Engineering Management Methods BMEVITMAK47
Electrical Engineering BSc Major
Software Engineering BSc Major

INNOVATION MANAGEMENT

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PRINCIPLE OF INNOVATION

„Innovation is **the conversion of an idea** into

- a new or an enhanced **product**, or
- a new or enhanced **process** (technology) used in any sector, or
- a new approach or extension of a **public service.”**

(OECD, Frascati Manual, 2002)

BASIC CASES OF INNOVATION

- Introduction of a **new product** — with which consumers are not yet familiar — or of a **new (better) quality of an existing product,**
- Introduction of a **new method of production (process, technology)** – that is unknown in a specific sector,
- Opening of a **new** (geographical, demographic, etc.) **market,**
- Introduction of **new marketing methods** including improvement in product design, packaging, market introduction, promotion, advertisement, pricing, etc.
- Introduction of a **new source of supply** of raw materials or partially-manufactured products,
- Carrying out a **new form of organization or organizational method**,
- Introduction of **new financing methods.**

GLOBAL TASKS OF INNOVATION

- **Replacing traditional raw materials** which are limited resources or dangerous for health or environment,
- **Decreasing carbon dioxide (CO_2) emission**, managing glasshouse effect and ozone shield damages,
- Research and development of **new technologies and methods for energy supply and energy saving,**
- **Decreasing the environmental pollution** and other dangerous effects for the environment,
- Prevention and treatment of **dangerous diseases,**
- Novel methods to meet the requirements of **healthy nutrition.**

FACTORS MOTIVATING INNOVATION

- **Continuous demands for novelties** (products and services) **by customers**,
- Collecting **more profit** by innovation,
- Birth of **new scientific results,**
- New **successes of the competitors** on the market,
- **Technical and financial obsolescence** (amortisation) of products and services,
- Regional (eg. EU) or national research and development **support opportunities.**

INFLUENCE OF INNOVATION

From the point of view of the mankind:

- **Promotes the general development** of the mankind,
- Driving force of the **progress of the economy,**
- **Main source** of regional, national or corporate **competitiveness,**
- **Enhances the quality of human life,**
- The world is moved along by several partial (business, political, etc.) interests, but **only the science and the innovation take it forward**.

INFORMATION SOURCES OF INNOVATION

Open information sources

Information sources which are open to public or free to use (eg. Google) or (parts of) public utilities (libraries, databases, etc.),

