



2015-16 State of the Future

**Washington launch at
Woodrow Wilson Center**

**Dave Rejeski, Woodrow Wilson Center
Clem Bezold, Institute for Alternative Futures
Jerome C. Glenn, The Millennium Project**

The Millennium Project has 56 Nodes and two Regional Networks (in Europe and Latin America)



A Node is a group of institutions and individuals that connect global/local futures work – making it easy

2015-16 State of the Future - 18th edition



A lucid, thought-provoking, strategically oriented exploration of the transforming world order.
Mihaly Simai, former Chairman, United Nations University

The State of the Future can make a difference in the world. Well done.
Wendell Bell, Professor Emeritus, Yale University

Global intelligence on the future of the world in the palm of your hand.
KurzweilAI News

So important for many people around the world.
Eleonora Masini, former Secretary and President, World Futures Studies Federation

Absolutely worth the reader's time... takes the reader much farther forward than most thinking.
Defense & Foreign Affairs Policy Journal

Authoritative compendium of what we know about the future of humanity and our planet
The Futurist

Strategic Planning for the Planet... remarkably articulate and prescient.
Foresight Journal

Certainly, the guide to make better decisions and achieve success.
Julio Millán, President Coraza Corporación Azteca

Invaluable insights into the future.
Ban Ki-moon, Secretary-General, United Nations


The Millennium Project



The Millennium Project
JEROME C. GLENN, ELIZABETH FLORESCU AND THE MILLENNIUM PROJECT TEAM
2015-16 STATE OF THE FUTURE

2015-16 State of the FUTURE

**Greatest number
of future-relevant
facts, information,
and intelligence
ever assemble in
one report.**



978-0-9882639-2-5

JEROME C. GLENN, ELIZABETH FLORESCU
AND THE MILLENNIUM PROJECT TEAM



The Millennium Project

Editors Jerome C. Glenn and Theodore J. Gordon
With support from the Rockefeller Foundation

Futures Research Methodology

Version 3.0



39 Chapters

1,300 pages

**Largest
collection of
Internationally
peer-reviewed
methods to
explore the
future ever
assembled in
one source**

- 
1. Introduction to Futures Research Methodology
 2. Environmental Scanning
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 4. The Delphi Method
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 31. Agent Modeling
 32. Chaos and Non-Linear Dynamics
 33. Multiple Perspective Concept
 34. Heuristics Modeling
 35. Causal Layered Analysis
 36. Personal Futures
 37. State of the Future Index
 38. SOFI Software System
 39. Integration, Comparisons, and Frontiers of Futures Research Methods

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Global Futures Intelligence System

<https://themp.org>



Hangouts Alerts - 30 Messages Account

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State Of The Future

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15 Global Challenges

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Results

Functioning as a think tank **on behalf of humanity**, not on behalf of a government, an issue, or an ideology.
Created to improve humanity's prospects **for building a better future.**



The 2013-2014 State of the Future



A must read for any decisionmaker with a long-term vision.
Enrique Peña Nieto, President of Mexico

The World is Improving **Better** than Most Pessimists Know



People are becoming healthier, wealthier, better educated, more peaceful, and increasingly connected, and they are living longer.

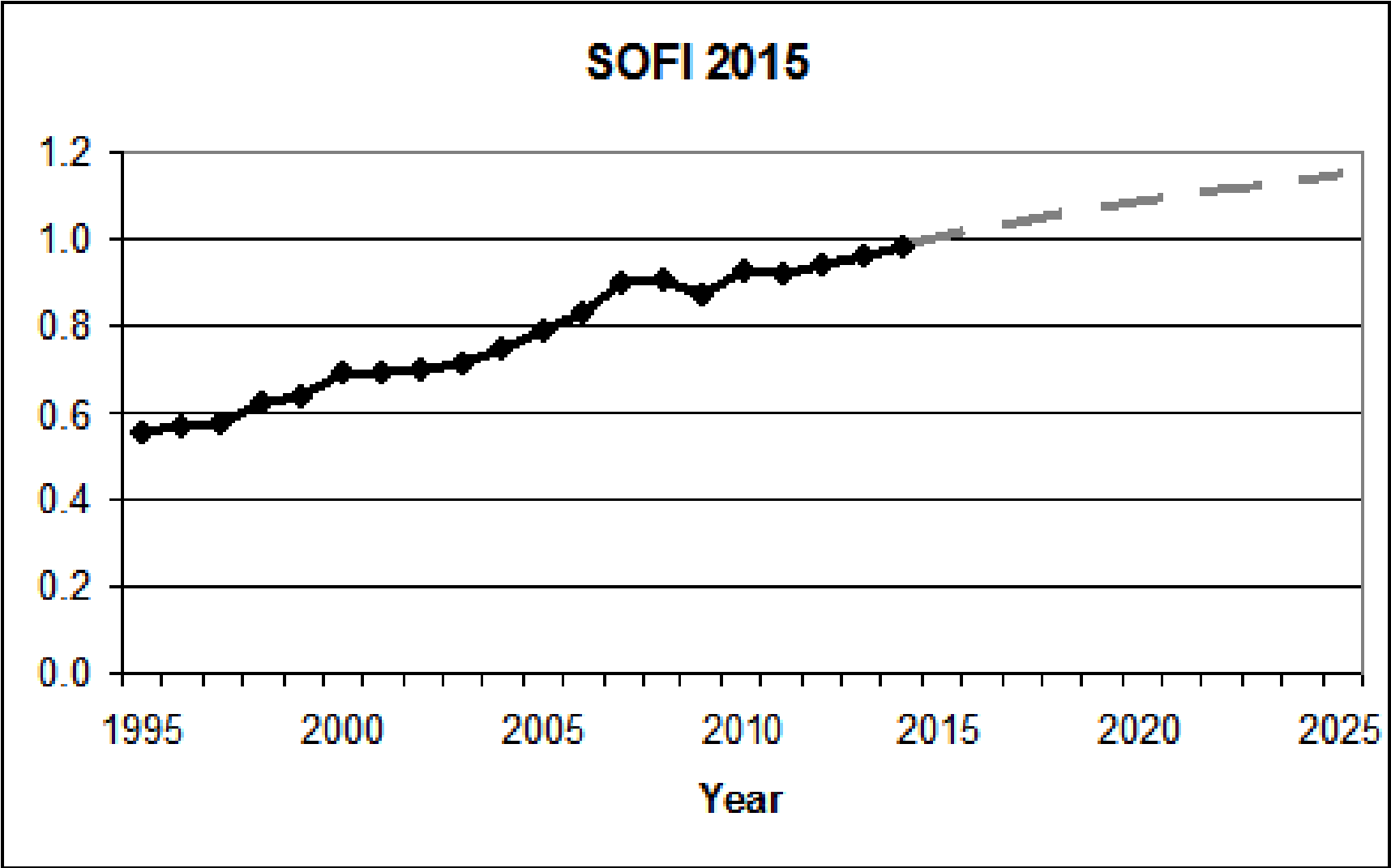
- The child mortality rate has dropped about 50% since 1990
- Half the developing world in extreme poverty 1981, now 17%
- 40% of humanity is connected via the Internet
- Life expectancy has increased 10 years over the past 20 years to reach 70.5 years today
- The Number of International wars continue to fall, **BUT**

