EDUCATION AND RESEARCH: KEYS TO PROSPERITY

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Three Important Words

- Prosperity
- Education
- Research

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Prosperity

- The state of being prosperous; advance or gain in anything good or desirable; successful progress in any business or enterprise; attainment of the object desired; good fortune; success; as, commercial prosperity; national prosperity.

Webster's Revised Unabridged Dictionary

Education

- By education I mean - not the education as is commonly understood by most of getting a piece of paper stating that the person has completed minimum requirement of certain degree or diploma but it is a process of molding raw minds into persons of principles, integrity, morality and generator of innovative ideas.

Research

- "Perhaps I could best describe my experience of doing mathematics in terms of entering a dark mansion. One goes into the first room and it's dark, completely dark, one stumbles around bumping into the furniture and then gradually you learn where each piece of furniture is, and finally after six months or so you find the light switch, you turn it on, suddenly it's all illuminated, you can see exactly where you were"

  Wiles, a mathematician.

Measures of Prosperity

- Life Satisfaction Indicators (LSI)
- Material Wealth Indicators (MWI)

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Ingredients of Prosperity

- Life Satisfaction Index (LSI)
  - Liberties
  - Equal Opportunity
  - Freedom of Choice
  - Time for Leisure
  - High Income
  - Good Health
  - Job Creation
  - Sunny Climate
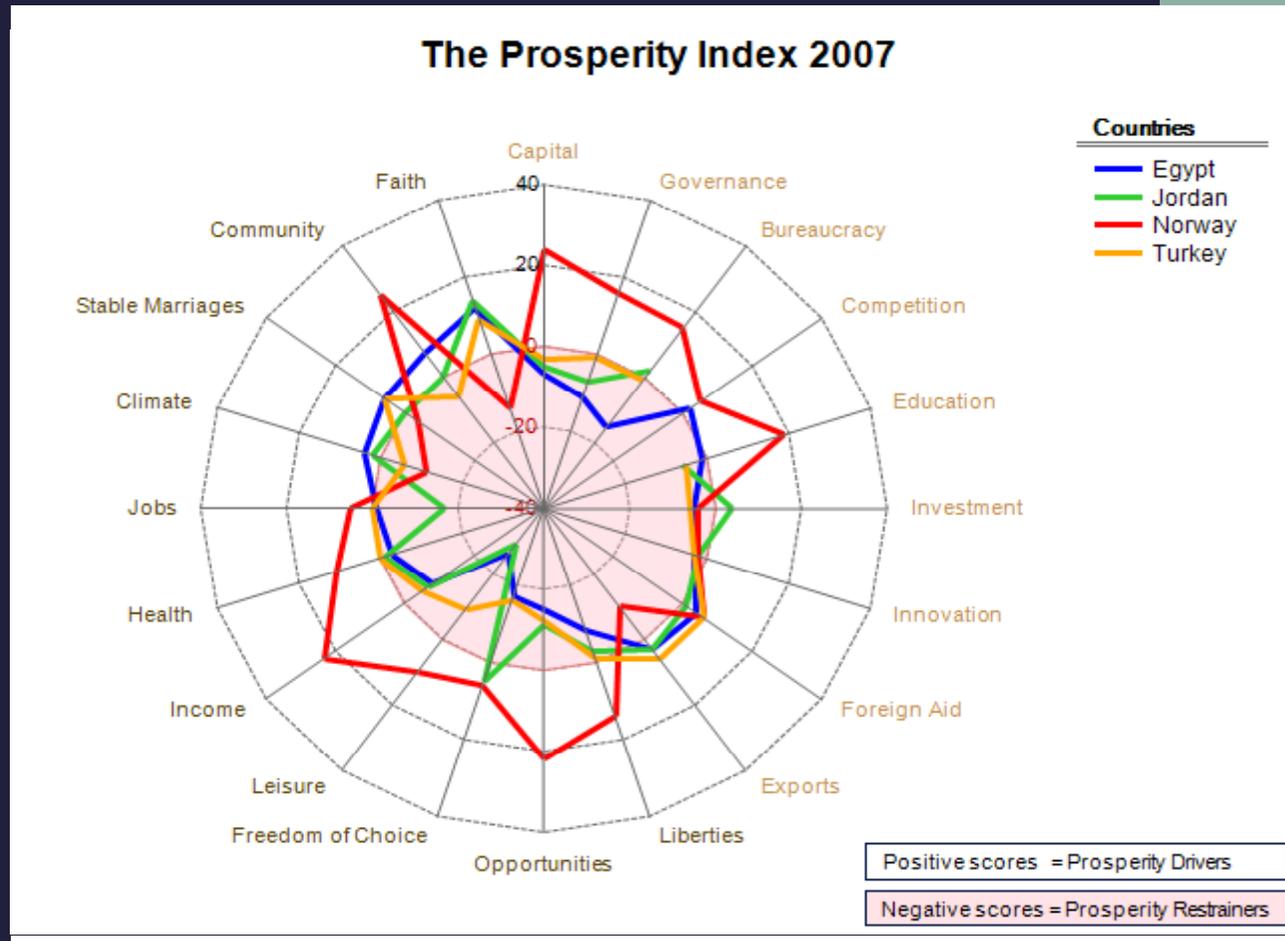 - Strong Marriages
  - Community Life
  - Faith

