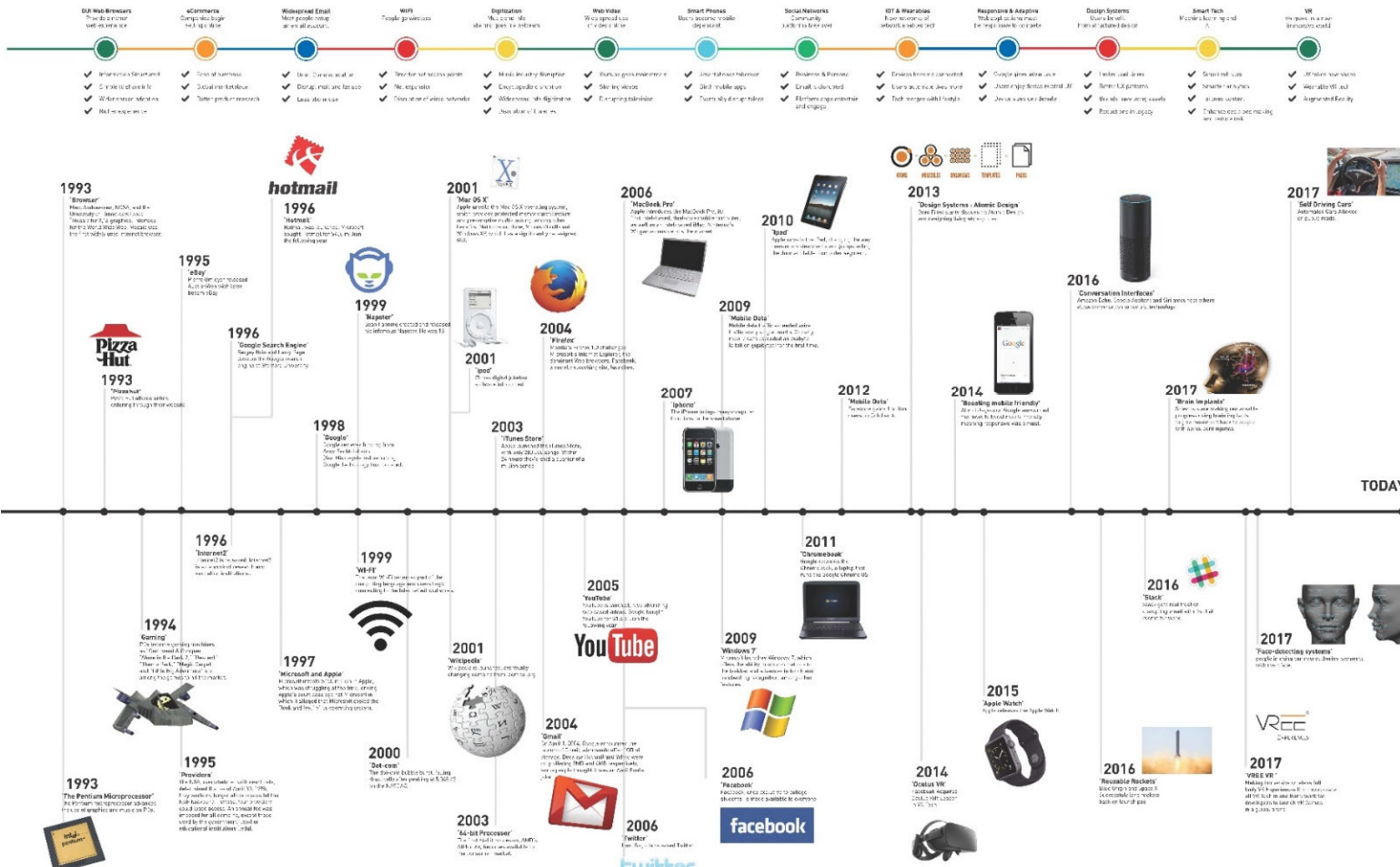
2011 Birth of HTML5
W3C's HTML5 was the first computer.

