MEDIUM- AND LARGE-TERM ECONOMIC CYCLES:

AN ANALYSIS OF INTERCONNECTION

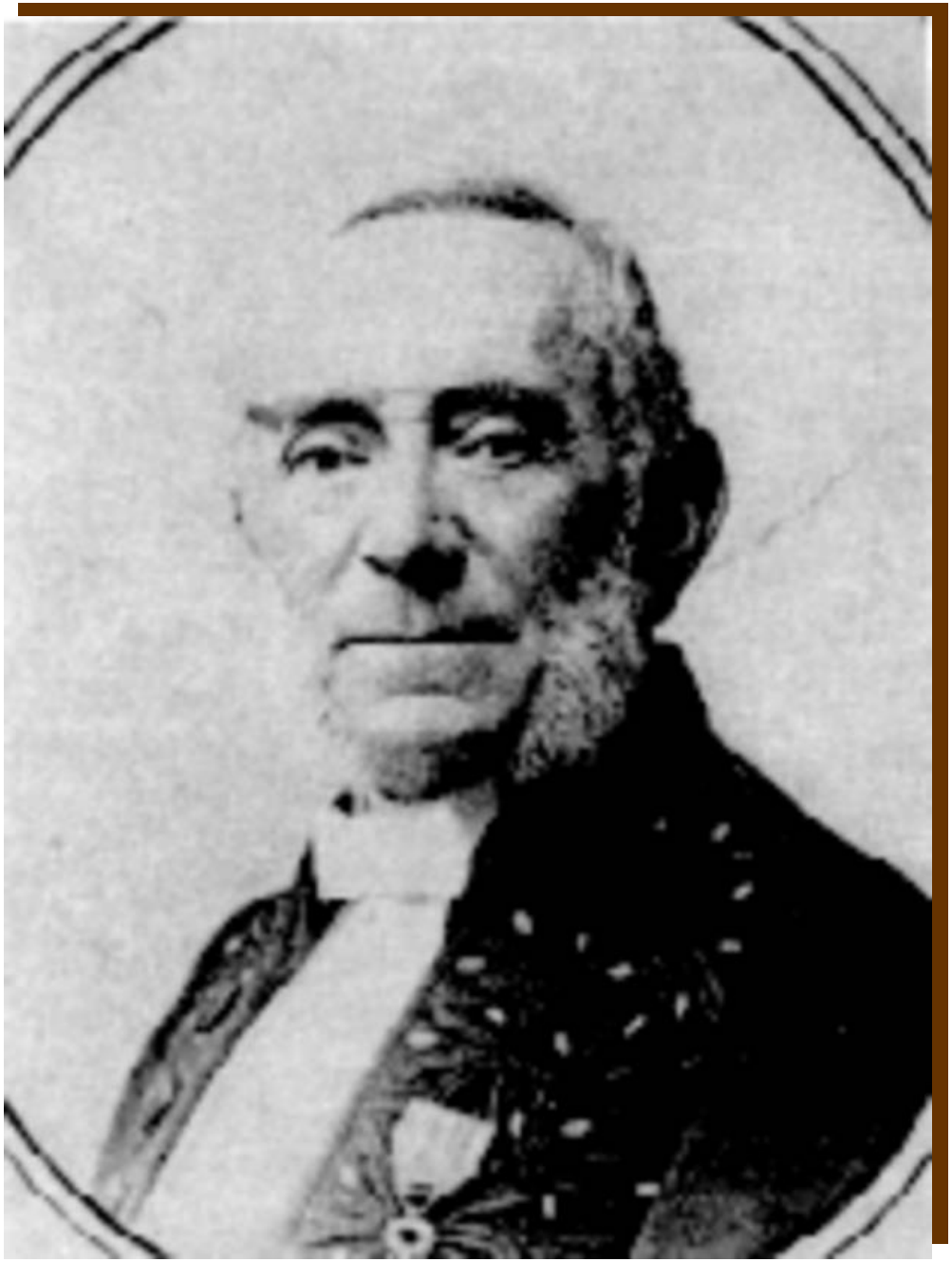
©Leonid Grinin
Russian Academy of Sciences

http://www.socionauki.ru/authors/grinin_l_e/other/

Medium-term or Business Cycles

- Medium-term or business cycles are the most known types of economic cycles. Their length is 7–11 years.
- The key feature: A fast economic growth (sometimes boom) is sharply changed by a collapse and a recession.
- The main causes of crises and recessions are the overcredit and overinvestment.

