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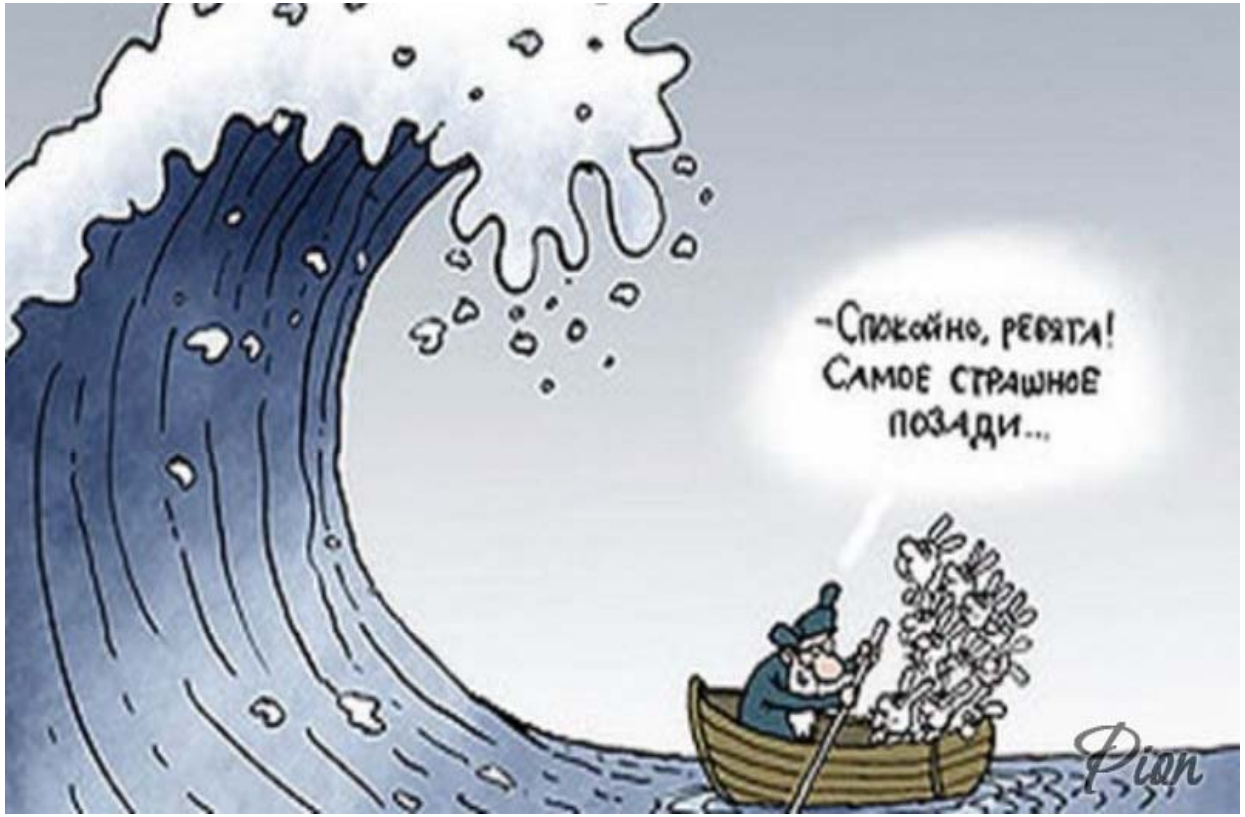
Towards a Unified Theory of Innovations: development of long-wave dynamics concepts.



1. The 1st stage of the Innovations Theory Development (1910 - first half of the 1940s)

2. The 2nd stage of the Innovations Theory Development (second half 1940 - first half of the 1970s)

3. The 3rd stage of the Innovations Theory Development (the mid-1970s – present)

Russian GDP vs GDP of World Leaders Countries (%) 1700-1913

Ratio	Total GDP			GDP per capita		
	1700	1820	1913	1700	1820	1913
Russia/ USA	3078,2	301,0	44,9	116,0	54,8	28,1
Russia/ China	19,6	16,5	96,3	101,8	114,8	269,6
Russia/ India	17,7	33,8	113,8	90,0	129,3	221,1
Russia/ Japan	105,2	182,1	324,1	107,2	103,0	107,3
Russia/ France	76,4	98,2	160,8	62,0	56,0	42,6
Russia/ United Kingdom	151,4	104,1	103,5	48,9	40,9	30,2
Russia/ Germany	120,9	143,3	97,9	68,3	65,1	40,8
Russia/ Italy	111,0	167,6	243,0	55,6	61,7	68,0