<https://bankai.eu/files/ux-timeline/ux-timeline-1d.pdf>

Internet Disruption



HISTORY OF UX EVOLUTION TIMELINE FOR INTERNET AGE

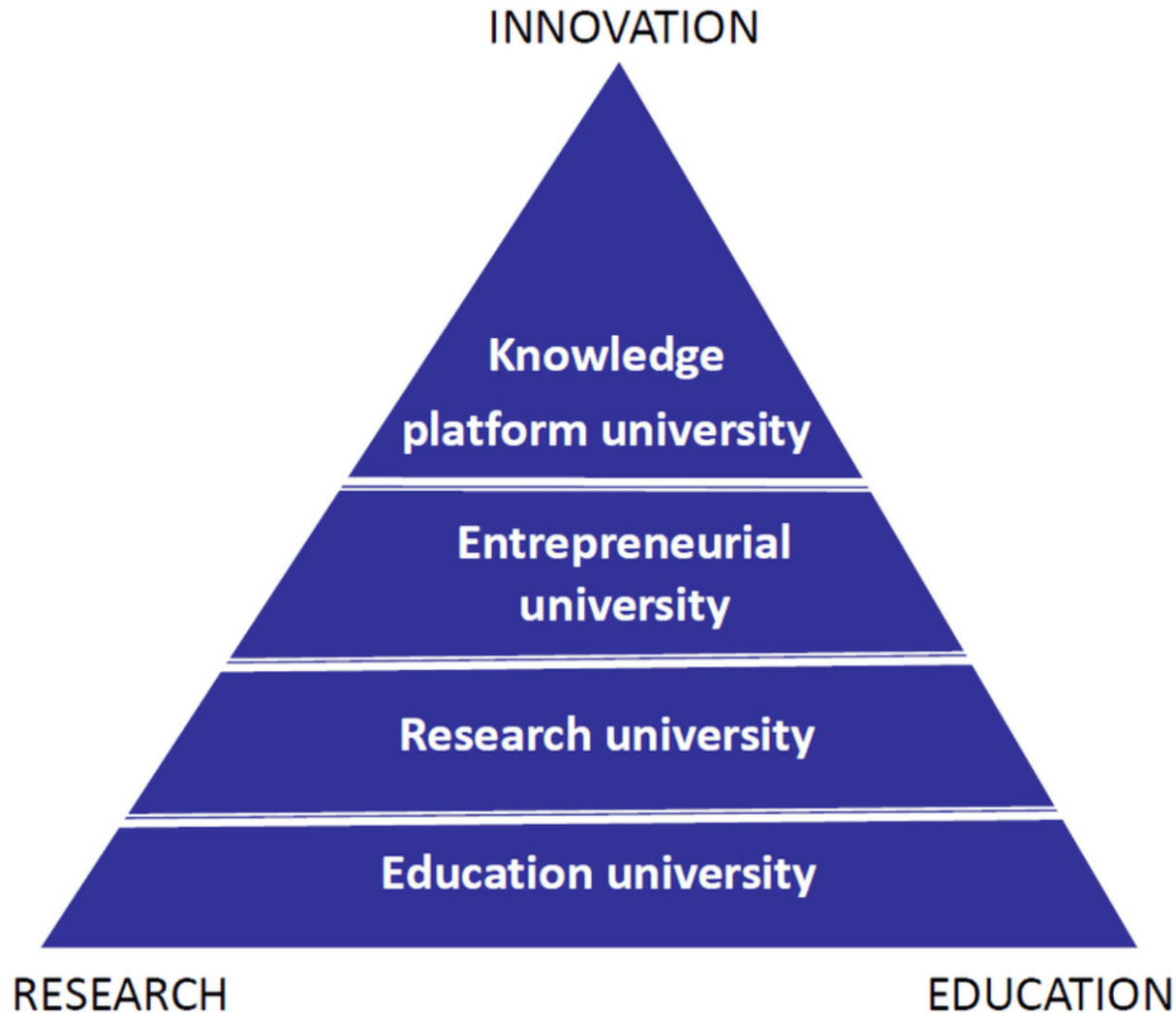


<https://bankai.eu/files/ux-timeline/ux-timeline-2d.pdf>

Innovation

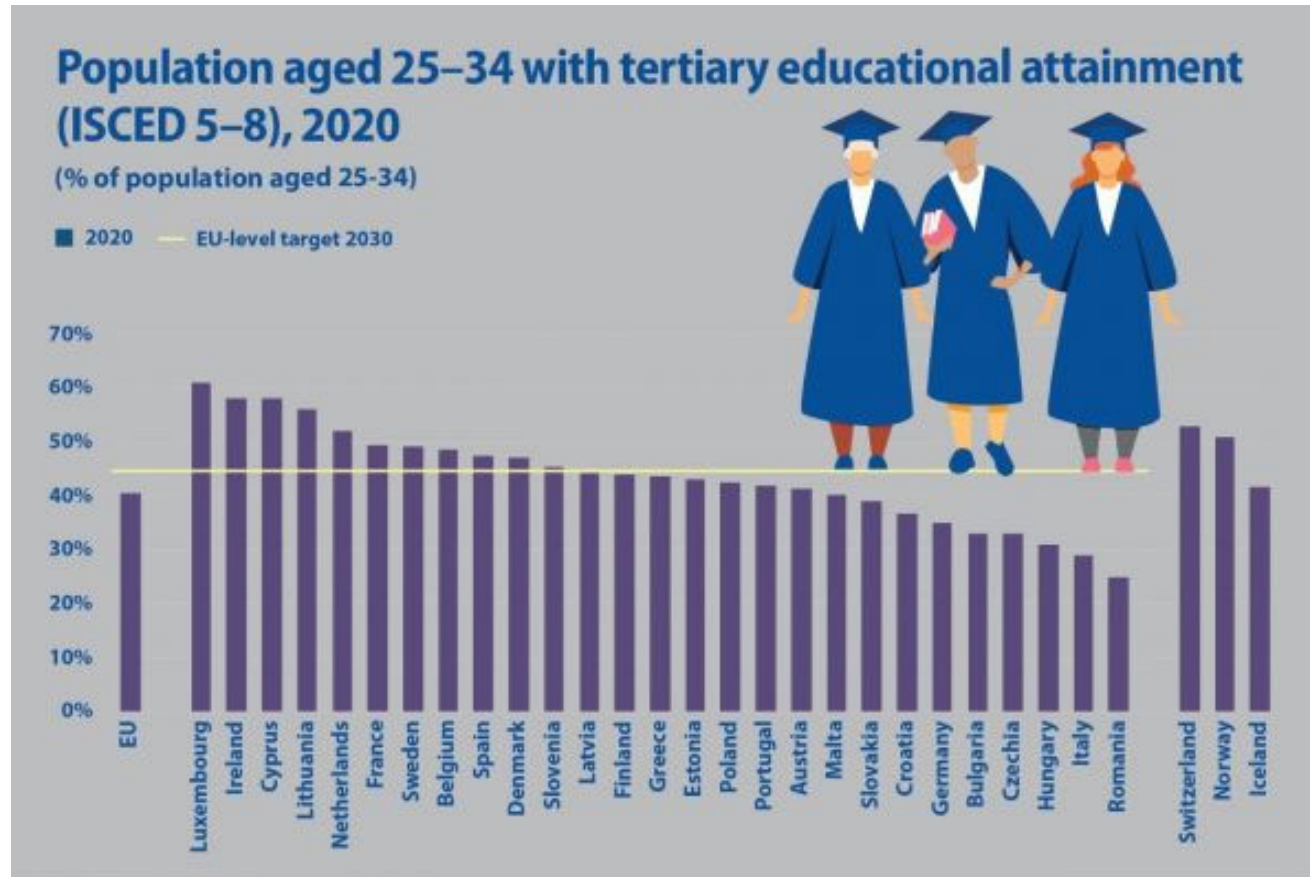
- As a difference with invention, which was discussed before, innovation is an **educated process**.
- Invention can happen accidentally, but innovation and development require people with academic background.
- As was seen in the last two slides, ICT innovation is a major component of the last century innovation and manifested itself many times as a changing/ disruptive factor.
- To do so, it was permanently associated with **research** and with **education**.

