

Mathematics in Vietnam in the Age of Information Technology

Nguyen Tu Cuong

Institute of Mathematics
Vietnam National Center for
Natural Science and Technology

Ho Tu Bao

Institute of Information Technology
Vietnam National Center for Natural
Science and Technology
and JAIST

Outline

- **Science in Vietnam**
- Mathematics in Vietnam
- Information Technology in Vietnam
- Mathematics and Information Technology in the country development
- Conclusion

Science in Vietnam

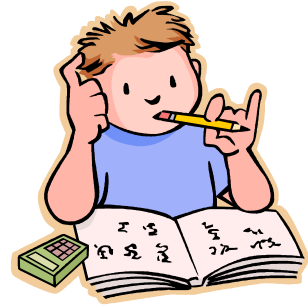
- Vietnam does not have a long tradition of science
- Before 1945, under the French colonialism, there was only a small university and four high schools for Vietnamese students with French as the teaching language
- 1945-1954: some schools with Vietnamese as the teaching language

(more than 90% Vietnamese were illiterate before 1945;
two enemies: starve and illiterate)



Science in Vietnam

- After 1954 Vietnam has gradually built up its education system at all level from primary schools to universities throughout the country
- Science carried a lot of prestige and had some influences in public affairs



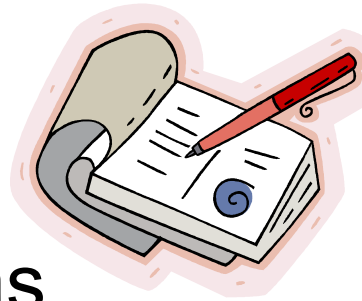
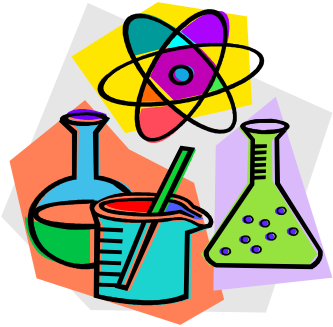
Science in Vietnam

- From 1960 to 1990 (during the war) the government systematically sent thousands of students to study in the socialist countries each year
- The fields of study were chosen so that upon their return there would be experts in almost all major fields of science and engineering



Science in Vietnam

- any research institutes were established during this period of time, especially the National Center for Natural Science and Technology with research institutes concentrating on basic sciences
- Gained international reputation such as the Institutes of Mathematics, Institute of Theoretical Physics (papers and pens)



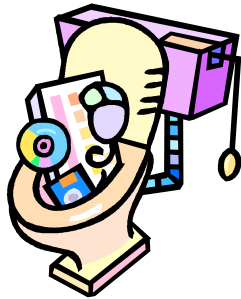
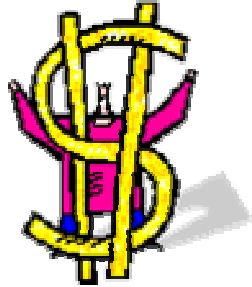
Science in Vietnam

- Various types of scientific cooperation between Vietnam and the eastern countries of Europe (INTERCOSMOS on space research, KNVVT on computer science, etc.)
- Joined in recognized scientific research centers (DUBNA, Banach Center of Mathematics, etc.)
- Programs to facilitate the exchange of knowledge (e.g., postgraduate training; fellowships and grants for joint research; partnerships between universities and academic institutions)



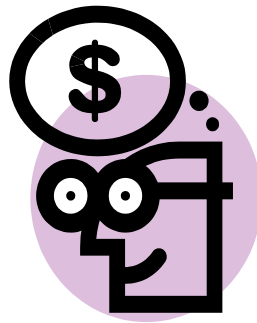
Science in Vietnam

- This situation has changed dramatically in the nineties when Vietnam turns to have a market-oriented policy in economy
- Scientific cooperation with the former socialist countries then gradually diminishes. The economy has been improved, but scientific research and training are declining
- Facing dramatically urgent basic needs from the population, scientific research and training were postponed for more prosperous days



