



ICT AND THE DIRECTION OF INNOVATION AFTER THE FINANCIAL CRISIS

**Looking at the future
with the aid of history**

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**APDC's Predictions & Broadband Summit
Lisbon, 8th July 2009**

**THE CURRENT CRISIS
IS NOT AN ACCIDENTAL EVENT
IN THE FINANCIAL SYSTEM**

**It has happened before
mid-way along the diffusion
of each technological revolution**

**If history is a guide...
A GLOBAL GOLDEN AGE
MAY LIE AHEAD**

FIVE TECHNOLOGICAL REVOLUTIONS IN 240 YEARS

1771

The 'Industrial Revolution' (machines, factories and canals)

1829

Age of Steam, Coal, Iron and Railways

1875

Age of Steel and Heavy Engineering (electrical, chemical, civil, naval)

1908

Age of the Automobile, Oil, Petrochemicals and Mass Production

1971

Age of Information Technology and Telecommunications

200??

Age of Biotech, Bioelectronics, Nanotech and new materials?

Each revolution drives a **GREAT SURGE OF DEVELOPMENT**
and shapes innovation for half a century or more

Why call them revolutions?

Because they transform the whole economy!

NEW INDUSTRIES

and

NEW PARADIGM FOR ALL

A powerful cluster of new dynamic industries and infrastructures with increasing productivity and decreasing costs



New generic technologies, infrastructures and organisational principles capable of modernising the existing industries too



Explosive growth and structural change



A quantum jump in innovation and productivity potential for all

A massive change in the direction of change

RESHAPING THE OPPORTUNITY SPACE AND THE WAYS OF LIVING, WORKING AND COMMUNICATING

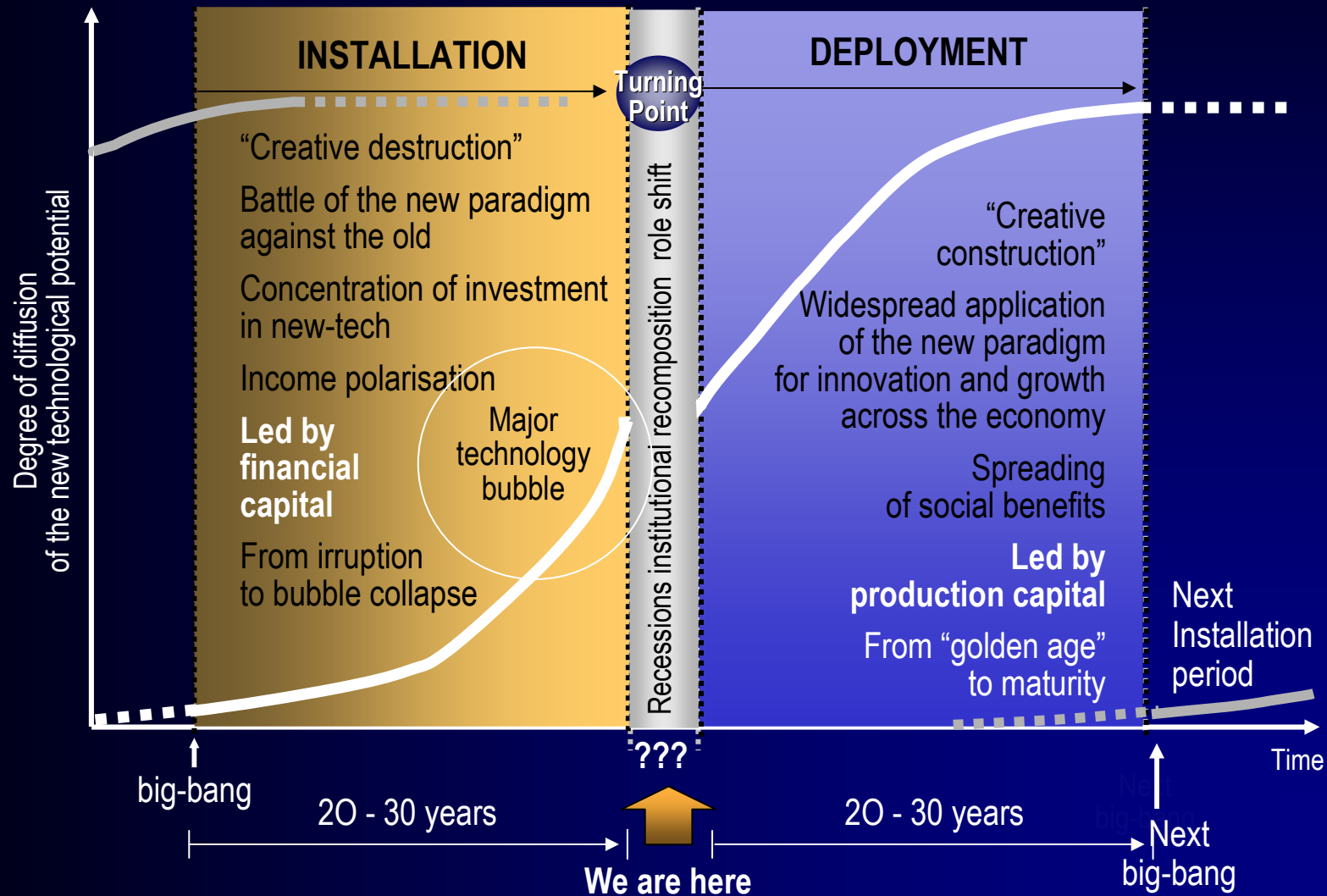
The paradigm shift taking place since the 1970s