Triad education-research-innovation



U. Petrusson, The university in the knowledge economy,
apud R, Bejinaru, Universities in the Knowledge Economy

University Role



ec.europa.eu/eurostat

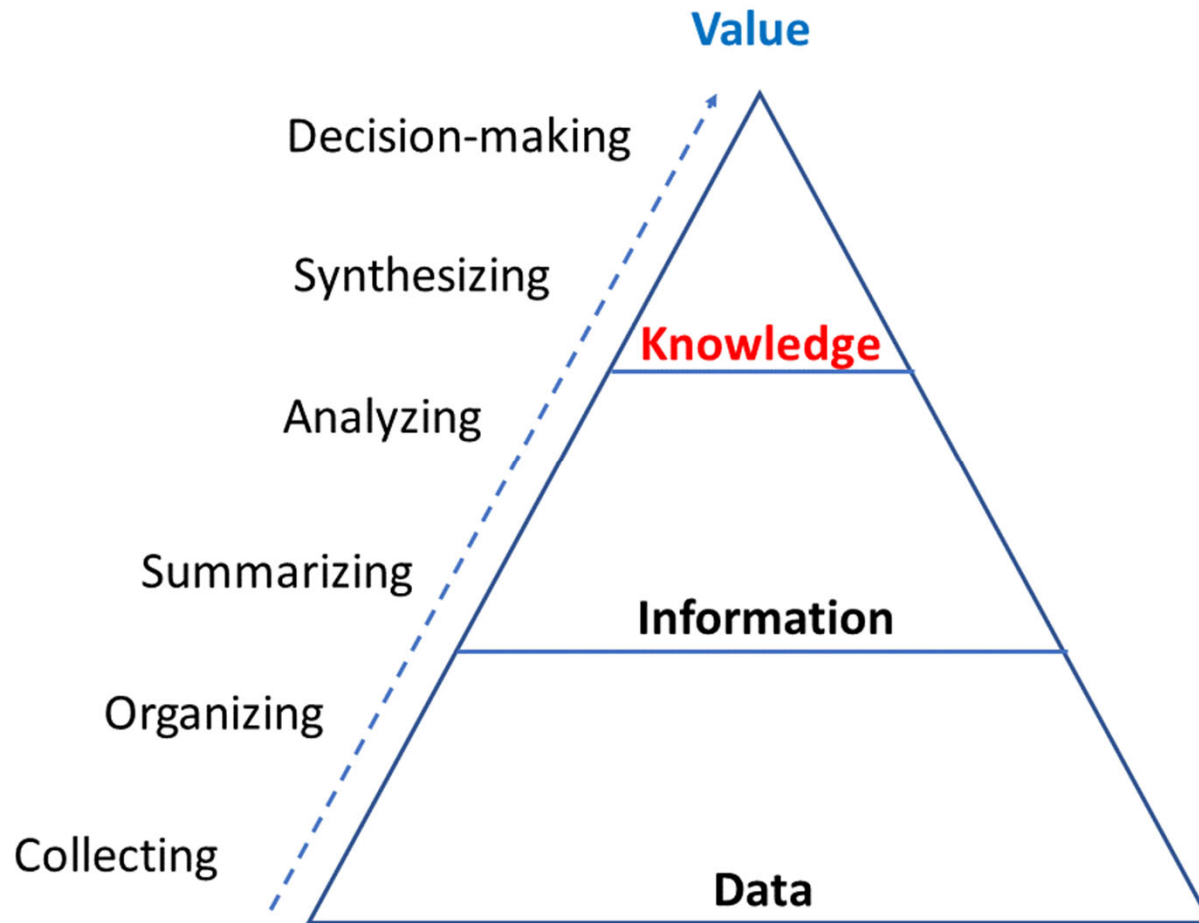
<https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20210625-1>

- Romania – Last position

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Data, Information Knowledge



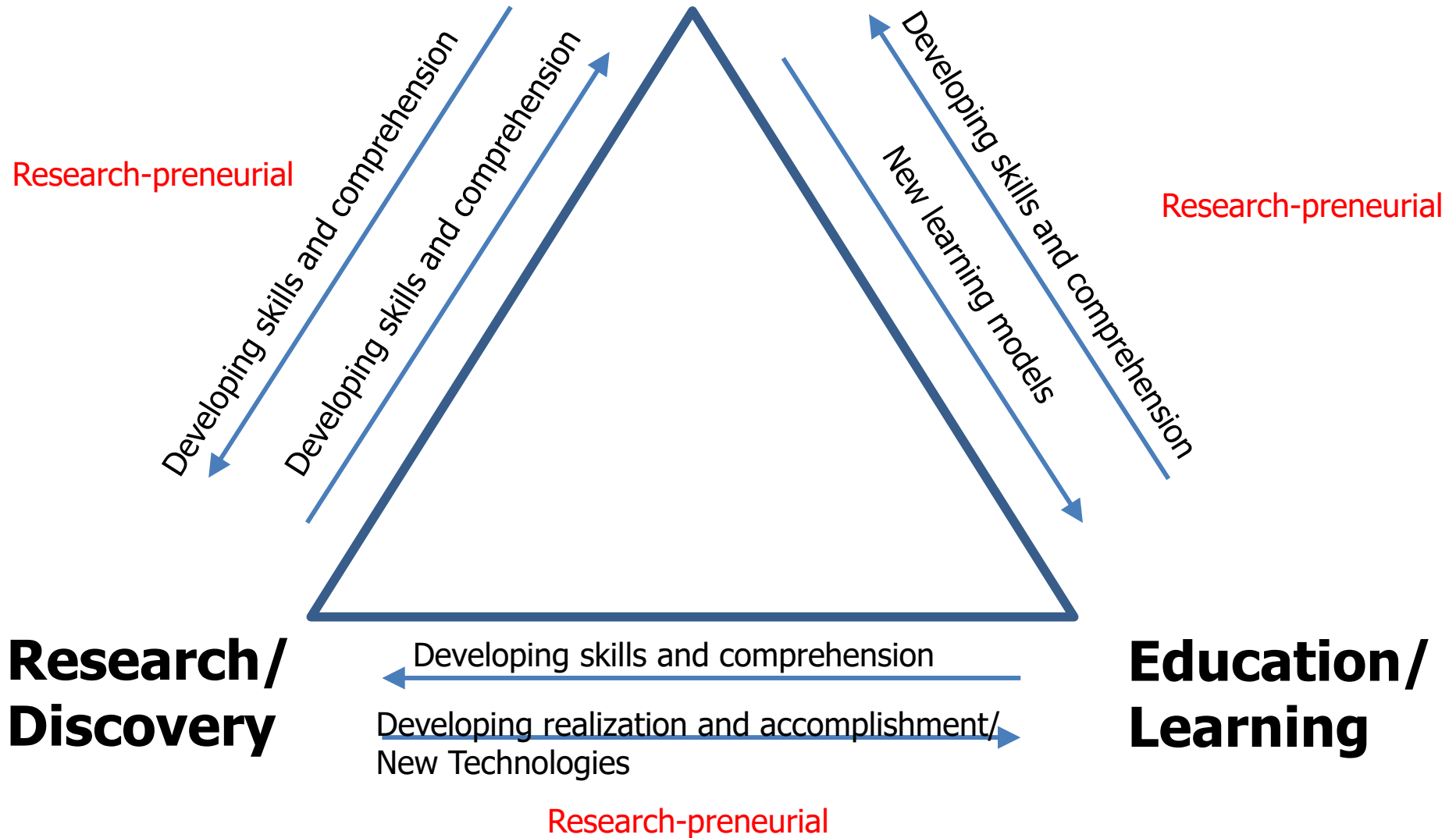
<https://learningforsustainability.net/knowledge-management/>