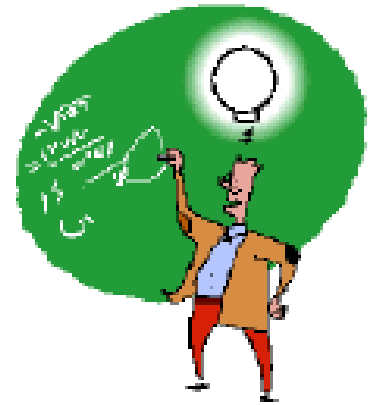
Science in Vietnam

- A common idea: scientific research is a sort of a luxury which a poor nation. Why waste time and resources in doing research when you can freely import advanced technologies?
- Vietnam now suffers a hemorrhage of trained scientists
- It is because of salaries which are about the lowest in the society and because of lacking of funding for their laboratories, libraries and doing field works



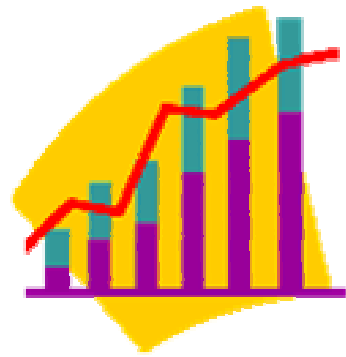
Science in Vietnam

- For the same reasons, fewer and fewer students want to study science
- Therefore, the universities and research institutes could not find enough junior scientists to overcome the lack of qualified teachers and researchers



Science in Vietnam

- Fortunately, in the last few years the government has realized the situation
- and started to increase investments in research and education, and to promote international scientific cooperation in the region and abroad in order to stop this brain drain



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Mathematics in Vietnam

- Vietnam is now considered to be one of those countries which have a good education system and mathematical researches
- This is a rare phenomenon, as Vietnam is a poor and developing country, underwent many wars
- In the sixties, when our country came out of the French war, from only 10 to 15 junior mathematics teachers
- Vietnam gradually has hundreds of doctoral degreed mathematicians acknowledged internationally, who have been working in universities and research institutes



The first mathematicians in Vietnam



International Conference on
Commutative Algebra and Algebra
Geometry in Hanoi (1996)

and their next generation



Mathematics in Vietnam

- Trained thousands of mathematics' teachers from primary schools to universities nationwide
- Contributed to training thousands of engineers for all scientific, technologies, and economical fields
- Vietnam now has a good team of mathematicians
 - ❑ with the latest knowledge of mathematics
 - ❑ thousands of scientific researches published in different high-ranking journals of mathematics
 - ❑ carry out collaborations equally together with their colleagues throughout the world



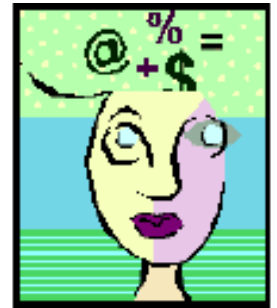
Mathematics in Vietnam

- Many Vietnamese mathematicians are invited to do research and teaching in universities and research centers in developed countries (e.g., United State, France, Germany, Japan, etc.)
- In 1995, Hanoi Institute of Mathematics was acknowledged as one of the ten institutes of excellence of the Third World Science Academy
- International workshops and conferences annually hold in Vietnam with the participation of famous mathematicians from various countries



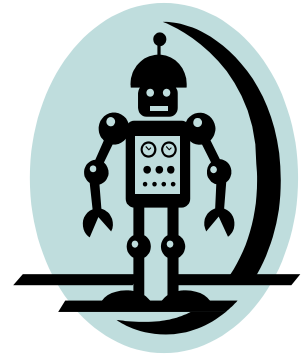
Mathematics in Vietnam

- At first, mathematicians in Vietnam have paid much attention to the application of math in daily life (e.g., applications of optimization theory, mathematics of economics, cybernetics, etc.)
- Another aspect of mathematical application is that it contributes to create new thinking methods in society
- In short, mathematics in Vietnam plays a very important role in enhancing people's knowledge, to create grey matter resources for the country



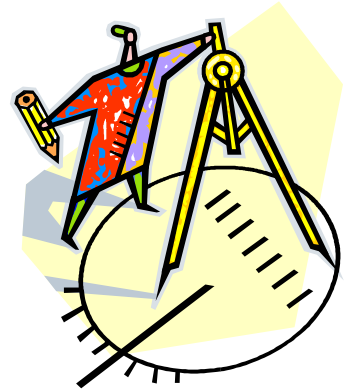
Mathematics in Vietnam

- This is the most important contribution to acquiring advanced technologies in the industrialization and modernization in Vietnam
- The enhancement of Vietnamese people's knowledge and training quality is one of the reasons to encourage foreign investments



Mathematics in Vietnam

- If no such a preparation of mathematical background, it is no doubts that Vietnam will find it difficult to acquire fast development of information technology
- as well other fields of national economy such as telecommunication, hydrometeorology, banking, etc.



