

# Forum

## A Futurist View: What is on the Horizon

### **Panelists:**

**Dean Jorge Vanegas**

and

**Professor Rodney Hill**

Texas A&M University

**Francis Rabuck**

Technology Manager

Bentley Systems



# Forum

Is the Capital Projects  
Industry observant...?  
Is it prepared...?

**Panelist:**

**Jorge Vanegas, Dean**



# HOWDY!



The world is  
changing fast...



# Reducing the history of the earth into 365 days



(4.6 billion years compressed into one year)

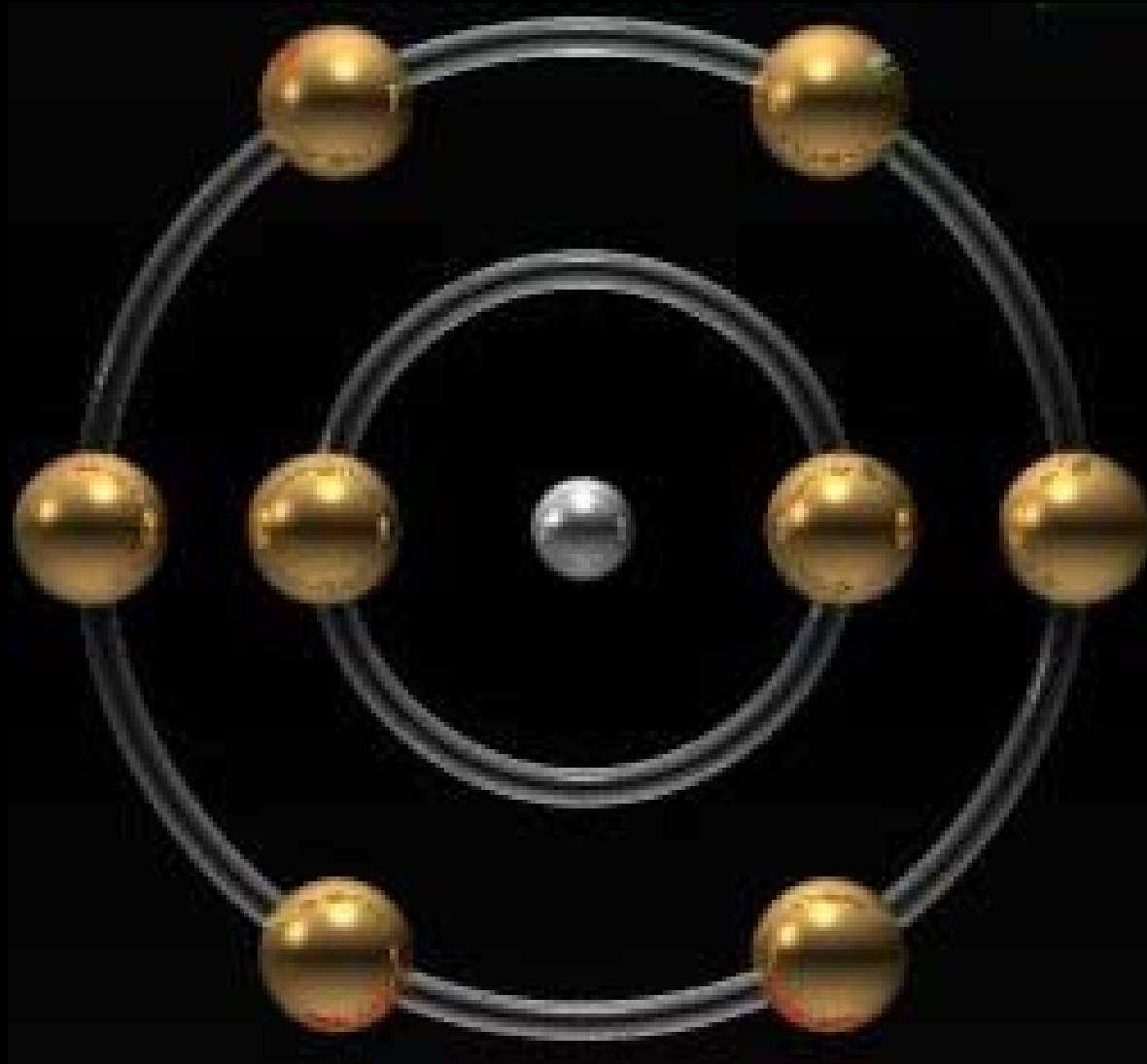
# January 1<sup>st</sup>

The earth is a boiling forming ball of fire!



April 1<sup>st</sup>

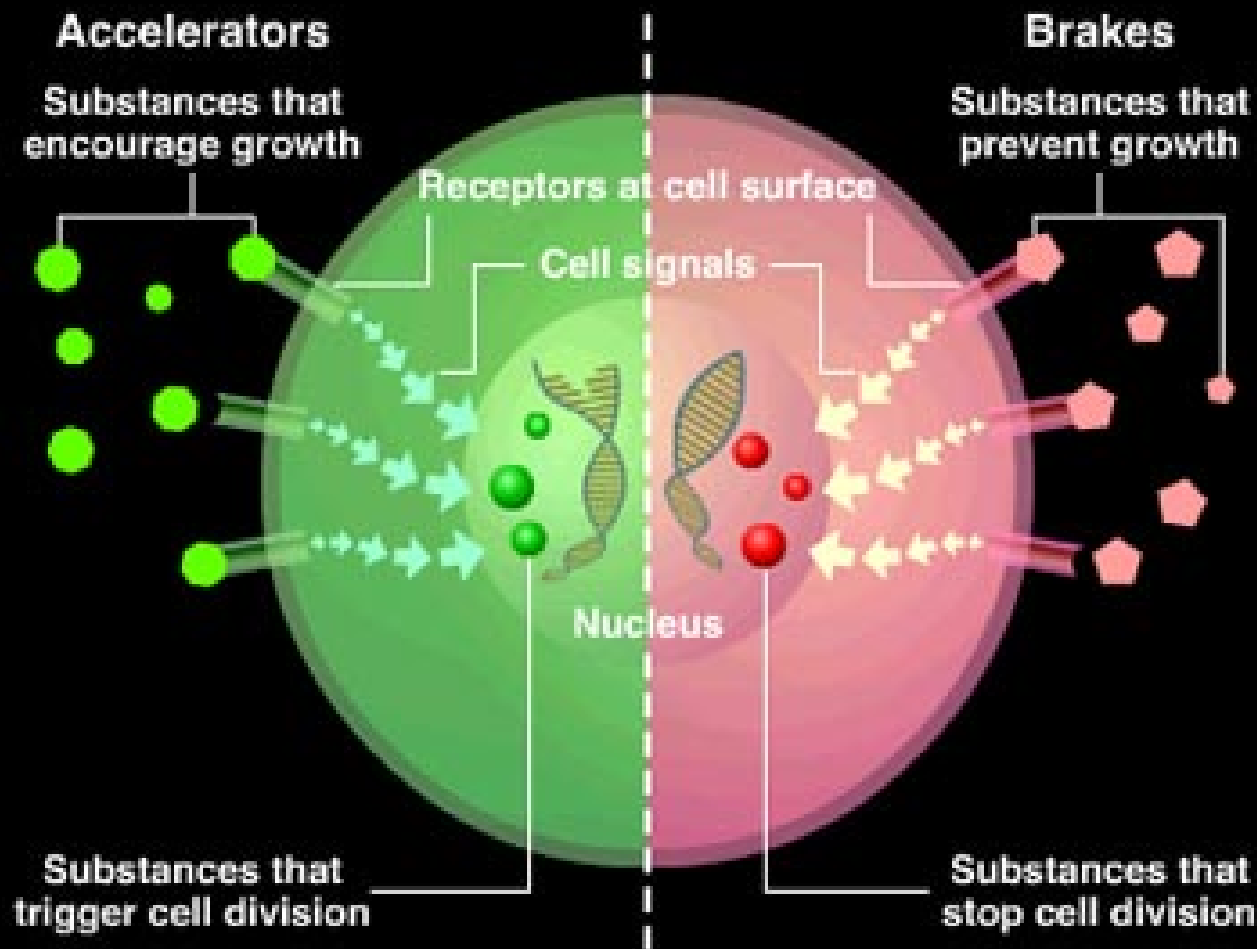
First life forms! Oxygen begins to appear!





October 31<sup>st</sup>  
Oxygen level reaches 20%!





November 2<sup>nd</sup>

First sexual response in life forms!

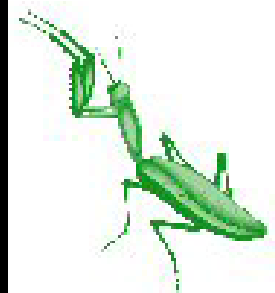
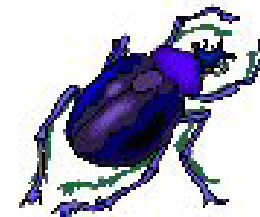
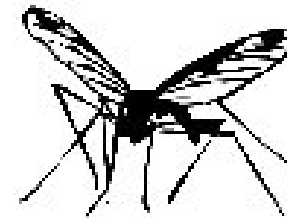
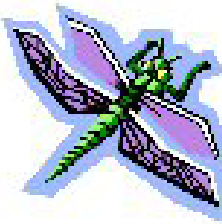
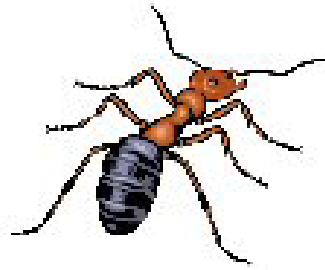
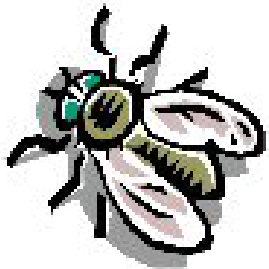
# November 3rd

Fish appear on the scene!



# November 13<sup>th</sup>

Insects appear on the scene!