Source: *Madison A.The World Economy: a Millennial Perspective, OECD 2001, p. 261, 264. (calculated on the data of Russia in the boarder of the former USSR).*

Russian GDP vs GDP of World Leaders Countries (%) 2005-2025

Ratio	2005	2008	2025
Russia/ USA	13,7	16,1	20,6
Russia/ Germany	67,5	78,2	109,7
Russia/ France	91,2	108,5	150,9
Russia/ United Kingdom	89,3	105,0	145,5
Russia/ China	31,8	29,0	17,3
Russia/ India	72,5	67,6	47,3
Russia/ Japan	43,9	52,6	76,7
Russia/ Brazil	107,2	124,5	151,0

Source: *Social Sciences and Modernity, 2011, №5, P. 31.*

THE 3 STAGES OF THE INNOVATIONS THEORY DEVELOPMENT

1.<u>In the first stage (1910 - first half of the 40s)</u> to the forefront issues of understanding the nature of innovation and their role in the development of society over time (long, medium and short periods): J.A.Schumpeter, M.I.Tugan-Baranovsky & N.D.Kondratieff.

2.<u>The second stage in the development of innovation theory (second half 1940 - first half of the 1970s)</u> is characterized by the increased role of macroeconomic analysis,

1) The first of which was dominated by the ideas of neo-Keynesians ("Big push", " Two gaps model").
2) On the second – neoclassical (S. Kuznets, R Solow, W.A. Lewis models, etc).

3.<u>The third stage of development of the theory of innovation began in the mid-1970s and continues to the present.</u> It is characterized by an offensive alternative approach to macroeconomic theory.

1) Second half of the 1970s - early 1990s is characterized by the emergence of new ideas drawn from evolutionary theory, institutionalism (the theory of the firm) and innovation management.

2) Since mid 90s innovations studied by the methods of systems analysis (a comparative analysis of innovation policy in different countries, study the ways and means of forming an effective innovation systems, etc.

1.1. M.I. Tugan-Baranovsky: Crisis Theory.

1894- magister degree of M.I. Tugan-Baranovsky

"The periodic industrial crises in England",

German (1901) and French (1913) translations .

Reasons for success:

- Combination of historical and statistical analysis with the theoretical.
- The industrial cycle - primary, and the trade - is secondary.
- Cyclical basis at the time were changes in prices for iron - the main structural material instruments of production
- Delineation of accumulation of loan capital and the real productive capital.
- The material basis of the cycle - the periodic creation of new capital actually innovations.

1.2. Nikolai Kondratiev: Long cycles of “Konjunktur “

Followed by M.I. Tugan-Baranovsky **Nikolai Kondratiev (1892-1938)**

1915 - graduated in Saint-Petersburg University.

1917 – Comrade (Deputy) Minister of Agriculture, in the latter part of Provisional Government.

1921 – Director of Conjuncture Institute (from 1923 - the People's Commissariat of Finance) and the Department of Economy and Planning Commissariat of Agriculture.

1922 – «The world economy and the environment during and after the war»

1924 – article «On the concepts of economic statics, dynamics, and environment»

«Konjunktur» - «a combination of circumstances» has been introduced by F. Lassalle (1863) and picked up by Werner Sombart (1904).

Kondratiev showed that the conjuncture of the species concept in relation to the generic concept of economic dynamics.

N.D.Kondratiev identifies four "empirical regularity"

- Qualitative and quantative,
- Evolutionary (irreversible) and wavy (reversible)

Chronology of Long Cycles

I cycle - machine utilization of steam power and the creation of a major British industry.

- In 1787 - 1810 / '17 - has an upward phase, and
- in 1810/17 - 1844/51 - the downward phase.
- Europe is covered with a republican and Napoleonic France. The U.S. withdrawal on the world market (such as cotton for the textile industry)

Cycle II - the rapid growth of rail transport and shipping.

- In 1844/51 - 1870/75 the upward phase of the parish, and
- in 1870/75 - 1890/96 - the downward phase.
- The Crimean War, the unification of Italy, the creation of the "Second Reich". New strengthening the role of the U.S. (export cheap grain)

III cycle - the widespread use of electricity.