Hanoi Institute of Mathematics

- The Institute of Mathematics is an institution of advanced research in mathematics, belonging to the National Centre for Science and Technology
- Founded in 1969 by the decree no. 25/CP of Vietnamese Government
- Its main tasks to carry out basic research in the mathematical sciences and to collaborate on scientific research
- Also committed to mathematics education at higher level



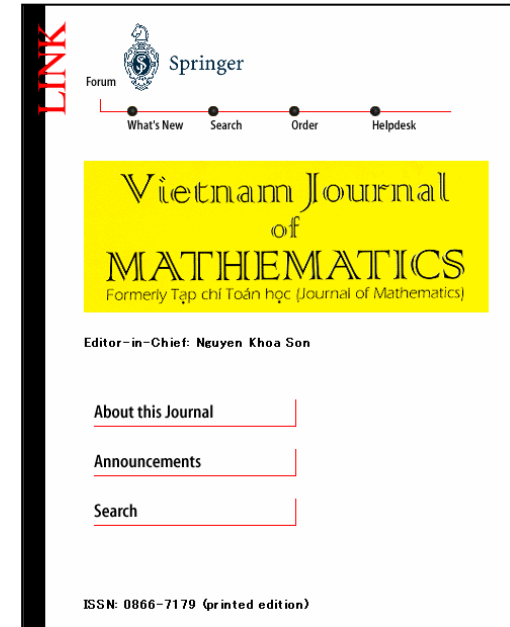
Hanoi Institute of Mathematics

- A staff of 76 researchers, of which 20 professors and 30 associate professors
- Currently 100 M.S. and 44 Ph.D. students
- More than 100 Ph.D. and 8 Dr. Sc. candidates defended at the Institute



Hanoi Institute of Mathematics

- Algebra and Number Theory
- Geometry and Topology
- Mathematical Analysis
- Equations of Mathematical Physics
- Probability and Mathematical Statistics
- Optimization and Control
- Mathematics for Computer Science
- Numerical Analysis and Scientific Computing
- Software Research & Development
- Center for Postgraduate Training



Government and mathematics



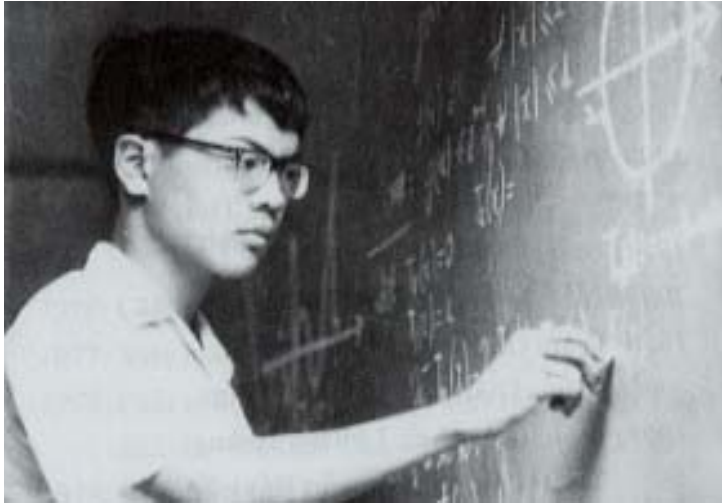
The Prime Minister Pham Van Dong and the Minister of Education and Training of Vietnam at Hanoi Institute of Mathematics (1983)

Schools of Gifted Students in Mathematics

- Established since in
 - ❑ Hanoi University (1964)
 - ❑ Hanoi University of Pedagogy (1966)
 - ❑ Vinh University of Pedagogy (1966)
- Extended to most provinces and other disciplines such as physics, chemistry, biology, literature, etc.



