



**Looking at the future
Learning from history**

**THE GOLDEN AGE AHEAD
IS BOTH DIGITAL AND GREEN**

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A GOLDEN AGE AHEAD?

Can anybody be optimistic
in today's uncertain world?

YES!

By having a historical understanding
of technological revolutions
and of how markets and governments
influence their patterns of diffusion

The history of technological revolutions
teaches us
that golden ages have risen
from the recessions
that follow
major financial collapses

FIVE TECHNOLOGICAL REVOLUTIONS IN 250 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

20??

Age of Biotech, Nanotech, Bioelectronics and new materials?

EACH ONE LEADS TO A TECHNO-ECONOMIC PARADIGM SHIFT

Changing the direction for innovation and organisation across the economy and society

New ways of
LIVING

New ways of
PRODUCING

**EACH NEW PARADIGM
brings a far reaching
transformation**

New ways of
COMMUNICATING

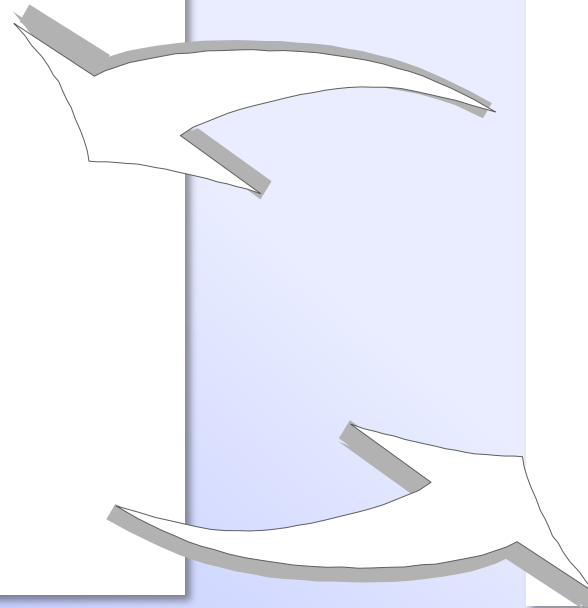
New ways of
WORKING

Because of resistance to such major paradigm shifts

CAPITALISM EXPERIENCES PENDULAR SWINGS EVERY TWO OR THREE DECADES

from bubble times to golden age and back

From a period of
FINANCIAL CAPITALISM
to force the
INSTALLATION
of each technological revolution
with unfettered
free markets
and income polarization