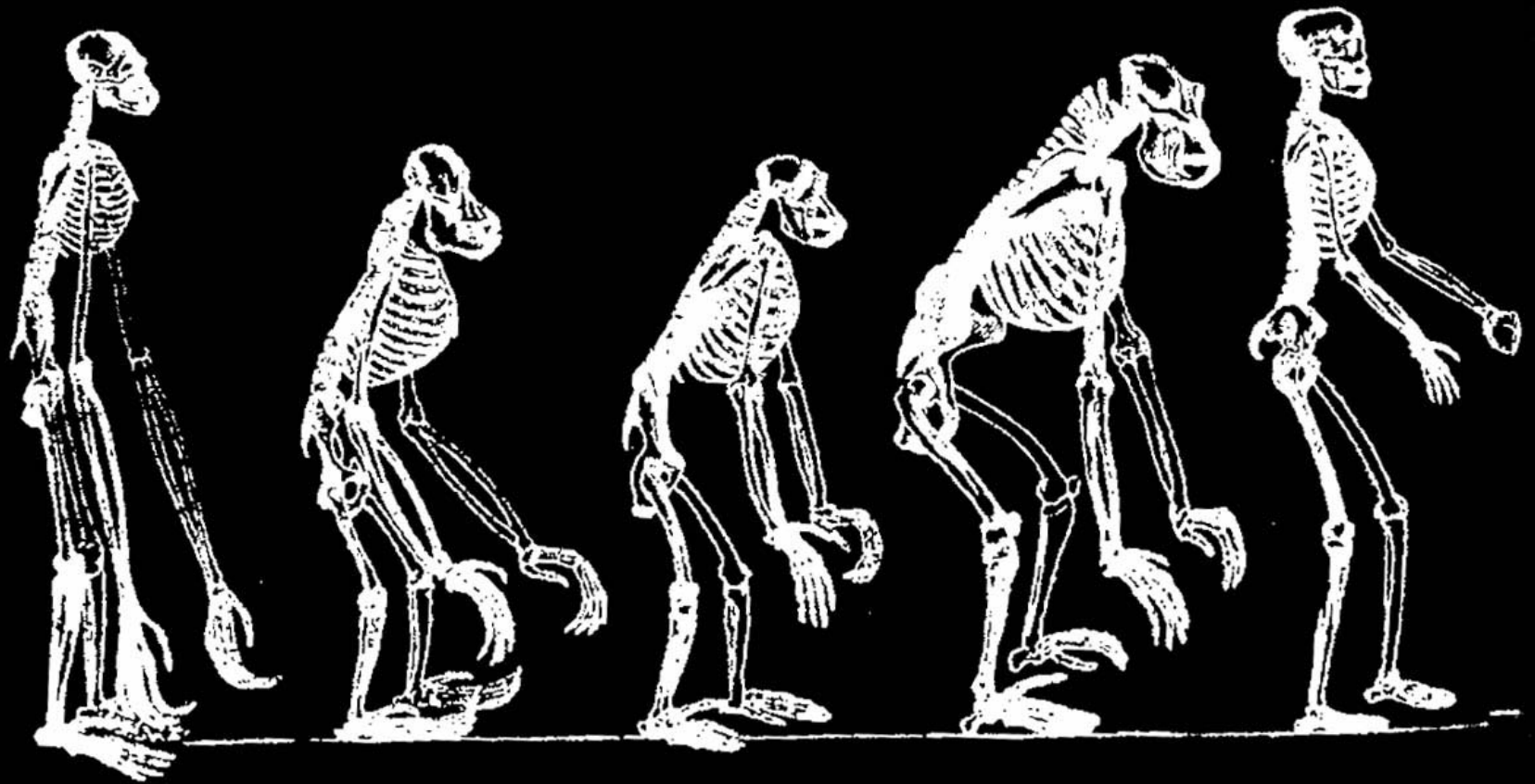
December 15<sup>th</sup>  
Dinosaurs appeared!



December 26<sup>th</sup>  
Dinosaurs Disappeared!

# December 31<sup>st</sup>

3 minutes before midnight  
human beings appeared!



Gibbon

Orangutan

Chimpanzee

Gorilla

Man



# December 31<sup>st</sup>

One minute before midnight  
farming appears!





December 31<sup>st</sup>

One second before midnight  
the steam engine is invented!





Your life span is approximately  $\frac{2}{3}$  of a  
second!

... And in addition,  
we are living in an  
age of transition...



# **In the history of human civilization, there have been only three waves of Transformation!**

- 1. Tribal hunting and gathering to agrarian society**
- 2. Agrarian society to the industrial revolution**
- 3. The industrial revolution to the information/knowledge age**

**We are now moving to the  
fourth wave:**

4. The information/knowledge age to the  
Intelligence/Innovation Age!



So, what is  
in the  
horizon for  
the Capital  
Projects  
Industry?



So, what is on the horizon?

# Prognostications



Predictions

Forecasts

Guesses







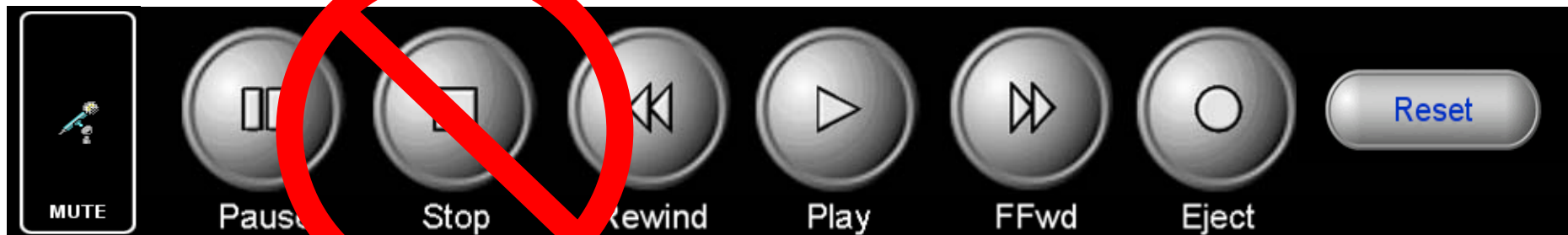
"It is said  
that the  
present is  
pregnant  
with the  
future."

Voltaire



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... And the Future arrives every second to "Play" as today's reality, and it does not have "Mute," "Pause," "Stop," "Rewind," "Fast Forward," "Eject," or "Reset" buttons....





***So, will YOU be able to ride the  
wave of the future...?***



*Or be dragged under by it...?*



# YOU have four choices:

- Are YOU going **to contribute to make the Future YOU want happen...?**
- Are YOU going **to just wait and see what Future will happen...?**
- Or, when whatever Future arrives:
  - Are YOU going **to ask “*what happened...?*”**
  - Or, are YOU just going **to say “*huh, something happened...?*”**



To face the future,  
we need to be...



# (1) Observant...

**The Future**

75/76H  
20Hz

6.0 R15 G55 C7 A3

S:NUCHAL/DATING

DVA: 49%

*... Particularly, of the  
serious and complex  
challenges we face...*



# Millennium Development Goals...





**End Poverty  
and Hunger**



**Universal  
Education**



**Maternal  
Health**



**Gender  
Equality**



**Combat  
HIV/AIDS**



**Child  
Health**



**Environmental  
Sustainability**



**Global  
Partnership**

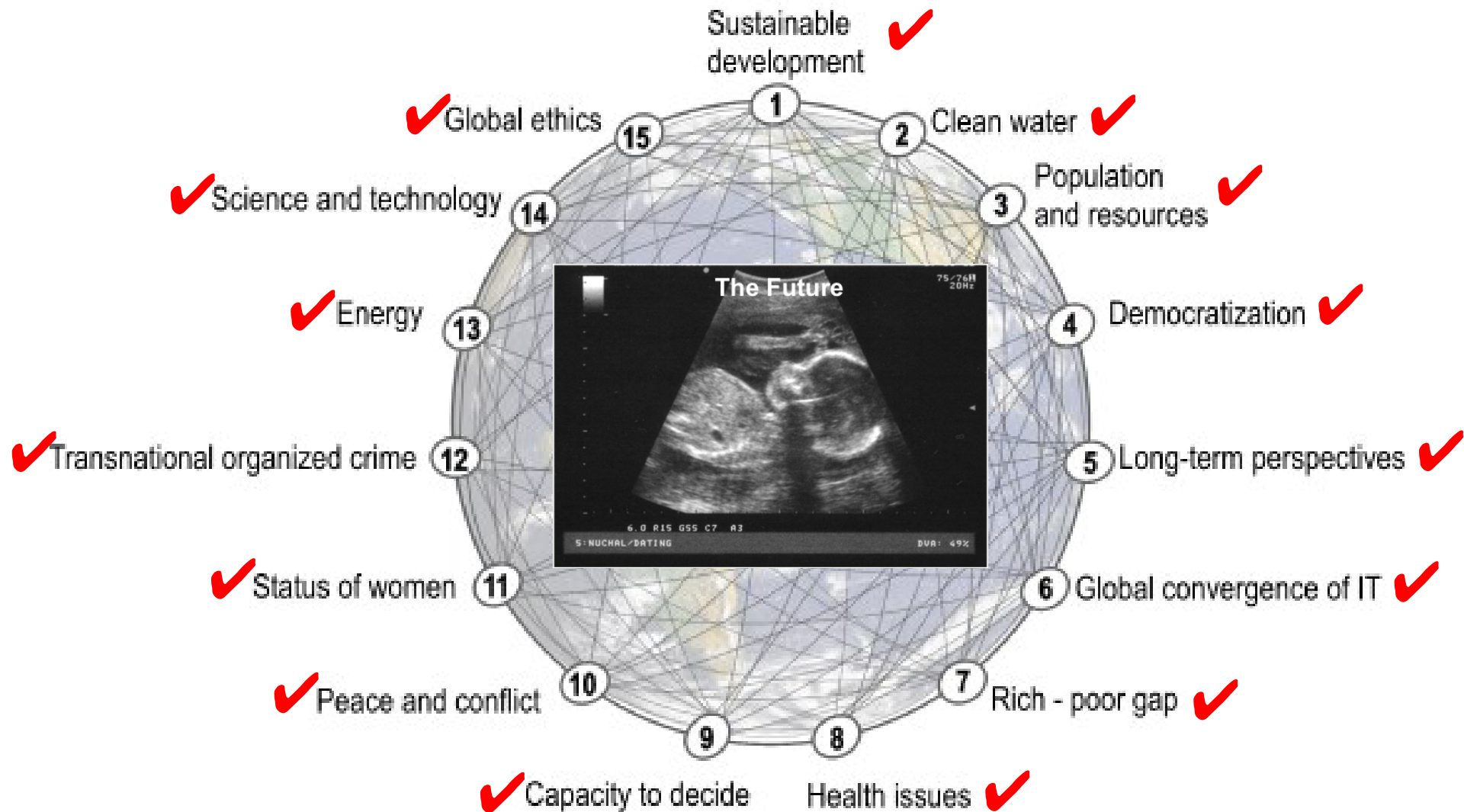


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# 15 Global Challenges for Humanity...





# The Grand Challenges for Engineering...



Make solar  
energy  
economical



Provide  
energy  
from fusion



Develop carbon  
sequestration  
methods



Manage the  
nitrogen cycle



Advance health  
informatics



Provide access to  
clean water



Engineer better  
medicines



Restore and  
improve urban  
infrastructure



Reverse-engineer  
the brain



Enhance virtual  
reality



Secure  
cyberspace



Prevent nuclear  
terror



Advance  
personalized  
learning



Engineer the tools  
of scientific  
discovery



# The 2030 Challenge to the Architecture and Building Community...



# The 2030 Challenge Targets

All new buildings, developments and major renovations shall be **designed** to meet a fossil fuel, GHG-emitting, energy consumption performance standard of 50% of the regional (or country) average for that building type.

## Carbon-neutral in 2030

(using no fossil fuel GHG emitting energy to operate).



At a minimum, **an equal amount of existing building area shall be renovated annually** to meet a fossil fuel, GHG-emitting, energy consumption performance standard of 50% of the regional (or country) average for that building type.

The **fossil fuel reduction standard** for all new buildings and major renovations shall be increased to 60% in 2010, 70% in 2015, 80% in 2020, and 90% in 2025.

# Doomsday Scenarios...



## QUARANTINE



XQUARANTINE

In 2019, Respiratory Distress Syndrome or ReDS is here, and it's not going anywhere. [Get the report.](#)

## GENERATION EXILE



XGENERATION EXILE

In 2019, our neighbors are refugees of climate and economic disasters who are looking for a place to live. [Get the report.](#)

## The Future



## RAVENOUS



XRAVENOUS

In 2019, the food chain is broken. So we're inventing new ways to feed ourselves. [Get the report.](#)

## OUTLAW PLANET



XOUTLAW PLANET

In 2019, the networks that we rely on to hold our societies together are being hacked, grieved, & gamed. [Get the report.](#)

## POWER STRUGGLE



XPOWER STRUGGLE

In 2019, we're all caught up in the "alternative fuel" wars as the world fights over what will take the place of oil. [Get the report.](#)



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# *Stark Realities...*



# REPORT CARD for **america's INFRASTRUCTURE**

★ HOME ★ REPORT CARDS ★ STATES ★ CATEGORIES ★ SOLUTIONS



## 2009 Grades

Aviation	D
Bridges	C
Dams	D
Drinking Water	D-
Energy	D+
Hazardous Waste	D
Inland Waterways	D-
Levees	D-
Public Parks and Recreation	C-
Rail	C-
Roads	D-
Schools	D
Solid Waste	C+
Transit	D
Wastewater	D-

America's Infrastructure GPA: **D**

Estimated 5 Year Investment

Need: **\$2.2 Trillion**

*And many more...*



To face the future,  
we also need to  
be...