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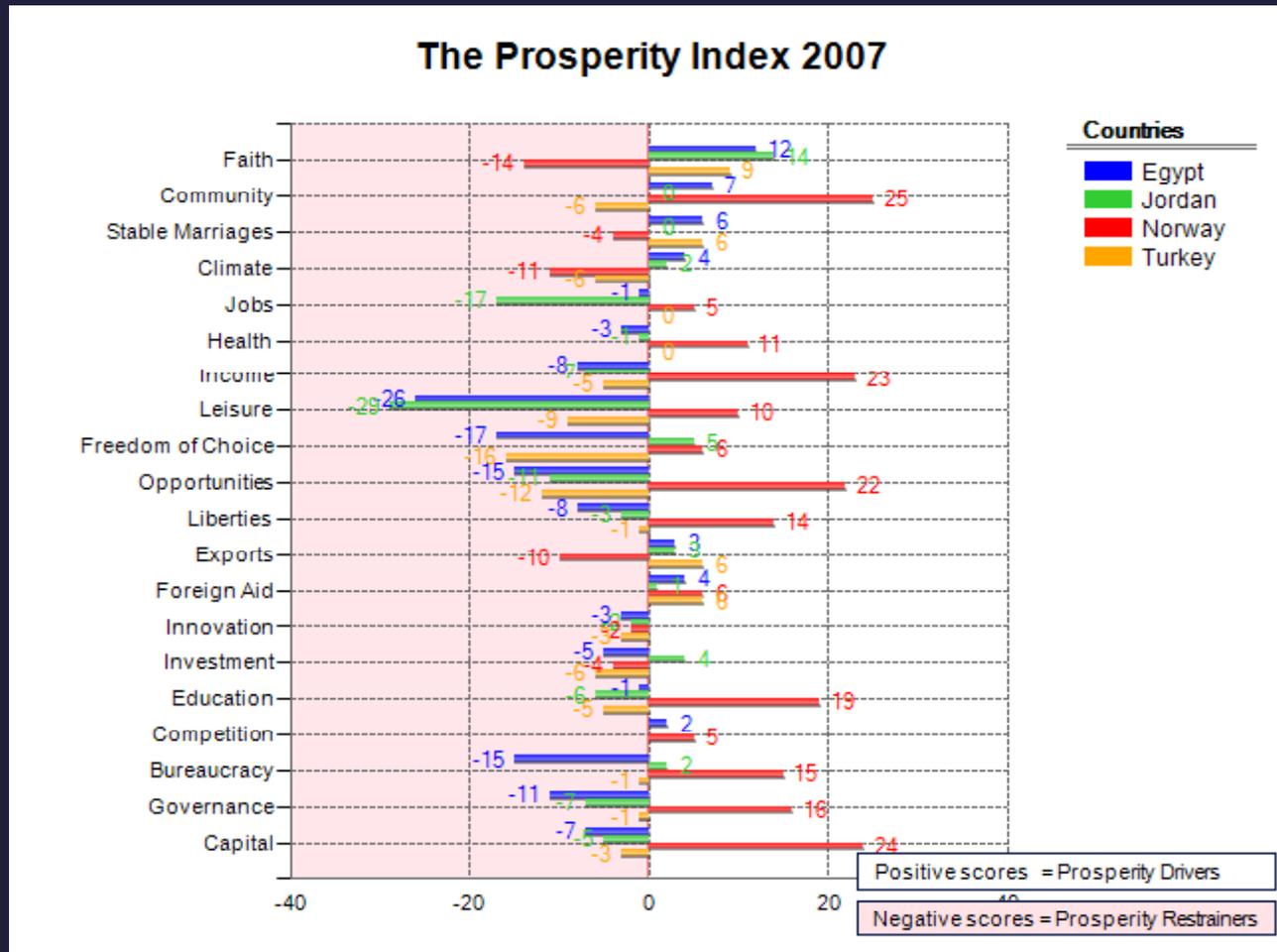
Ingredients of Prosperity

- Material Wealth Indicators (MWI)
  - Invested Capital
  - Good Governance
  - Low Cost of Bureaucracy
  - Competitive Markets
  - Better Education
  - Economics Openness
  - Exploiting Innovation
  - Avoids Foreign Aid
  - Commodity Exports