The future dangers are **worse** than most optimists indicate



- Advance technologies could lead to global long-term structural unemployment
- A single individual could one day make and deploy weapons of mass destruction
- Artificial general intelligence could evolve beyond our control in a destructive fashion
- Proliferation of advanced destructive weapons among hate groups could lead to continual chaos
- Long-term affects of global warming could produce massive and continual social violence
- Organized crime lead to worldwide Central America-like conditions making democracy an illusion
- Urban infrastructures may become too complex to manage, maintain, and prevent sabotage
- Uncontrollable nanotech extracting carbon from the air could cover the planet with a gray goo
- Large enough asteroid could hit the earth and cause a “nuclear winter”
- Nanotech warfare may grow beyond human control
- Doomsday scenarios of nuclear proliferation are possible
- The Earth’s magnetic poles could weaken no longer protecting life from solar radiation (500 years)

2015 State of the Future Index



28 Variables use in the 2015 SOFI

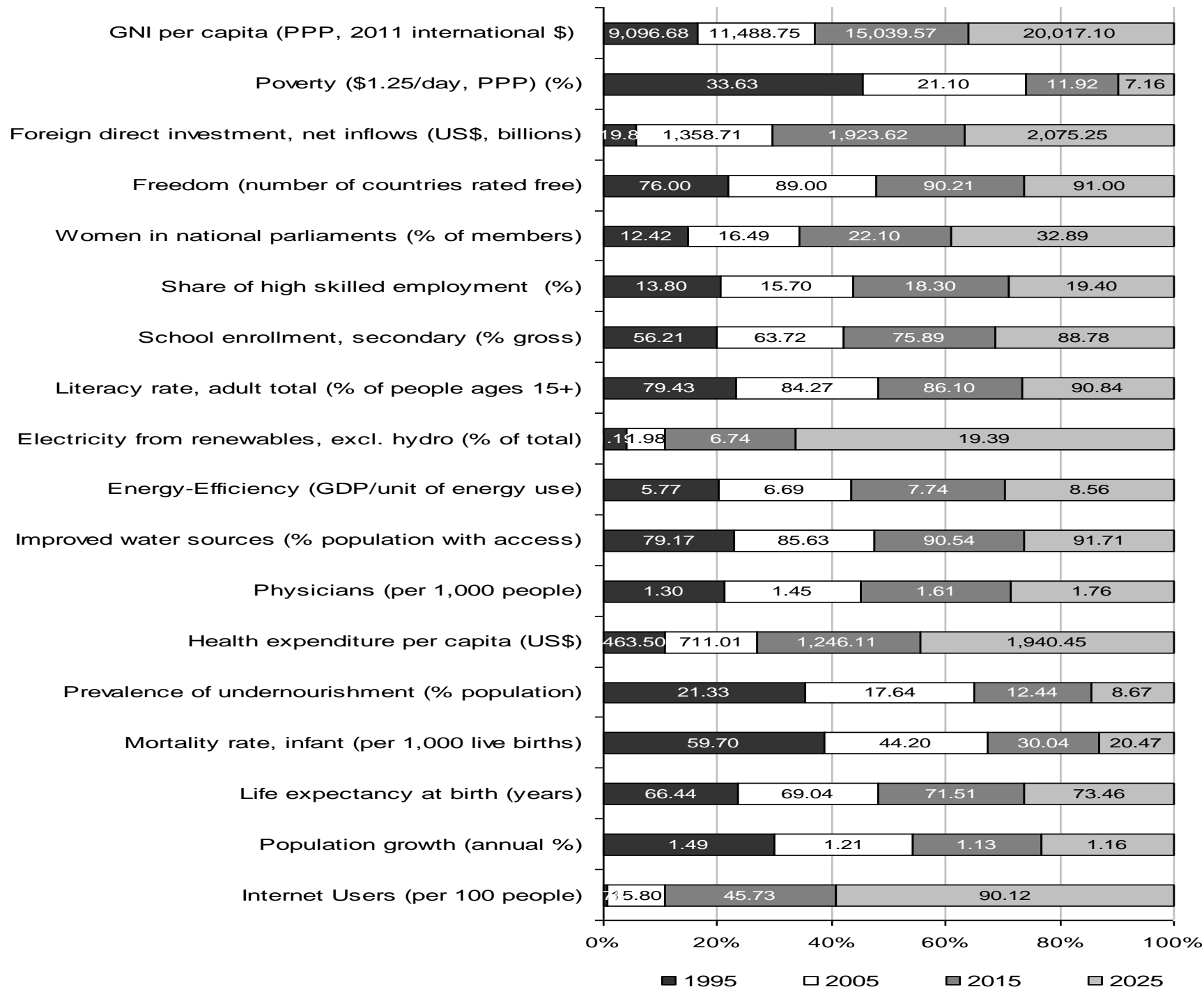


- GNI per capita, PPP (constant 2011 int \$)
- Economic income inequality (income share held by highest 10%)
- Unemployment, total (% of world labor force)
- Poverty headcount ratio at \$1.25 a day (PPP) (percent of population)
- CPIA transparency, accountability, and corruption in the public sector rating Foreign direct investment, net inflows (BoP, current US\$, billions)
- R&D Expenditures (percent of GDP)
- Population growth (annual rate)
- Life expectancy at birth (years)
- Mortality rate, infant (per 1,000 live births)
- Prevalence of undernourishment percent of population)
- Health expenditure per capita (current US\$)
- Physicians (per 1,000 people)
- Improved water source (percent of population with access)
- Renewable internal freshwater resources per capita (cubic meters)
- Biocapacity per capita
- Forest area (percent of land area)
- Fossil fuel and cement production emissions (MtC/yr)
- Energy-efficiency (GDP per unit of energy use (constant 2011 PPP \$ per kg of oil equivalent))
- Electricity production from renewable sources, excluding hydroelectric (percent of total)
- Literacy rate, adult total (% of people ages 15 and above)
- School enrollment, secondary (percent gross)
- Share of high skilled employment (percent)
- Number of wars and serious arm conflicts
- Terrorism incidents
- Freedom rights (number of countries rated “free”)
- Proportion of seats held by women in national parliaments (percent of members)
- Internet users (per 100 people)