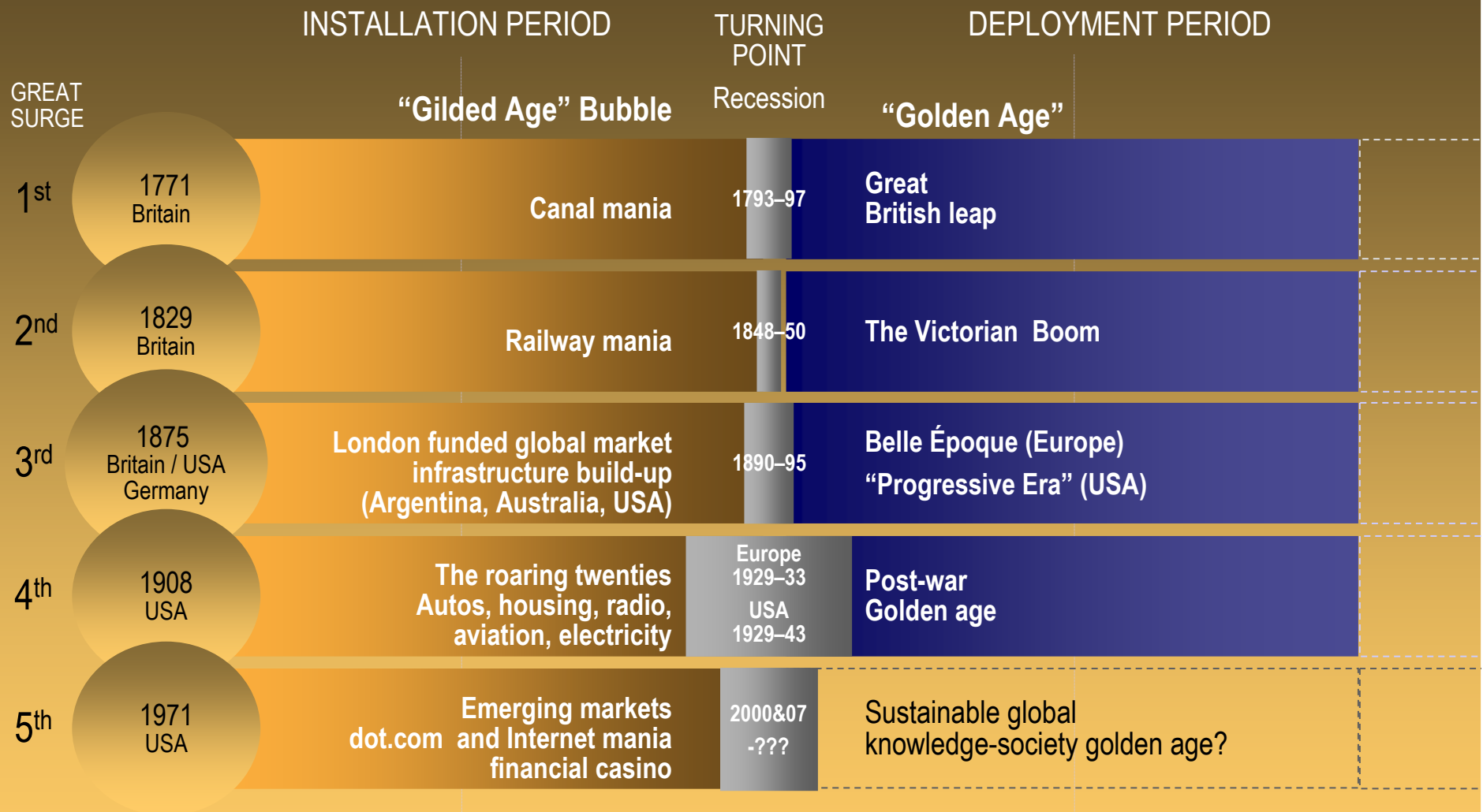
**A radical change in management “common sense”
brought on by a different set of enabling technologies**