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Comparison of Prosperity

The Prosperity Index 2007

Capital
Governance
Faith
Bureaucracy
Community
Competition
Stable Marriages
Education
Climate
Investment
Jobs
Innovation
Health
Foreign Aid
Income
Exports
Leisure
Liberties
Freedom of Choice
Opportunities

40
20
0
-20
-40

Countries
— Egypt
— Jordan
— Norway
— Turkey

Positive scores = Prosperity Drivers

Negative scores = Prosperity Restrainers

A Comparison at a Glance

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The Positive Indicators

- Pluses for our societies
  - Faith
  - Community
  - Stable Marriages
  - Climate

The Deficient Indicators

- Negatives
  - Jobs
  - Income
  - Leisure
  - Freedom of Choice
  - Opportunities
  - Education
  - Bureaucracy
  - Governance
  - Capital
  - Innovation
  - Investment

To Build a Prosperous Society

- We need to focus on the following:
  - Better Education
  - Freedom of Choice
  - Liberties
  - Exploitation of Innovation
  - Generate High Income
  - Capital Investment
  - Good Governance

Education – the Key to Prosperity

- ■ Interestingly, all deficiencies are directly or indirectly related to Education

Virtues of Education

- Education melts away ignorance; and fundamentalism will disappear, leading to a critical mind paired with Knowledge, Wisdom, and Tolerance. It prevents poverty, corruption, selfishness, greed, crime, wars, environmental damage and therefore catastrophes.

Politics, Economics, and Science

- "Politics led me to economics, and this led me inevitably to science and the scientific approach to all our problems and to life itself. It was science alone that could solve these problems of hunger and poverty, of insanitation and illiteracy, of superstition and deadening custom, of vast resources running to waste, of a rich country inhabited by starving people".
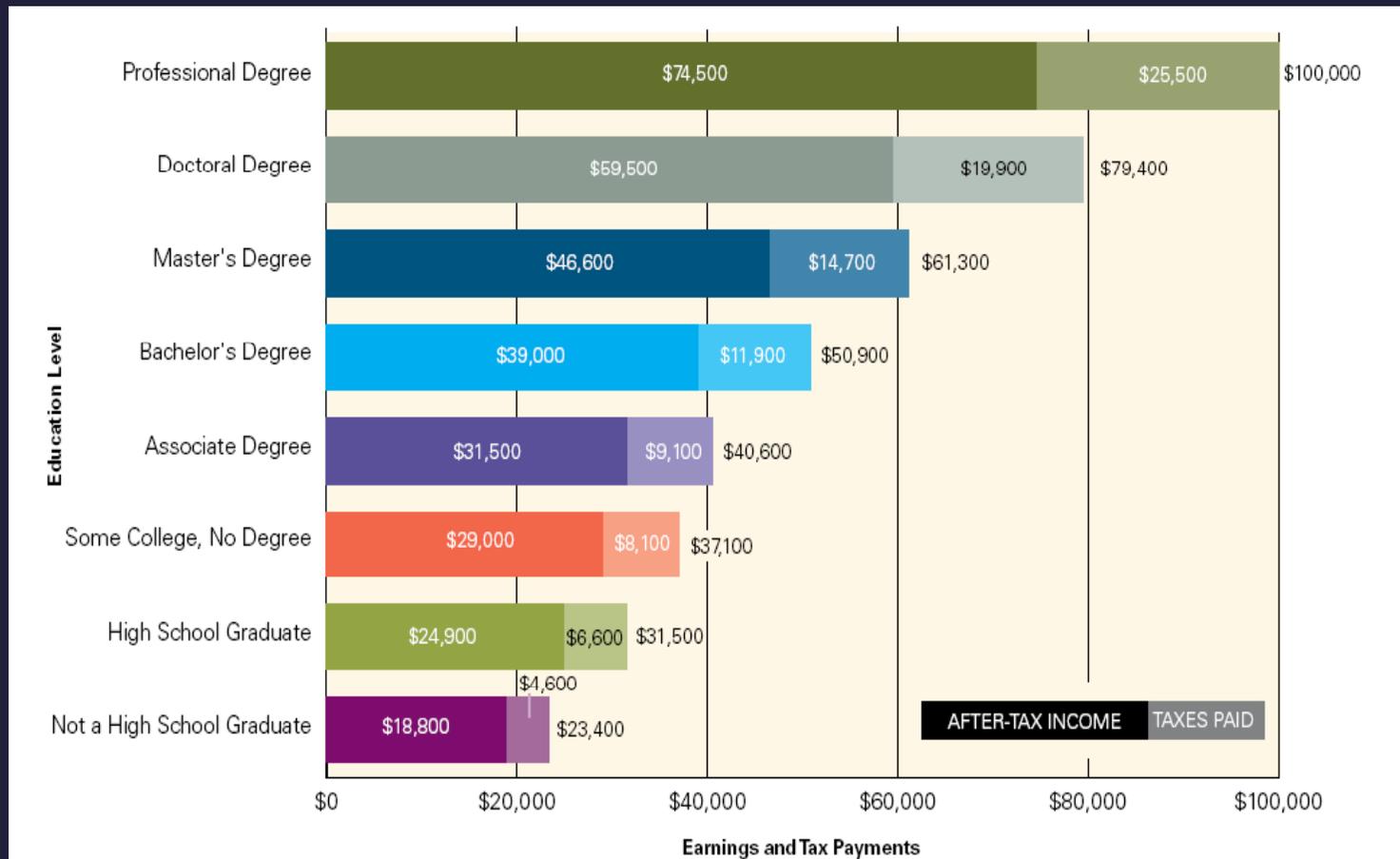
   J. L. Nehru (1937)