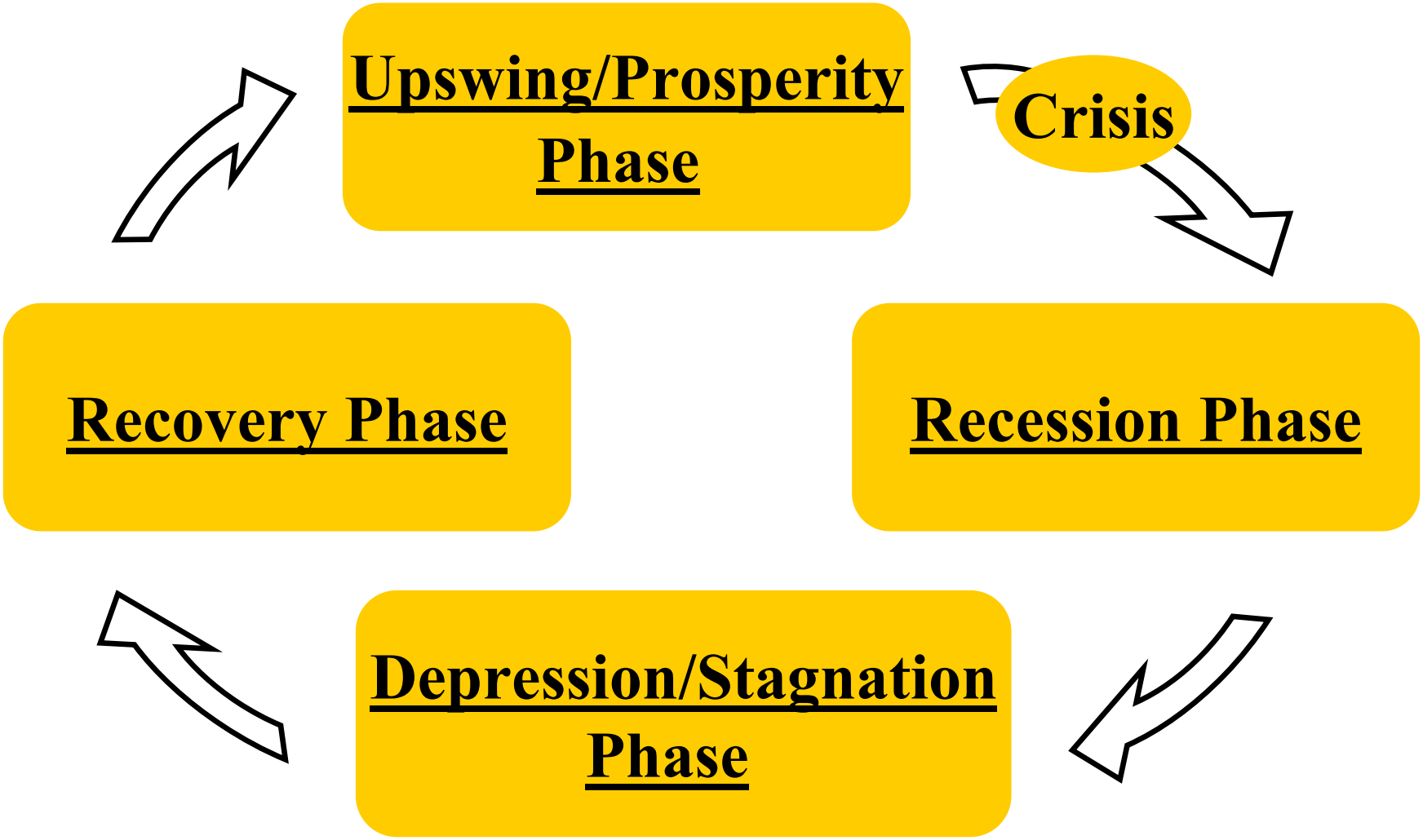
http://www.socionauki.ru/authors/grinin_l_e/other/



Clément Juglar
1819 – 1905

http://www.socionauki.ru/authors/grinin_l_e/other/

The Model of a Juglar Cycle



http://www.socionauki.ru/authors/grinin_l_e/other/

Nikolay Kondratieff
1892 –1938

http://www.socionauki.ru/authors/grinin_l_e/other/

Kondratieff Waves

- In the 1920s the Russian economist Nikolay D. Kondratieff showed that in the long-term dynamics (about half a century) there is a certain **cyclical regularity.**
- The **upswing phases** are followed by the **downswing phases**.
- Those long cycles are called Kondratieff waves or K-waves.

http://www.socionauki.ru/authors/grinin_l_e/other/

The Number of Kondratieff Waves

- Now most researchers define **five Kondratieff waves,** starting from the end of the 1780s.
- The fifth wave is still in progress.
- The sixth wave is forecasted in 2020–2070 with leading sector consisting of biotechnologies, nanotechnologies, medicine, new information and cognitive technologies.

http://www.socionauki.ru/authors/grinin_l_e/other/

Table. 1. Kondratieff Waves and Their Phases

No K-Wave	K-Wave Phase	Date of the Beginning	Date of the End
I	A: upswing	The end of 1780s – the early 1790s.	1810–1817
	B: downswing	1810–1817	1844–1851
II	A: upswing	1844–1851	1870–1875
	B: downswing	1870–1875	1890–1896
III	A: upswing	1890–1896	1914–1928
	B: downswing	1914–1928/29	1939–1947
IV	A: upswing	1939–1947	1968–1974
	B: downswing	1968–1974	1984–1991
V	A: upswing	1984–1991	2006–2008
	B: downswing	2006–2008	2020-s?

http://www.socionauki.ru/authors/grinin_l_e/other/

Explanations of K-Waves

- Monetary theories.
- The dynamics of capital investments.
- The dynamics of innovations.
- Cycles of military activity.
- Alterations of business generations.
- Class struggle.
- Connection with the cycles of hegemony.