Due to resistance and difficulty in assimilating such changes
EACH GREAT SURGE GOES THROUGH TWO DIFFERENT PERIODS

The first half sets up the infrastructure and lets the markets pick the winners
the second half reaps the full economic and social potential



The historical record: bubble prosperities, recessions and golden ages



The Golden Ages follow the big financial collapses, facilitated by enabling regulation and policies for shaping and widening markets

**WHAT DOES ALL THIS
TELL US
ABOUT THE FUTURE?**

**That historical patterns
can be a better guide
than the recent past**

**THE NEXT 20 YEARS
WILL BE VERY DIFFERENT
FROM THE LAST 20**

**WE ARE NOT FACING
AN ACCIDENTAL FINANCIAL CRISIS
BUT A RECURRENT STRUCTURAL SHIFT**

**IT IS THE WATERSHED
OF THE CURRENT GREAT SURGE:**

**Moving from laissez faire
to the active come-back of the State**

**Passing control of investment
from financial to production capital**

**Shifting from supply-push to demand-pull
in investment and innovation**

**Moving from individualist focus
to collective interests**

**AND THIS TIME
IN A GLOBALISED ECONOMY**

A shift in the principal innovation agents

INSTALLATION

THE STATE
in a
facilitating
service
role

FINANCE and
THE NEW
ENTREPRENEURS
as drivers
and innovators

DEPLOYMENT

FINANCE
in a
facilitating
service
role

PRODUCTION
and
THE STATE
as drivers
and innovators

**INSTITUTIONAL INNOVATION REPLACES FINANCE
AS GUIDING FORCE OF PRODUCTION INNOVATION**

**And the new technologies move from “pushing” products and teaching clients
to responding to their requirements**

A SHIFT IN THE DYNAMICS OF GROWTH

“Gilded Age” Installation

SUPPLY PUSH

CONTEXT

Mature industries
are technologically exhausted
their markets are saturated

The old economy stagnates
The new technologies are only incipient

SOURCE OF DYNAMISM?

Finance for massive investment
in new technologies,
industries and infrastructures
competing to select
new engines of growth
and to rejuvenate the rest

**TIMES OF EXPERIMENT
AND TURBULENCE**

Recessions, institutional recomposition and changeover

“Golden Age” Deployment

DEMAND PULL

CONTEXT

The new engines of growth are ready
The new infrastructure widens and deepens
market access

The old industries are rejuvenated
The new paradigm has been learned

A huge potential for growth is installed

SOURCE OF DYNAMISM?

Expansion of demand
(public and private)
and reshaping of its profile
(direct or indirect income redistribution)
to enable production growth
and constant innovation

**TIMES OF BUILD-OUT
AND HARMONIOUS GROWTH**

**HARMONIOUS GROWTH IN DEPLOYMENT
DEPENDS ON
ADEQUATE POLICIES
AND CHANGING SOCIAL VALUES
TO MAKE THE BEST
OF THE TECHNOLOGICAL POTENTIAL**

And that means: GUIDING DEMAND!