Education Pays

- Education is a sound investment with long term returns.

- A US survey states that for every dollar invested in education, to get more students through college above the current level, the state will receive a three fold return.

- Graduates have higher lifetime earnings, few interruptions in their careers, require fewer government services, and higher rate of home ownerships.
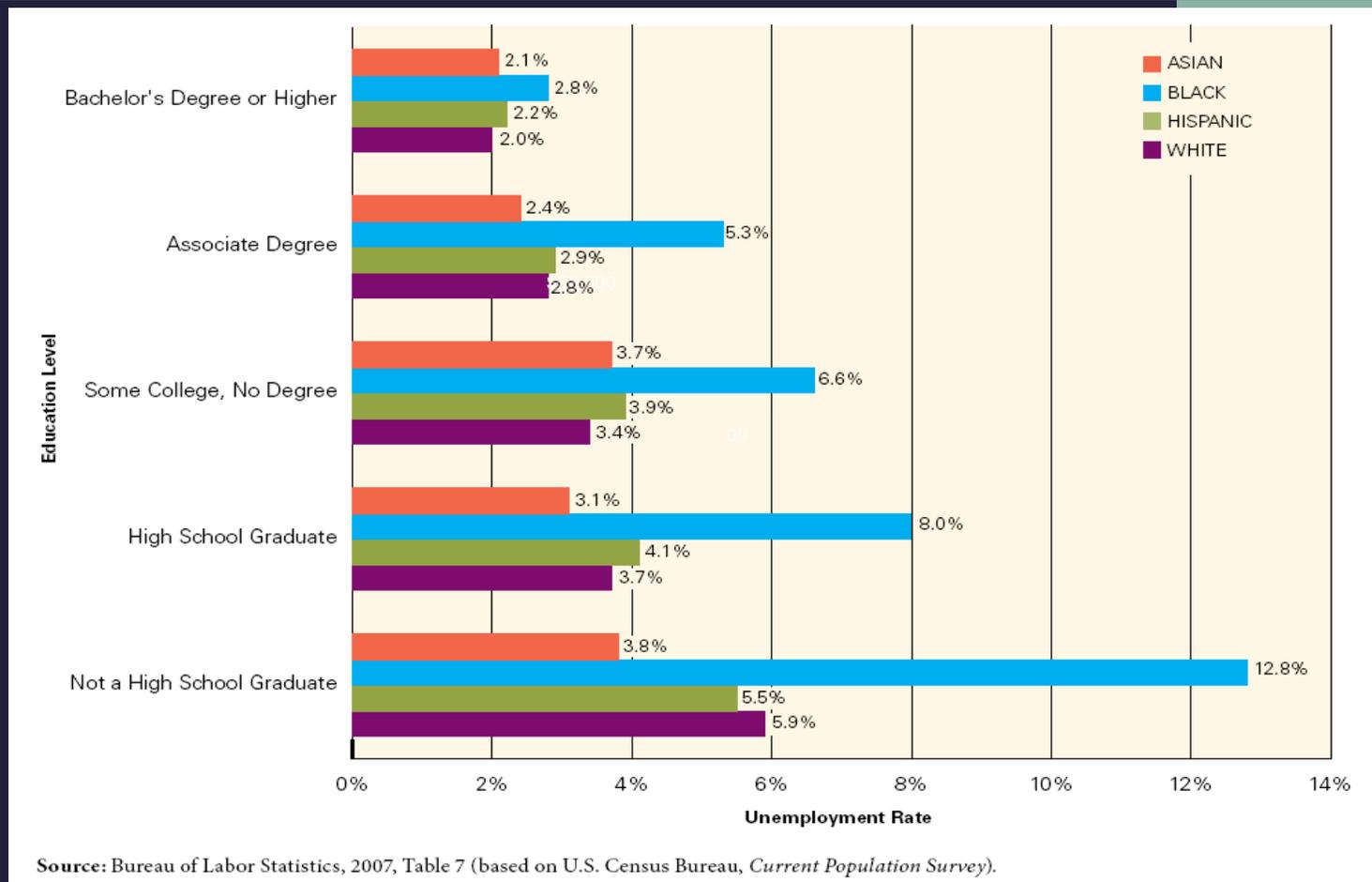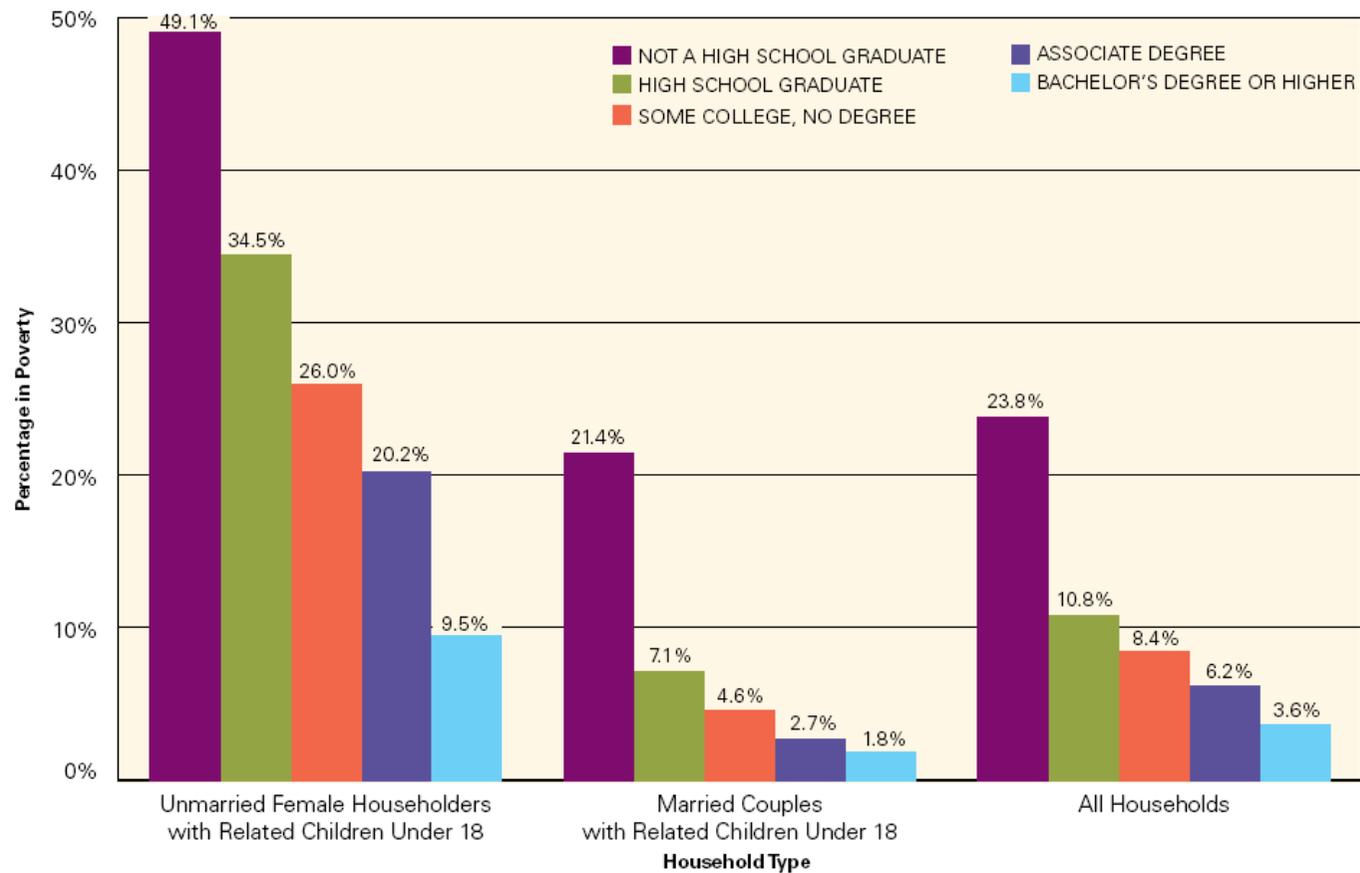
Trends in Education Series, 2007

USA Earnings in 2005

Professional Degree — $74,500 — $25,500 — $100,000
Doctoral Degree — $59,500 — $19,900 — $79,400
Master's Degree — $46,600 — $14,700 — $61,300
Bachelor's Degree — $39,000 — $11,900 — $50,900
Associate Degree — $31,500 — $9,100 — $40,600
Some College, No Degree — $29,000 — $8,100 — $37,100
High School Graduate — $24,900 — $6,600 — $31,500
Not a High School Graduate — $18,800 — $4,600 — $23,400

AFTER-TAX INCOME   TAXES PAID

Education Level — Earnings and Tax Payments

Trends in Education Series, 2007

Unemployment

Source: Bureau of Labor Statistics, 2007, Table 7 (based on U.S. Census Bureau, *Current Population Survey*).