- 1890/96 - 1914/20 G. - upward phase. The "new" imperialism. Active involvement of other overseas countries, "the young capitalist culture" (Canada, Australia, Argentina).

N.D.Kondratiev identifies four "empirical regularity"

1. Before the beginning of the upward phase of each major cycle, or early observed significant changes in global economic conditions of life;

2. The periods of bullish phase is much more abundant political and social upheavals - wars, revolutions, coups d'état;

3. Downward phase followed by a prolonged depression of agriculture;

4. Regular cycles on the downside are more acute phases of crisis and deep depression.

Downside and upside waves of long cycles conjuncture by N. Kondratiev

Periods	Number of years of raising	Number of years depression
The downward wave of long cycle from 1822 to 1843	9	12
The upward wave of long cycle from 1843 to 1874	21	10
The downward wave of long cycle from 1874 to 1895	6	15
The upward wave of long cycle from 1895 to 1912	15	4

Source: N. Kondratiev. The problems of economic dynamics. M.: Economics. 1979. P. 208.

1.3. Schumpeter's Business Cycles

(1883-1950).

- The desire to overcome the static constructions of main stream economists was already clearly expressed in his book "The Theory of Economic Development. The study of business profits, capital, interest, and the cycle conditions." (1912).
- Schumpeter showed, as a result of entrepreneurial activity is the development of a capitalist society.
- The main function of the entrepreneur, for Schumpeter, is the ability to innovate, to introduce them into production.

- Schumpeter :"To produce means to combine the available items in our field and power." Form and content development, in terms of Schumpeter, defined the term "implementation of new combinations."

- **The term "innovation"** will appear in his later work only in the "Business Cycles . A Theoretical, Historical and Statistical Analysis of the Capitalist Process."(1939).

3 levels of balance in Economy

Level 1 - **the balance between supply and demand in the short run (Kitchin cycles)**
Level 2 - the balance between market prices and production costs (Juglar cycles)
Level 3 - the balance on the basis of the updated core capital goods (Kondratiev cycles).

Kondratyev describes the following basic capital goods:

- Industrial buildings,
- Drainage systems,
- Transport infrastructure,
- The costs for training of skilled workforce

Renewal of fixed capital goods requires substantial and long-term capital, possible only under certain conditions:

- Considerable size of accumulated capital;
- The excess in the dynamic of capital accumulation over the volumes of the current investment;
- The concentration of capital in the possession of powerful business centers through the system of credit and the stock market;
- Low correlation between relatedness of capital mobility, low cost and abundance of capital.

2.The development of Long-wave Economic Dynamics Concepts (second half 1940 - first half of the 1970s)

is characterized by the increased role of macroeconomic analysis, in turn, he has at least two substages:

1) The first of which was dominated by the ideas of neo-Keynesians ("Big push", " Two gaps model", etc.)

2) On the second – neoclassical (S. Kuznets, R Solow, W.A. Lewis models, etc).

2.1. Kuznets' Cycles

In the 30's Kuznets formulated the theory of the leading sectors - investments in fixed assets of leading sectors give impetus to economic development.

Kuznets has allocated 2 basis of the leading sectors:

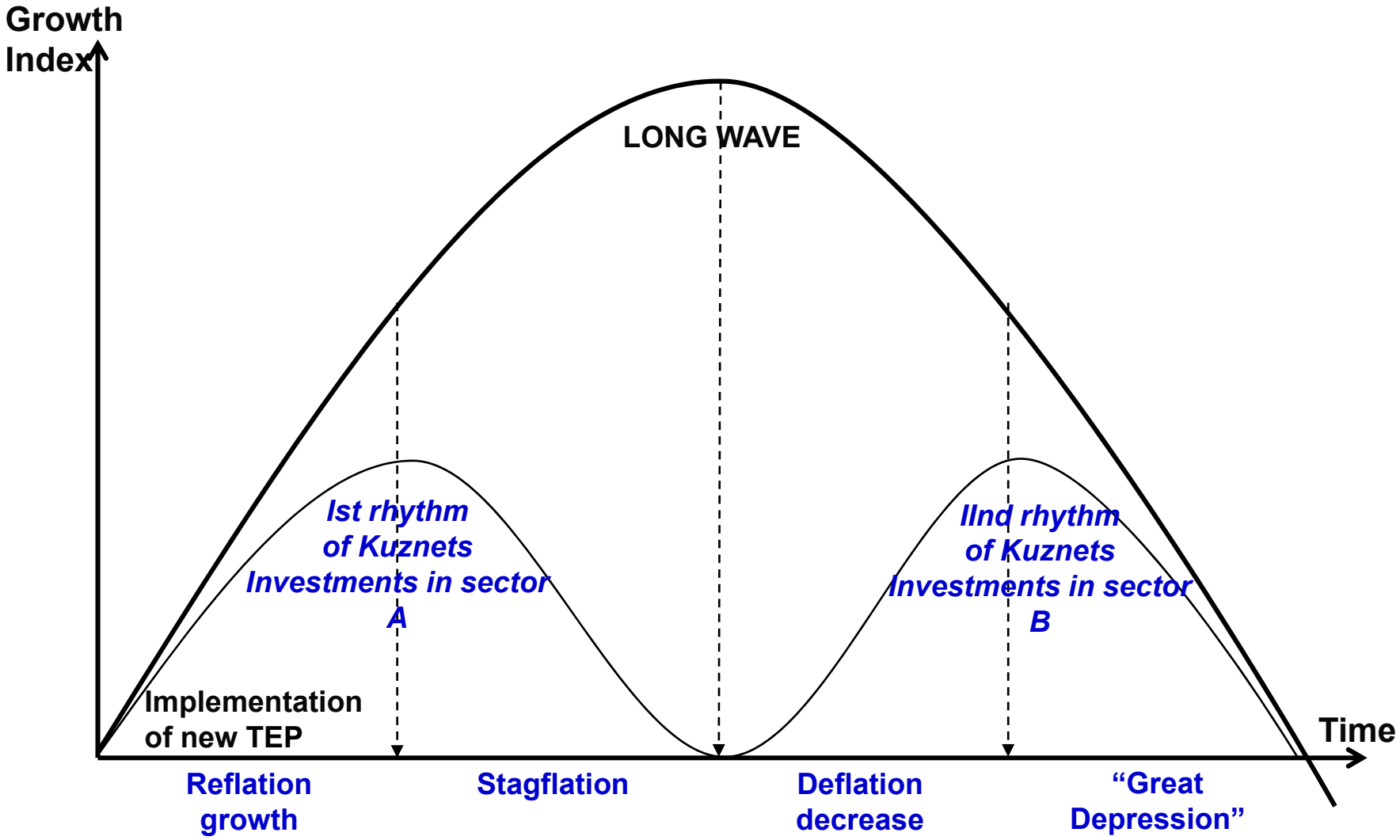
- *primary (mining industry and agriculture) and*
- *secondary (manufacturing).*

If the price of products of the primary sectors are relatively low - this contributes to the secondary sector, and vice versa.

According to S. Kuznets it is a kind of industries clustering which equals to 30-year period.

2 correspond rhythms of S. Kuznets equals to Kondratiev' long wave.

2.2.Correlation between Long Waves and Kuznets' cycles (by B. Berry)



Source: *Berry B.J.L. Long-wave Rhythms in Economic Development and Political Behaviour/ Baltimore; London, 1991.*