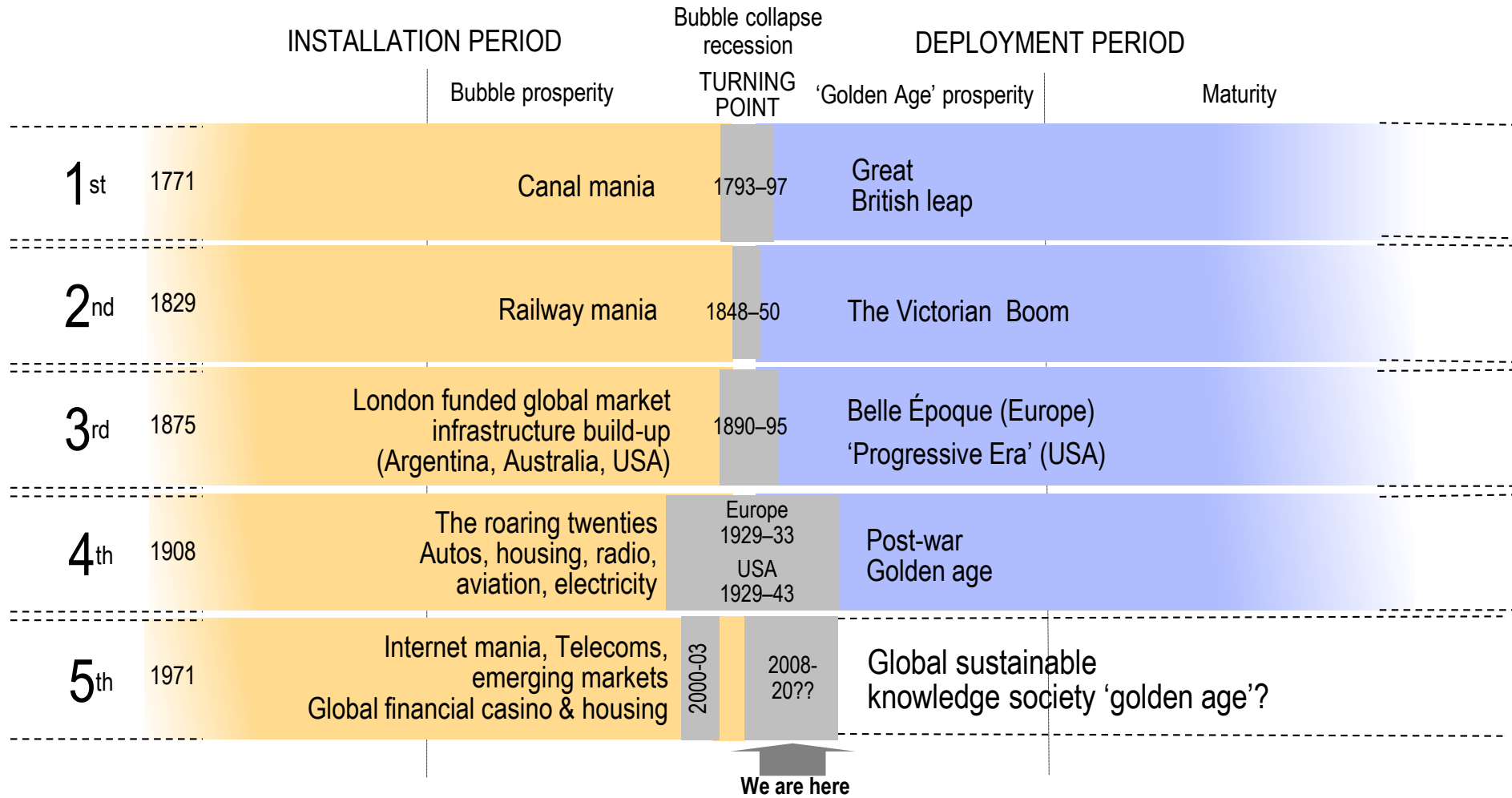


To a period of
PRODUCTION CAPITALISM
aided by government
to enable the full
DEPLOYMENT
of the new potential
across the whole economy
and the spread of its benefits to society

A MAJOR BUBBLE COLLAPSE SIGNALS THE NEED TO SWING THE PENDULUM

**The resulting recession moves government, business and society
to shift gear and unleash the Golden Age**

The historical record: bubble prosperities, recessions and golden ages



HOW DO THE TWO PROSPERITIES DIFFER?

	INSTALLATION BUBBLES	Turning point	GOLDEN AGE DEPLOYMENT
Investment	Concentrated in new technologies and finance		Widely spread across the real economy transforming all sectors
Finance	Self-serving casino behaviour		Profitable services to the new real economy
Employment	Declining with modernization and geographical shifts		Reviving with the new fabric of the economy (depending on policy) and especially with new lifestyles
Innovation	New products, services, processes and infrastructures SUPPLY PUSH		Institutional, policy and social innovations creating a favourable context for modernising all industries and activities applying the new technologies DEMAND PULL

And people recognize when the times change from one mode to the other

**BUT GOLDEN AGES
DON'T COME AUTOMATICALLY**

**They must be facilitated by an active State
giving a direction for innovation
widening markets
and ensuring social stability**

WHY?

**Because markets alone
cannot change the context**

After the collapse
markets continue making changes in production and consumption
BUT INNOVATING IN RANDOM DIRECTIONS

BUSINESS

Restructuring
of all industries
and sectors

GOVERNMENT

Modernisation
and redesign
of the policy
framework

A successful
'turning point'
involves promoting
a clear, synergistic
and common
direction
in three
major areas

Articulation of
a new different
lifestyle

CONSUMERS

THE POLICY DECISIONS TAKEN NOW
WILL SHAPE THE NEXT TWO OR THREE DECADES... and possibly more!

EACH GOLDEN AGE BRINGS A NEW ASPIRATIONAL IDEAL OF THE 'GOOD LIFE'

Based on new goods and services at 'affordable' prices

From the 1850s: **VICTORIAN LIVING**

The rise of the urban upper and middle classes different from the rural aristocracy

From 1900: **THE BELLE ÉPOQUE**

Cosmopolitan lifestyles for upper and middle classes across the world

After WWII: **THE AMERICAN WAY OF LIFE**

Suburban lifestyles, reaching all workers in the advanced countries and middle classes in the 'third world'