However, neither of these explanations appears to be completely satisfactory or universally accepted.

http://www.socionauki.ru/authors/grinin_l_e/other/

Table. 2.K-Waves and technological styles

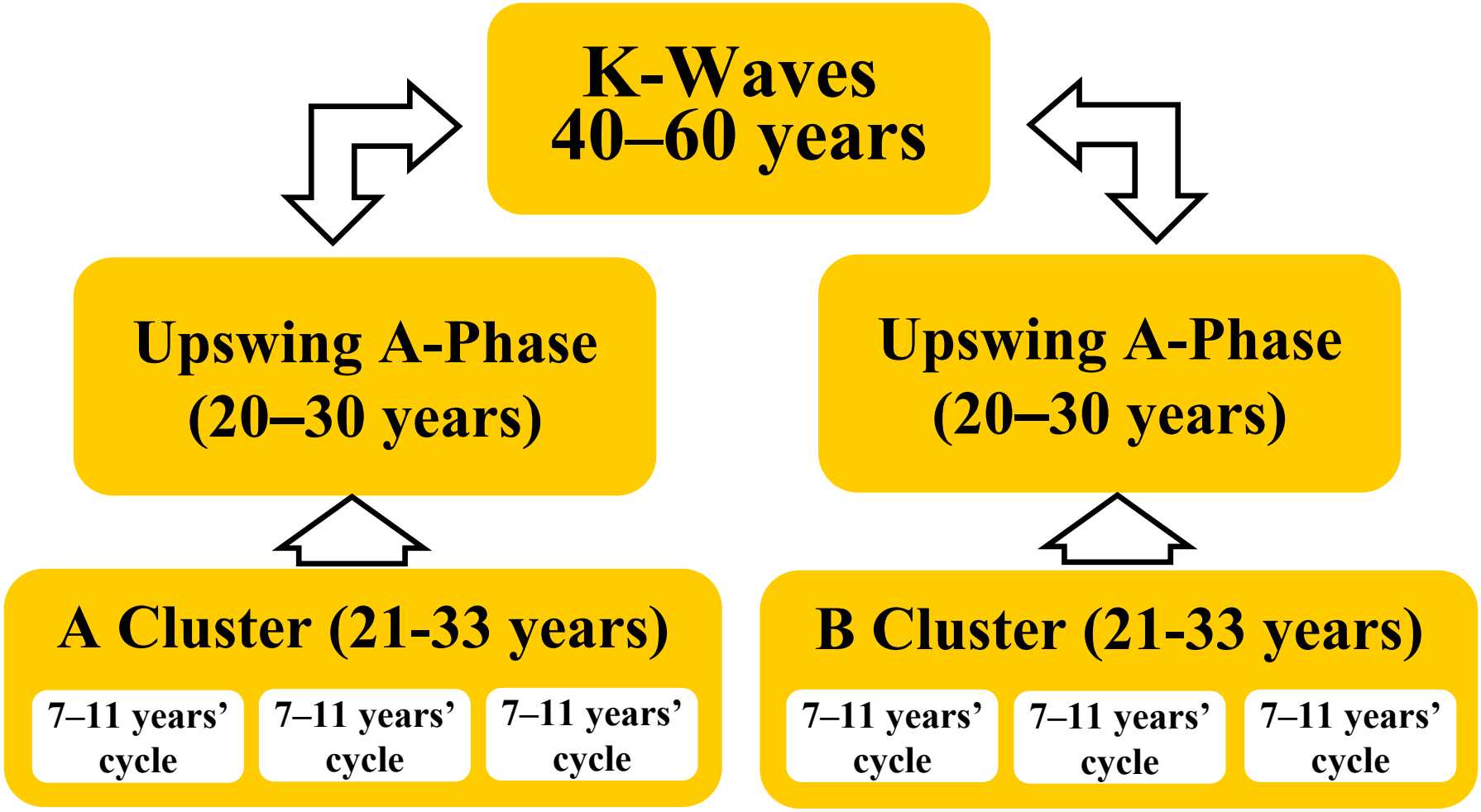
Wave	Date	New Technological System
The first wave	1780s–1840s	of textile industry
The second wave	1840s–1890s	of railways, coal and steel
The third wave	1890s–1940s	of electricity, chemistry and heavy engineering industry
The fourth wave	1940s – the early 1980s	of automobile, artificial material, electronics
The fifth wave	1980s – ~2020s	of microelectronics, personal computers
The sixth wave	~ 2020–2070	biotechnologies, nanotech-nologies, medicine, new information and cognitive technologies

http://www.socionauki.ru/authors/grinin_l_e/other/

The Connection between K-Waves and Juglar Cycles

- There is only one factor which can really determine stable duration of Kondratieff waves and their phases. **This factor is Juglar cycles.**
- The relatively regular periodicity of the K-waves' phases is determined by the relatively stable duration of J-cycles, whose ternary chain-clusters are 20–30 years in length.