## (2) Prepared...

**The Future**

75/76H  
20Hz

6.0 R15 G55 C7 A3

S:NUCHAL/DATING

DVA: 49%

***“It is not the strongest of  
the species that survives,  
nor the most intelligent,  
but the  
one most responsive  
to change.”***

*“If you don’t like  
change, you’re  
going to like  
irrelevance even  
less.”*

Change is  
hardest on  
those caught by  
surprise!





*We live in a surplus  
society...*



“The ‘surplus society’ has a surplus of similar companies, employing similar people, with similar educational backgrounds, coming up with similar ideas, producing similar things, with similar prices and similar quality.”

“The short road  
to ruin is to *emulate*  
the methods of your  
adversary.”

***“To grow, companies need to break out of a vicious cycle of competitive benchmarking and imitation.”***

W. Chan Kim & Renée Mauborgne  
“Think for Yourself —Stop Copying a Rival”  
Financial Times/08.11.03



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*“Beware of the tyranny of making Small Changes to Small Things. Rather, make Big Changes to Big Things.”*

So, what big  
changes lie in the  
future for the  
capital projects  
industry?



There is a **Perfect Storm**  
brewing within the  
Capital Projects  
Industry...



The  
**HOW...**

The **WHAT...**

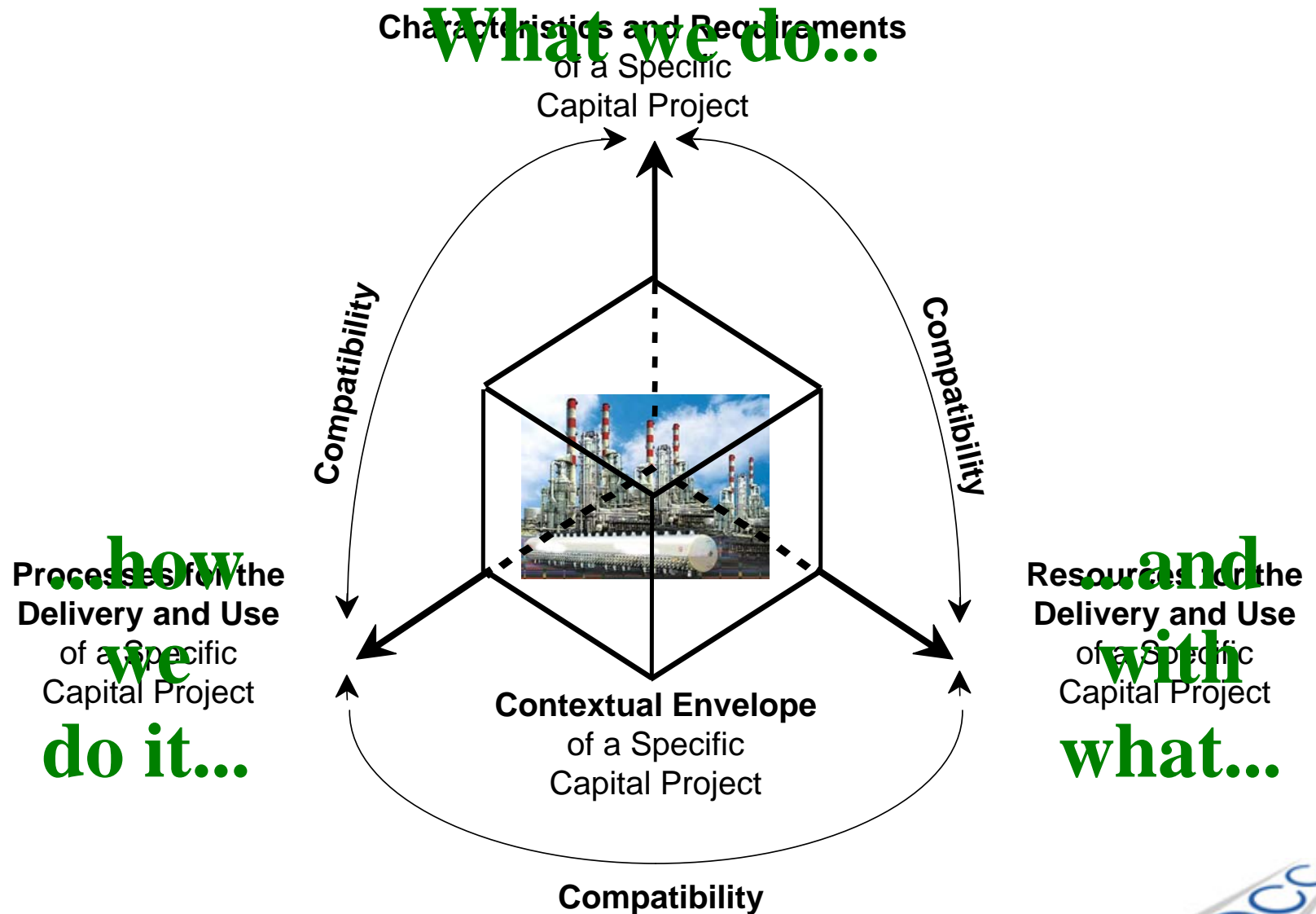
Capital  
Projects  
Industry

The  
**WITH  
WHAT...**

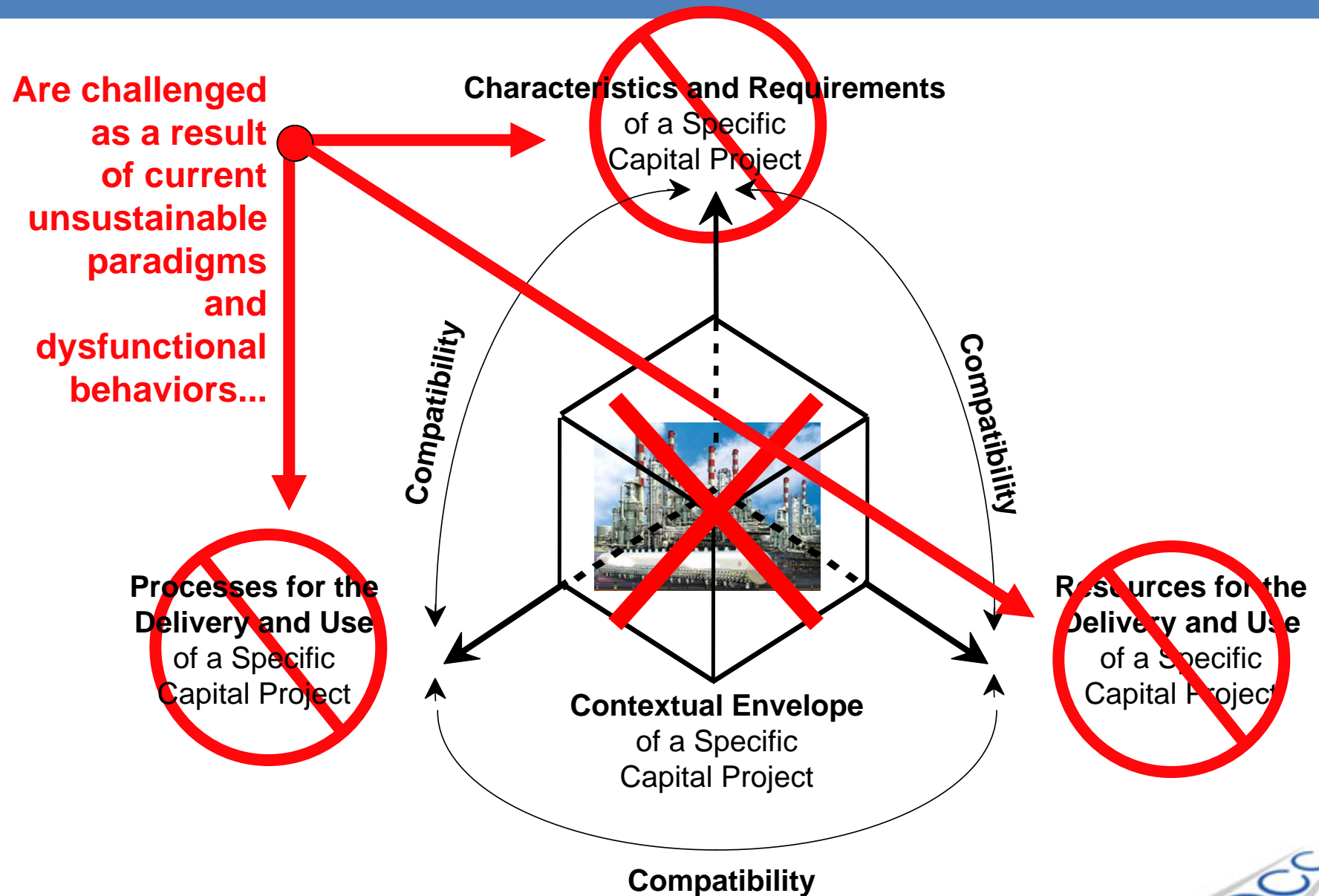
Are **ALL** being challenged and  
**WILL CONTINUE** to be challenged even more in the future...



# In other words...



# In other words...



So we will see more advances in ...