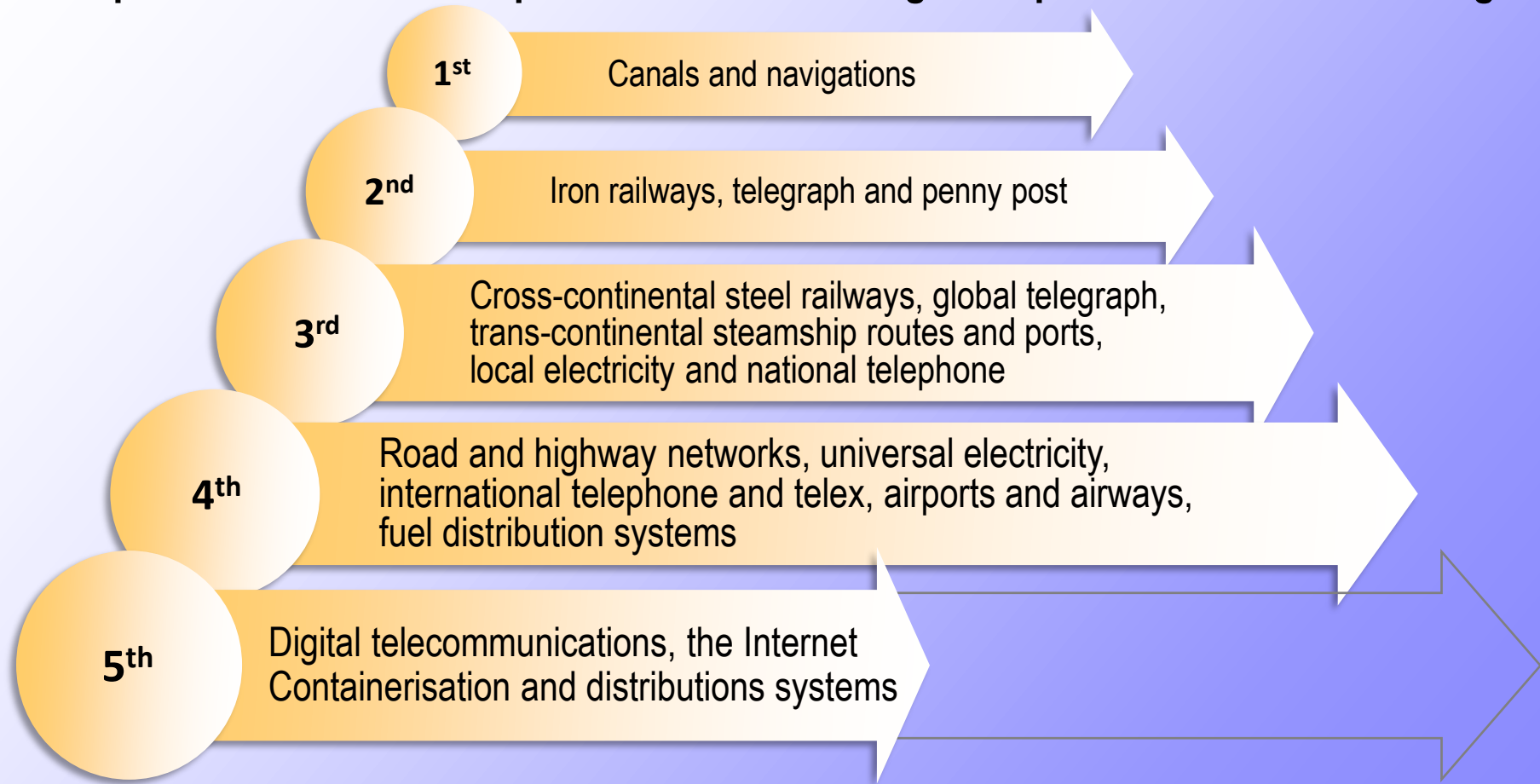
Now: **SUSTAINABLE & TAILORED LIFESTYLES?**

Global diversity, urban and rural, using ICT in a green direction and lifting all boats???

**EACH NEW LIFESTYLE SPREADS FROM THE ELITES TO WIDER SECTIONS OF SOCIETY
It shapes the consumption desires of the majority and guides innovation trajectories**

THE NEW INFRASTRUCTURAL NETWORKS ARE CRUCIAL IN THE TRANSFORMATION

Each expands and transforms possible markets and guides product and service design



What was happening in the United States in the 1930s after the crash of 1929

THREE MAJOR DISCONNECTS

Potential for mass production

INNOVATION

Lack of mass demand

Risk-averse finance

INVESTMENT

Innovation and production potential

Business insisting on free markets

ECONOMIC CONTEXT

Government trying to shape the context

Only war procurement taught business the advantages of working with government and of having truly massive markets for mass production

HOW WAS THE CONTEXT CHANGED FOR THE POST WAR GOLDEN AGE?