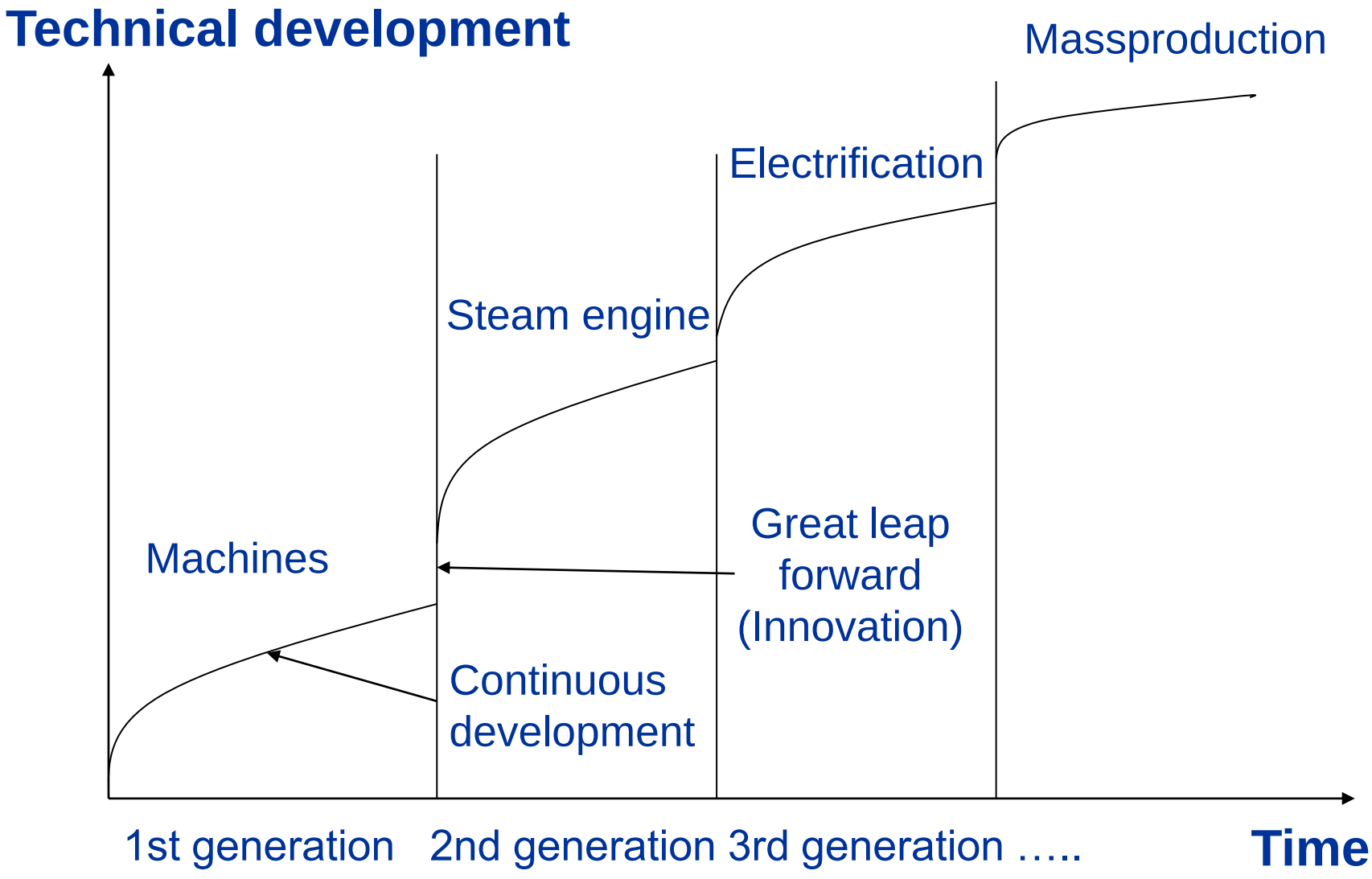
Purchasing of knowledge and/or technology

Purchasing external information which became independent products (eg. patents) or built into products (equipment, software, etc.),