**Sustainability**  
(in **WHAT** we do...)

Characteristics  
of Specific  
Capital Projects



**Lean  
Project**

**Delivery**  
(in **HOW** we  
do what  
we do...)

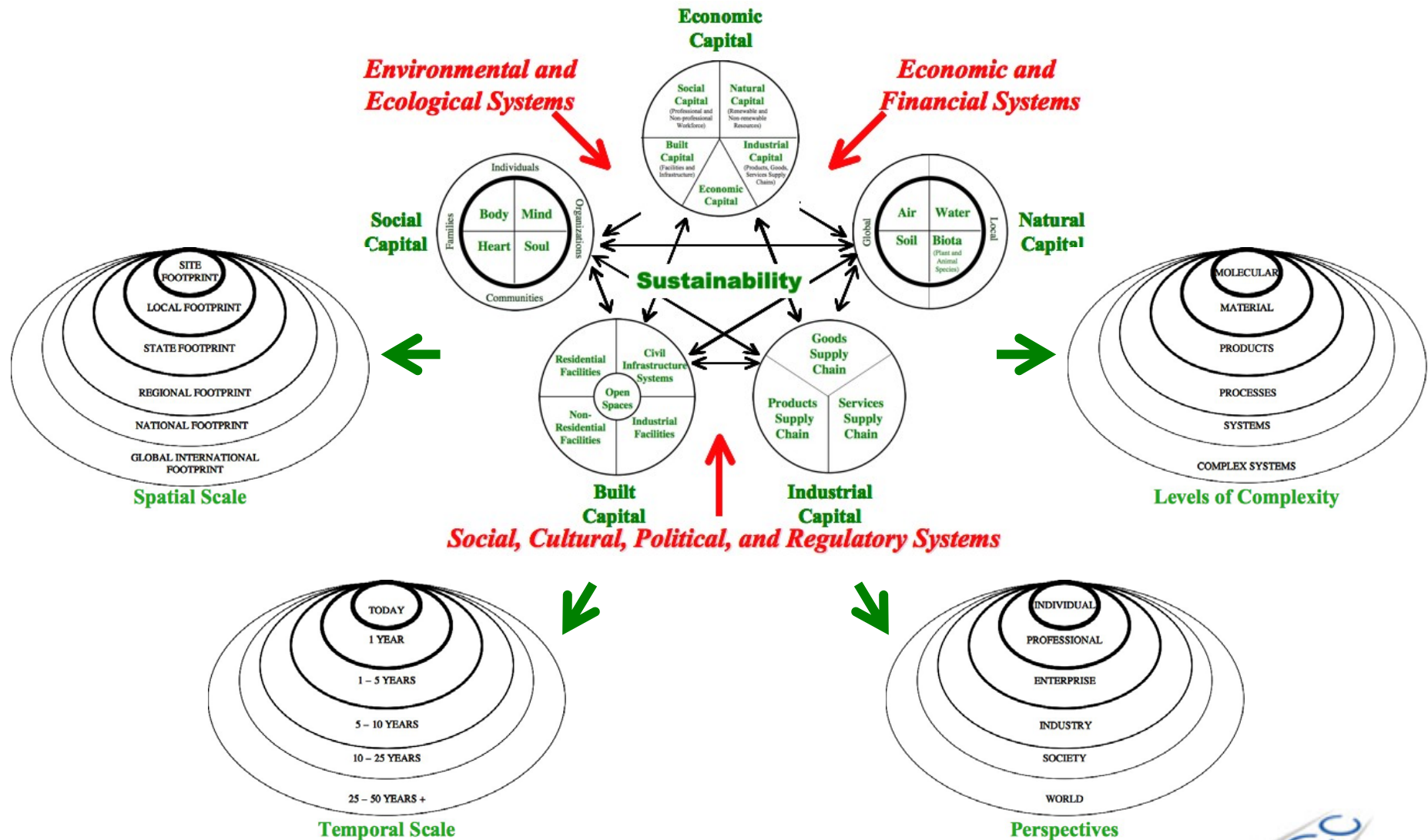


**Fully  
Integrated  
and**

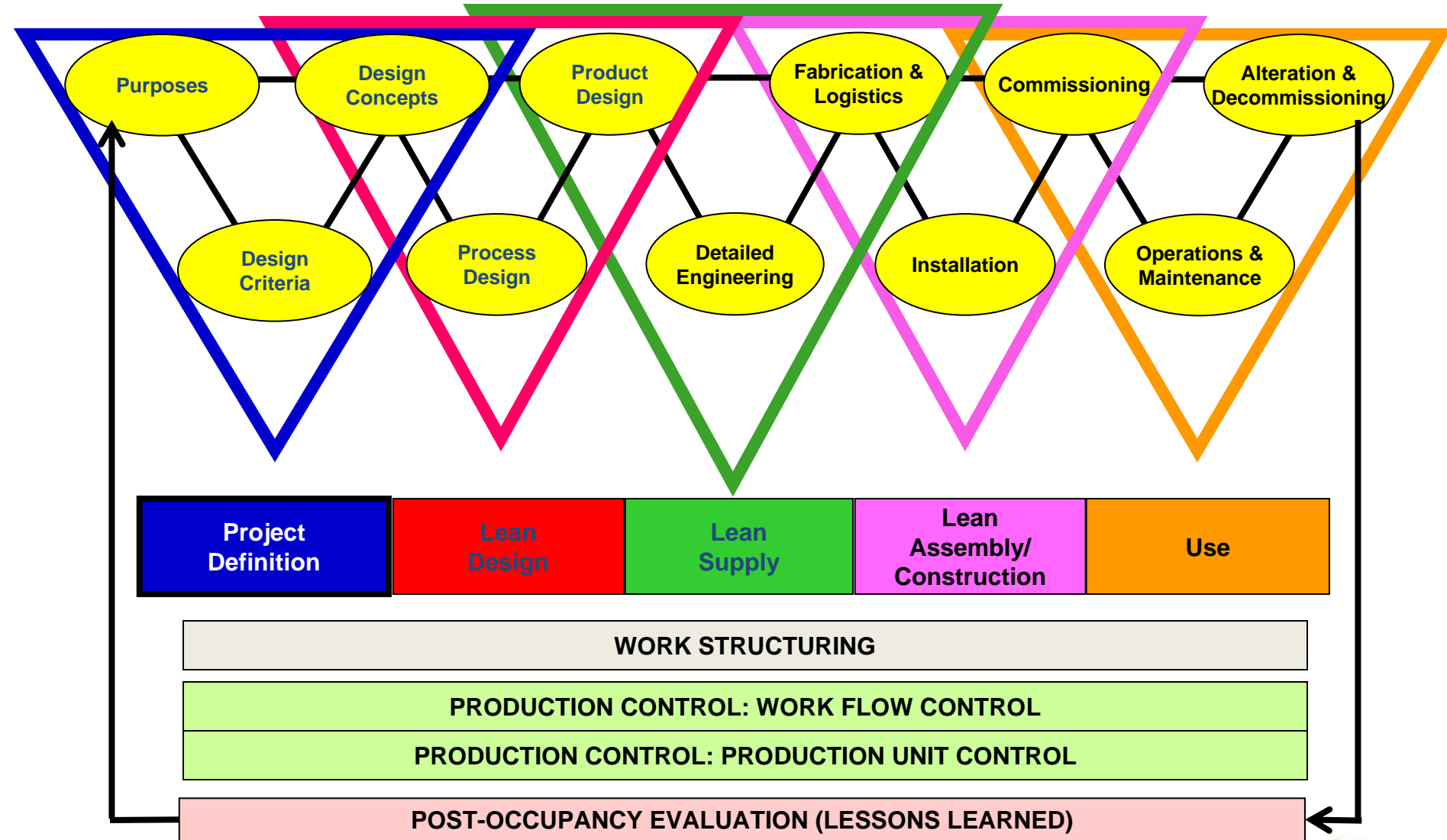
**Automated  
Technologies**  
(in **WITH WHAT**  
we do what  
we do...)



# Sustainability...

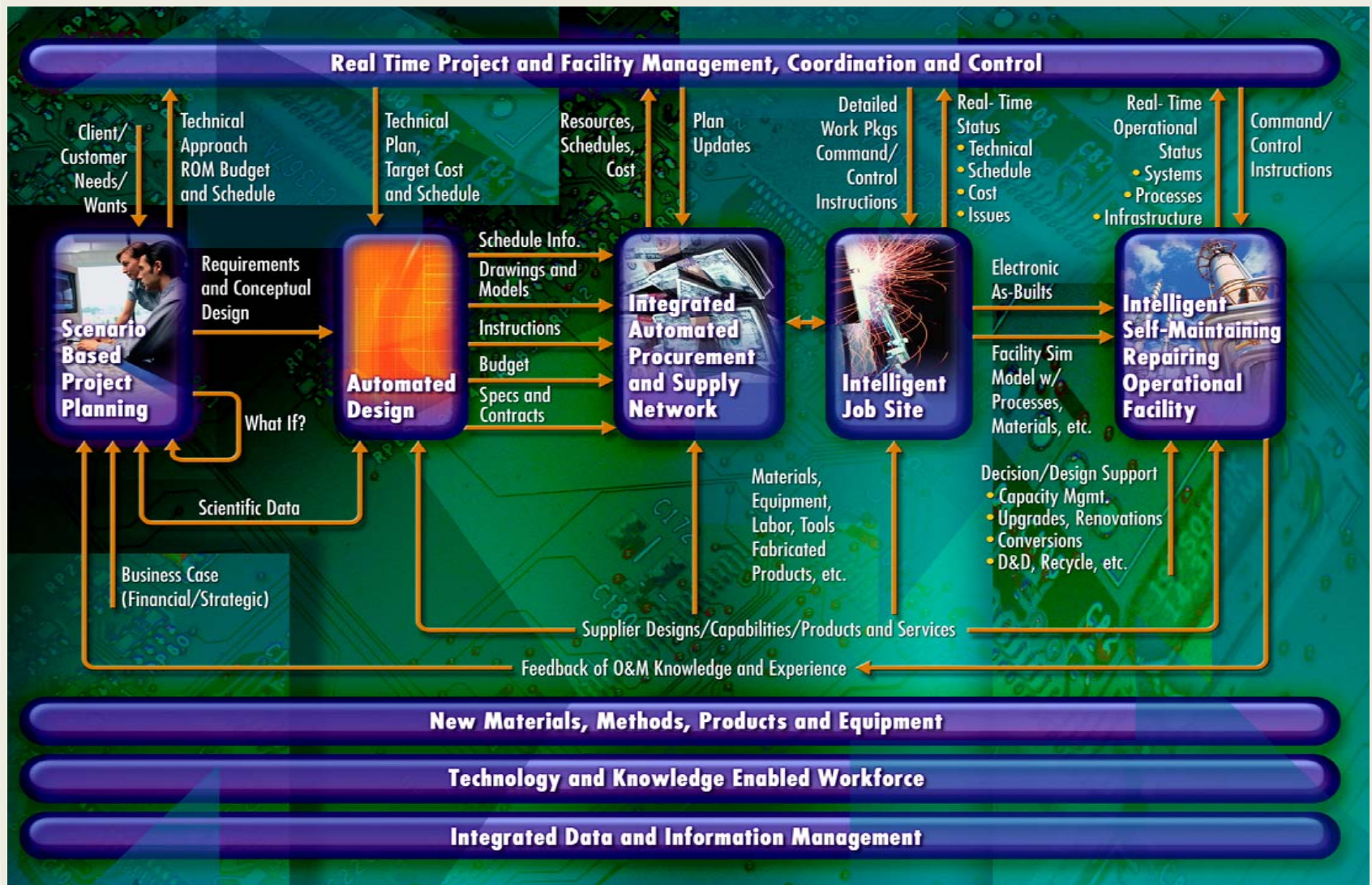


# Lean Project Delivery...



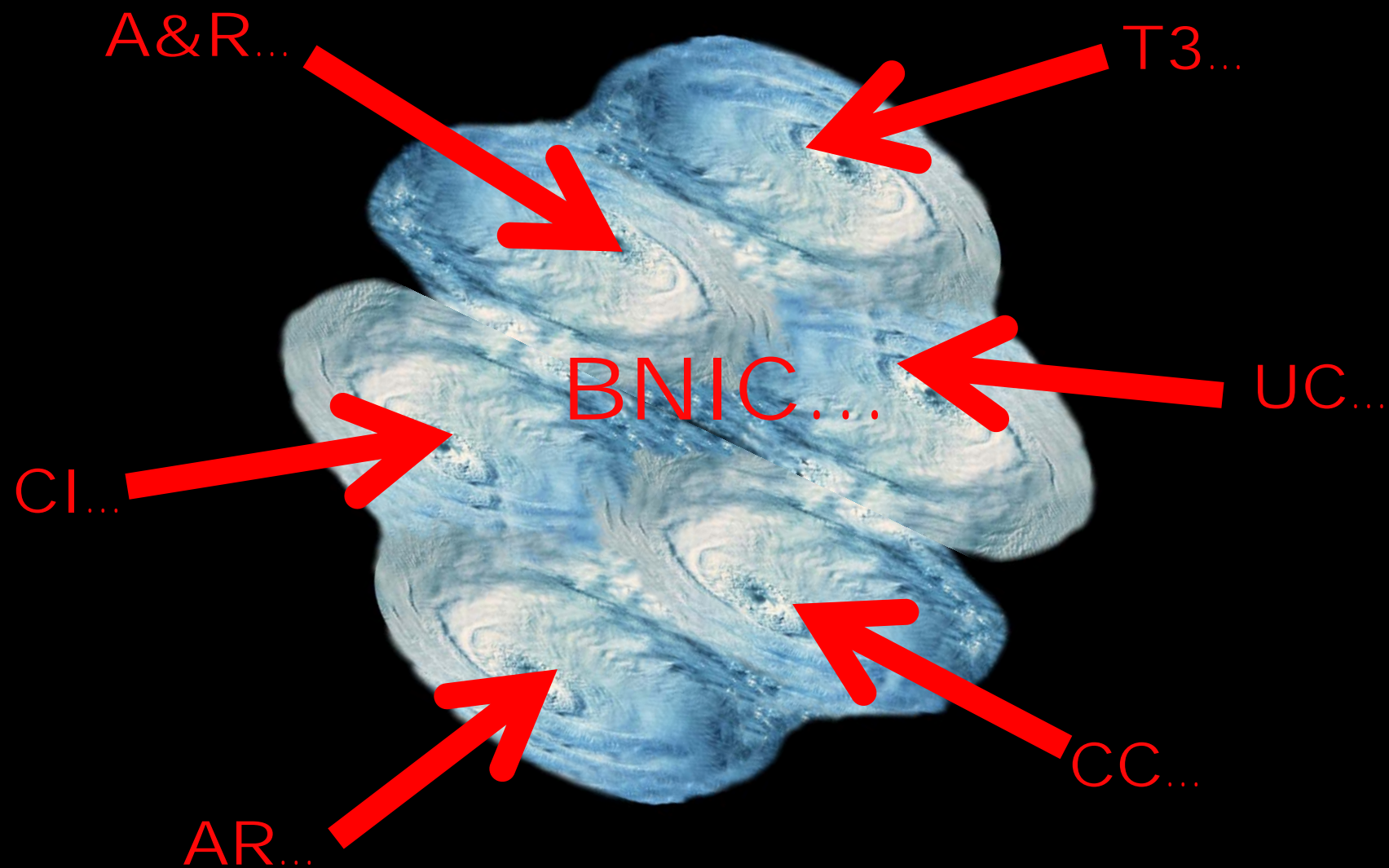


# Fully Integrated and Automated Technologies...



But, these developments  
pale in comparison with  
the **Super Storm** brewing  
outside the Capital  
Projects Industry...