World Report Card

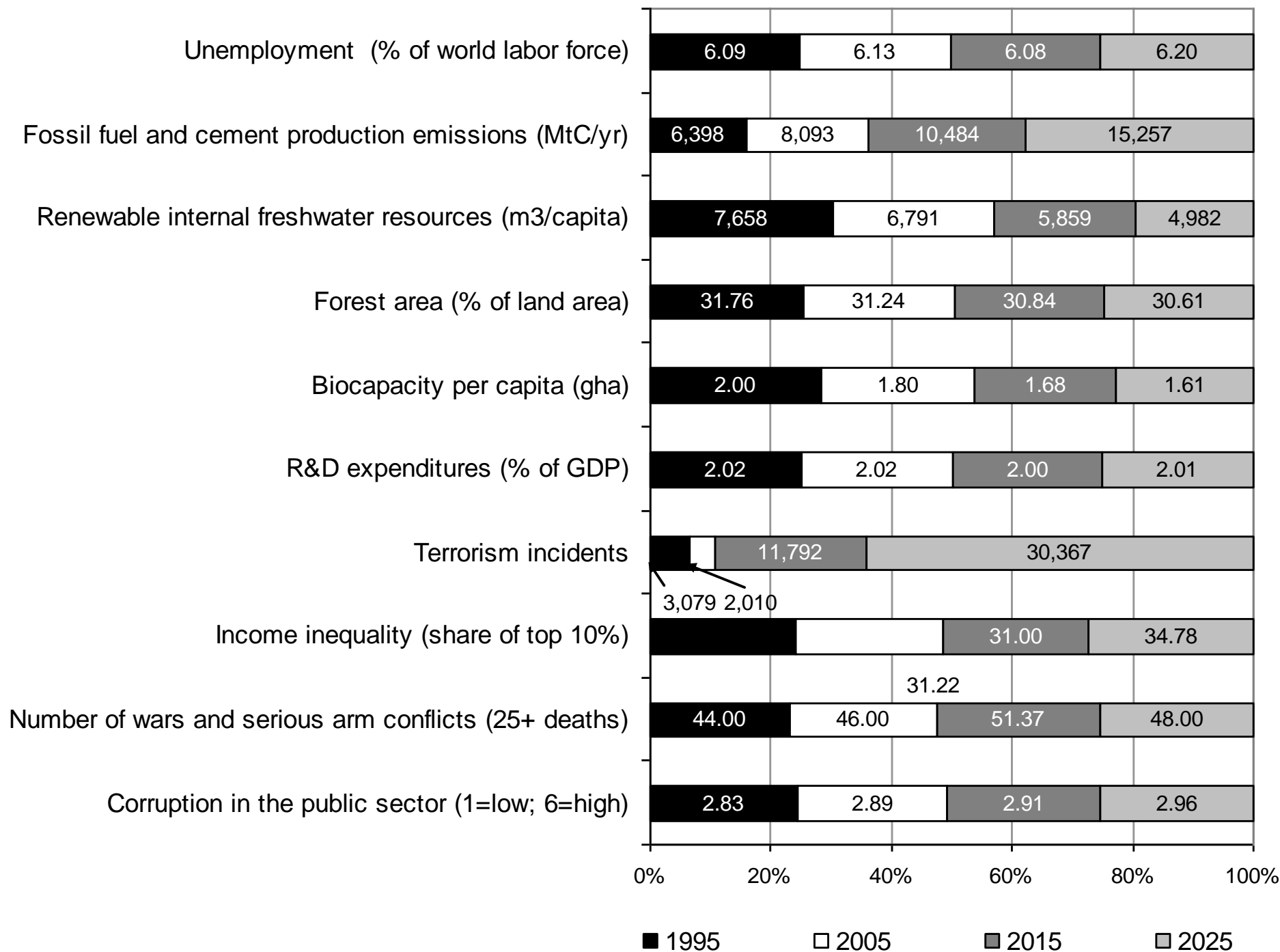
Where are We Winning?





World Report Card

Where are We Losing?



Framework for understanding Global Change: 15 Global Challenges



How can sustainable development be achieved for all while addressing global climate change?

How can everyone have sufficient clean water without conflict?

How can ethical considerations become more routinely incorporated into global decisions?

How can population growth and resources be brought into balance?

How can scientific and technological breakthroughs be accelerated to improve the human condition?

How can genuine democracy emerge from authoritarian regimes?

How can growing energy demands be met safely and efficiently?

How can decisionmaking be enhanced by integrating improved global foresight during unprecedented accelerating

How can transnational organized crime networks be stopped from becoming more powerful and sophisticated global enterprises?

How can the global convergence of information and communications technologies work for everyone?

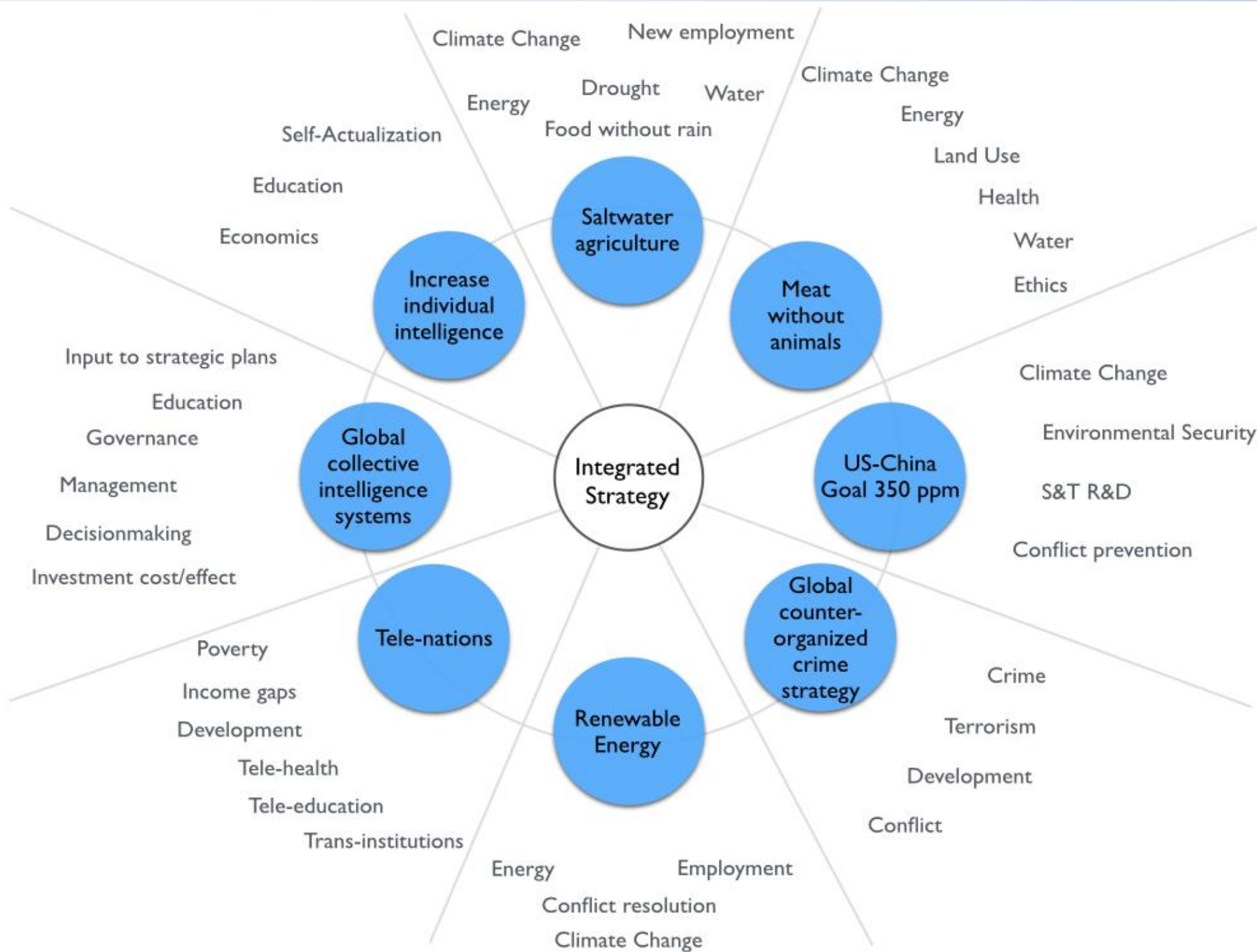
How can the changing status of women improve the human condition?