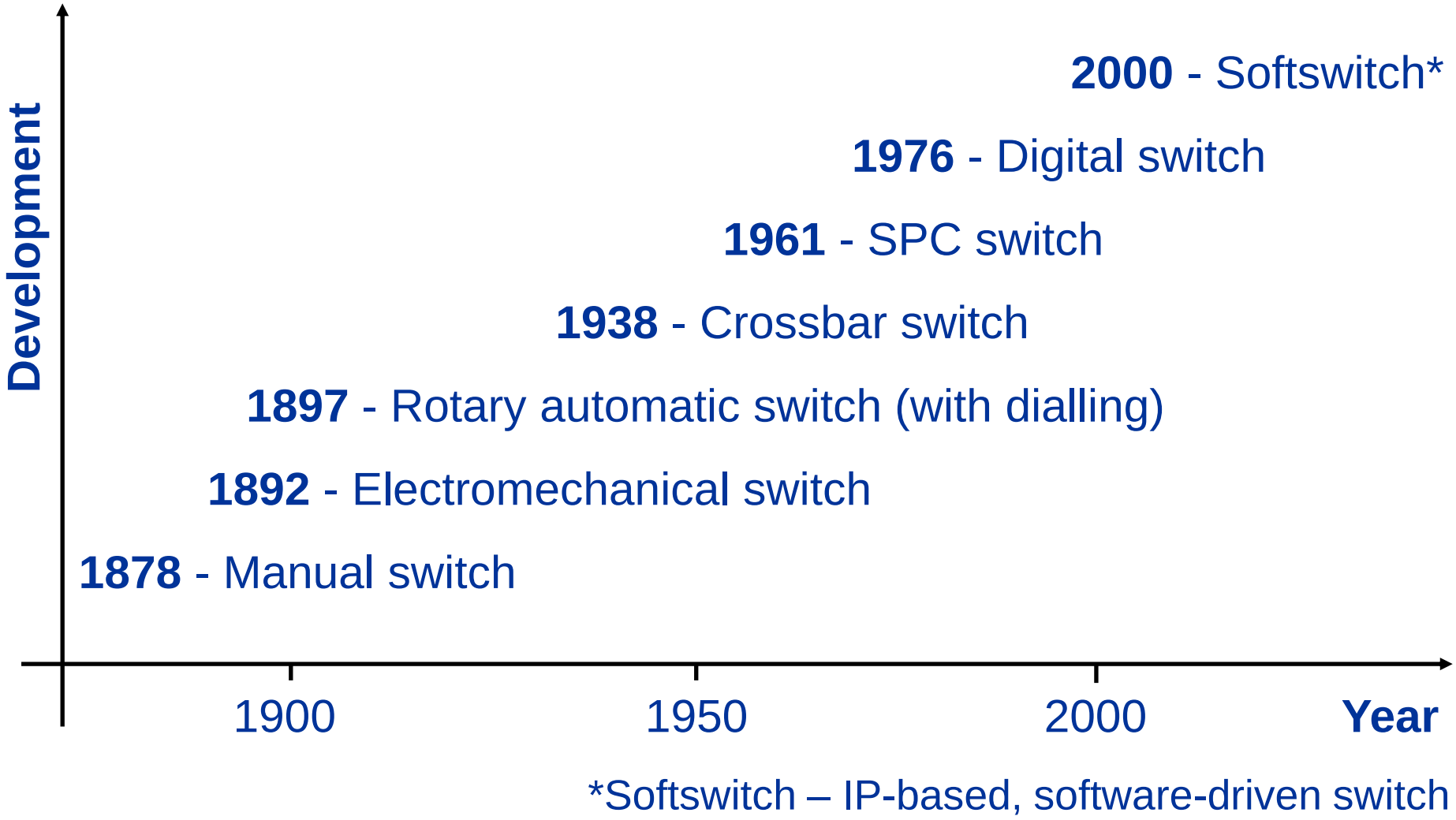
Cooperation in innovation

Active **cooperation with other enterprises or research institutes** in innovation **to reach the critical mass** in infrastructure and/or resources.

PHASES OF TECHNICAL DEVELOPMENT



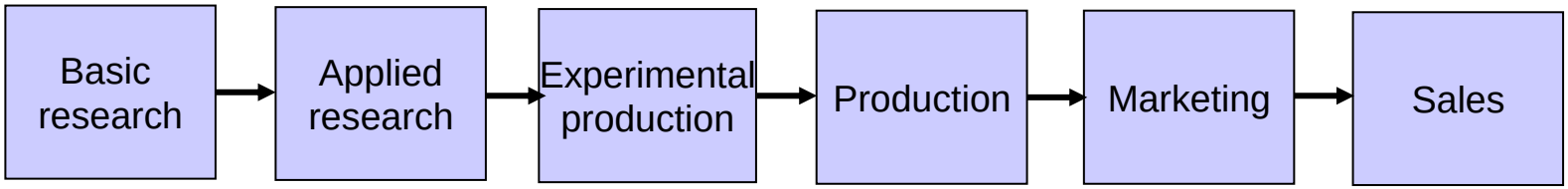
INNOVATION IN THE HISTORY OF TELEPHONY



*Softswitch – IP-based, software-driven switch

MODELS OF THE INNOVATION CHAIN (1/2)

Open innovation chain (old model)