**The potential is there to bring
a sustainable and diversified
knowledge society across the globe
with a pattern of satisfaction
very different from “consumerism”**

SUCH CHANGES HAVE HAPPENED BEFORE

Age of Steam, Coal,
iron and railways

VICTORIAN LIVING

The British 'middle classes' established an industry-based **urban** lifestyle, different from that of the country-based aristocracy. It then spread to the new upper classes elsewhere

Age of Steel and
Heavy Engineering
First Globalization

THE BELLE EPOQUE

British, European and American upper and middle classes established a **cosmopolitan** lifestyle which spread to the upper classes of the world

Age of the Automobile,
Oil, Petrochemicals
and Mass Production

THE AMERICAN WAY OF LIFE

American upper and middle classes established a **suburban** energy-intensive lifestyle that spread to the working classes of the advanced countries and to the middle classes of the developing world

Age of Information
Technology and
Telecommunications

SUSTAINABLE GLOBAL LIFESTYLES???

Will the affluent educated classes of the developed and emerging countries establish an ICT-intensive knowledge society with a variety of environmentally friendly lifestyles and consumption patterns???

Each new style becomes the embodiment of progress and comfort shaping the “good-life” aspirations of the majority

**The aspirations and values
that measure the quality of life
depend on the paradigm**

**BUT IT IS SOCIETY THAT
SHAPES EACH SUCCESSIVE
TECHNOLOGICAL POTENTIAL**

**The “luxury” life:
values and aspirations
UNDER THE MASS PRODUCTION PARADIGM**

- Brand new is better than old
- Individual transport is freedom
- Bigger is better than smaller
- More is better than less
- Fabricated is better than hand-made
- Housework with machines is better than by hand
- Synthetic is better than natural
- Disposable is comfortable
- Leisure is rest (not exercise)
- Shopping is a leisure activity

ENABLERS

- Low cost of products
- Consumer credit
- Unemployment insurance
- Official trade unions
- Savings and loan banks
- Low cost housing and easy mortgages
- Full coverage of roads, electricity and telephones
- Public education and health

OPINION SHAPERS

- Role models
- Advertising
- Movies, TV
- Relative prices
- Marketing strategies

THE CURRENT TECHNOLOGICAL POTENTIAL

The techno-economic paradigm shift from the 1970s

FROM THE LOGIC
OF CHEAP ENERGY (oil)
for transport, electricity,
synthetic materials, etc.



TO THE LOGIC
OF CHEAP INFORMATION
its processing
transmission and productive use

Preference for tangible
products
and disposability

Unthinking use
of energy and materials

**Unavoidable
environmental destruction**

Preference for services
and intangible value

Huge potential for savings
in energy and materials

**Capacity for
environmental friendliness**

**It is a huge opportunity space for innovation,
growth and radical changes in lifestyles**

**The notions of luxury and good taste emerge at the top of the income scale
and spread by imitation**

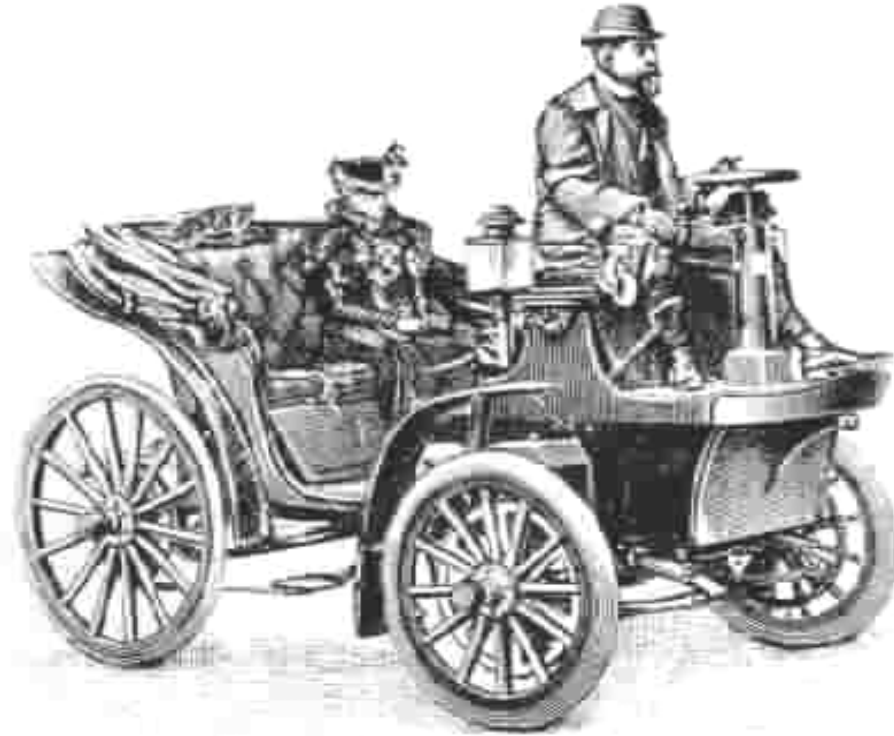
**PART OF THE PARADIGM SHIFT IS ALREADY HAPPENING
AMONG THE EDUCATED HIGH INCOME GROUPS**