Poverty

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Life Time Earnings

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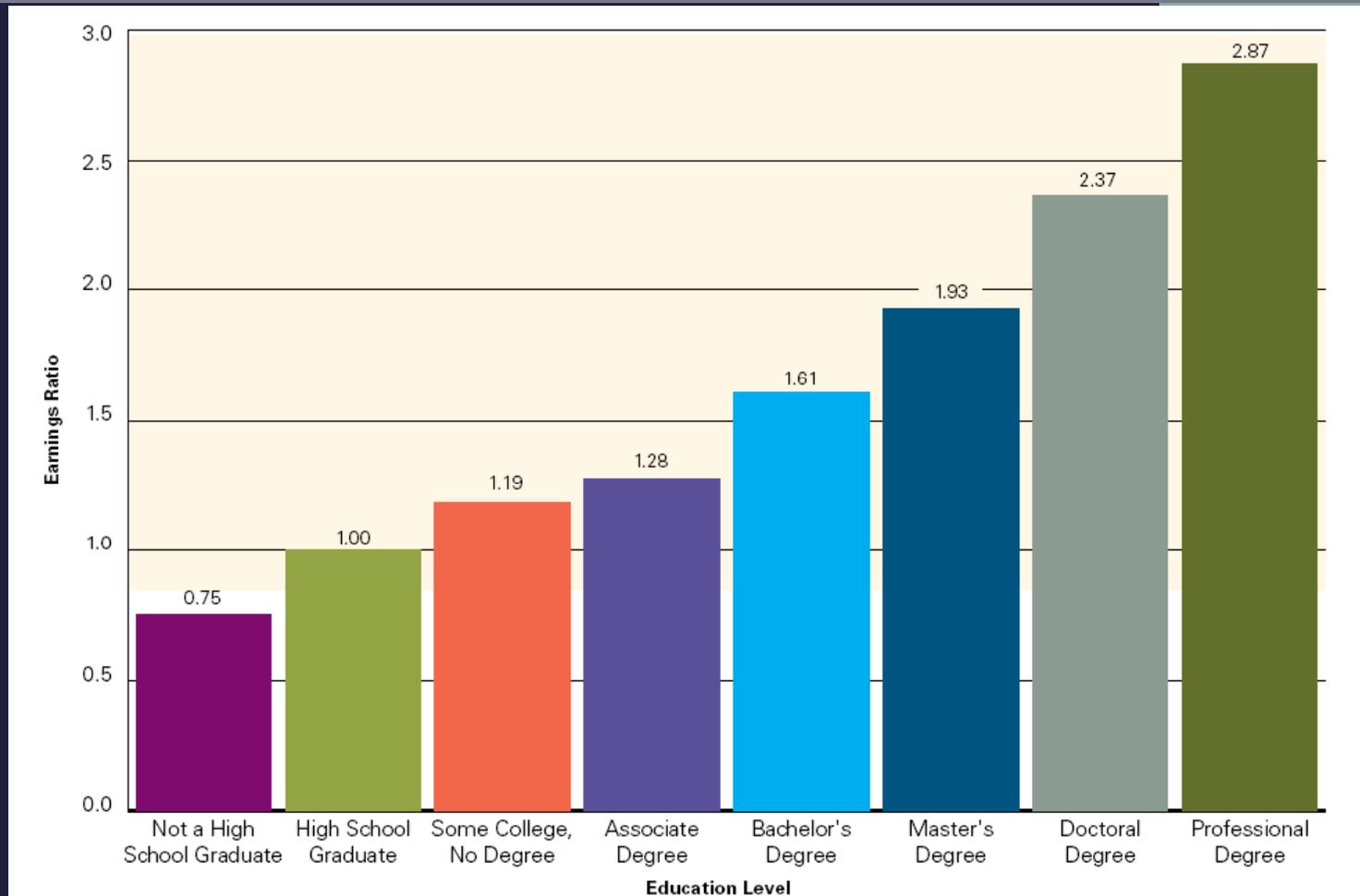
Trends in Education Series, 2007

From Where To Start?

What Makes a Nation Strong

- Not gold but only men can make
A people great and strong;
Men who for truth and honor's sake
Stand fast and suffer long.
Brave men who work while others sleep,
Who dare while others fly...
They build a nation's pillars deep
And lift them to the sky.

Ralph Waldo Emerson, 1803-1882

Nation's Wealth

The nation's wealth is its people who strive to develop new ideas and create processes and mechanisms that bring riches to the society.