CLEAR DIRECTIONS FOR INNOVATION

Suburbanization (government funded infrastructure),
Marshall Plan for post-war reconstruction
Cold war mass production and high tech

A STRONG REVIVAL OF 'REAL' INVESTMENT

Growing demand from high salaries;
consumer credit (with unemployment cover)
mortgage insurance for home ownership;
government procurement and R&D funding

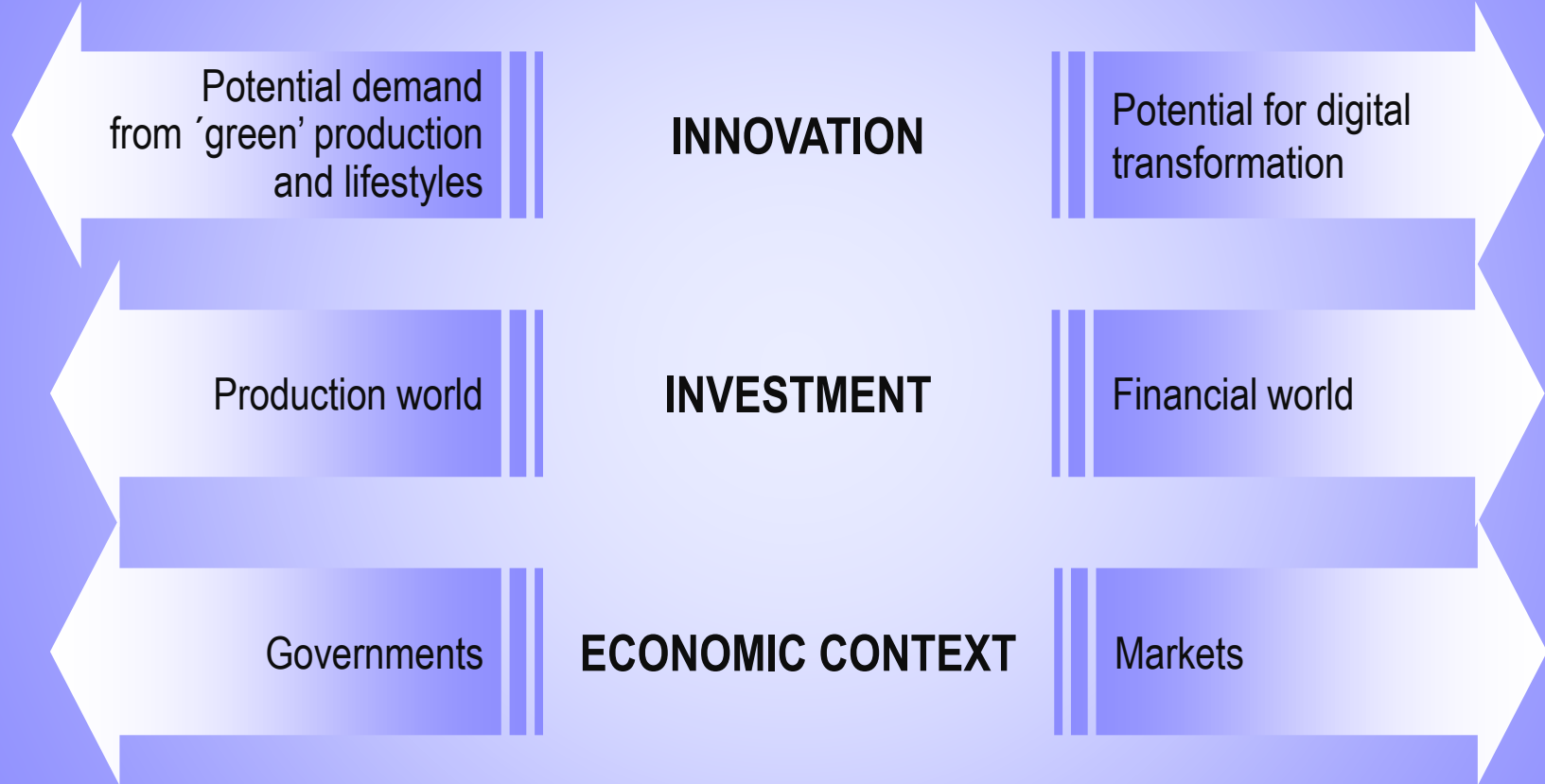
A DYNAMIC AND STABLE ECONOMIC CONTEXT

Acceptance of:
high taxes that turned into demand;
of Keynesian policies nationally
and of international institutions

**IT WAS A MASSIVE SET OF ADEQUATE INSTITUTIONAL INNOVATIONS
THAT UNLEASHED AND SUPPORTED THE GREATEST BOOM IN HISTORY**

What is happening now in the advanced world since the crash of 2008?