- Small is better than big
- Natural materials are better than synthetic
- Multipurpose is better than single function
- 'Gourmet' food is better than standard
- Fresh organic fruit and vegetables are healthier
- Exercise is important for well being
- Global warming is a real danger
- Not commuting to work is possible and preferable
- Solar power is luxurious
- Internet communications, shopping, learning
and entertainment are better than the old ways , etc.

**YET MASS PRODUCTION DISPOSABILITY
AND HIGH USE OF ENERGY AND MATERIALS CONTINUE WITH US**

THE NEW PARADIGM IS STILL WRAPPED IN THE OLD

It's just like the first automobiles
that began looking like horse driven carriages



An automobile in 1898

L.De Vries. 1972

WHY? Because in the crucial 1990s we had cheap oil and cheap Asian labour which favoured the stretching of the old marketing and consumption patterns

TO CONTINUE ON THIS ROUTE WE WOULD NEED SEVEN PLANETS!

But the market will not let us get that far

THE UNAVOIDABLE PATH OF THE CURRENT GLOBALISATION PATTERN

Global growth of demand

Rising prices of oil and raw materials

Rising packaging and freight costs

Increasing CO₂ emissions

Visible effects of increasing global warming

Rising climatic risk

CHANGE IN THE ECONOMICS OF THE PRODUCTION, TRANSPORT AND DISTRIBUTION OF TANGIBLE GOODS

CHANGE
IN BUSINESS
STRATEGIES

CHANGE
IN GOVERNMENT
POLICIES

Optimal relocation and geographic re-specialisation of physical production

Increasing shift from tangible to intangible production

Gradual redesign of the consumption patterns for the “good life”