The Challenges

- Educating the future leaders
- Planning of a beneficial future
- To design a streamlined educational curriculum where in addition to their majors the students are taught disciplined thought processes, social responsibilities, economics, and impact of technology on society.
- Research oriented teaching and learning
- Patience for solving the great problems of our time.

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Benefits of Technology

- Improves living standards
- Increases productivity
- Improves public services
- Creates new industries and employment opportunities
- Creates internationally competitive products
- From one third to half of US growth has resulted from technology transfer.

Science, Technology, and Society

- The spread of new knowledge, products, and processes derived from scientific and technological progress transforms social structures, modes of behavior, and attitudes of mind.
- The rapid spread of a new technology does not of itself imply rapid social change.
- The well-established customs of daily life and social institutions, the society's values and traditions. economic, social, and educational policies, the negotiations and agreements between interest groups determine the absorption rate of technology.
- By contrast, for most of the developing countries, the basic needs for survival - food, health, shelter, and education - are far from the technology.

Prosperity, Education and Research Linkage

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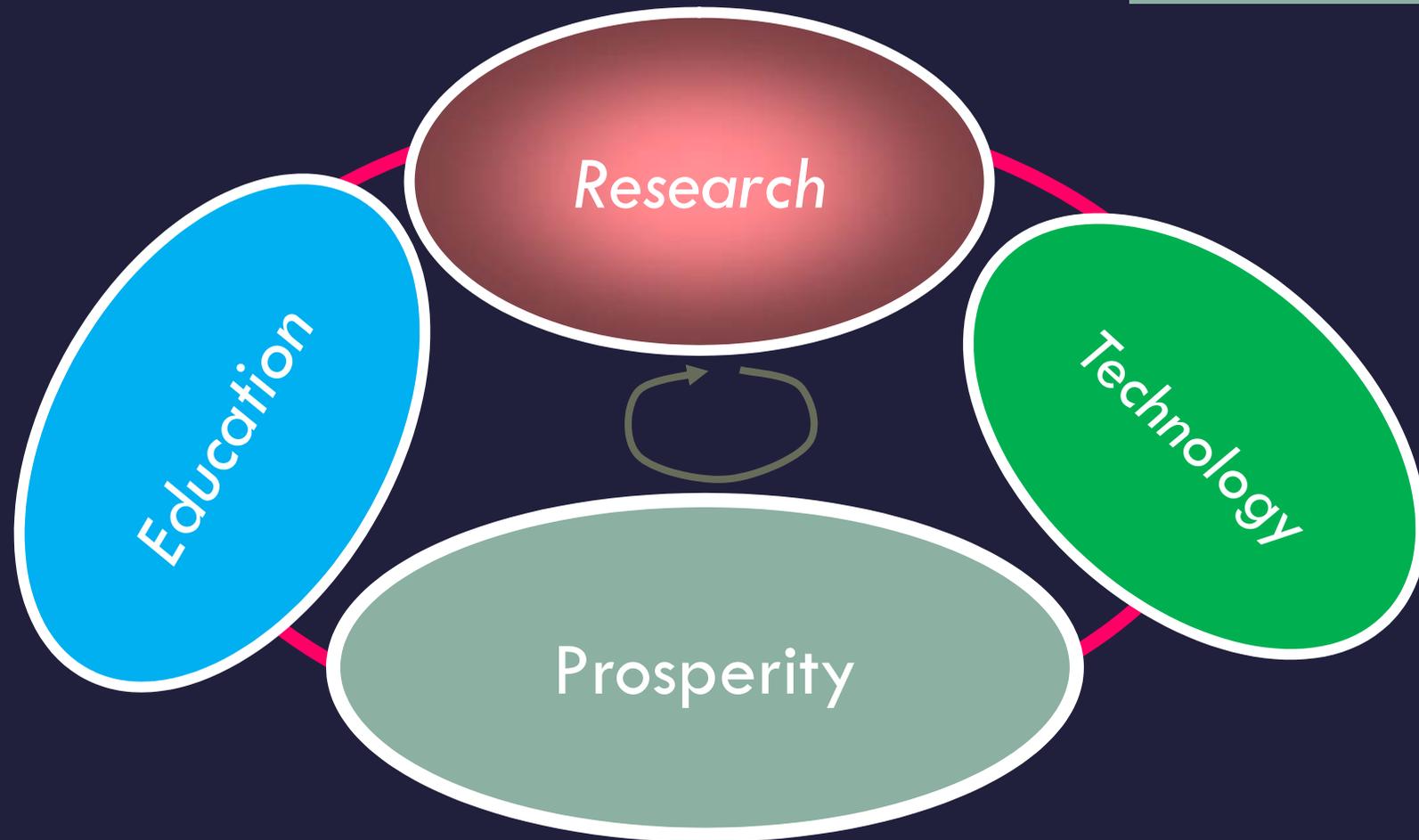
Institutional and Personal Initiatives

Institutional and Policy Requirements

- Development is a journey between tradition and modernity; its pace and level vary from society to society. The Society must develop policies to introduce new technologies without disturbing too much traditional values.