Schools of Gifted Students in Mathematics



Visit of Prime Minister in 1987



Learn math during the war



35 years later

Schools of Gifted Students in Mathematics



1996

1st: Romania
2nd: U.S.A .
3rd: Hungary
6th: China
7th: Vietnam

1997

1st: China
2nd: Hungary
3rd: Iran
4th: Russia/U.S.A.
10th: Vietnam

1998

1st: Iran
2nd: Bulgaria
3rd: Russia/USA
4th: Taiwan
8th: Vietnam

1999

1st: China/Russia
2nd: Vietnam
3rd: Romania
4th: Bulgaria
5th: Belarus

1995

1st: China
2nd: Romania
3rd: Russia
4th: Vietnam
5th: Hungary

(unofficial ranking among
more than 80 teams)

2002

1st: China
2nd: Russia
3rd: U.S.A.
4th: Bulgaria
5th: Vietnam

2001

1st: China
2nd: Russia/USA
3rd: Bulgaria/Korea
4th: Kazakhstan
10th: Vietnam

2000

1st: China
2nd: Russia
3rd: U.S.A.
4th: South Korea
5th: Vietnam, Bulgaria

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Can or cannot?

- Can a developing country apply new achievements of sciences and technologies, especially IT, to create opportunities for leapfrogging?
- Can Vietnam move faster from an agricultural society to an industrial one with the increasing characteristics of the information society and knowledge-based economy?
- Is information technology one of few chances for Vietnam to develop?



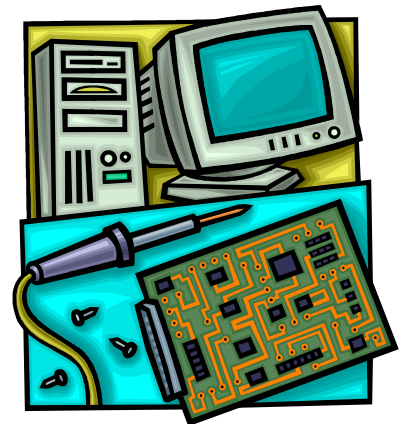
IT in Vietnam before 1975

- In 1967, MINSK 22 was the first computer to the North, then MINSK 32, ODRA, ROBOTRON. In the South were IBM 360-20, 30, 40 and 50
- Main applications: Scientific computing, military service, transportation service, education and training. In the South computers mainly used in management
- Main results: Effective service in the war, and providing the first generation of computer users



IT in Vietnam during 1975-1993

- Increasing computation power: 20 IBM 360 (all types), IBM 370 and the 3rd generation of Russian computers (equivalent to IBM 360 and 370)
- 1981: Imported first micro computers (Apple, Micral R2E, IBM PC). First PC in Vietnam created at IOIT named DoiThong-82
- Together with scientific computation and education, an increasing use in management of government organization and enterprises



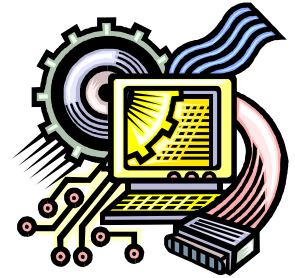
IT in Vietnam: National Policies

- 1975: Decree 173/CP of Government on the accelerating and strengthening the use of mathematics and computers in state management
- 1981: Decree 37/NQ-TW of Politburo on information service for management and state leaders
- 1993: Decree 49/CP on "Information Technology Program of the Year 2000" (IT 2000)
- Master plan on IT for the period 2001-2005
- 8.2002: New Ministry of Post and Communication (responsible of IT development)



IT 2000: Objectives

- To build an national information infrastructure
- To be able to meet demands of information for governmental management and for socio-economic activities
- To develop step by step bases for the industry of information technology



IT 2000

Building Infrastructure for IT

- Education and training
- Research and development
- Development of an IT industry
- Build a data communication network
- Standards

Application of IT in State Management and Socio-Economic Activities

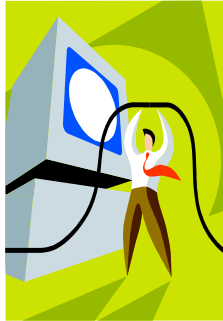
- State management
- National security and defense
- Support for activities in the market economy
- Agro-industrial production branches
- Applications in other branches of the economy and localities

Policies Encouraging the Development and Applications of IT

- Construction of infrastructure
- Training
- Development of networks
- International transfer of technology and cooperation
- Capital-generation and expenditures
- Protection of intellectual property