Clusters of Juglar Cycles and Stable Duration of K-waves and Their Phases



http://www.socionauki.ru/authors/grinin_l_e/other/

Two Types of Juglar Cycles

- **During the upswing phases** Juglar cycles are characterized by stronger rises and less significant depressions.
- **During the downswing phases** they, on the contrary, are characterized by weak rises and lengthy depressions.
- Thus, **there are two types of Juglar cycles' chains** that have peculiar features of upswings and downswings.

http://www.socionauki.ru/authors/grinin_l_e/other/

Two Types of Juglar Cycles

The duration and relative regularity of K-waves' phases is determined by the character of the adjacent chains, or **clusters**, of Juglar cycles.

Cluster A is a chain of several upswing Juglar cycles characterized by strong rises and less significant depressions.

Cluster B is a chain of several downswing Juglar cycles characterized by weak rises and lengthy depressions.

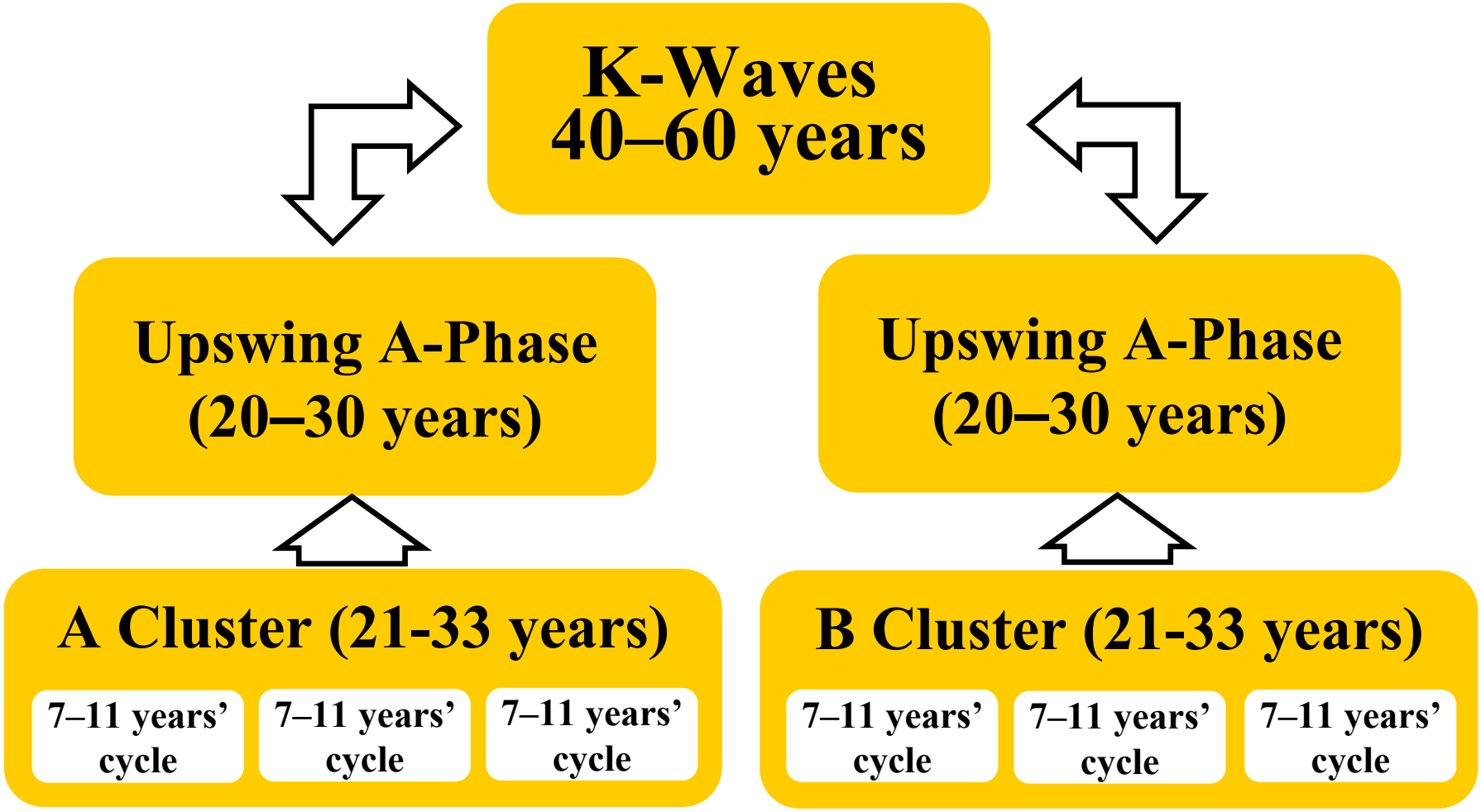
Examples of the Connection between K-Waves and Juglar Cycles