Knowledge

- Data is fragmented pieces of symbols and characters strung together, information is refined data whereas the knowledge is useful information.
- Additionally, data can lack context when looked at singularly, whereas information gives context to data and knowledge brings depth in understanding to the information.

Knowledge Triangle

Innovation/ Practice/ Engagement



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The Fourth Industrial Revolution

- **The first Industrial Revolution** (end of 18th century). **Mechanization.** Steam. Large scale production.
- **The second Industrial Revolution** (end of 19th century). **Electrification.** Mass production.
- **The third Industrial Revolution** (end of 20th century). **Automatization and Globalization.** Electronics and information technology.
- **The fourth Industrial Revolution** aka Industry 4.0 (beginning of 21st century). **Digitalization.** Cyber-physical systems. Knowledge Economy.
- **The fifth Industrial Revolution** (???) **Personalization.** Cooperation between people and machines.

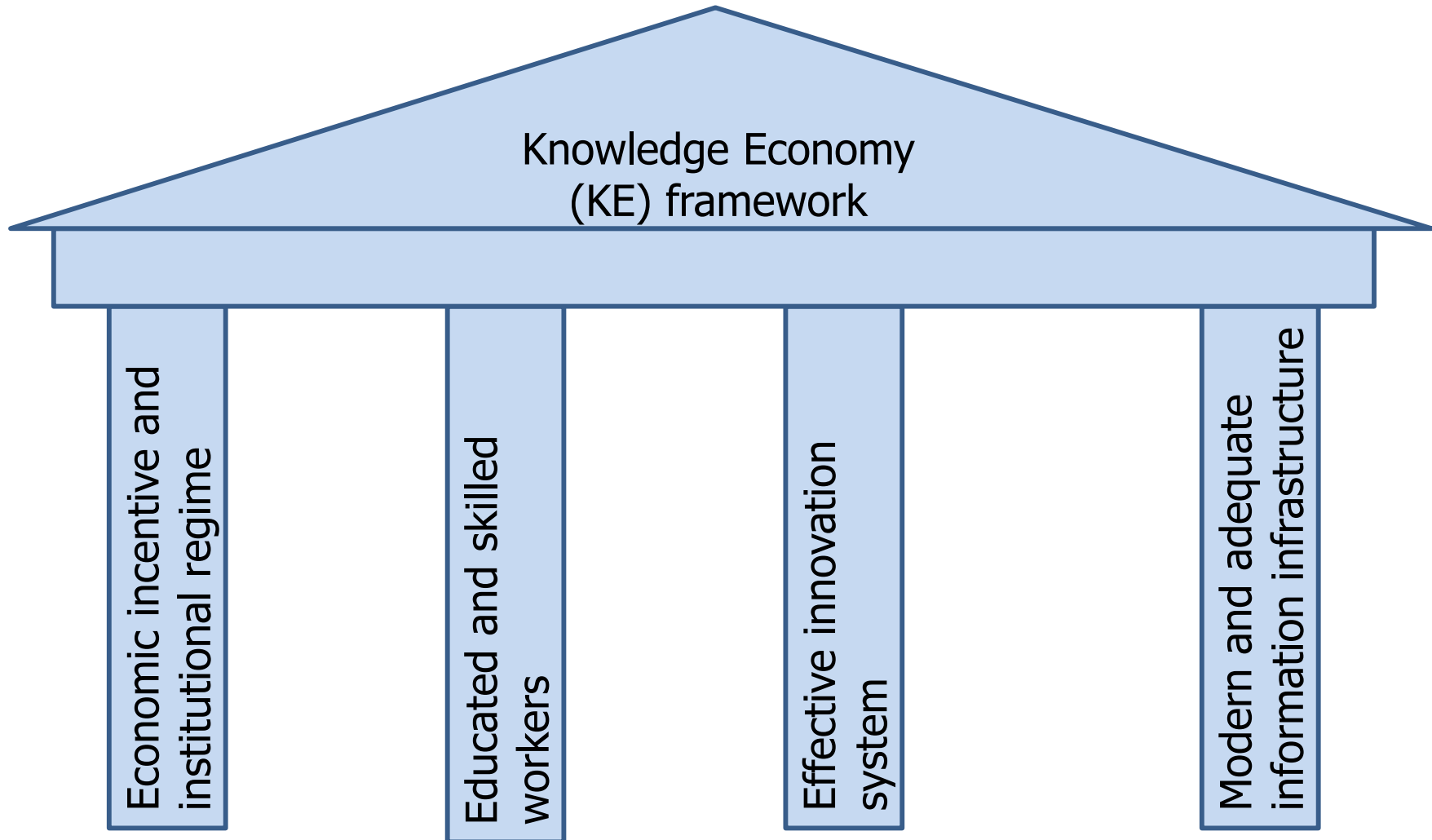
Knowledge Economy

- The Knowledge Economy (KE) is an economic system based on human capital and intangible assets (like patents), where the production is based on knowledge-intensive activities.
- A knowledge-based economy is focused on generating and using knowledge to create value through activities such as:
 - Investments in R&D
 - Leveraging emerging technology directions
 - Patenting
 - Development of scientists and engineers

Knowledge Economy

- In a KE, the knowledge hold greater contributing power to the economic welfare of nations than in industrial societies
- The KE is
 - more dependent on intellectual capital and skills,
 - less dependent on the production process.
- The KE is based on **IT/ICT** industries at the forefront of overall economic growth.
- It is based on **STEM** jobs
 - Science,
 - Technology,
 - Hqj lqhhubqj /
 - P dwkhp dwlfv1

The pillars of the Knowledge Economy



D.H. Chen, C.J. Dahlman, The knowledge economy, the KAM methodology and World Bank operations

Economic and Institutional Regime

- Stable economy
- Good economic policies
- Flexible and dynamic financial system
- Efficient allocation of resources
- Encouragement for creativity and innovation
- Incentives for the efficient use and creation of knowledge
- Protection for intellectual property rights
- Free international trade

Educated and Skilled Labor Force

- Basic education is necessary for working and for the use of information.
- Necessary for technological innovation:
 - Technical secondary-level education;
 - Higher education in engineering and science.
- Difficult to measure impact on education on innovation, but statistical studies showed significant impact of education on economic growth.
- Countries with performant education systems have good innovation results and large GDP per capita.