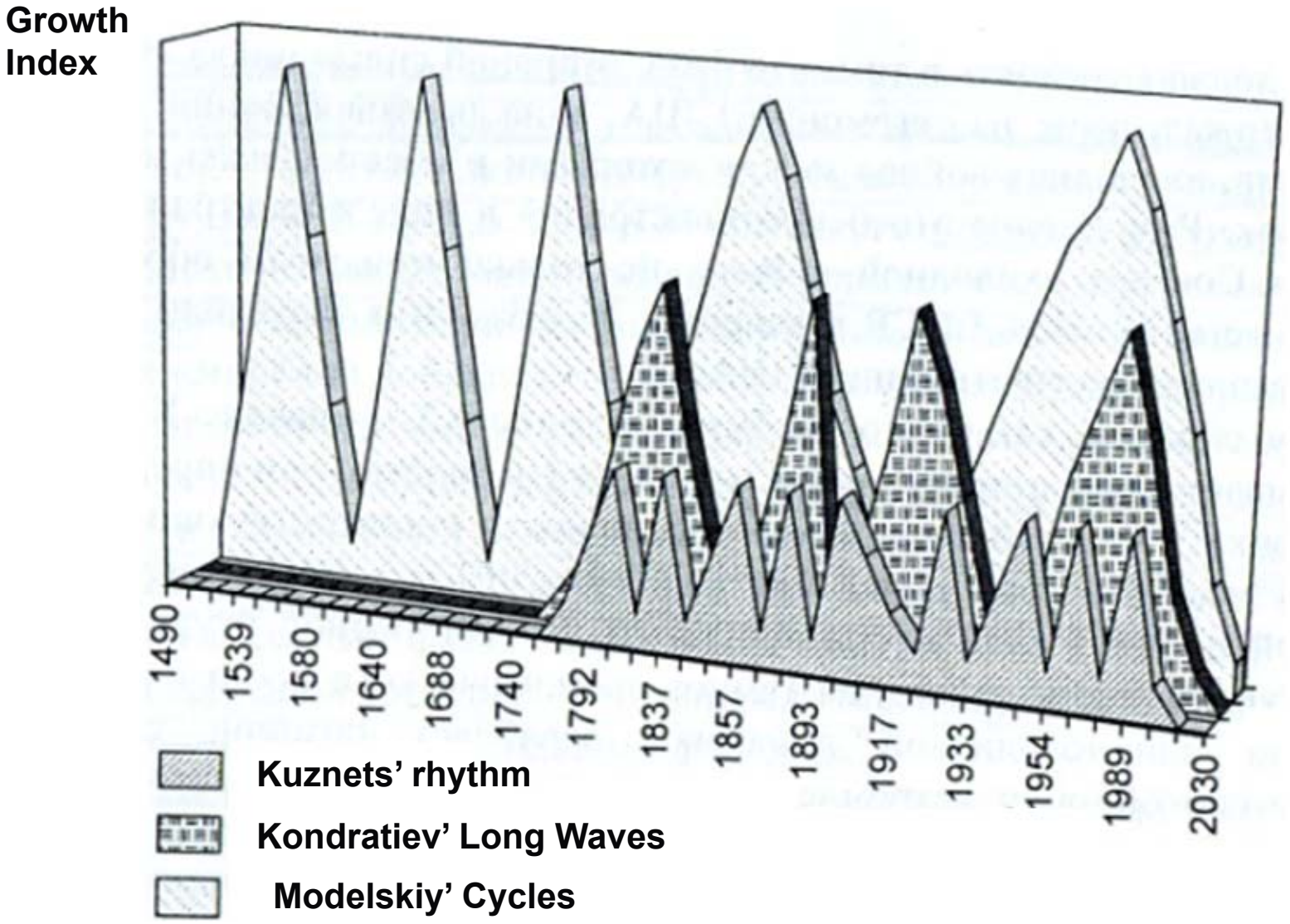
Correlation between Kondratiev Long Waves and Kuznets' cycles

- The coincidence of the two phases of recovery cycles leads to reflationary growth - in this period the active introduction of new techniques and new technologies take place.
- The decline rate of the Blacksmith with the continuing increase long wave leads to stagflation.
- If down-under long wave begins the ascent of the second rhythm Forge, there comes a deflationary decrease,
- if the decline rate of the Blacksmith coincides with the down-wave large loop situation comes a deep crisis, reminiscent of the "Great Depression" of 30's in the USA.

2.3. Combined Dynamics of Modelskiy' Cycles, Kondratiev' Long Waves and Kuznets' rhythm

- The rhythms of Kuznets and Kondratieff long waves added by Modelsky large cycles, lasting from 90 to 122 years (**Modelsky G. Exploring Long Cycles. New York. 1987)**
- American historian George Modelski connects these cycles with periods of global world wars and the era of dominance of a geopolitical force.
- It leads to modification of Kondratiev' long waves.

Combined Dynamics of Modelskiy' Cycles, Kondratiev' Long Waves and Kuznets' rhythm



Source: *Rumyantseva S. Specificity of a paradigm shift long techno-economic fluctuations. Vestnik. St. Peterburg university. Ser. Economics. 1998. Vol. 2(12).*