THE BEST OF POSSIBLE FUTURES IS BEING HINDERED BY THREE GREAT DISCONNECTS



GLOBAL GROWTH CANNOT BE FULLY REACTIVATED UNTIL THEY ARE RECONNECTED

WHY GREEN?

What is its relation with ICT?

What is meant by 'green growth' ?

THE INTRINSIC CHARACTERISTICS OF ICT ARE COMPATIBLE WITH 'GREEN'

The paradigm shift that began in the 1970s has gradually made that clear

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

Preference for services
and intangible value
Huge potential for savings
in energy and materials

Unavoidable environmental destruction

Potential environmental friendliness

SO DIGITISATION AND GREEN ARE 'MADE FOR EACH OTHER'

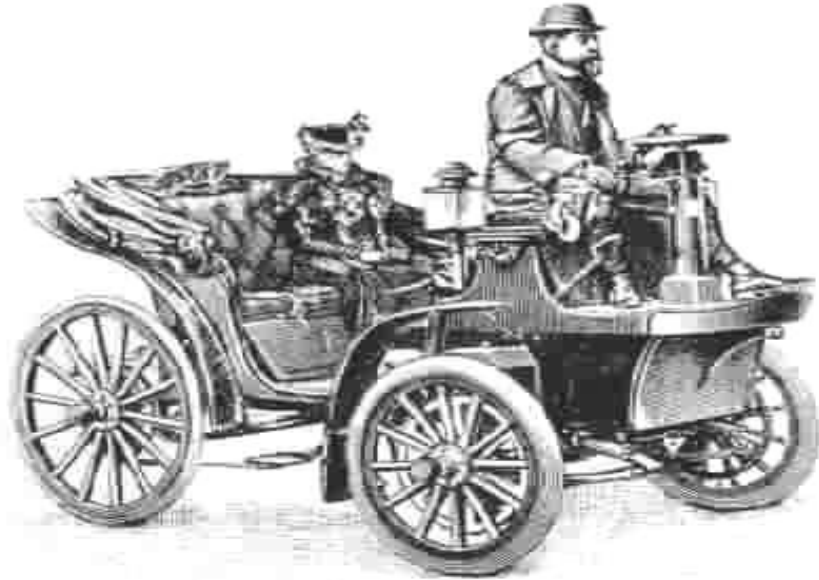
The environment is not the problem... It's the solution!

Dynamic growth can occur with a radical increase in the proportion of intangibles in both lifestyles and GDP
BUT THE NEW POTENTIAL IS ONLY SLOWLY EMERGING

WHY?

**Because each new paradigm
must at first be
still wrapped in the old**

Early automobiles looked like horse-driven carriages



One of the early automobiles 1898


Reproduction: L. De Vries. 1972

If and when the context is changed by intelligent policies, consumers and businesses will respond

THE TRANSFORMATION SPACES FOR THE NEW 'GREEN' PRODUCTION AND LIFESTYLES

HUMAN CENTRED SERVICES

Health and care
Leisure and sports
Entertainment
Mobility & Distribution
Diversified electricity
Education 'industry'
The arts
Intermediation
Sharing and barter
Conservation
Logistics
Maintenance
Resource recovery, recycling, reuse
Pollution reduction
And so on



An aspirational
'good life'
with less energy
and materials,
more ICT and
more jobs

MODERNISATION OF PRODUCTION

Circular economy
Truly durable products
3-D printing
Rental model
Nanotechnology
Renewable energy
Batteries & carbon capture
Sustainable architecture
New construction methods
Bio-plastics & Custom materials
FTTH and Wi-Fi infrastructure
Smart electrical grid
Complex systems engineering
Hydroponics and urban agriculture
and so on

**Massive innovation and massive employment, next to robotics and AI
in sustainable activities, enhanced and enabled by ICT**

THE BEST OF POSSIBLE FUTURES REQUIRES THREE RECONNECTIONS

**CLEAR DIRECTIONS
FOR INNOVATION**

Digital + Green and
full global development

**A STRONG REVIVAL
OF 'REAL' INVESTMENT**

Recoupling of the
financial world
with production

**A DYNAMIC AND STABLE
ECONOMIC CONTEXT**

Strong consensus
business-government
nationally and globally

SUCH A TILTING OF THE PLAYING FIELD

CAN OPEN INFINITE BUSINESS OPPORTUNITIES AND IMPROVE THE LIVES OF THE MAJORITY

**IT'S UP TO ALL OF US
TO MAKE IT HAPPEN**

**AND THIS TIME THE EUROPEANS
CAN BE THE PIONEERS**

THANK YOU!

For more about all this:

www.carlotaperez.org