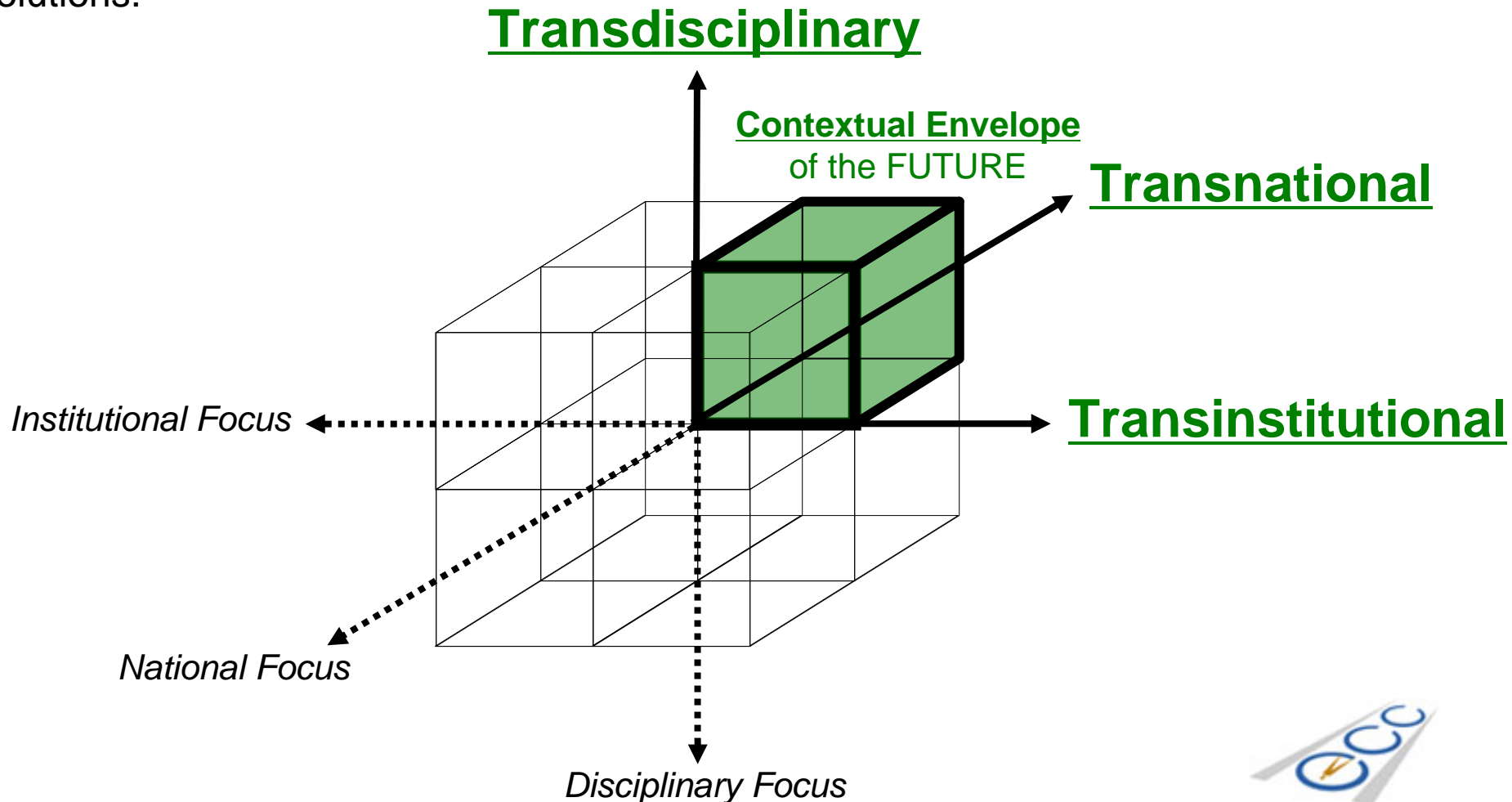






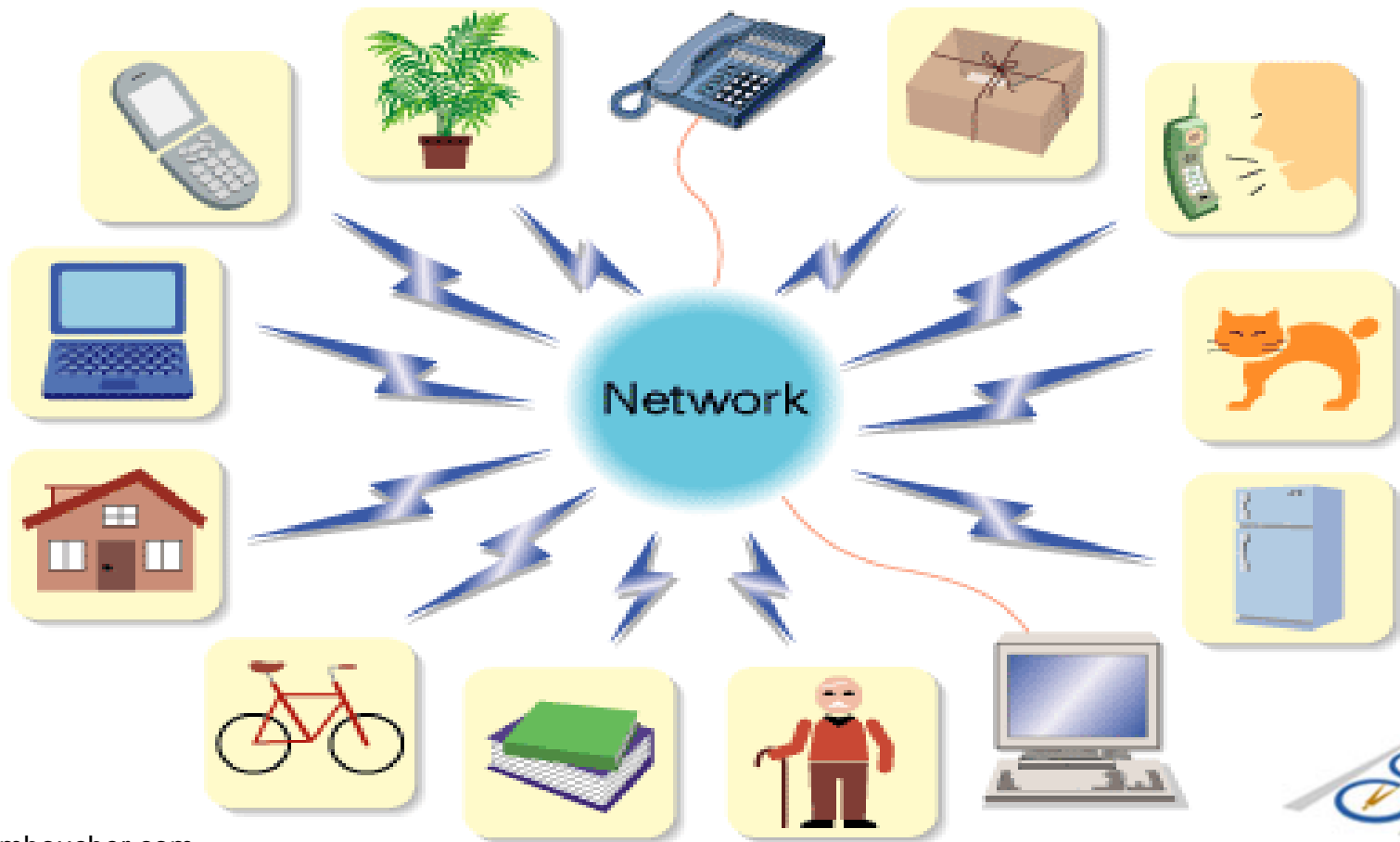
# (1) T3...

Transdisciplinary, Transinstitutional, and Transnational: Eliminating the artificial boundaries among **disciplines** and **knowledge domains**, **institutions** (public and private), and **nations**, in the pursuit of solutions.



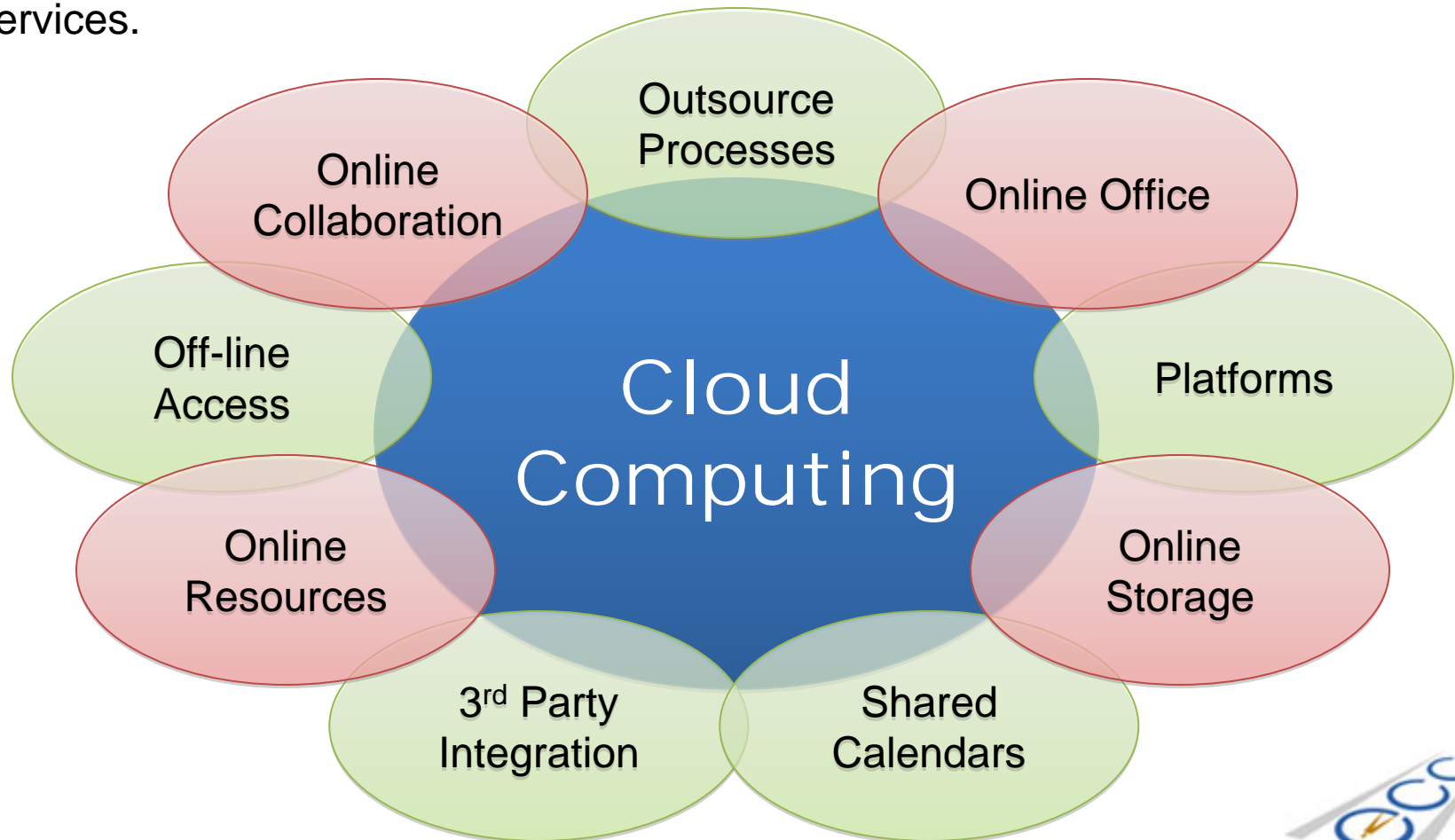
## (2) UC...