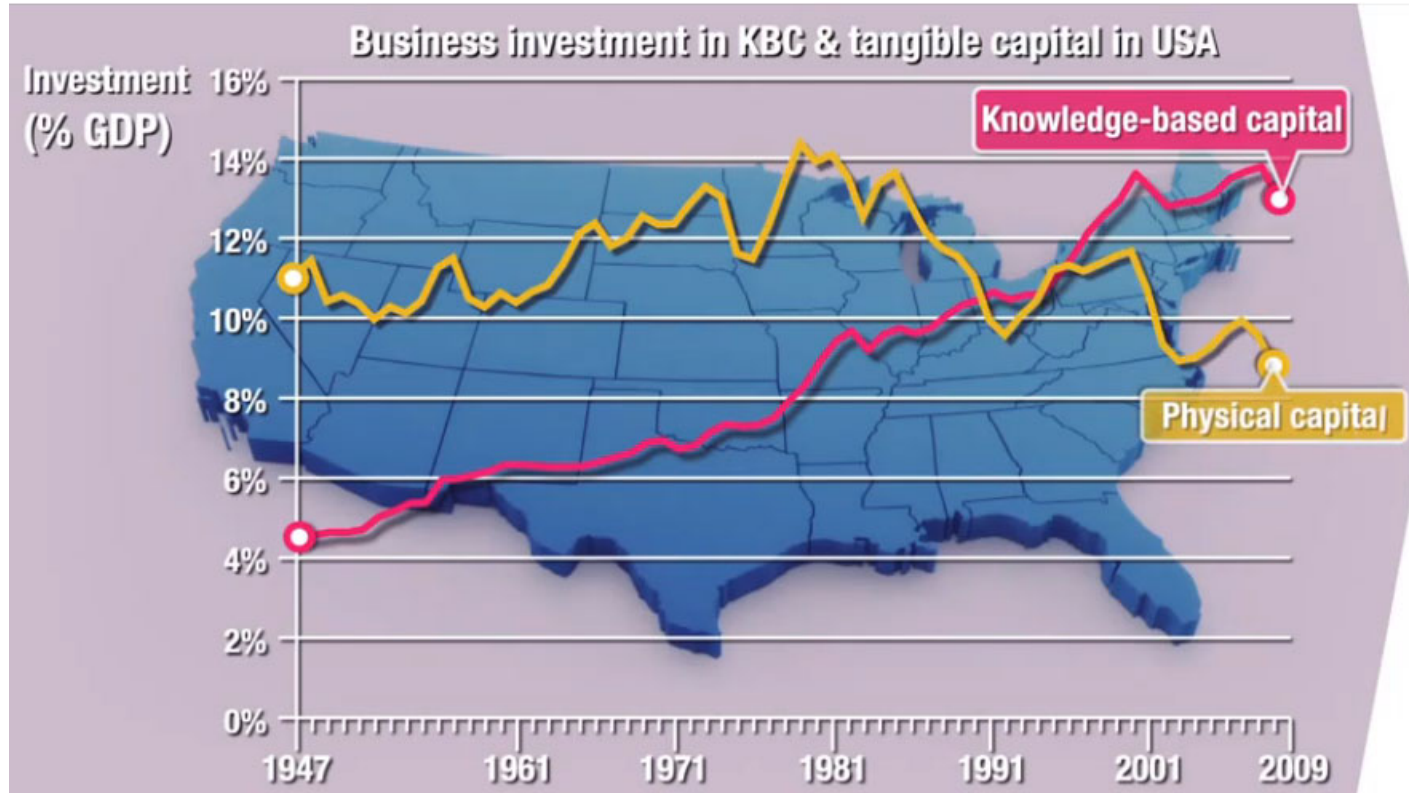
Effective Innovation System

- Network of institutions in innovation:
 - Universities,
 - Public research
 - Private research
 - Policy think tanks

Adequate Information Infrastructure

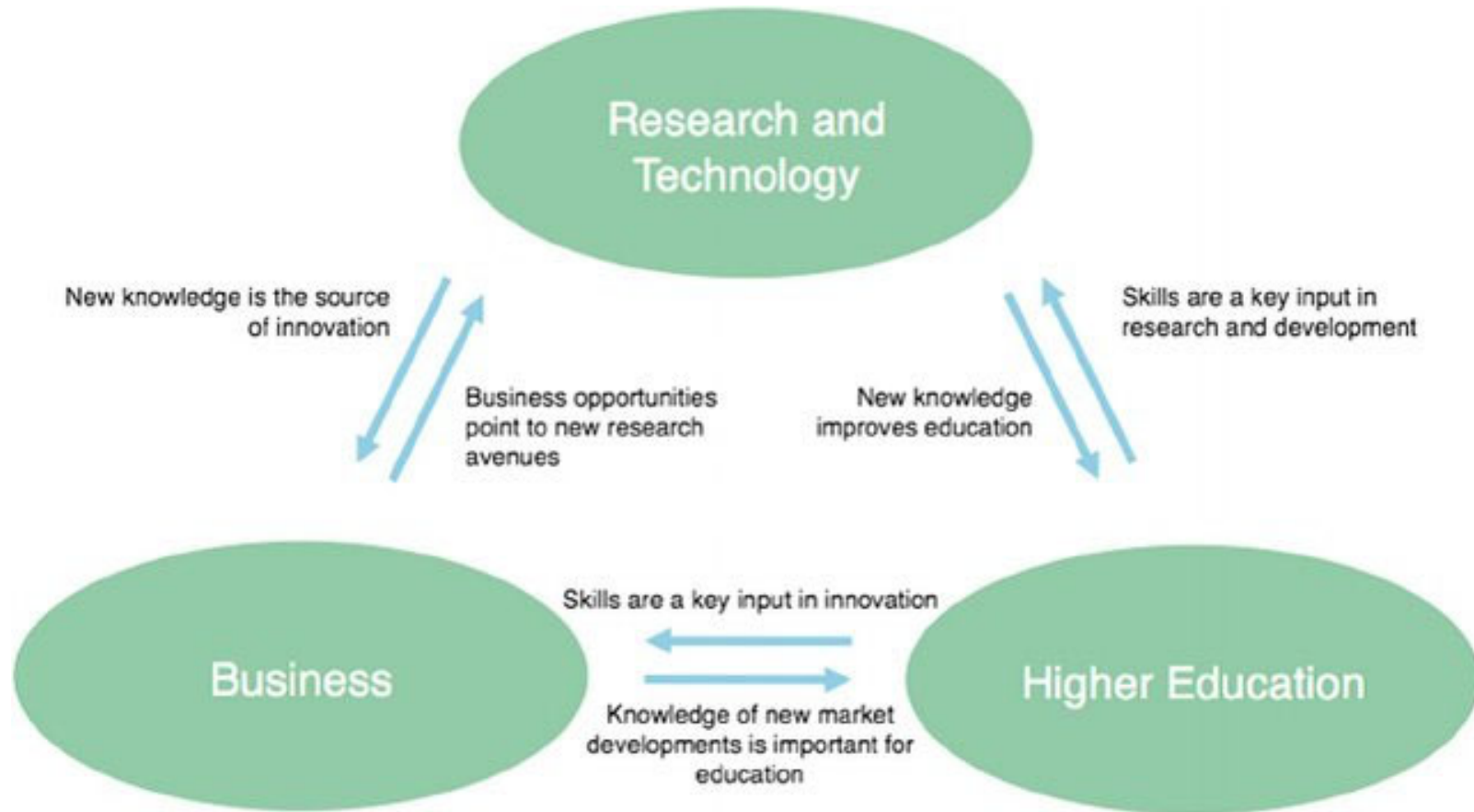
- ICTs are the backbone of the knowledge economy and in recent years have been recognized as an effective tool for promoting economic growth and sustainable development.
- This, in turn, tends to lead to an increase in the volume of transactions leading to a higher level of output and productivity. Moreover, with the increased flow of information, technologies can be acquired and adapted more easily again leading to increased innovation and productivity.

