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ARBEITSWELTEN DER ZUKUNFT

Die soziale (R)Evolution und das Arbeiten 4.0

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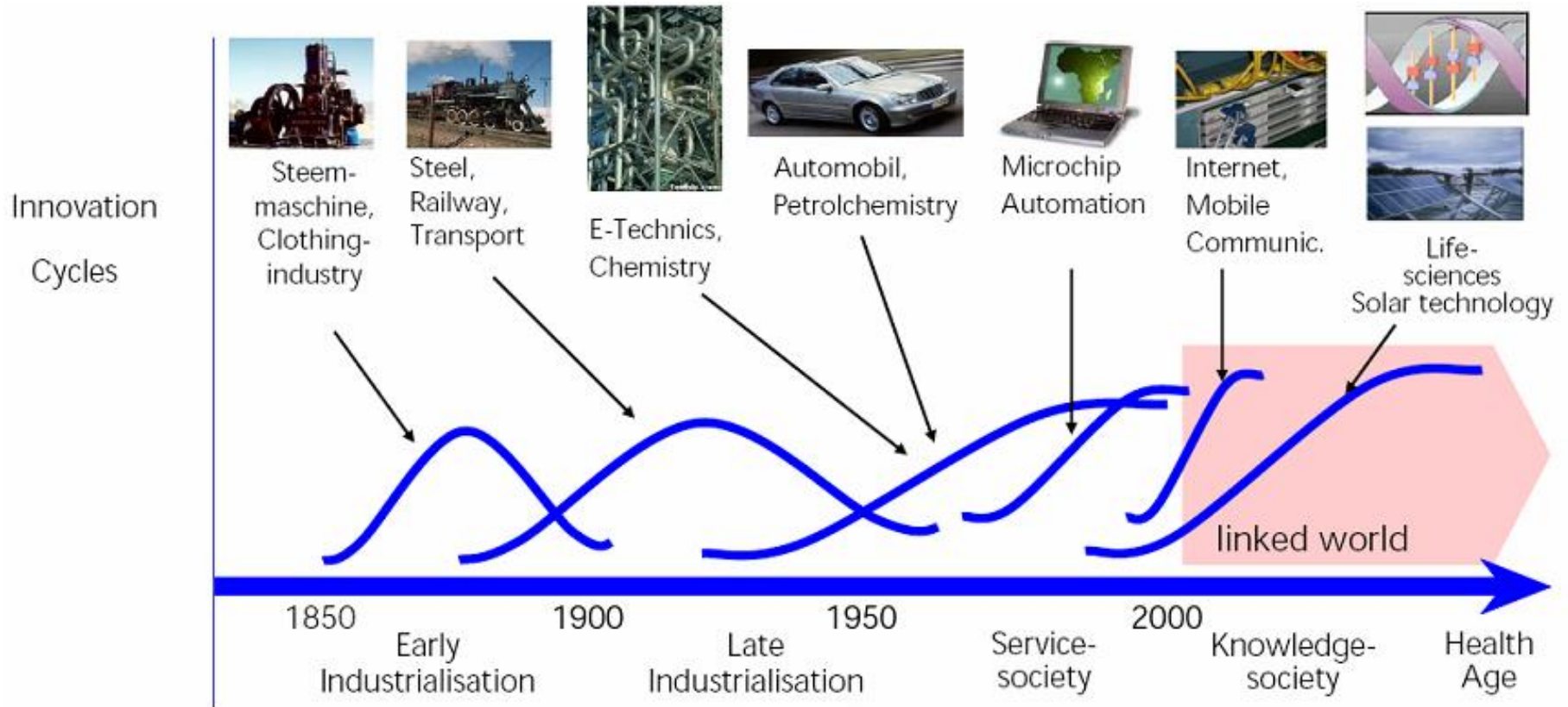
# Content

- Where we are.. : 1<sup>st</sup> & 2<sup>nd</sup> Industrial revolution
- What's going on.. : ongoing industrial revolution
- What's next ??

# Industrial Innovation

- Innovation with mechanization of the factories..
- textile industry in the 17<sup>th</sup> century -> a series of innovations -> increasing productivity & less human energy
- iron industry in the 18<sup>th</sup> century -> a cheaper, easier production of cast iron, using a coke-fueled (as opposed to charcoal-fired) furnace -> inexpensive process for mass-producing steel -> iron and steel -> application to ships, buildings and infrastructure.
- integration of steam engine to industrialization -> power machinery, locomotives and ships