**Ubiquitous Computing:** Making many computers available to a user throughout the physical environment, while making them effectively invisible to the user, enabling the user to **remotely interact** with people and the natural, built, and virtual environments; **remotely monitor, collect**, and **access** data, information, knowledge, experience, and wisdom; and **remotely control** devices.



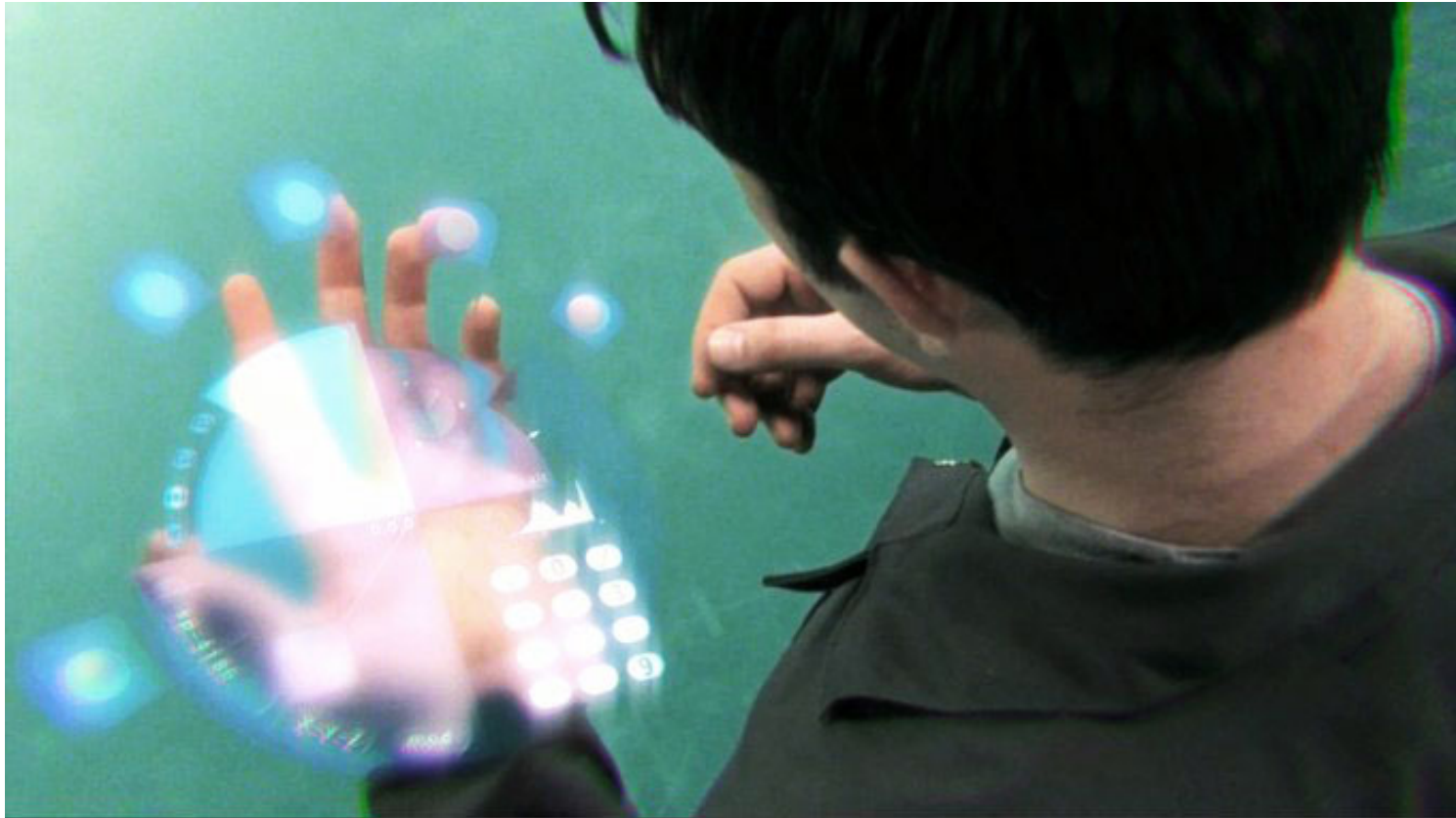
# (3) CC...

**Cloud Computing:** A style of computing in which capabilities related to Information Technologies (IT) are provided to users “**as a service**” allowing them to access technology-enabled services from the Internet (“**in the cloud**”) without requiring knowledge of, expertise with, or control over the technology infrastructure that supports the services.



# (4) AR...

**Augmented Reality:** A term for a **live direct** or **indirect view of a physical real-world environment** whose elements are merged with, or *augmented* by **virtual computer-generated imagery**, creating a mixed reality.

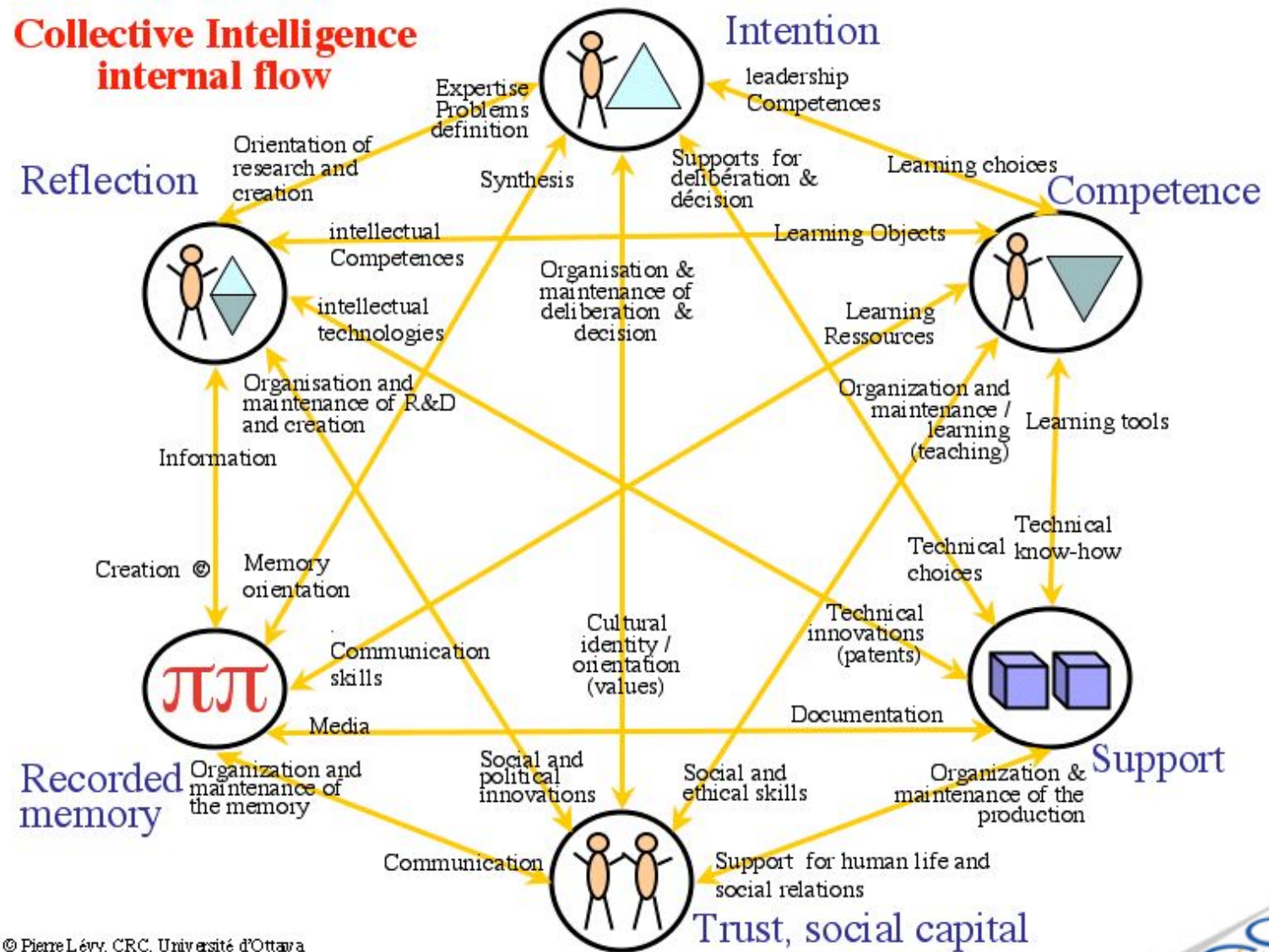


# (5) CI...

**Collective Intelligence:** A **shared** or **group intelligence** that emerges through **collaboration**, **innovation**, and **competition**, from the capacity of human communities to evolve towards higher order complexity and integration, which (1) appears in a wide variety of forms of **consensus decision making** in bacteria, animals, humans, and computer networks; and (2) is studied as a subfield of **sociology**, of **business**, of **computer science**, of **mass communications**, and of **mass behavior** – from the level of quarks to the level of bacterial, plant, animal, and human societies.



# In other words...





# (6) A&R...

**Automation and Robotics:** The application of **science, engineering, and technology** (particularly **electronics, mechanics, control systems, computer-aided technologies, hardware and software, and artificial intelligence**), in the design, manufacture, and application of **autonomous devices and robots for industrial, consumer, or entertainment use**, which reduce the need for human sensory and mental requirements, and which perform tasks that are too dirty, dangerous, repetitive, or dull for humans.