- Technical changes do not transform societies independently of other factors that are not related to technology as such.

- Institutional requirements and policies to govern research and development must be framed after evaluating societal state of technology absorption.

Institutional Initiatives - I

- Recruit excellent researchers and encourage them with wider perspectives and rich creativity
  - Upgrade and expand university graduate programs, increase research grants to graduate students in university doctoral programs.
  - Promote participation of young researchers in research projects.
  - Establish a standard career path via postdoctoral experience to tenured research posts.
  - Create a system for collecting and disseminating information both on postdoctoral researchers and on posts available to them.
  - Promote international cooperation in securing researchers; enhance the framework for receiving foreign researchers in Saudi Arabia.

Institutional Initiatives - II

- Improve mobility within/among research organizations and systems. Enhance organizational flexibility and fluidity within the research community
  - Convert universities and research institutions into "centers of excellence," and reorganize the research system making them more dynamic to spearhead academic trends and advances.
  - Run SWOT analysis on research institutes attached to universities, and reorganize them so as to enhance their roles, missions and capacity as centers of excellence; and, when necessary, convert them to other functions or abolish them.
  - Create a flexible framework for establishing joint research units among universities and research institutes.
  - Create a body that ensures quality and run periodic quality assurance audits.

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Institutional Initiatives - III

- Establish a world standard research infrastructure.
  - With an aim of achieving world-standard quality, improve research facilities, equipment and support systems.
  - Enhance the infrastructure for sharing, disseminating and storing scientific/academic information and materials.
- Improve research facilities and equipment
  - As the criteria for improving research facilities, place priority on academic trends, research requirements, and Centers Of Excellence formation.
  - Carry out basic facility planning in a programmatic manner; place priority on cutting edge facilities; adopt a facility leasing approach.

Institutional Initiatives - IV

- Improve research support systems
  - Expand research support programs that employ research assistants and/or skilled outside personnel.
  - Provide internships and other practical training for research support personnel.
- Improve the infrastructure for sharing, disseminating and storing scientific information and materials
  - Improve and expand networks for scientific information sharing and dissemination.
  - Improve electronic library functions.
  - Establish archive libraries (centralized document-control centers).

Institutional Initiatives - V

- Promote research in the humanities and social sciences, and advance interdisciplinary research activities.
  - Address social issues such as environment, integrate research in the humanities and social sciences with research in the natural sciences.
  - Establish a body to analyze and evaluate research trends and conditions in the humanities and social sciences.
  - Establish an ethical philosophy to underpin research activities.

Institutional Initiatives - VI

- Promote linkage and cooperation between the academic and other sectors of society Make university research open and accessible to society
  - Vigorously promote university-industry collaboration; actively feed the fruits of research back into society; strengthen public trust and support for scientific research.
  - Establish and expand centers for collaborative research through stationing university-local industry coordinators, the conducting of joint projects, and other means.
  - Support the establishment of technology licensing organizations (TLOs).
  - Improve the system for university-industry cooperation (e.g., deregulation of personnel and accounting affairs).
  - Take positive steps to raise the level of public understanding of scientific research.

Initiatives from Research Aspirators

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Initiatives From Research Aspirators

- Select problems that are important
- Luck favors the prepared mind, there are no short cuts in good research – "Genius is 99% perspiration and 1% inspiration" Edison
- Sell your research – write clearly and well, give informal and informal talks
- Success brings confidence and courage
- Turn the problem around – think positive and not negative
- Knowledge and productivity are like compound interest

Initiatives From Research Aspirators

- Persistence is needed – let your subconscious work; it generates creativity
- Discuss the problems with colleagues, "The closed door is symbolic of a closed mind"
- "It is a poor workman who blames his tools – the good man gets on with the job, given what he's got, and gets best answer he can"
- Do not waste time in fighting the system – get on with your work
- Know your weaknesses, strengths, and faults

Hamming – You and Your Research

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Conclusions

- There is strong link between education, research, and prosperity.

- To develop the nation, we first train leaders.

- Technology transfer is crucial and university – industry collaboration is essential.

- Research can be promoted by taking several initiatives, some institutional and some by individuals.

- We cannot afford to ignore the importance of motivating the young students. We need to train primary and secondary teachers toward delivering effective teaching.

Continuous Struggle is the Key to Success

- "Every morning in Africa, a gazelle wakes up, it knows it must run faster than the fastest lion or it will be killed; every morning a lion also wakes up, it knows it must run faster than the slowest gazelle or it will starve to death; so…. whether you are a lion or a gazelle when the sun comes up, you better start running"

African Proverb

Questions

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