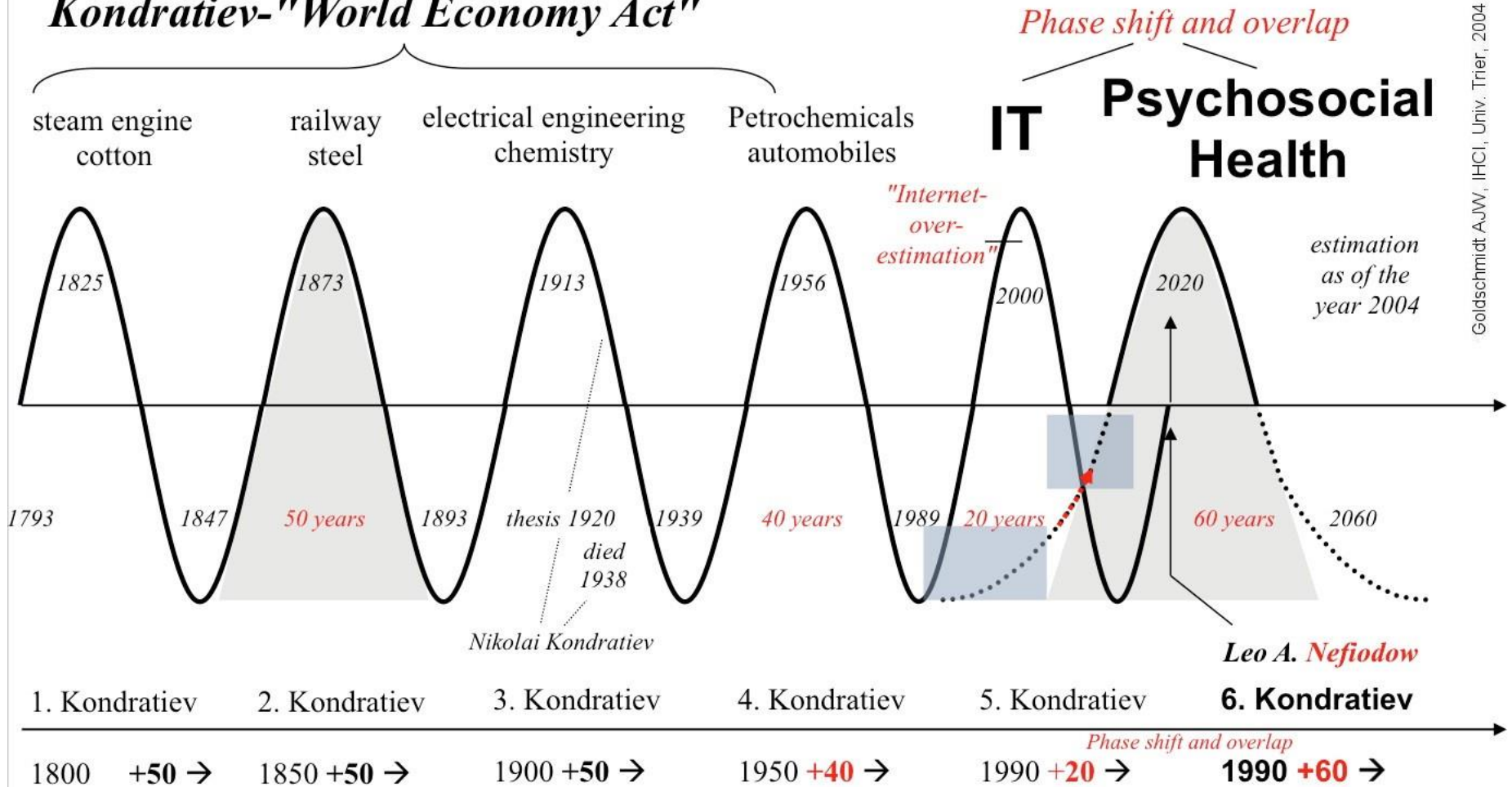
# Kondratieff-Cycles: Key Innovations....



Nikolai Kondratiev: Anti-Marxist theory about 1920's; empirical study UK/USA  
 Josef Schumpeter: Definition of a "Kondratiev"-Unit  
 Leo A. Nefiodow: 6th Kondratiev "Psychosocial Health"