How can ethical market economies be encouraged to help reduce the gap between rich and poor?

How can shared values and new security strategies reduce ethnic conflicts, terrorism, and the use of weapons of mass destruction?

How can the threat of new and emerging diseases and immune microorganisms be reduced?

How can education make humanity more intelligent, knowledgeable, and wise enough to address its global challenges?



Initial Draft

Integrated Global Strategy

Inevitability of New Economics



- Concentration of wealth is increasing
- Income gaps are widening
- Employment-less economic growth seems the new normal
- Return on investment in capital and technology is usually better than labor
- Number of persons per services & products is falling
- 25-50% unemployment is a business-as-usual forecast by 2050 without new economic approaches
- If so, will some form of guaranteed income be necessary?

Future Work/Technology 2025 Study



1. Literature and Related Research Review
2. Real-Time Delphi
3. Road Maps and Scenario Drafts
4. RTDelphi Feedback on the Scenarios
5. Final Scenarios, Policy Implications, and produce initial report
6. Initial Report as input to the National Planning Workshops
7. Collect results of the national planning workshops, analyze & synthesize results
8. Final report for public discussion

300 respondents plus 100 tourists



Hangouts Alerts Messages Account

The Millennium Project - Global Futures System

Select Language

search

Future Work/Technology 2050

Over 1000 text comments



The Millennium Project

Instructions:

You are invited to share your judgments about how future technology over the next 35 years ([artificial narrow intelligence](#), [artificial general intelligence](#), [Internet of Things](#), [robotics](#), [synthetic biology](#), [nanotechnology](#), [3D/4D printing](#), [self-driving vehicles](#), [drones](#), [mobile/cloud](#), [augmented reality/holography](#), etc.) could affect the [future of work](#), and what should be done to create positive conditions for humanity.