- The most common timing of Kondratieff waves with their phases and the generally accepted timings of Juglar cycles.
- The change of fundamental innovations can occur in no other way but through medium-cycles, including their booms, crises and depressions phases.
- **The correlation between the duration extremes** of K-waves (40–60 years) and those of Juglar cycles (7–11) are very close:

7: 11 = 0, 64 ~ 40: 60 = 0,66

http://www.socionauki.ru/authors/grinin_l_e/other/

Clusters of Juglar Cycles and Stable Duration of K-waves and Their Phases

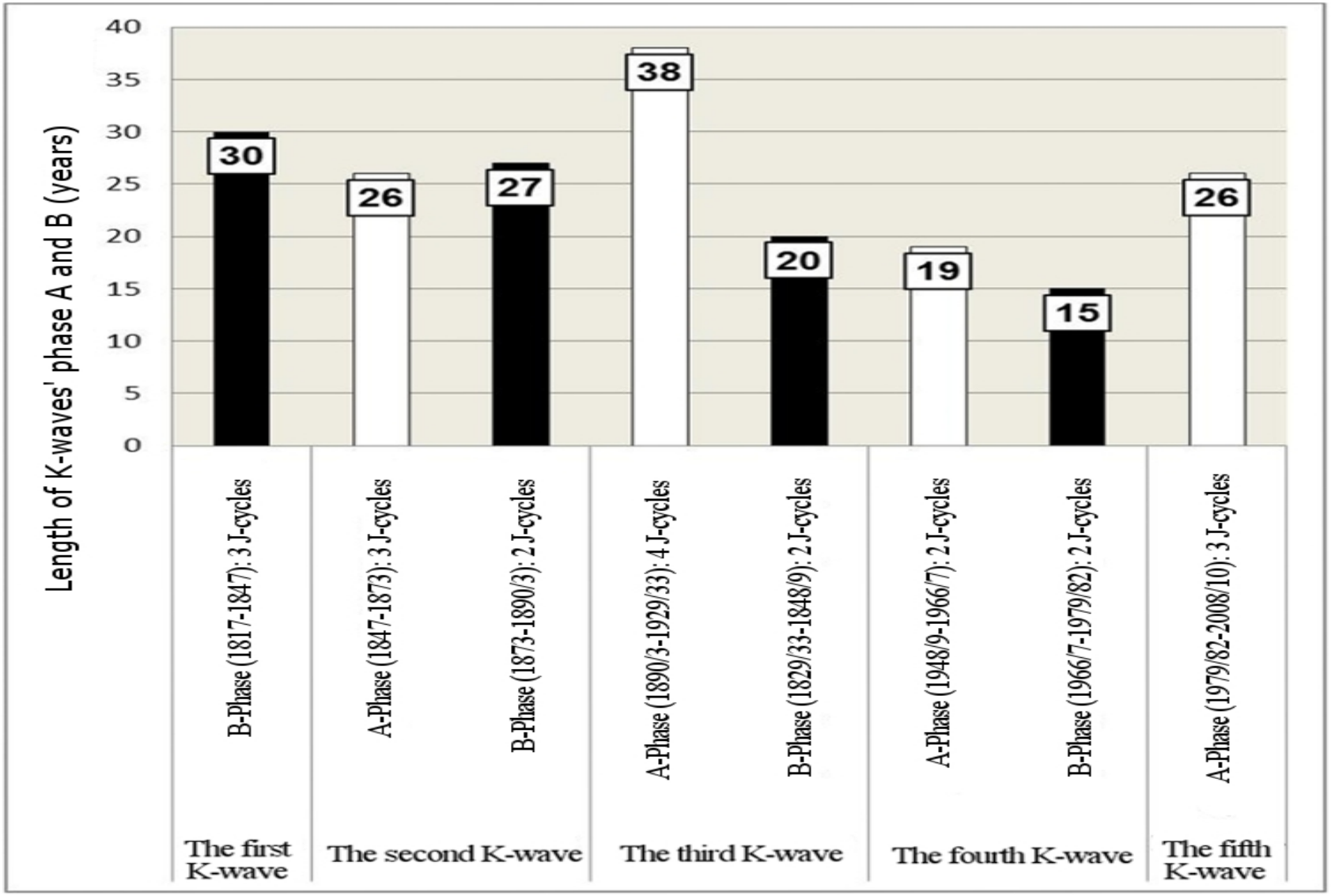


http://www.socionauki.ru/authors/grinin_l_e/other/

Multiple Proportion of K-Waves' Phases to Juglar Cycles

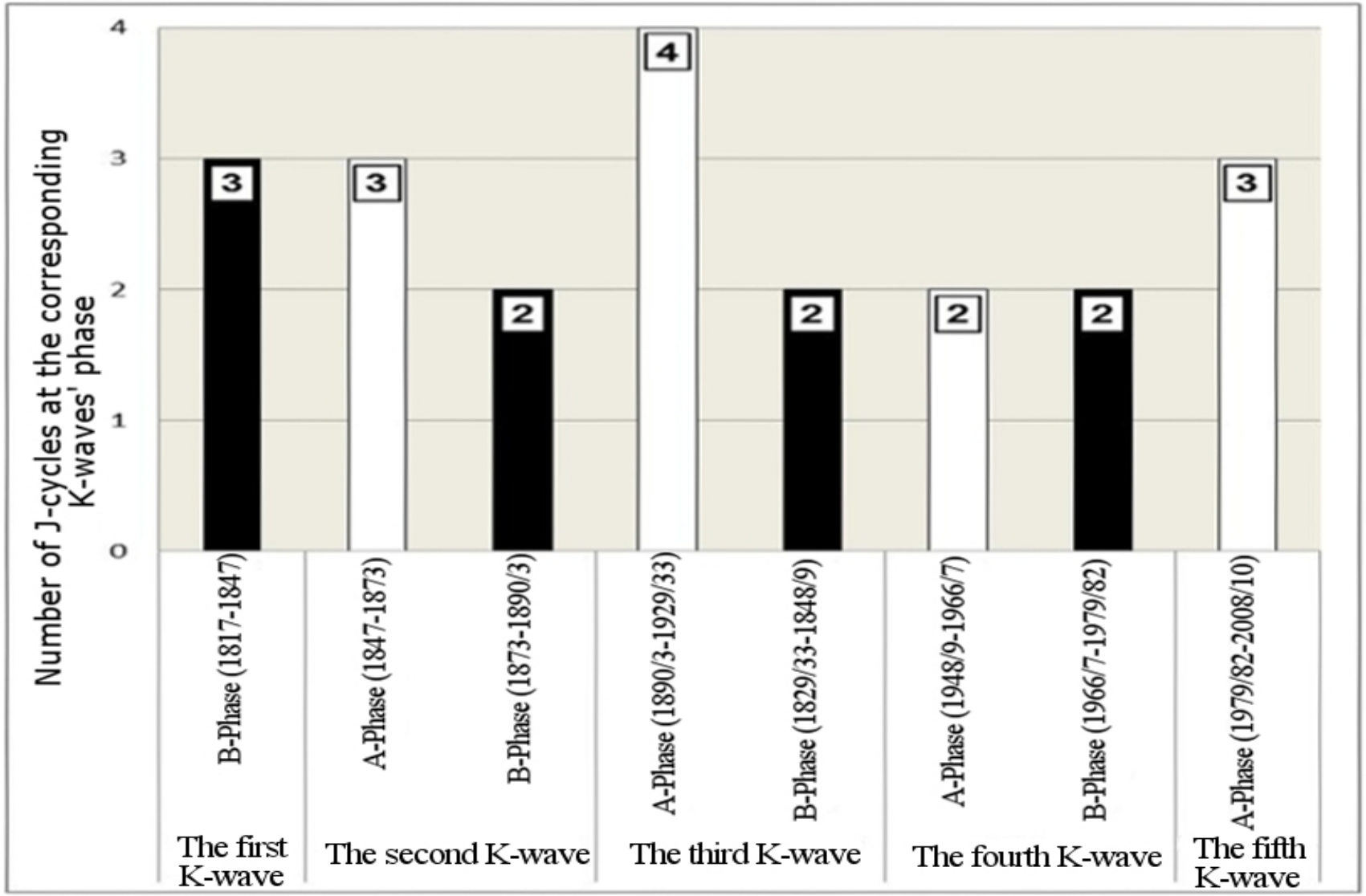
- Whatever duration of phases, we can see **multiple proportion of K-waves phases to Juglar cycles.** It proves the deep connection between Juglar cycles and K-waves. We can measure the length of the K-waves and phases in 'juglars'.
- The number of 'juglars' in different waves and phases fluctuates from 4 to 6 and from 2 to 4, respectively.

Diagram 1. The Length of A- and B-Phases of K-Waves in years



http://www.socionauki.ru/authors/grinin_l_e/other/

Diagram 2. The Length of A- and B-Phases of K-Waves in “juglars”



http://www.socionauki.ru/authors/grinin_l_e/other/

The Logic of the Connection between K-Waves and Juglar Cycles

It is just **the character of Juglar cycles' cluster that to a considerable degree defines the character of the K-wave phase.** In this respect it is worth emphasizing that:

- Juglar cycles are more empirically observable than the K-waves;
- the factors forming Juglar cycles are also more clearly determined and described;
- crises as a phase of a cycle are attributes of only medium-term cycles but no long one.

http://www.socionauki.ru/authors/grinin_l_e/other/

The Logic of the Connection between K-Waves and Juglar Cycles

- There is a **negative feedback loop** between the upswing and downswing trends, that is reinforced by every new medium-term cycle.
- The rise in prices and profit rate, as well as a strong demand together lead to the expansion of production.
- Falling profit rate, decreasing growth rate cause the reduction of investments and search for new innovative solutions.