**"applicable" to a national economy in general,  
 not applicable to all participants in a "market"**

## Kondratiev-"World Economy Act"



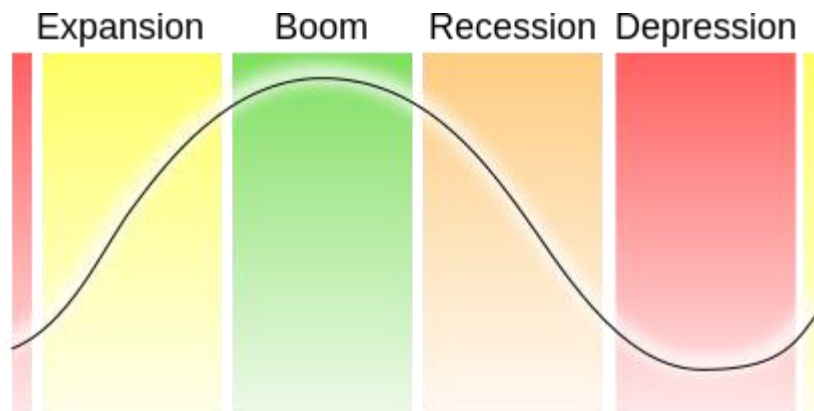
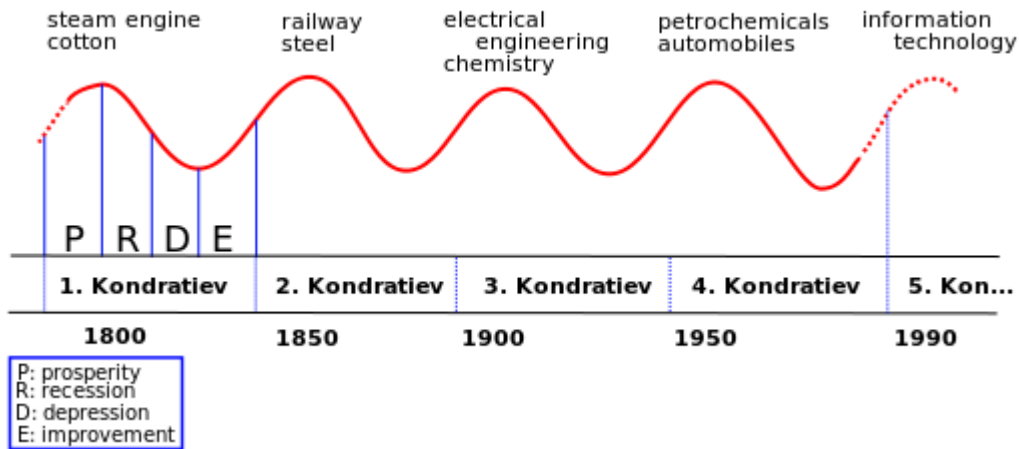
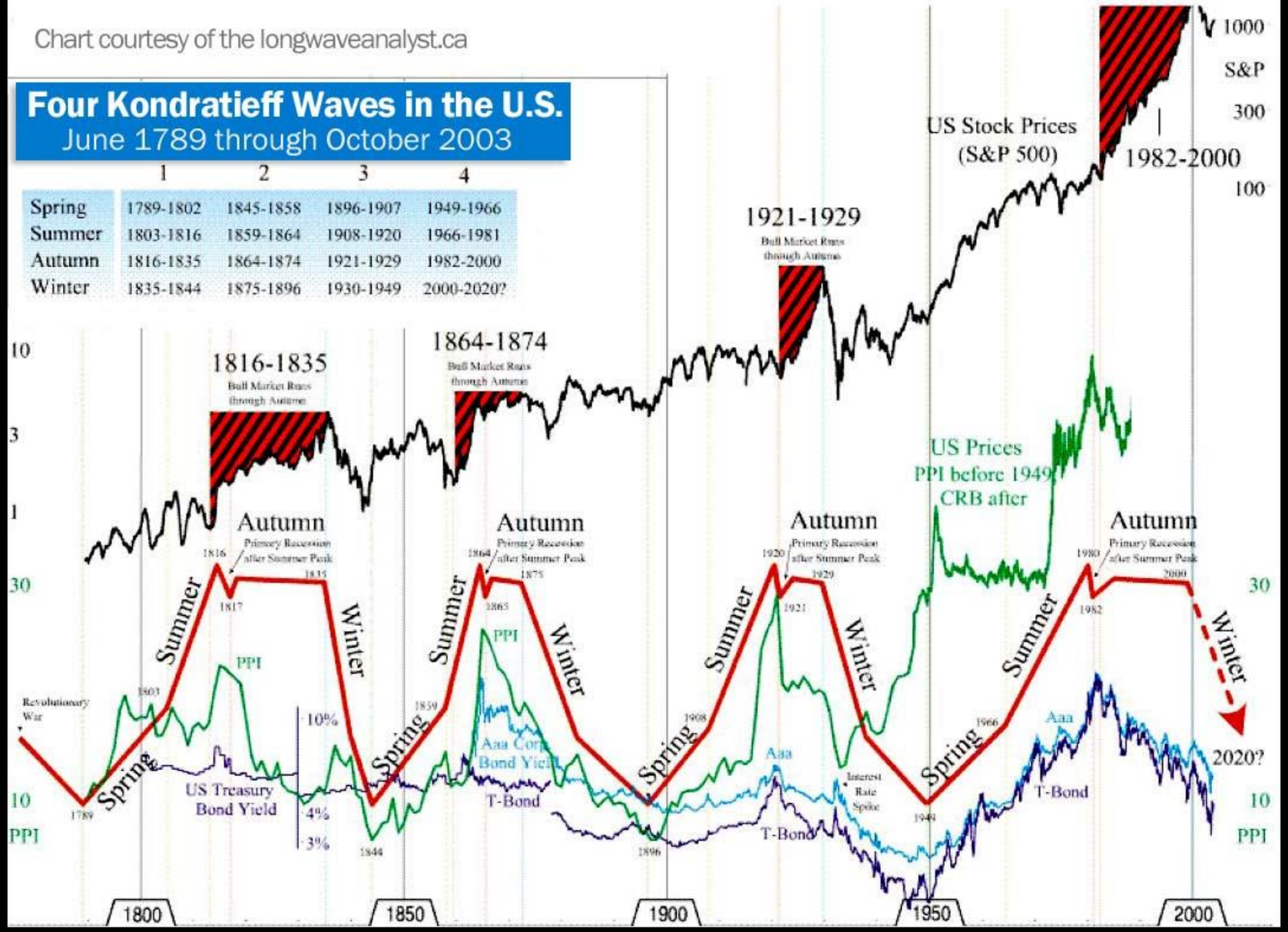