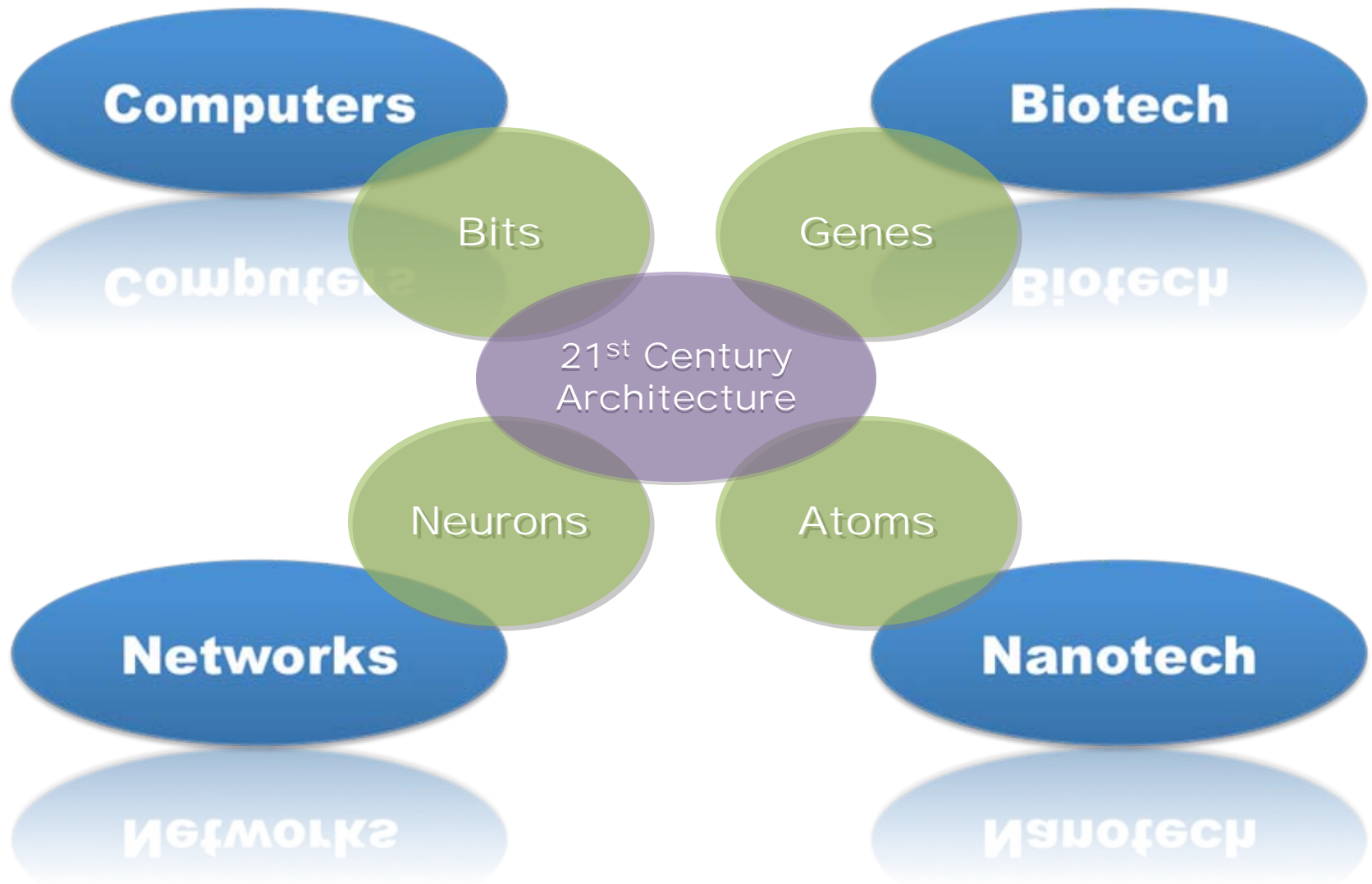
# And finally, (7) NBIC...

**Nano-Bio-Info-Cogno Convergence:** The synergistic combination of four major provinces of science and technology, each of which is currently progressing at a rapid rate: (1) **nanoscience** and **nanotechnology**; (2) **biotechnology** and **biomedicine**, including **genetic engineering**; (3) **information technology**, including **advanced computing** and **communications**; and (4) **cognitive science**, including **cognitive neuroscience**.





# In other words...



In closing, let me  
leave you with two  
thoughts...



With respect to the future,  
is the Capital Projects  
Industry **OBSERVANT...**?



*Or, is it a “boiling frog”...?*



Is the Capital Projects  
Industry **PREPARED...**?



*Or, will it be caught by surprise...?*



# Your call...









# Thank you...

[jvanegas@tamu.edu](mailto:jvanegas@tamu.edu)



And now, Professor  
Rodney Hill...



# Forum

## The Present and Future Perfect Storm

**Panelist:**

**Rodney Hill, Professor**



# What is the future for the construction Industry?



The future belongs to  
people who see  
possibilities before they  
become obvious.

Ted Levitt



World population is expected to peak at 9 Billion by 2050.

The United Nations estimates a 50% increase in population within 4 decades. We are approaching the limit of our food and water supply.



If you began building 40 cities of  
2 million people a year for the  
next 40 years, you would meet  
the needs of the population  
increase by 2050.



This is an unprecedented era of accelerating change in human existence where the past will no longer predict the future.





Currently, there exists no system that can feasibly plan & create the infrastructure for those cities or a construction system to build cities at that speed.



“The hypercompetitive  
business environment  
demands new emphasis on  
rewarding speed,  
creativity, and innovation  
within the workforce.”

Cetron and Davies

You can't do today's job  
with yesterday's  
methods and be in  
business tomorrow!



The **twentieth century** alone features more turning points in the history of mankind than the previous **five centuries** put together!



When people think of a future period, they intuitively assume that the current rate of progress will continue for future periods.

We assume that progress changes at the rate that we have experienced recently.



At the 2009 rate of change, the entire 20th Century would take place in 25 years.



Twentieth-century  
solutions executed with  
twentieth-century  
speed will not solve  
twenty-first-century  
problems.





Presently there are over a billion people living in shadow cities around the world and another billion will be living in shadow cities in 10-15 years.



There is no more fresh water in the world today than 2000 years ago when the population was 3% of the present!



Water will become a more pressing problem than oil, and the quantity, quality and distribution of water will pose significant scientific, technological and ecological difficulties as well as serious political and economic challenges.



As of last year, for the first time  
in history, there was no world  
food surplus.



Oil supplies are expected to peak  
in the next 10-15 years & raw  
materials will be sought after  
and in demand more than  
anytime in the history of  
mankind.



Thus.....



# The Perfect Storm



# Water





# The link between water, food and energy is strong!

The average human drinks 4 liters of water per day while 500 times as much water is required to produce our daily food totals.



Governments have failed to limit pumping to the sustainable yield of aquifers and water tables are now falling in countries that contain more than half the world's people, including the big three grain producers:  
**China, India, and the US.**



If the vast aquifers in Saudi or the arid southwestern US are depleted, the loss of irrigation water means the end of agriculture.



**The World Bank foresees**  
**“Catastrophic**  
**consequences for future**  
**generations”** unless water  
use and supply can quickly  
be brought back into  
balance.



“Two out of every three people  
in the world will be facing water  
shortages by 2025...  
global conflict will inevitably  
result...”

United Nations



It takes 1,000 tons of water to make a ton of wheat worth \$200 and only 14 tons of water to make a ton of steel worth \$560.

**Countries concerned with expanding the economy and creating jobs have chosen industry.**



Major cities are taking water  
from agriculture to meet the  
needs of growing cities.

**Mexico City, Cairo, Beijing, San  
Diego, Los Angeles, Las Vegas,  
Denver and El Paso.**



Farmers surrounding the major cities have found that the price of water far exceeds the value of the crops they can produce.

**Cities are buying water rights from farmers and ranchers.**

The highly productive land owned by these farmers will become wasteland.





**Slowly but surely, fast-growing cities are siphoning water from the world's farmers even as they try to feed some 70 million more people each year.**



Because of falling water tables, conversion of cropland to non-farm uses and industrialization, China's grain harvest is falling.



175 million Indians  
are fed with grain  
produced with water  
from irrigation wells  
that will soon go dry!



By 2010, half of India's population will have to survive on just five gallons of water per person per day for all uses.



The over-pumped  
aquifers in Iran which  
have gone dry has  
created a flow of water  
refugees.



The accelerating depletion  
of aquifers means the day  
may come soon, creating  
potentially unmanageable  
food scarcity.



Many smaller rivers in the world  
have disappeared and major rivers  
are on the endangered list.

**The Colorado in the US southwest,  
the Yellow in China, Indus in  
Pakistan, the Nile in Egypt and the  
Ganges in India.**

**How about the Rio Grande in  
Texas?**



The Nile Valley is one of the most fertile lands in the world but because of the shortage of water, Egypt now imports over half of the wheat it needs.





Egypt, Ethiopia and Sudan are entirely dependent for its water on the Nile River, which is reduced to a trickle as it enters the Mediterranean. **Population in these three countries is projected to climb to 264 million in 2025 from 167 million today.**



The European Parliament estimates that 70% of the Continent's drinking water contains dangerous concentrations of nitrate pollution.



Contaminated water is implicated in 80% of the world's health problems. **An estimated 40,000 people around the world die each day of diseases directly caused by contaminated water.**



Contaminated water results in  
the occupancy of 50% of all  
hospital beds in developing  
countries.



**By 2040, at least 3.5 billion people will run short of water.**

By 2050, fully 2/3's of the world's population could be living in regions with chronic shortages of water.



Can engineers and contractors  
take the lead in rain water  
harvesting, cisterns and  
conservation?

**What opportunities can this  
present?**



How can you reinvent your  
company and role in an  
accelerating future?



# Global Food Supply





Importing grain has become the most efficient way to import water. **In effect, countries are using grain to balance their water books.** Similarly, trading in grain futures is in a sense trading in water futures.



**The countries that are financially the strongest will fare best in the grain markets/water markets.**



Many of the Middle Eastern countries are buying rich farm land in areas of the world where the rainfall is plentiful. **All of the food produced will go back to the Middle East.**



South Korea just leased 125,000  
acres of fertile land from Russia  
to meet their food needs!



To adequately meet human nutritional need over the next 40 years, global agriculture will have to supply the same amount of food that was previously produced throughout the entire history of humanity.



There has been no growth in the world grain harvest or world fish catch since 1990. **In a two year period from 1994 to 1996, China shifted from being a net grain exporter of 8 million tons to being a net importer of 16 million tons- a 24 million ton swing.**

**Almost the entire world surplus of grain.**



China is reducing rice production  
to redirect the water to its  
growing population.

**2 weeks ago rice prices  
increased by 30%.**

Last year average food prices  
went up by 50%



To alter the diet of China and have China consume seafood at the level of Japan, it would need 100 million tons a year:  
**the current world catch.**





China, Egypt, Cambodia and India have banned exporting grain.

**Restrictions in Kazakhstan, Russia, Ukraine and Argentina have closed a third of the global wheat market.**



**The potential benefits of GM food should be dead obvious to all.** It is possible to grow bountiful crops on marginal lands.



Designer plants could make deserts bloom, detoxify ruined soils, return scarce rangeland to nature, eliminate malnutrition , and abolish hunger for a future population of 10 billion or so.



For the first time in decades  
there was no surplus food in the  
world markets.

Look for food prices to increase  
by 3 to 5 times the present  
prices in the coming years.

The Arlington Institute



Three separate factors are converging to drive food prices up.

**Over the next forty years, population will grow by 3 billion.**

Within 10 years the developing countries will be eating 40% more meat and more grain will be shifted to animals. **Grain prices will go up and the global poor will starve.**



It is predicted that temperatures will rise 3.6F this century and that means a twelve to twenty percent fall in global food production.



The price of food relative to average income is heading for levels that have not been seen since the early 19th century, and it will not come down again in our lifetimes.

Gwynne Dyer, Ph.D, Global Business Network



The average US household  
spends 10% of annual income on  
food.

**The World Bank forecasts the  
average US household will  
spend 25% of annual income on  
food within ten years.**





# Energy & Building Materials



If China consumes oil at the rate of the US by 2030, they would use 99 million barrels of oil a day.

**The world currently is producing 84 million barrels a day.**

**The Futurist, July 2006**



As of August of 2009,  
China is consuming ½ of  
the oil production of  
Saudi!



The International Energy Agency  
said that oil supply was falling faster  
than expected and will force up  
prices to record levels and increase  
the west's dependence on oil cartel  
Opec within five years.