http://www.socionauki.ru/authors/grinin_l_e/other/

K-Waves and Generations' Alteration

- There is a theory explaining K-dynamics by generations' alteration. Its weak point is that the change of generations is not a one-stage process.
- However, the factor of generation' alteration can be connected with Juglar cycles.
- 7–11 years is an adequate period to renew significantly the generation of businessmen.
- Within three medium-term cycles the business generation and typical business practices are almost entirely renewed.

http://www.socionauki.ru/authors/grinin_l_e/other/

The Logic of the Connection between K-Waves and Juglar Cycles

- During the K-wave's upswing A-phase a rapid expansion of economy inevitably leads a society to the necessity of changes.
- But the opportunities for a society to change lag behind the demands of economy.
- That is why the **development inevitably changes into B-phases,** during which the crisis and depressive phenomena impel deep transformations.

World-System Scale

Our model shows that to understand the nature of Kondratieff waves it is necessary to examine their functioning not at the level of a separate state, but, first of all, at the world-system level.

The world-system scale allow:

- reinforcing the positive feedback loops for a long period;
- restraining the appearance of negative feedback loops.

http://www.socionauki.ru/authors/grinin_l_e/other/

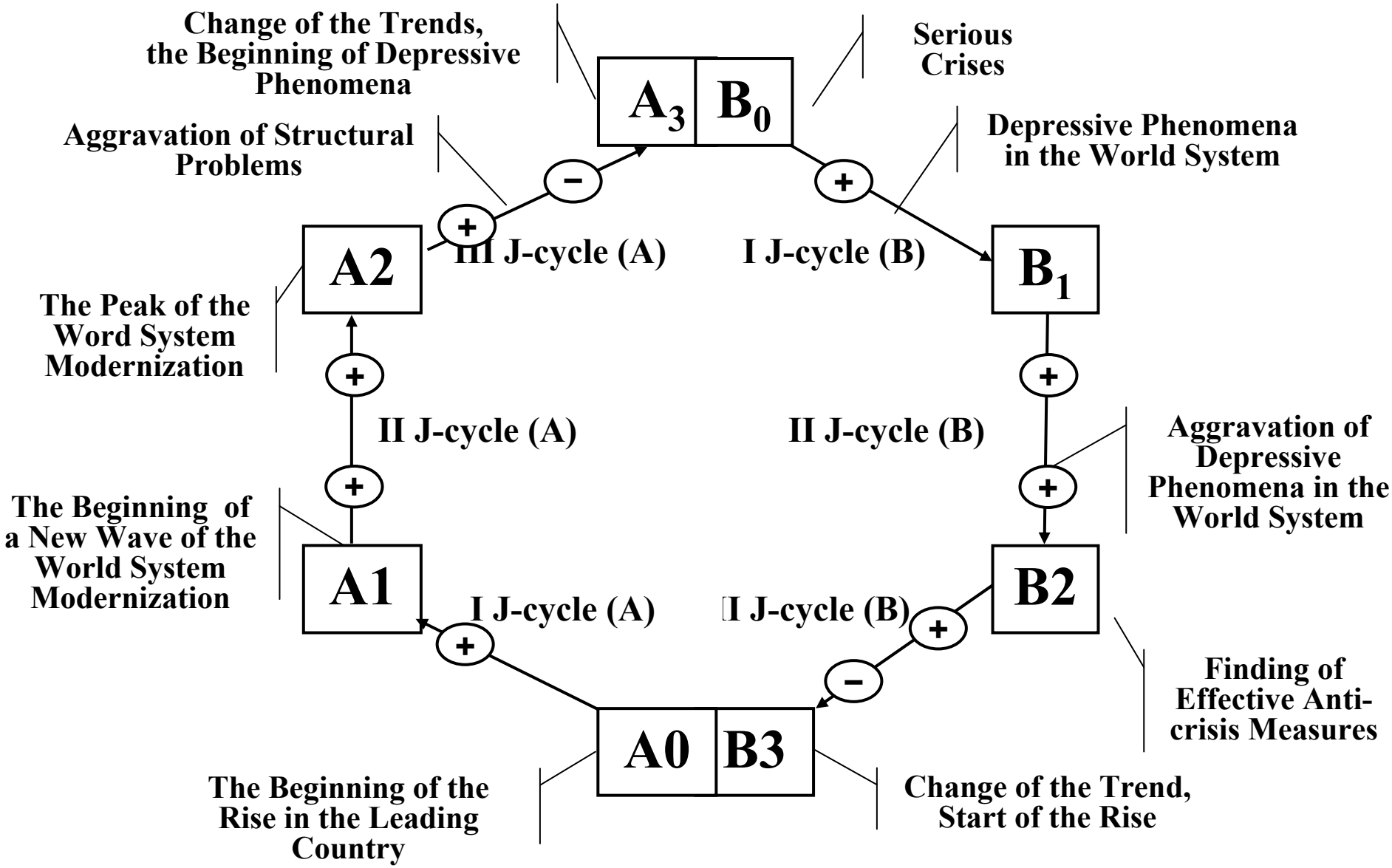
Positive Feedback Loops

Positive feedback loops arise

- **during A-phase** due to the acceleration of modernization within the World-System in whole;
- **during B-phase** due to the complexity of the search for the anti-crisis measures and the time needed for a social innovation introduced in a certain society to be adopted by the other societies.