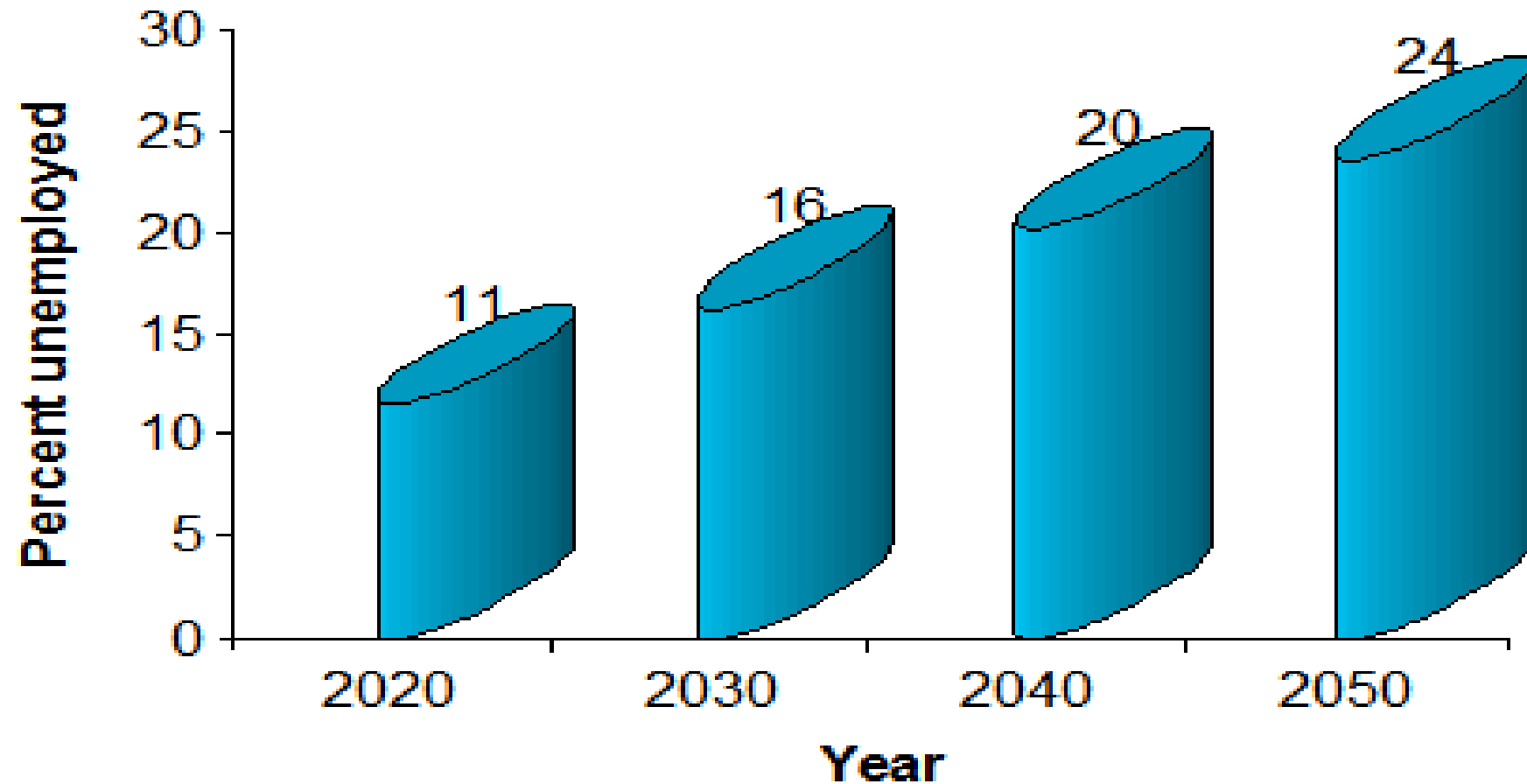
Occupations of Panelists

they could select more than one

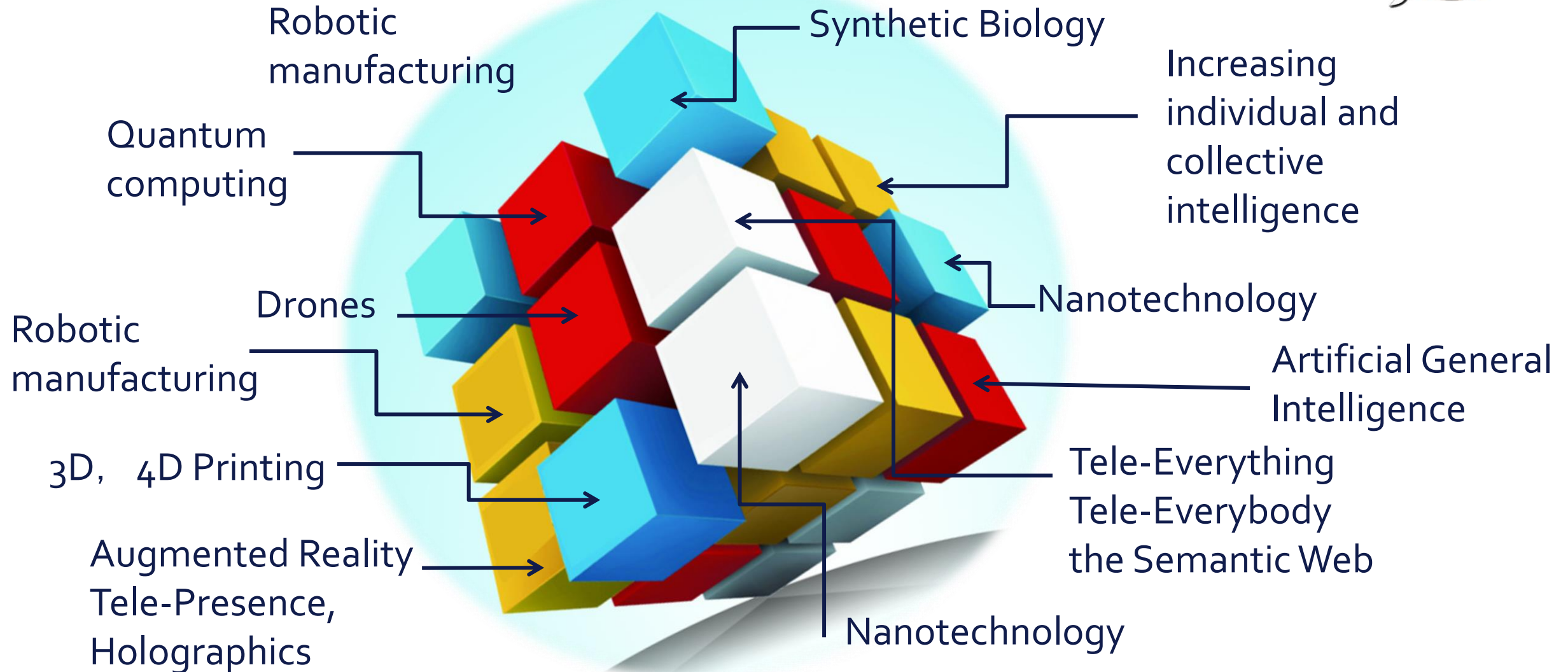


Futurist (153)	AI or Related ICT (27)
Executive Manager (82)	Cognitive Science (27)
Engineer/Technologist (75)	Science Fiction (26)
Social Science (53)	Natural Science (22)
Public Policy (50)	Physics (20)
Economist (39)	Biology/Physiology/Neurosciences (18)
Philosophy (38)	Mathematics (12)
Most Common Combinations	
Futurist, Engineer/Technologist (17)	Futurist, Social Science (7)
Futurist, Executive Manager (9)	Social Science, Executive Manager (5)
Engineer/Technologist, Executive Manager (4)	Futurist, Philosophy, Social Science (4)
Futurist, Economist (4)	Futurist, Philosophy (4)