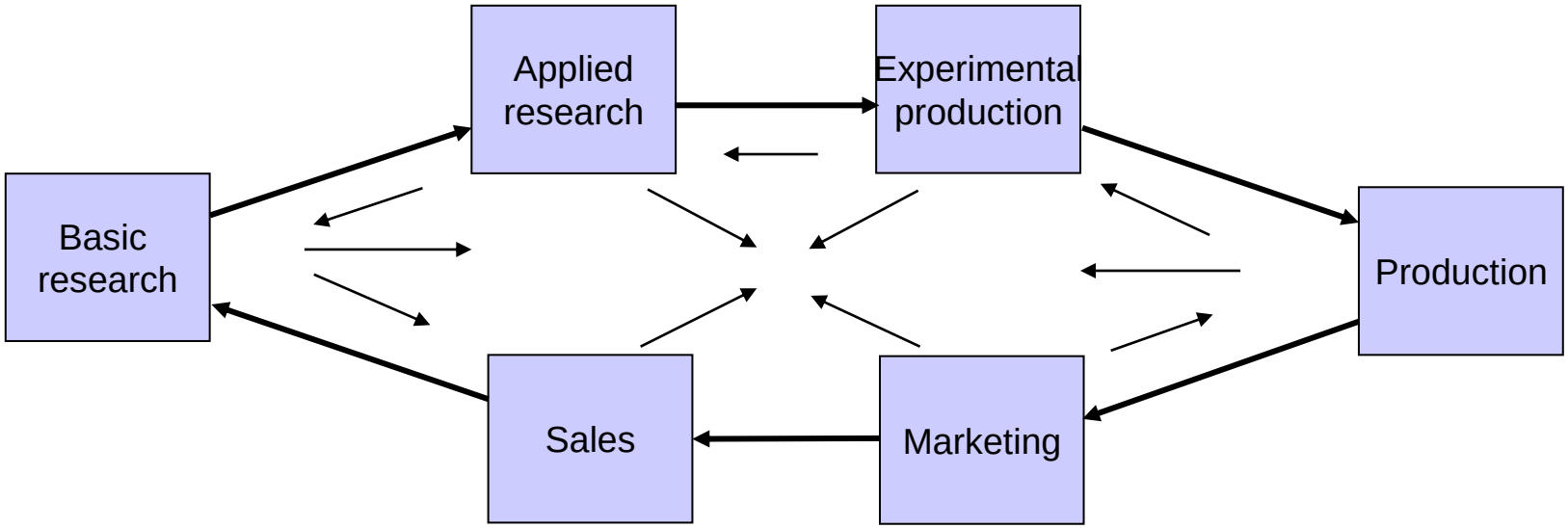


- An innovation arises and acts with respect to the so-called linear model in a straightforward way **without any feedback**

- The product of innovation activity is developed **in research institutes and/or laboratories**

MODELS OF THE INNOVATION CHAIN (2/2)

Closed innovation chain (new model)



- The **product ideas** are born **for market demands** and other effects,
- **Product plans** are shaped with respect to **market requirements**,
- **Testing** from the experimental production happens **on the market**,
- **Experience** from any source is **fed back to research and development**.

EUROPEAN UNION (EU) POSITION ON INNOVATION

The basic development factors of the knowledge based society and economy are:

education, research, innovation and their synergies.

Strengthening cooperation and synergies is important

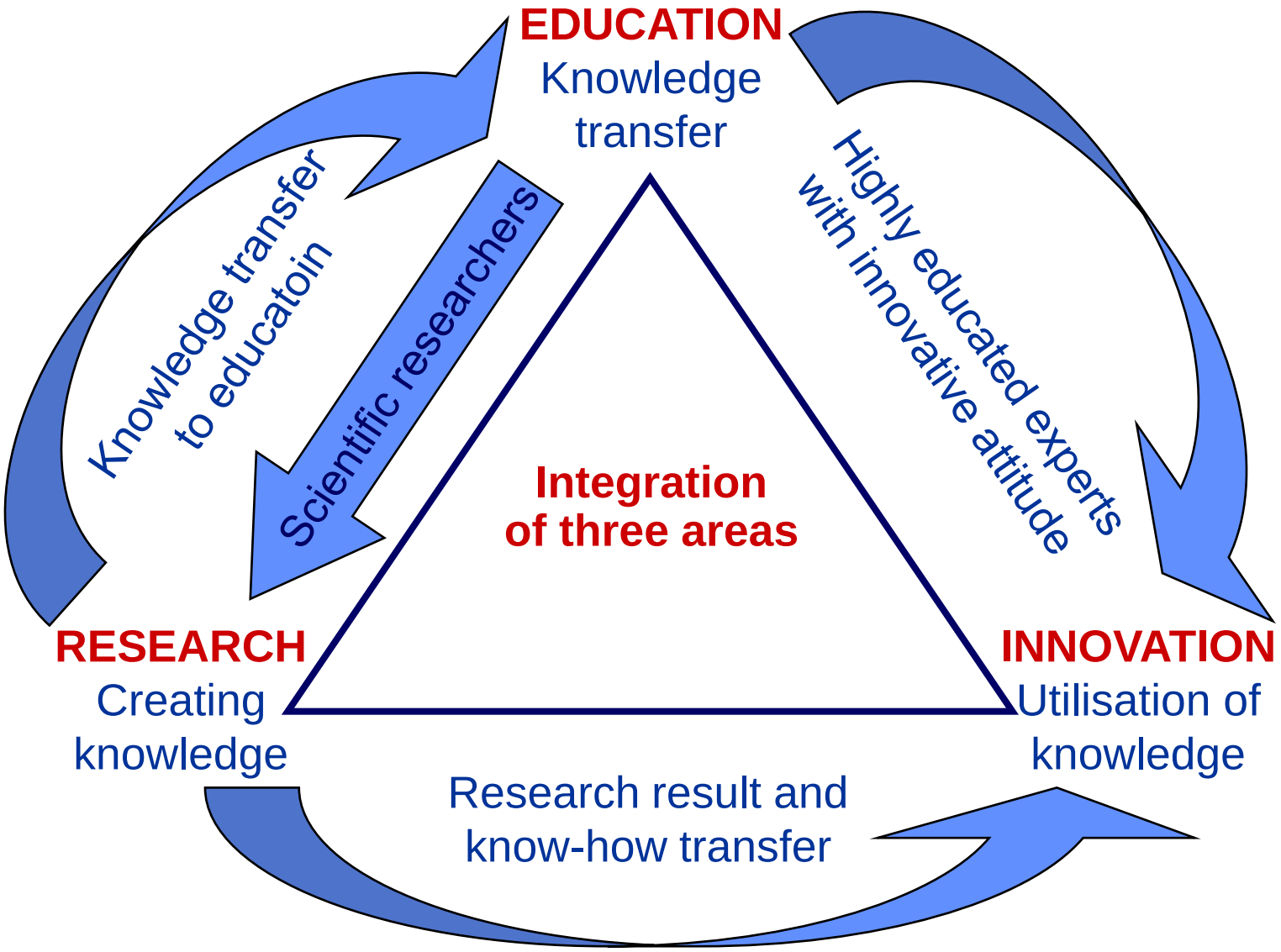
- to enhance competitiveness of the industrial and service sectors in the EU,
- to create new jobs and sustainable growth.