**WHY WAIT
UNTIL THE PLANET FORCES US
TO CHANGE COURSE?**

**Firm and intelligent
policy action, business strategies
and social decisions
can take us there!**

**AND IT IS PROBABLY
THE ONLY EFFECTIVE WAY
OUT OF RECESSION**

MAJOR TRANSFORMATIONS TO EXPECT AND PARTICIPATE IN

**RISING COSTS OF ENERGY,
MATERIALS AND TRANSPORT**

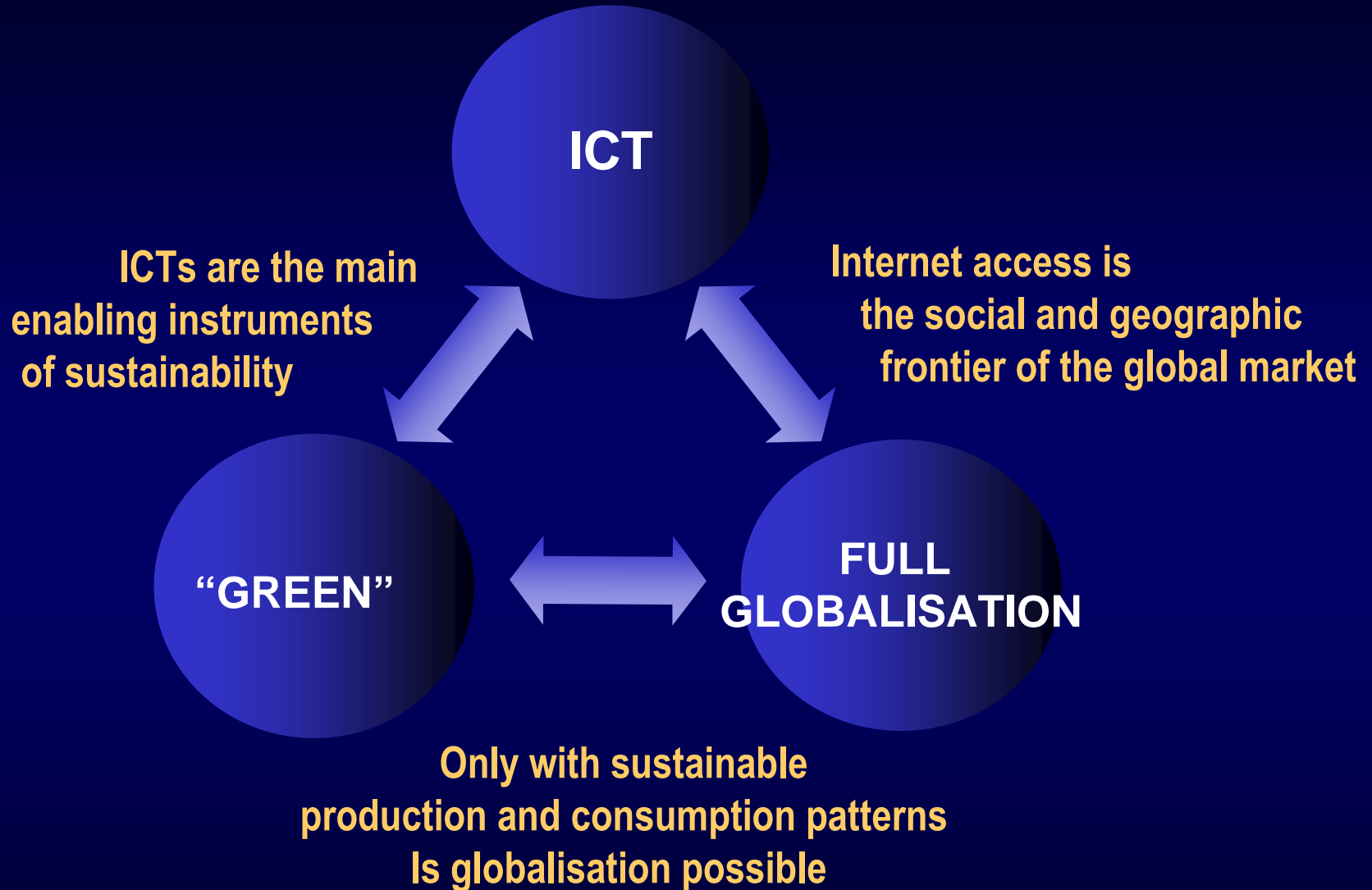
**POTENTIAL OF INFORMATION
AND COMMUNICATIONS
TECHNOLOGIES**

**GROWING
ENVIRONMENTAL THREATS**

Energy systems
Freight transport & distribution
New materials and recycling
Packaging and conservation
Waste disposal
Education
Health and well being
Sports and leisure
Cultural activities
Third Age living
Architecture and urban planning
Etc. etc.

**It is enough for healthy growth in the OECD countries
and across the whole developing world
(guaranteeing increasing markets for each other)**

The triple route to the golden age...