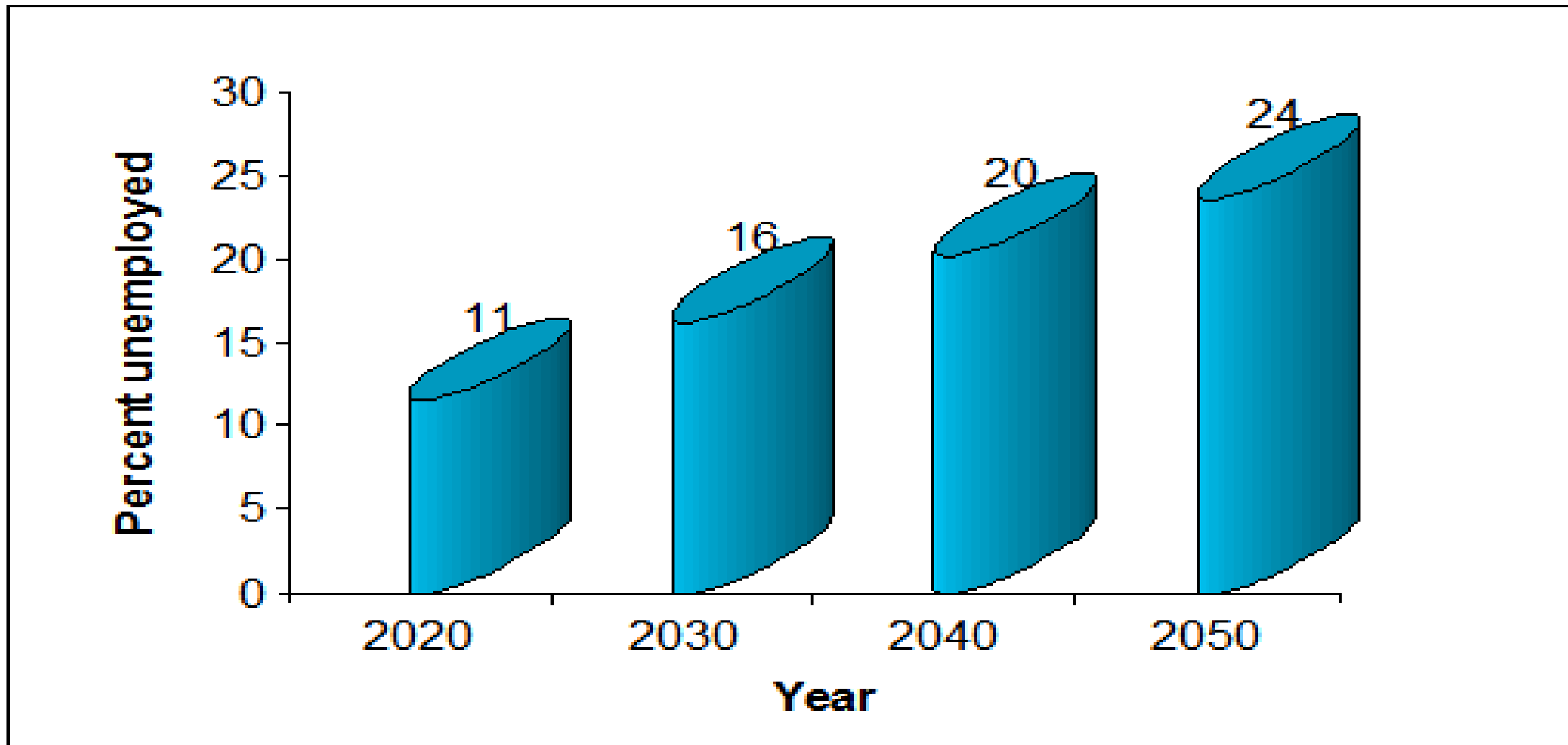
Averages of all participants



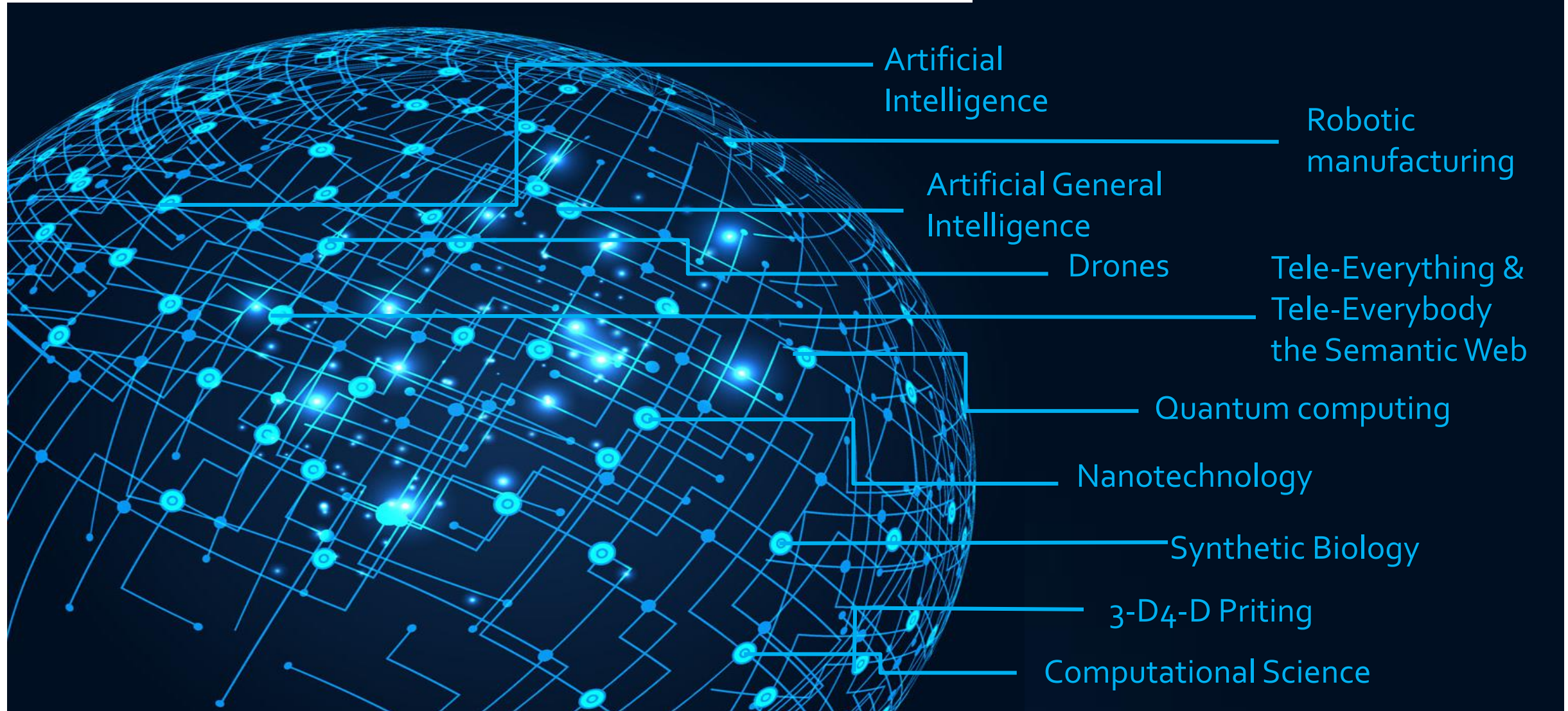
Future Technology Synergies



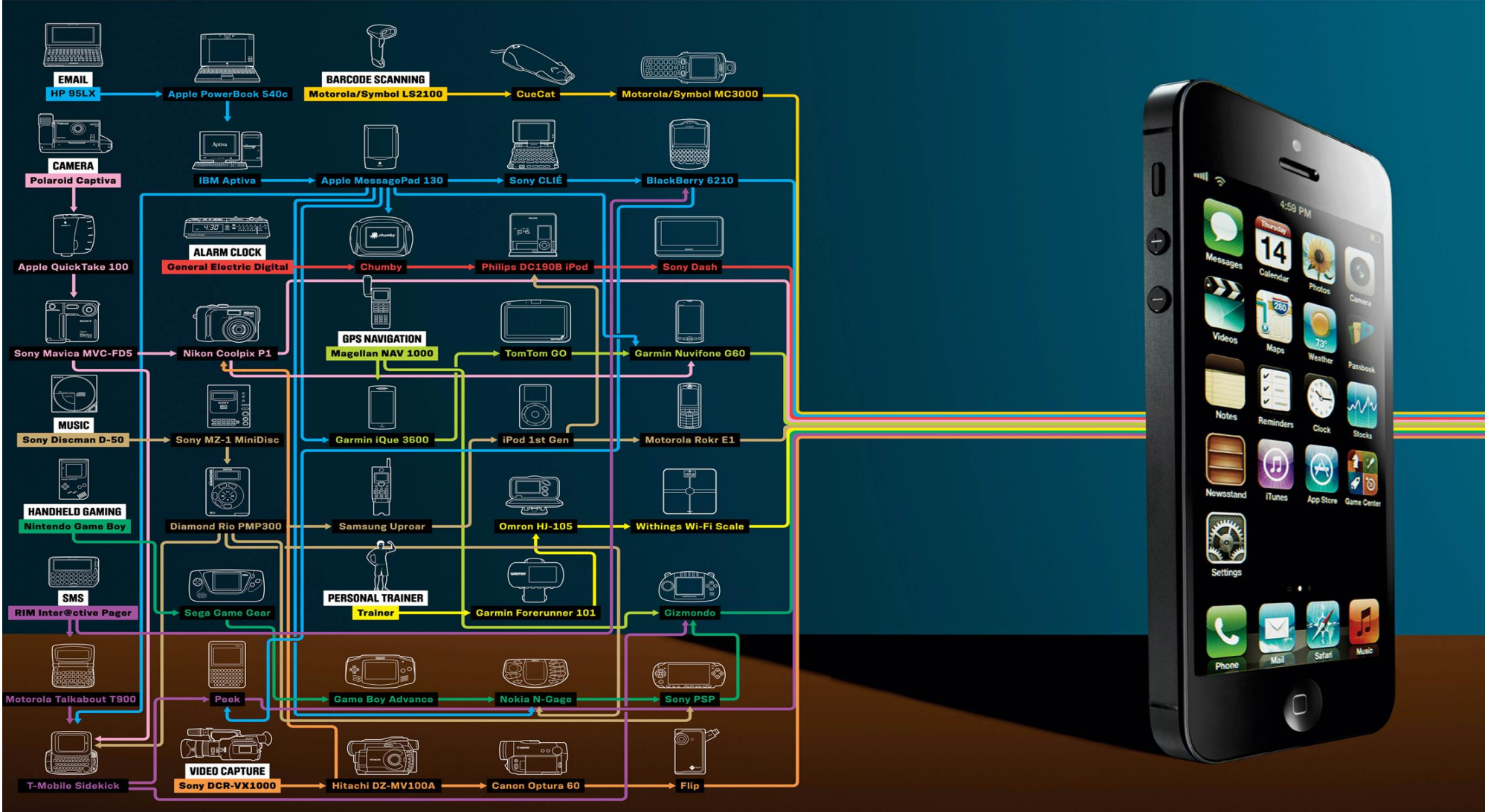
Averages of all participants



Future Technology Synergies



Smart Phone Integration/Synergies



Future Technology Synergies



Robotic
manufacturing

Artificial
Intelligence

Quantum
computing

Drones

Robotic
manufacturing

3D, 4D Printing

Augmented Reality,
Tele-Presence,
Holographics

Future
Technology



Emerging Technologies Table



If \ Then	Nano-technology	Synthetic Biology	Artificial Intelligence	Robotics	3-D Printing	Augmented Reality
Nano-technology	XXX					
Synthetic Biology		XXX				
Artificial Intelligence			XXX			
Robotics				XXX		
3-D Printing					XXX	
Augmented Reality						XXX

Artificial Intelligence ... that can autonomously
“write” and improve its code...



by responding to feedback from
sensor networks worldwide,
will accelerate AI's intelligence
worldwide... moment by moment

When this
begins to
happen (2050?),
the speed of