Basic achievements of IT 2000

- Widely recognized the role of IT in the development of the country
- Initially established the IT infrastructure (e.g., information networks)
- Gradually computerized the state management, and important sectors of the economy: banks, airlines, transportation, etc.
- Realizable projects on 6 national databases

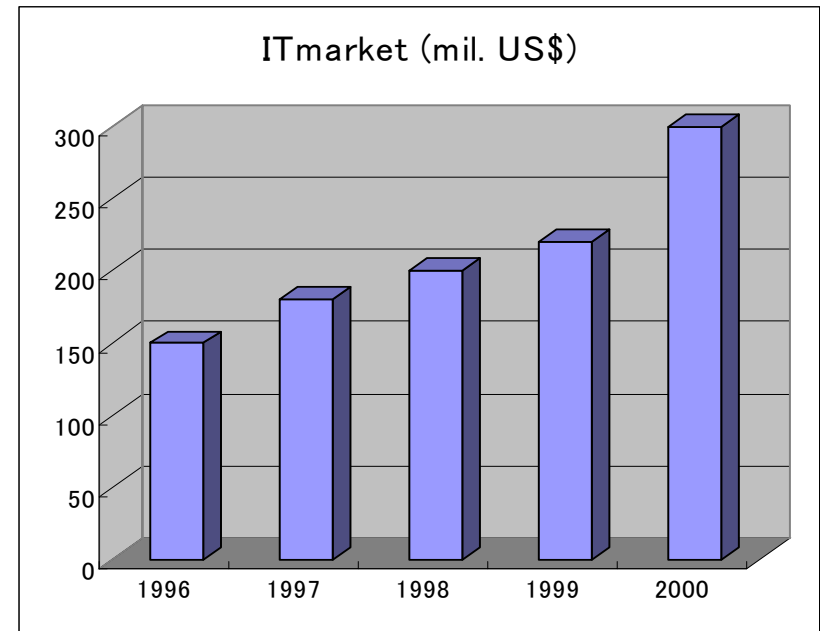


Basic achievements of IT 2000

1996	1997	1998	1999	2000
150	180	200	220	300

IT market in Vietnam annually increases with speed 20-25%. In 2000, it increased about 30%.

(U.S. & Foreign Commercial Service and U.S. Department of State)

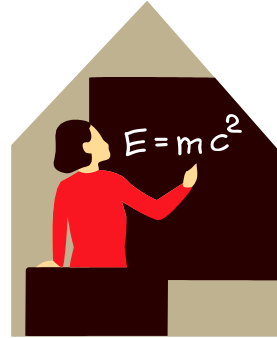


IT in next periods

- Industrialization and modernization
 - Enhancement of efficiency and results in state management, production, business
 - Economy integration and globalization
 - Preparation for an information society and knowledge economy
 - National security and defense
 - Development of IT as an industry
-

Human resources for IT

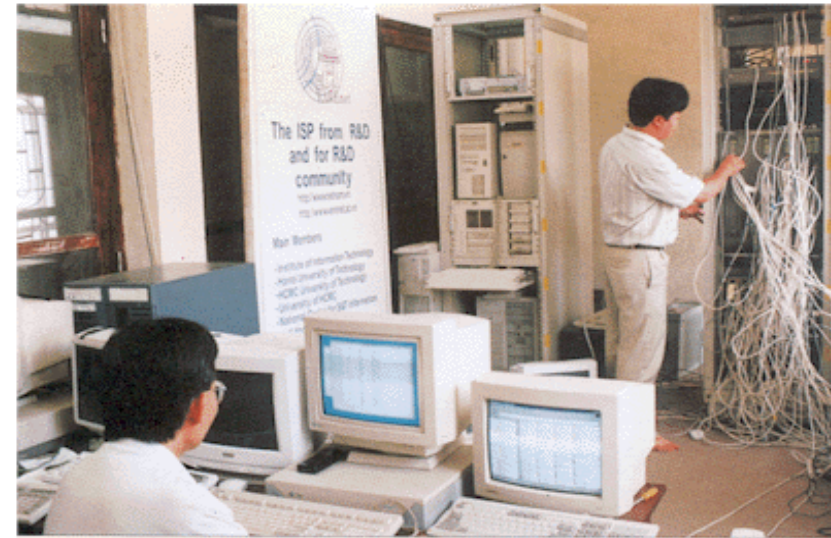
- In seventies, eighties IT people mainly came from the mathematics community. More fundamental but less practical
- In nineties, computers widely become popular and available. Many people want to do IT (programs). More practical but much less fundamental
- Want 25,000 people working in IT in 2005 who can contribute to the IT development and IT applications (19,000 programmers, 6,000 managers for software projects, etc)