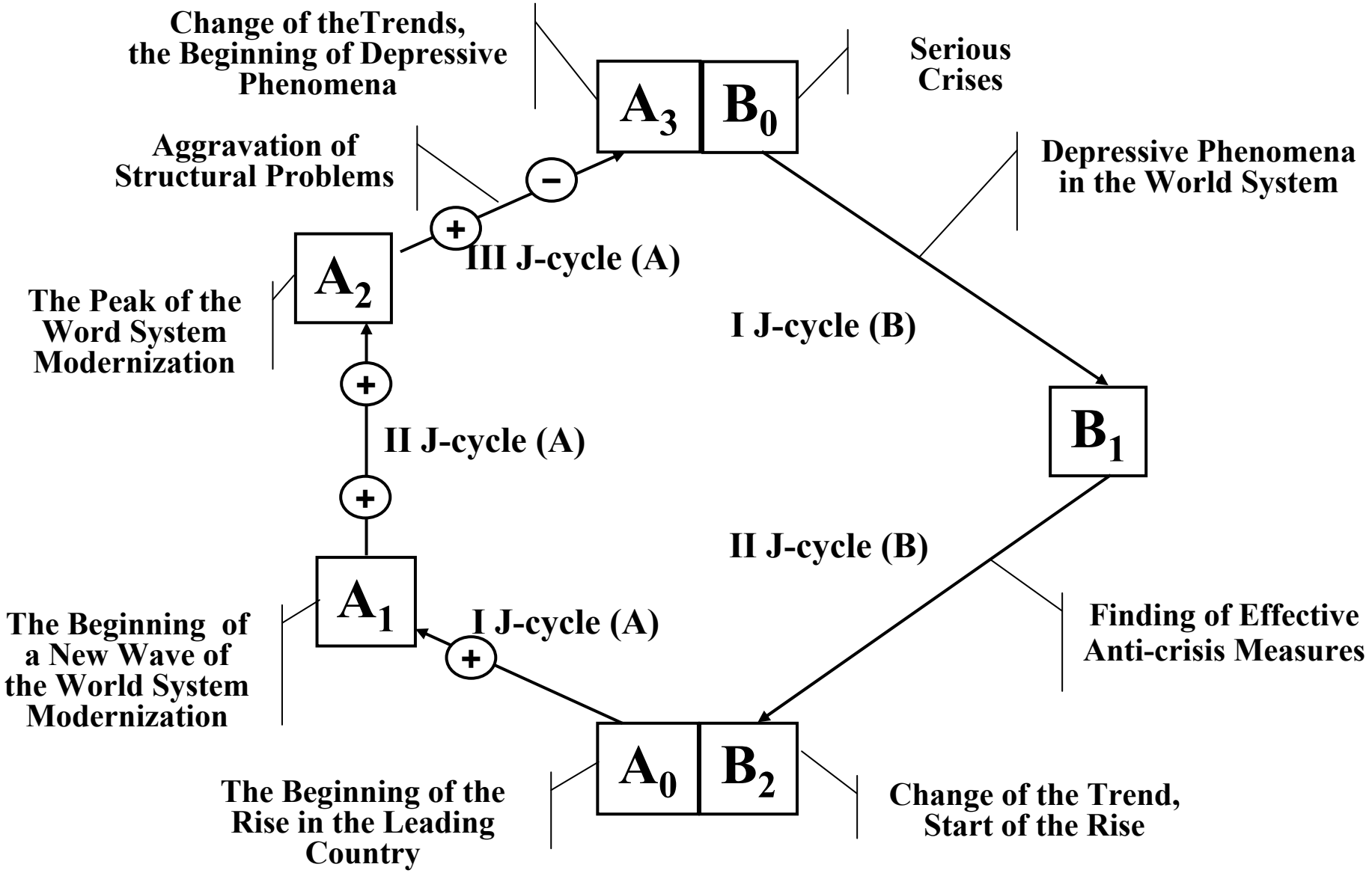
http://www.socionauki.ru/authors/grinin_l_e/other/

Scheme 1. Connections between Juglar Cycles and K-Wave (Ternary B-Cluster)



http://www.socionauki.ru/authors/grinin_l_e/other/

Scheme 2. Connections between Juglar Cycles and K-Wave (Binomial B-Cluster)



http://www.socionauki.ru/authors/grinin_l_e/other/

Thank you for attention!

http://www.socionauki.ru/authors/grinin_l_e/other/