**Gas will reach the same shortage  
within ten years.**

Financial Times, July 10, 2007

At the International World  
Economic Summit in Davos in  
2008, oil was predicted to reach  
\$500 a barrel by 2020.



China was one of the largest exporters of coal until last year when it imported 16 million tons of coal.

**It created six storage facilities to stockpile existing domestic coal production. China has enough stockpiled for 4 decades.**



China is buying up coal mines around the world and investing in oil and energy companies in every continent in the world.

Wall Street Journal, August 21,2009



The demand for metals are predicted to double in demand over the next ten years.

**The global supply chain will be altered dramatically in an accelerating future for materials and energy.**





China has 95% of the world's  
rare earths.

**Rare earths are used in green &  
high technology products.** China  
announced on Sept. 4, 2009, that  
they were restricting the export  
of rare earths.



**China has been the  
fastest growing  
economy in the world  
since 1980.**



In less than 10 years  
India's economy will  
surpass that of the  
UK!



India is projected to have  
an 8% growth rate this  
year!

Financial Times, July 10, 2009



# Growth forecasts for 2009

China-9.8%

France-1.9%

Japan-2.0%

US-2.7%

Germany-1.9%

UK-2.0%

Financial Times, Jan. 28, 2009

Among the five basic food,  
energy and industrial  
commodities-grain, meat, oil,  
coal, and steel consumption in  
China has eclipsed that of the US  
in all but oil.

The Futurist, July 2006

Chinas consumption  
of steel is two and a  
half times that of  
the United States.

China's highway  
system will be  
larger than  
America's by  
2020!



Many countries are just now facing up to the state of declining infrastructure in their countries as massive new construction projects are competing for attention.



China is planning to build 20 new major cities each year for the next 14 years. **The ones it already has are growing by 13 million to 15 million people annually.** 300 million farmers will move from the countryside in the next 20 years.

Andrew Zolli, Fast Company, March 2007



China announced that  
they are building 79  
regional airports in the  
next five years.



World oil has peaked but  
population has not. **Between  
2040-2050 world population will  
increase 50% from today's  
population.**

What will be tomorrow's energy  
source?



# Population



In the 18th century, we added a few days every year to human longevity. During the nineteenth century we added a couple of weeks each year and now we're beginning to add 3+ months to each year this century.



People born in the 1990's can possibly live to be 110-120 years old. With new genetic and nanotechnology discoveries, you could work, stay healthier & live even longer.



With the previous scenario,  
population on the earth will  
reach beyond the 50% increase  
mark predicted for 2050.

**Can the earth sustain even a  
50% increase?**





**With the increase in population  
& the cost of energy, mass  
transportation will be mandated  
and supported by governments.**



# Technology Wild Cards



**We used to live in a domino world in which one change logically caused the next. Now we have entered a chain reaction world of exponential shifts.**

Interconnection means that our problems and opportunities are intimately linked.



Intel's computer chips in 1965 held a few dozen transistors.

Today, Intel's high-end chip contains more than 1.7 billion transistors. **That number is expected to exceed 10 billion by 2012.**

Technology Review, July, 2005



Researchers in Israel have  
fashioned a bio-computer out of  
DNA that can handle a billion  
operations per second with  
99.8% accuracy.

**A trillion of these bio-computers  
can fit in a test tube.**



By 2014, iPod will hold  
the contents of the  
Library of Harvard  
University.



By 2017, iPod will  
contain the Library of  
Congress.



**The military has funded MIT to  
develop internet in the brain by  
2018!**





It is estimated that ***all*** the technological knowledge that is known today will comprise only 1% of all the technological knowledge available by the year 2030!

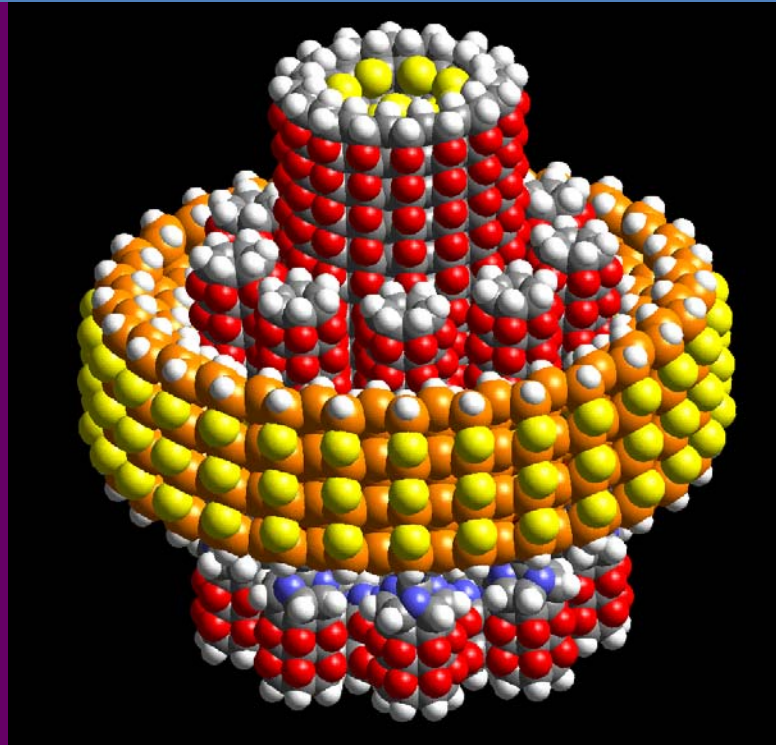


Two thirds of the jobs that will  
be available in the world by 2020  
haven't been invented yet!



Last week, the US said there was  
a shortage of highly skilled  
workers who can deal with the  
new emerging technologies.





**Nanotechnology is frequently described as a technology with the potential to capsize the established order.**



# Nanotechnology

Designing and building machines in which every atom and chemical bond is specified precisely.



“The nanotechnology revolution will enable us to redesign and rebuild-molecule by molecule-our bodies and brains and the world with which we interact, going far beyond the limitations of biology.”

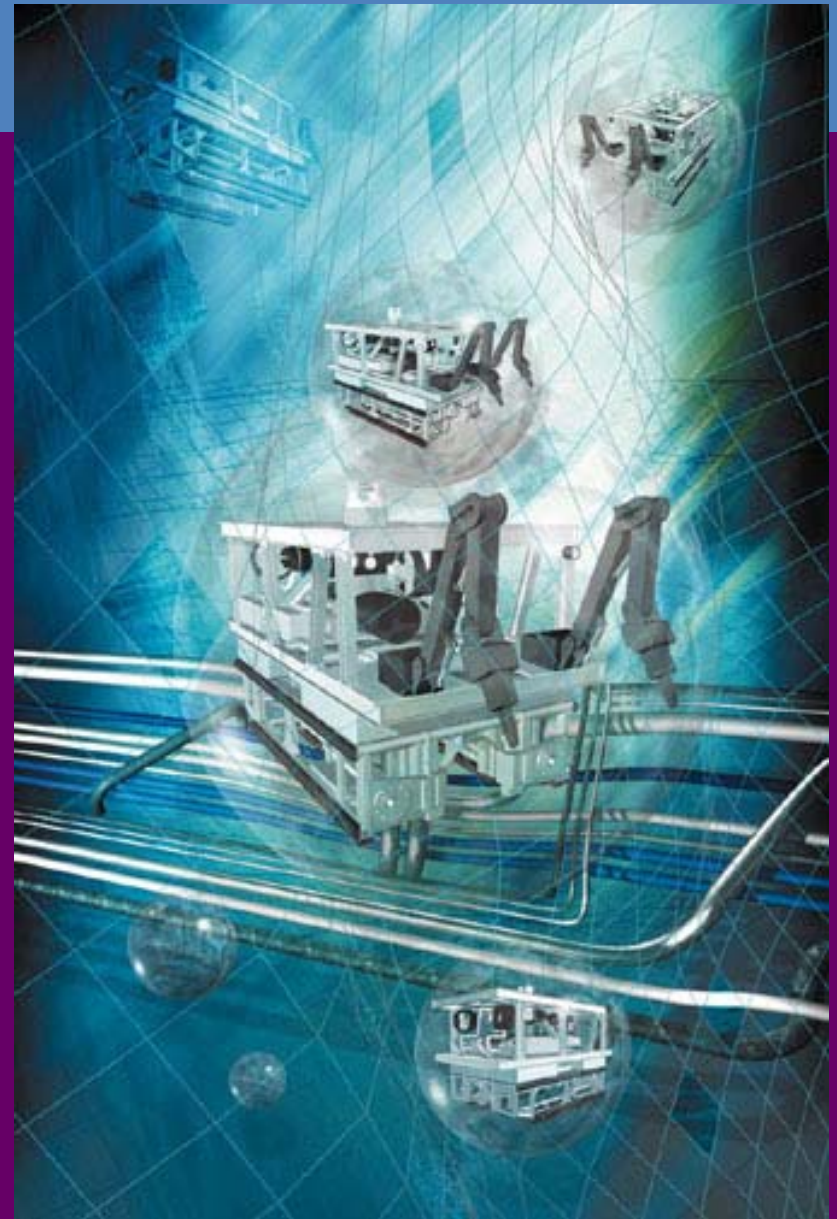
Ray Kurzweil, Futurist, March, 2006



Nanobots injected in our bloodstream will destroy pathogens, correct DNA errors, eliminate toxins and perform many other tasks to enhance our physical well-being.

Ray Kurzweil, Futurist, March, 2006

Biotechnology,  
nanotechnology  
and artificial  
intelligence  
have become  
engines of the  
global economy.





**Can you build 50% of the  
buildings existing on earth in the  
next 40 years with existing  
technology?**



**Can nanofactories be developed  
in time to build the cities of the  
future?**



**What role will artificial  
intelligence play with robotics  
to accelerate the construction of  
new cities?**



What could be  
invented today that  
will put you out of  
business tomorrow?



**Recently there was a shortage of construction cranes and raw materials. What will be the demand on equipment and materials to build structures for a 50% increase in population in 4 decades?**



# Possible Wild Card Scenarios



How much will fuel costs  
escalate in an age of accelerating  
construction for vessels  
delivering construction materials  
to Africa, India, Asia & South  
America? What have you done  
to assure a reliable global supply  
chain?



Producers of items that are heavy and bulky & expensive to transport are cutting back on shipping globally causing a shortage of products abroad.





At what point will countries find  
importing materials  
unsustainable in the light of  
escalating fuel prices?

Example: aggregate for Qatar



The next 4 decades of  
unprecedented growth will  
result in chronic raw material  
shortages.



Will there be an attempt again  
for a cement cartel to control  
prices globally?



How will you deal with a lack of standardization of components when the majority of construction work in the world is a mix of global suppliers?

What critical and creative skills must your managers possess to solve these problems?



What are the crucial social,  
cultural and ethical skills needed  
by your company to practice  
abroad?



What about adaptive reuse in the US?  
3,000 of the 8,000 shopping malls in the  
US have closed their doors.

What about the mothballed military  
bases?

Thousands of auto dealership across the  
country are vacant.

Closed prison facilities across the US?



In addition to building for an increasing population, the possible results of global warming must be addressed **now** and will take decades to build defenses for vulnerable cities.



150 million people living in coastal areas around the globe could be displaced by 2070. Cities will have to be relocated and built to accommodate that possibility.

13 of the world's 15 largest cities are on coastal plains and are in peril.





Can you solve the problems of deteriorating infrastructure and maintaining present buildings in the US and the rest of the world while coping with critical new dwellings for an exploding population?



You may have to reinvent your company and take on new roles that include research to innovate/invent the technology & systems demanded for creating the future.

Creativity has become the currency of the new millennium.



The FUTURE  
will be hardest  
on those caught  
by surprise!



And now, Fran  
Rabuck...