Institute of Information Technology



- IT basic research
- IT products and software
- IT applications
- IT training



Network Center of IOT

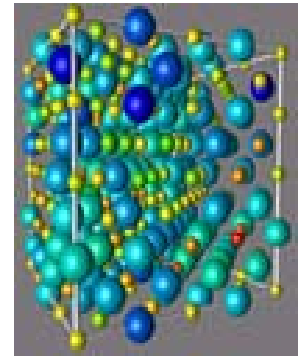
Role and Impact of IT

- New active factors for the economy and society, and therefore for the process of forming the information economy and society?
- It is time for us to change ourselves so that we can survive in that new environment that is uncertain, changeable, unstable, unpredictable which are so complicated (out of control by traditional methods)
- The reflexivity of socio-economic systems assures that the active participation of **thinking man** in these systems are more and more important



Role and Impact of IT

- IT has been applied to establish databases and abundant sources of information in all fields, agencies and businesses
- To support people in intellectual activities, in looking for and discovering knowledge that helps make decisions in business and economic activities
- To increase the above-mentioned abilities, learning, that of all individuals, businesses and organizations must be considered the core issue

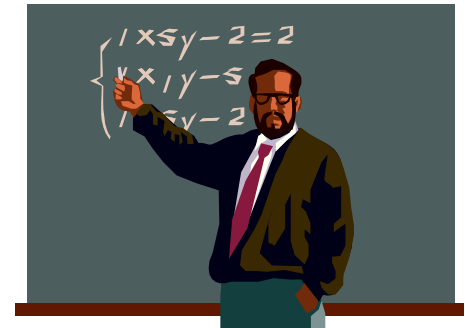


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IT and Mathematics

- The Internet offers new and more effective means of sharing scientific knowledge and advancing education and research
- Mathematics should be the first discipline for which we should establish virtual research and teaching environments



IT and Mathematics

- Mathematics is deeply connected with the acquisition of knowledge and the general development of the mind as a whole
- Mathematics is a part of any new technological invention. For this, one can provide numerous illustrations like the applications to computer sciences, communication theory, physics, finance, and biology
- IT tools for teaching and doing mathematics

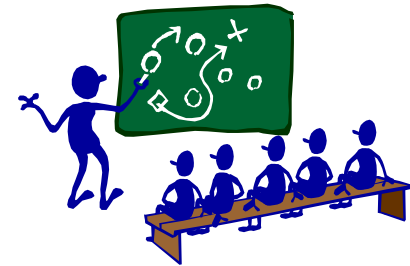
IT and Mathematics

- Mathematicians are able to explore the online mathematical library located at the HIM. They can look for and borrow references and summaries of books and journals through the online library
- They can read and download papers from the Mathematical Reviews, Zentral Blatt, Mathematical Science Net, and many preprint servers
- A pilot project for distance learning in mathematics by online courses is under construction at the HIM



Mathematics and IT

- Providing math background for IT people
- Contributing to IT development, in particular in promising areas for research and development
 - ✓ Security and cryptography
 - ✓ Computer graphics
 - ✓ Bioinformatics
 - ✓ etc.



Conclusion

- Introduced to science in Vietnam, mathematics in Vietnam, and development of information technology in Vietnam
- Vietnam has a remarkable achievement in mathematics in last forty years
- There are new opportunities for mathematics development in the age of information technology, and the need of mathematics contribution to IT as well to country development

Conclusion

- The shift to the economy of knowledge and information has divided the Third World into 4 different kinds of countries
 - countries of huge population
 - countries of many oil resources for export
 - “newly industrialized countries” that are able to effectively integrate into the global economy
 - countries that are likely to be put aside of the flow
- Science and technology, in particularly mathematics and IT, are considered as the most important national policies in the way to a sustainable development