increasing AI's
intelligence will
be *far faster*
and produce
more change
*than Moore's
Law*

What was asked?



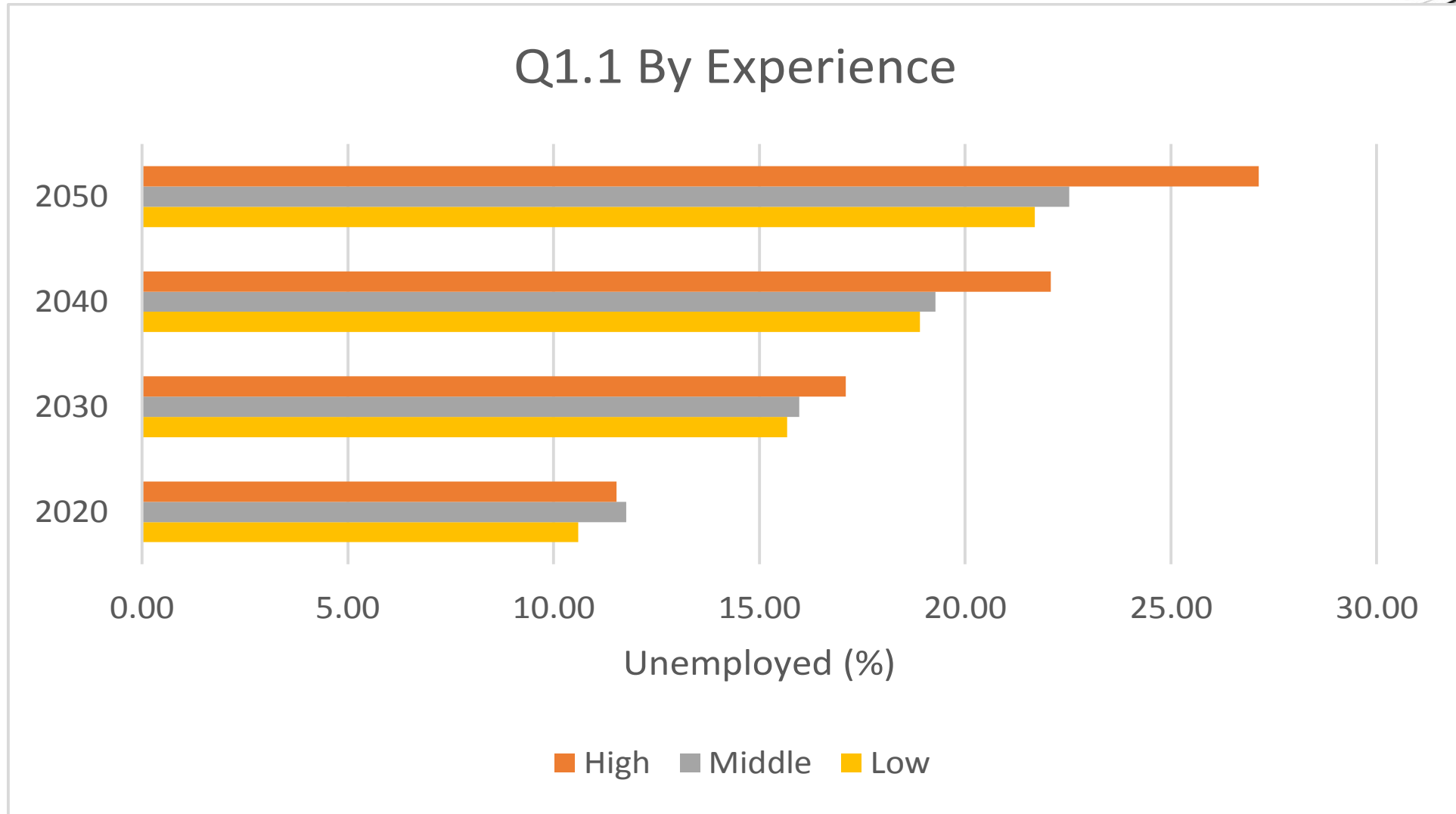
1. If socio-political-economic systems stay the same around the world, and technological acceleration, integration, and globalization continue, what percent of the world do you estimate could be **unemployed** - as we understand being employed today during each of the following years: 2020; 2030; 2040; 2050
2. More jobs were created than replaced during both the Industrial and Information Ages. However, many argue that the speed, integration, and globalization of technological changes of the next 35 years (by 2050) will cause massive structural unemployment. What are the **technologies or factors** that might make this true or false?
3. **What questions** have to be resolved to answer whether AI and other future technologies create more jobs than they eliminate?
4. How **likely and effective** could these actions be in creating new work and/or income to address technological unemployment by 2050?