Chart courtesy of the longwaveanalyst.ca

## Four Kondratieff Waves in the U.S. June 1789 through October 2003

	1	2	3	4
Spring	1789-1802	1845-1858	1896-1907	1949-1966
Summer	1803-1816	1859-1864	1908-1920	1966-1981
Autumn	1816-1835	1864-1874	1921-1929	1982-2000
Winter	1835-1844	1875-1896	1930-1949	2000-2020?





# Implications for 2012 & Beyond

- Prof.Thompson's analysis : moving from 'recession' to 'depression' in 2013, ... until 2017-2020
- Current economic condition: following 2007, even collapse, **enlarging international market in 18 times**
- Good news for world economy, ready for spring boom → **new levels of social & economic development !!!**



# Ongoing 3<sup>rd</sup> Revolution to 4<sup>th</sup>...

- Digitalization of manufacturing-process  
→ changing business & other things
- Convergence technology : clever software, novel materials, more dexterous robots, new processes, 3D printing with whole range of web-based services → factory with mass customization

## What's next ?!→ third dimension

- digital design → too complex for a traditional factory to handle. → these machines may be able to make almost anything, anywhere—from your garage to an African village.
- printing high-tech parts of military jets in customized shapes working in the middle of a desert -> download a design and print with a kit
- New material: lighter, stronger, more durable material,old ones, Carbon fibre is replacing steel and aluminium in aeroplanes to mountain bikes.
- new techniques in tiny scale, nanotechnology for products enhanced features, such as bandages for healing cuts, more efficient and robuster engines
- **disrupting traditional technology??** in every field → less employment → more jobs for example, for designers, engineers, IT specialists, logistics experts, marketing staff and other professionals
- **quick change in demand** & of design for people in the same place between **companies and customers**

# Social Innovation

- **Transportation:** steamboat, steamships, railway steam locomotive etc.
- **Communication & Banking :** telegraph, factory system, industrial financing & banking system -> Adam Smith -> modern economics with free enterprise, private ownership of means of production, and lack of government interference.
- **Quality of Life :** a greater volume & variety of factory-produced goods -> raise of living standard of living for middle and upper classes -> poor and working classes, especially unskilled workers → social inequality & problems → governance for workers, health insurance, trade union etc.

# Investment for Industry 4.0

- In order to achieve the goal by 2030, European firms must keep investing about EUR 90 billion per year to generate the necessary additional value added. This would add up to EUR 1,350 billion. (Roland Berger) → not so large at the European level & far below numerous investment comparing activities of European politics, such as the bailout programs for indebted member states.

# Industry 4.0 requires...

- Core element of the value chain ?!
- Sometimes necessary to move to a new location
- Expertise & employment with higher value
- product and process design
- Sales and marketing with higher quality
- For some areas very critical → deindustrialization → Risk of losing high-value activities

# Arbeiten 4.0

- Ensuring a balanced labor market
- Highly skilled jobs (engineering, consulting, information technology, research, etc.)
- Low skilled jobs (tourism, distribution, etc.)
- Deindustrialization weakening middle class
- Disappearance of mid-salary jobs
- Mismatch of the labor market → polarizing society

# Good News...

- Current economic condition: following 2007, even collapse, **enlarging international market in 18 times**
- Good news for world economy, ready for spring boom → **new levels of social & economic development !!!**