Knowledge-based capital vs Physical capital



<https://medium.com/@heyamir/knowledge-based-capital-vs-physical-capital-71783fb0c4ab>

EIT view



European Institute of Innovation and Technology – EIT drives innovation across Europe by integrating business, education and research organizations to collaborate and find solutions to pressing global challenges.

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Knowledge driven

- No exact definition, but it uses knowledge as defined before (information, understanding, or skill that comes from experience or education) to exist and to evolve.
- Part of new terminology: **knowledge transfer, knowledge worker, knowledge-intensive, knowledge-based, knowledge-driven,...**
- Variated integration: **Knowledge-Driven Economy, Knowledge-Driven Development, Knowledge-Driven Quality Improvement, Knowledge-Driven Culture, etc...**
- Sometimes it has variants: **Knowledge-Based Systems, Knowledge-Based Education, etc...**

Knowledge Driven Entrepreneurship

- **Entrepreneurship= entrepreneurial capacity+entrepreneurial opportunity**
- Entrepreneurship in the knowledge domain requires the recognition of the opportunities and therefore awareness of this domain.
- Entrepreneurship in the Knowledge Domain requires study and comprehension, but top professors and researchers are rarely ☹ world-class knowledge-driven entrepreneurs.
- It makes sense to raise the entrepreneurial and research/scientific education among people with scientific and with managerial backgrounds and merge these groups – the main target of the CITE project ☺ .

Knowledge Entrepreneurs

- Transition from industrial creation to knowledge creation.
- Knowledge flows between countries, markets, networks, individual players.
- Direct connections accelerate the interaction on the knowledge market and enforce the apparition of new business leaders – the knowledge entrepreneurs.

Knowledge-Based Social Entrepreneurship

There are social problems even in the developed countries:

- Medical issues given by pollution
- Drug abuse
- Unwanted pregnancy
- Criminality

Many social problems are associated with poverty (even for developed countries):

- Quality of life
- Health problems
- Criminality
- Illiteracy
- Children with disabilities

Social entrepreneurship

- Social entrepreneurs find new instruments, methods, business models to undertake social problems.
- Social ventures:
 - Public institutions
 - Non-governmental organizations (NGOs)
 - Nonprofit organizations
 - Profit organizations
- Knowledge economy evolves societies and bring economic prosperity, but can **increase gaps between countries and society segments.**
- Importance of continuous education, understanding, learning, adopting new technologies and encourage the entrepreneurial mindset.

Social entrepreneurship

Social entrepreneurs:

- Find resources,
- find volunteers,
- get public support
- Get private support

Some are using knowledge (satellites, drones, cameras and sensor networks, AI-based simulation, machine learning, game theory, etc...) to:

- Fight criminality
- Fight diseases
- Support education/ fight illiteracy
- Support life-long learning

Green Entrepreneurs

KB social entrepreneurs

- Survey and reduce pollution
- Protect forests
- Preserve endangered species
- Water supply management systems
- Create green energy
- Sustainable cities
- Better/more efficient/greener economic activities
- Better/more efficient/greener living
- Better/more efficient/greener transportation

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