Questions Asked continued



5. Will wealth from artificial intelligence and other advanced technologies continue to **accumulate income** to the very wealthy increasing the income gaps?
6. How necessary or important do you believe that some form of **guaranteed income** will be necessary to end poverty, reduce inequality, and address technological unemployment?
7. Do you expect that the **cost of living** will be reduced by 2050 due to future forms of AI robotic and nanotech manufacturing, 3D/4D printing, future Internet services, and other future production and distribution systems?
8. **Big changes** by 2050?
9. What alternative **scenario axes** and themes should be written connecting today with 2050 describing cause and effect links and decisions that are important to consider today?
10. Other **Comments** to improve this study?

More experience **Futurist** have higher 2050 unemployment forecasts



Will we teach people to find markets worldwide
for self-employment ?



Digital Business

By 2050 everyone is connected
to the future Internet and
everyone is surrounded by a
9.6 billion person market

How many could learn to be self-employed, finding markets worldwide instead of local non-existent jobs? For example:



The capital requirements for start-ups are increasingly low – consider YouTube, Facebook, Uber

The distance, number, and diversity of potential income sources are far greater today.

Informal economies with 3D printing and Internet-based businesses are expanding rapidly.

People could be taught how use Kickstarter.com to help get investments.

Aging Society – work after “retirement age” finding markets on the Internet.

Although advancing tech increases income and jobs for highly skill workers, it also creates low skilled work such as tele-tourism, buying/selling on systems like eBay, tele-personal assistants.

Culture could become more entrepreneurial with media memes like “you can do anything.”

EU had 1.8 million jobs in the app economy with €17.5bn in revenues in 2013. The EU created <http://eurapp.eu/> to help others get in this high tech growth area.

One-Person Businesses

Find markets
around the
world for what
you are
interested in
doing

not non-existing
jobs

What could this look
like in 2050?



Will we create our own Avatars in the Digital World to be our Cyber-selves? Cyber-Clones?



Finding unique
exciting work
for us while...

we sleep?

Guaranteed income – cash flow projection elements



Income to Government

- License and tax Robots
- Carbon Tax
- Tobin tax – on international financial transfers
- Eliminate tax havens
- Universal minimum corporate tax
- Own percent of corporations
- Tax massive wealth growth like some IT

Lower annual cost of guaranteed income

- Consolidate welfare programs (unemployment payments, etc.) into the guaranteed income
- AI/robotics lowers to cost of living
- Free health and education

Factors to consider

- National service; Minimum annual public work
- Phase in from work to “next” what every post-job/employment will be
- Different incomes in different areas, countries
- Can you both work income and guaranteed income?

Q.3. What questions have to be resolved to answer whether AI and other future technologies create more jobs than they eliminate?



220 answers and 212 comments the responses

- How intelligent can AI and AGI become?
- **Do we want jobs at all**, should we be fighting to retain jobs, or fighting to eliminate them.
- What are **plausible alternative** definitions of work, jobs, employment, and basic income
- **Who will own the AI?** Is AI an independent operator, can it own tools it's using or controlling? Does it have IPR over its productions, code, algorithms or inventions? What if very creative AI make lot of money and become a millionaire, gaining lot of financial leverage? How we determine and control AI motives? And should we?
- How can we create initial conditions for AGI or super or strong AI so it **evolves in a good way?**
- What **taxes** and how collected
- Will human beings still be essential for conceiving, designing, building and applying new technological tools - or will machines also take over this part?
- Work creation though AI, not "jobs creation."

Continued



- How far will we **allow** machines to emulate us? What is the **ethics** of this?
- Is the objective of the AI and other future technologies: economic **growth or quality** of humanity?
- How can we **control** the developments? co-exist, co-create (with machines) new solutions
- **Who is responsible for AI mistakes** (autonomous cars - who has to pay in case of accident)
- What knowledge will become **obsolete** and therefore, what effect on **education and professions**?
- What new knowledge, skills, education, jobs will be necessary to get the most out of **the global brain** and to create a sustainable economy with happy people
- Will you become **obsolete** in 10 years **or** will you become a **superprofessional**?
- What impact does it have on the development of our **children's emotional state**.
- Whether **AI** can be constrained or whether artificial super intelligence will be **malevolent or benevolent**.

6.1 Please rate how necessary you believe guaranteed lifetime income will be by 2050



Number of responses: 212

Guaranteed income necessity	Score
Absolutely necessary	54
Very important	53
Can help	36
Irrelevant	27
Not too necessary	12

Some Initial Generalizations



- No actions to address these issues received high consensus
- Little understanding of the future of synthetic biology and its impacts on work
- Most understand that the world economic and social systems are going to change by both government and market
- Plausible alternative cash flow projections for introduction of basic income are missing
- Many of the respondents envision a better future for humanity, end of the tyranny of jobs to earn a living, and a flourishing of the pleasure of meaningful work – a self-actualization economy
- The changes will be irregular around the world

Guaranteed income – cash flow projection elements to 2050



Income to Government

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- Carbon Tax
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Available now out front...



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2015-16

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For further information



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<http://millennium-project.org/millennium/FRM-V3.html>

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