Europe should create the **integrated knowledge triangle among education, research and innovation**.

Most member states have difficulties:

- not having enough **innovative attitude,**
- **critical mass** of human and financial resources are needed,
- the **best scientific researchers** must be attracted.

THE KNOWLEDGE TRIANGLE



EIT - EUROPEAN INSTITUTE OF INNOVATION & TECHNOLOGY

EIT is an independent EU body which was set up in 2008 to address Europe's innovation gap with a positive impact on economy and society.

Headquarters: Budapest, Innovation park

The mission of the EIT is to grow and capitalise on the innovation capacity and capability of actors from higher education, research, business and entrepreneurship from the EU and beyond through the creation of highly integrated **Knowledge and Innovation Communities (KICs).**

Recent KICs are:

- **Climate-KIC** (Climate change mitigation and adaptation)
- **KIC InnoEnergy** (Sustainable energy)
- **EIT Digital** (Future information and communication society)

  Nodes: *Stockholm*, Helsinki, Berlin, Paris, Eindhoven
  Associate nodes: Trento, London, Budapest

EIT DIGITAL - THEMATIC AREAS

- **Smart Spaces**
  including service-centred home and office
- **Smart Energy Systems**
  smart energy management, Green ICT
- **Health & Well-Being**
  including ambient assisted living, digital medicine
- **Intelligent Transportation System**
  safer & sustainable traffic and transportation systems
- **Future Media and Content Delivery**
  entertainment, education, accessing media
- **Smart Cities**
  towards intelligent and sustainable smart cities

EU PROGRAMME - HORIZON 2020

ICT IN EXCELLENT SCIENCE

- **Future and Emerging Technologies (FET)**
  - FET Open: fostering novel ideas
  - FET Proactive: nurturing emerging themes and communities
  - FET Flagships: pursuing grand interdisciplinary science and technology challenges
- **Research infrastructures**
  - Developing the European research infrastructure for 2020 and beyond
  - Development, deployment and operation of ICT-based e-infrastructures
  - ICT infrastructure resources and services for research
  - Access to and management of scientific data
  - High Performance Computing