**But we need policy consensus
involving government, business and society**

**HOW WAS
THE PREVIOUS
GOLDEN AGE
UNLEASHED?**

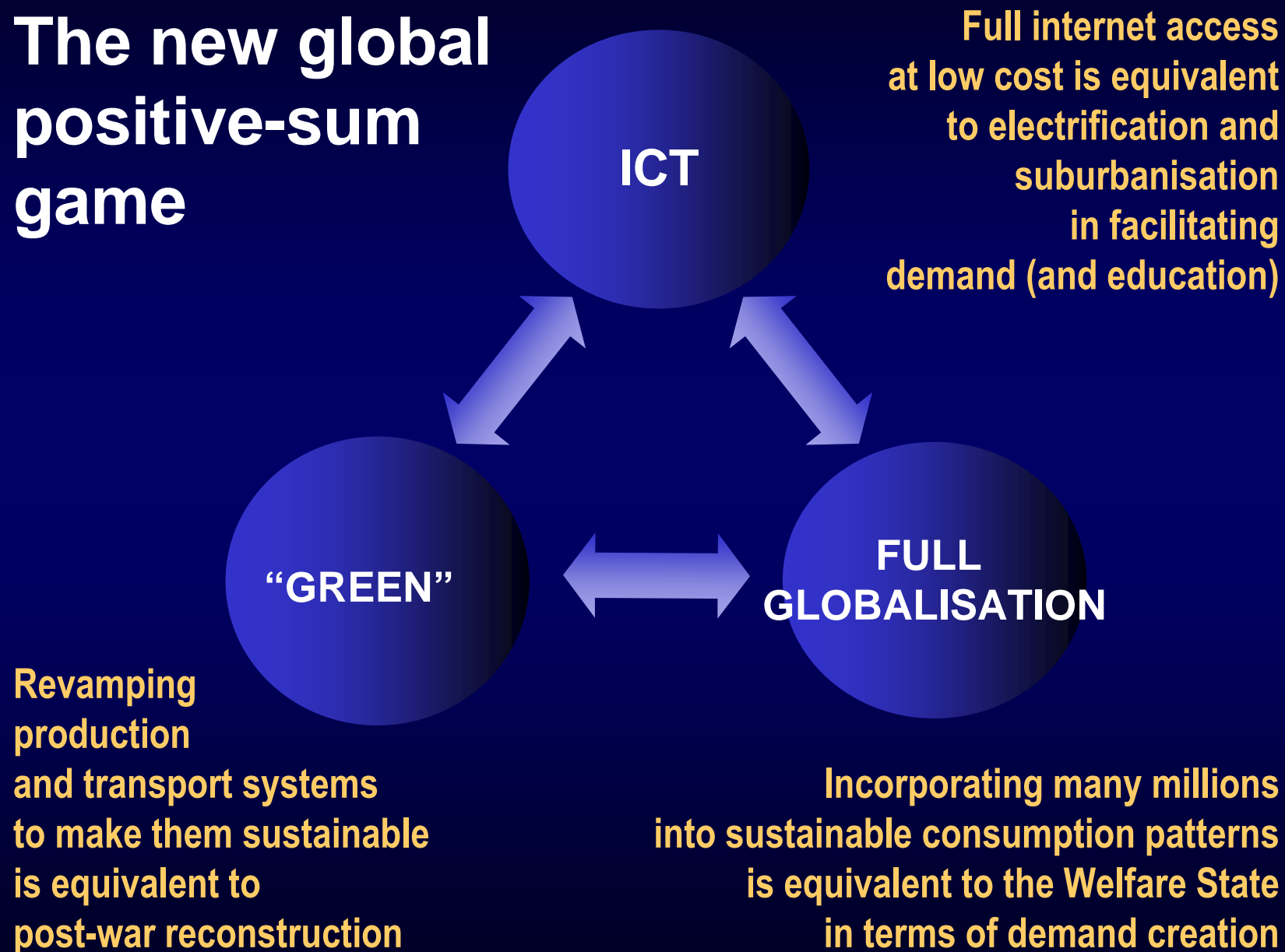


**By widening demand
and stretching the reach of infrastructures**

SHAPING THE PROFILE OF DEMAND AND WIDENING MARKET REACH FOR THE POST-WAR GOLDEN AGE

- **Reconstruction of Europe (aided by the Marshall Plan)**
- **Income redistribution through the Welfare State: the workers as “middle class” consumers**
- **Universal reach of new infrastructures (electricity roads, telephones, etc.) urban, suburban and rural**
- **The State as employer and as major buyer (infrastructure, military, education, health, etc.)**
- **Subsidies to agriculture (increasing standard of living and investment capacity in the countryside)**
- **Ample credit for housing and for instalment buying of cars and appliances (plus unemployment insurance)**
- **Funding of infrastructure projects in developing countries (World Bank and other agencies)**

The new global positive-sum game



**THE TECHNOLOGICAL STAGE
IS SET TODAY
FOR THE GLOBAL GOLDEN AGE
OF THE 21st CENTURY**

**IT IS THE TASK
OF THIS GENERATION
TO MAKE IT A REALITY**