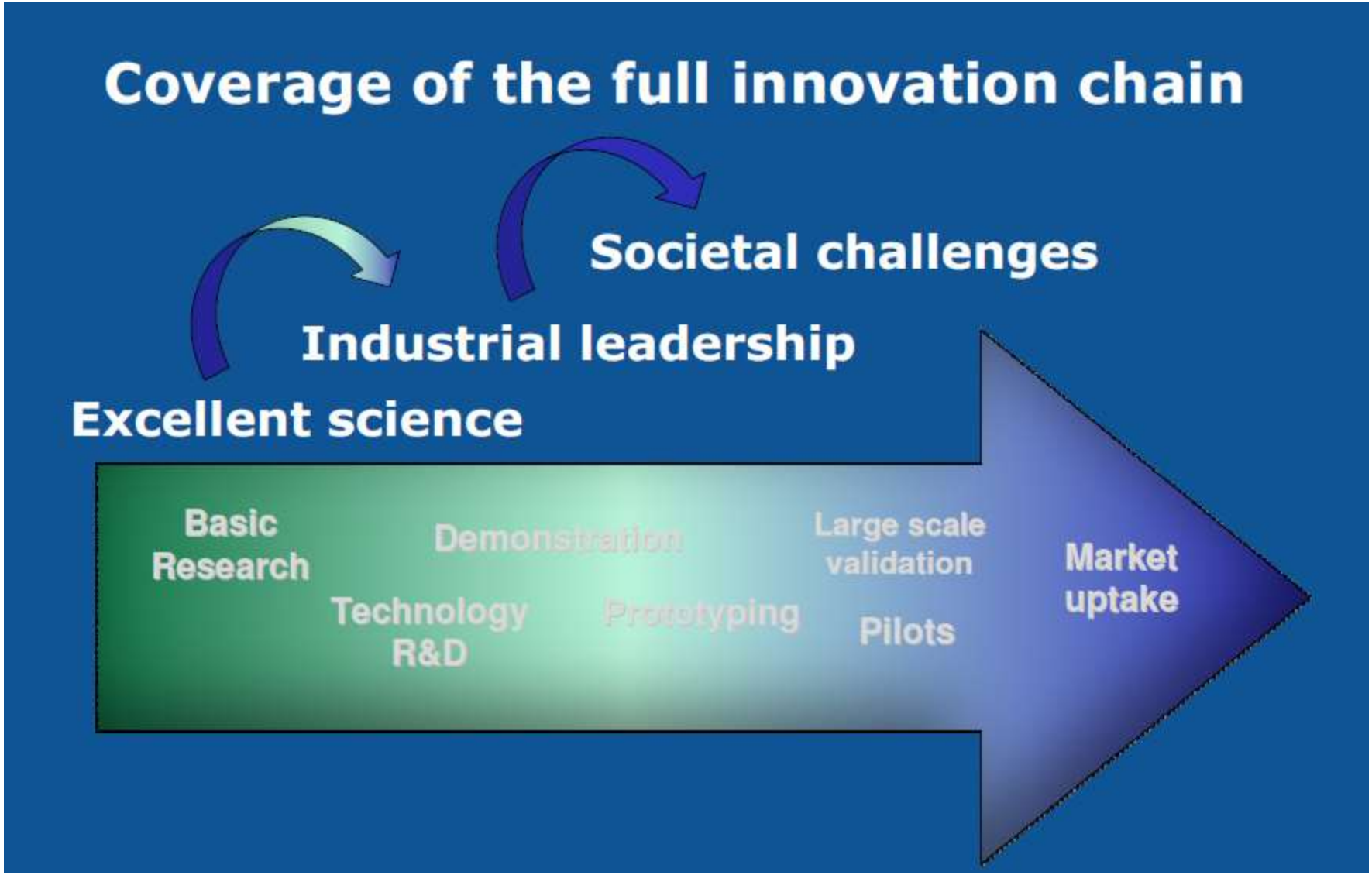
ICT IN INDUSTRIAL LEADERSHIP

- **A new generation of components and systems**
  - engineering of advanced embedded and resource efficient components and systems
- **Next generation computing**
  - advanced and secure computing systems and technologies, including cloud computing
- **Future Internet**
  - software, hardware, infrastructures, technologies and services
- **Content technologies and information management**
  - ICT for digital content, cultural and creative industries
- **Advanced interfaces and robots**
  - robotics and smart spaces
- **Micro- and nanoelectronics and photonics**
  - key enabling technologies

ICT IN SOCIETAL CHALLENGES

- **Health**, demographic change and wellbeing
- **Food** security, sustainable agriculture, and forestry, marine, maritime and inland water research, and the bioeconomy
- Secure, clean and efficient **energy**
- Smart, green and integrated **transport**
- **Climate** action, environment, resource efficiency and raw materials
- **Europe** in a changing world – inclusive, innovative and reflective societies
- **Secure** societies – protecting freedom and security of Europe and its citizens

EU PROGRAMME - HORIZON 2020



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