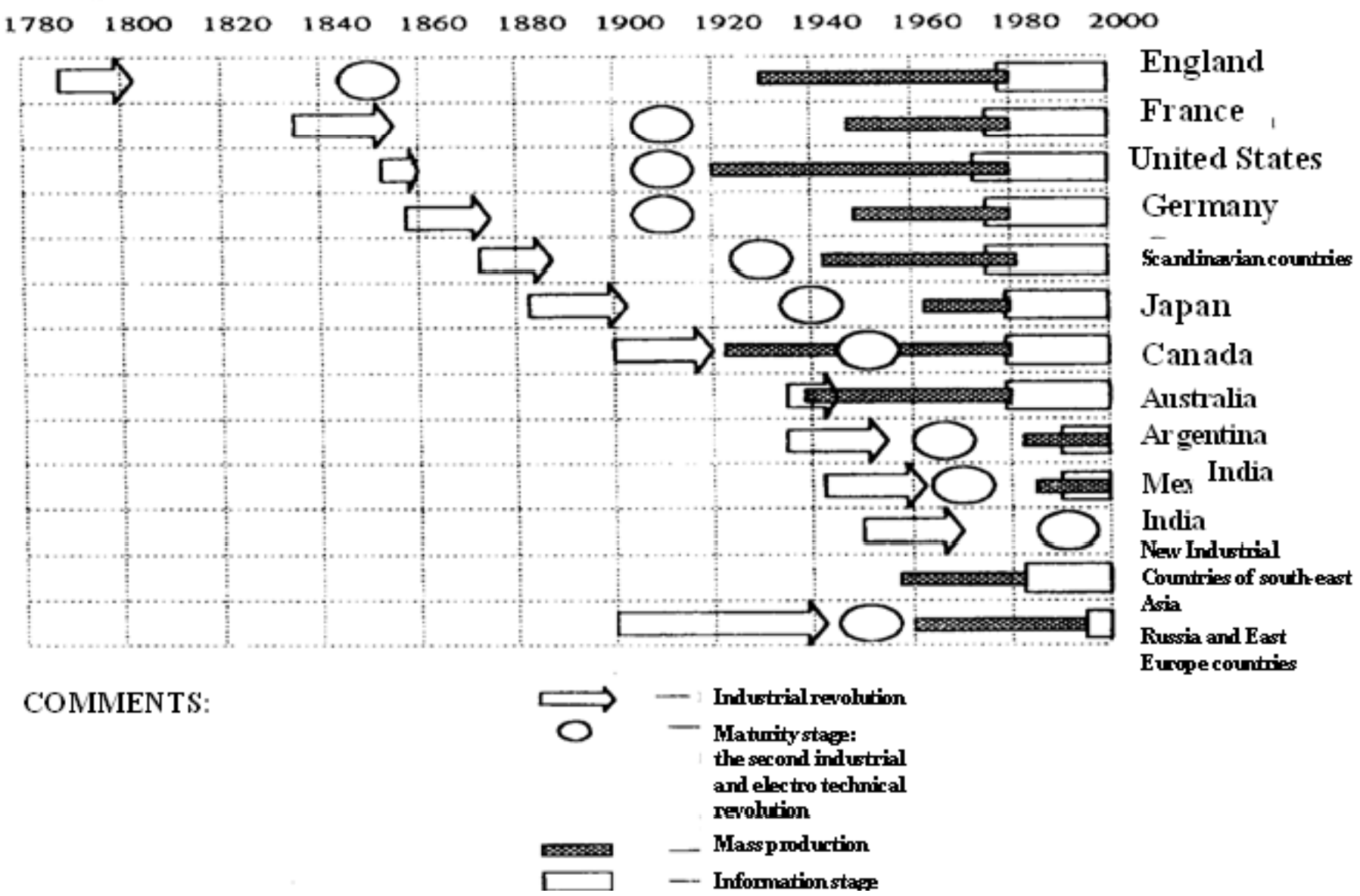
3. New Step in Long Waves Studies

- In 1975 G.Mensh promotes the concept of technological stalemate, according to which the innovator appears only under hard pressure and deep depression when the need for innovation is a matter of life and death.
- During this period, the authors still try to find some underlying cause of the long-wave dynamics:

- Rostow connects cycles to fluctuations in prices of raw materials and foodstuffs,
- N.Nakitsenovich - with the change of the basic energy,
- P.Korpinen - with changes in the financial system ,
- J. Goldstein - explains their exogenous factors and, above all wars,
- E.Mandel - intensification of the class war.

However, most researchers (J. Forrester, C. Freeman, J. Clark, L.Sute, Van Der Zwan, R. Metz, SM Menshikov, etc.) connects the long wave conditions with the dynamics of investment in fixed assets.

3.1. ECONOMIC GROWTH STAGES IN DIFFERENT WORLD COUNTRIES



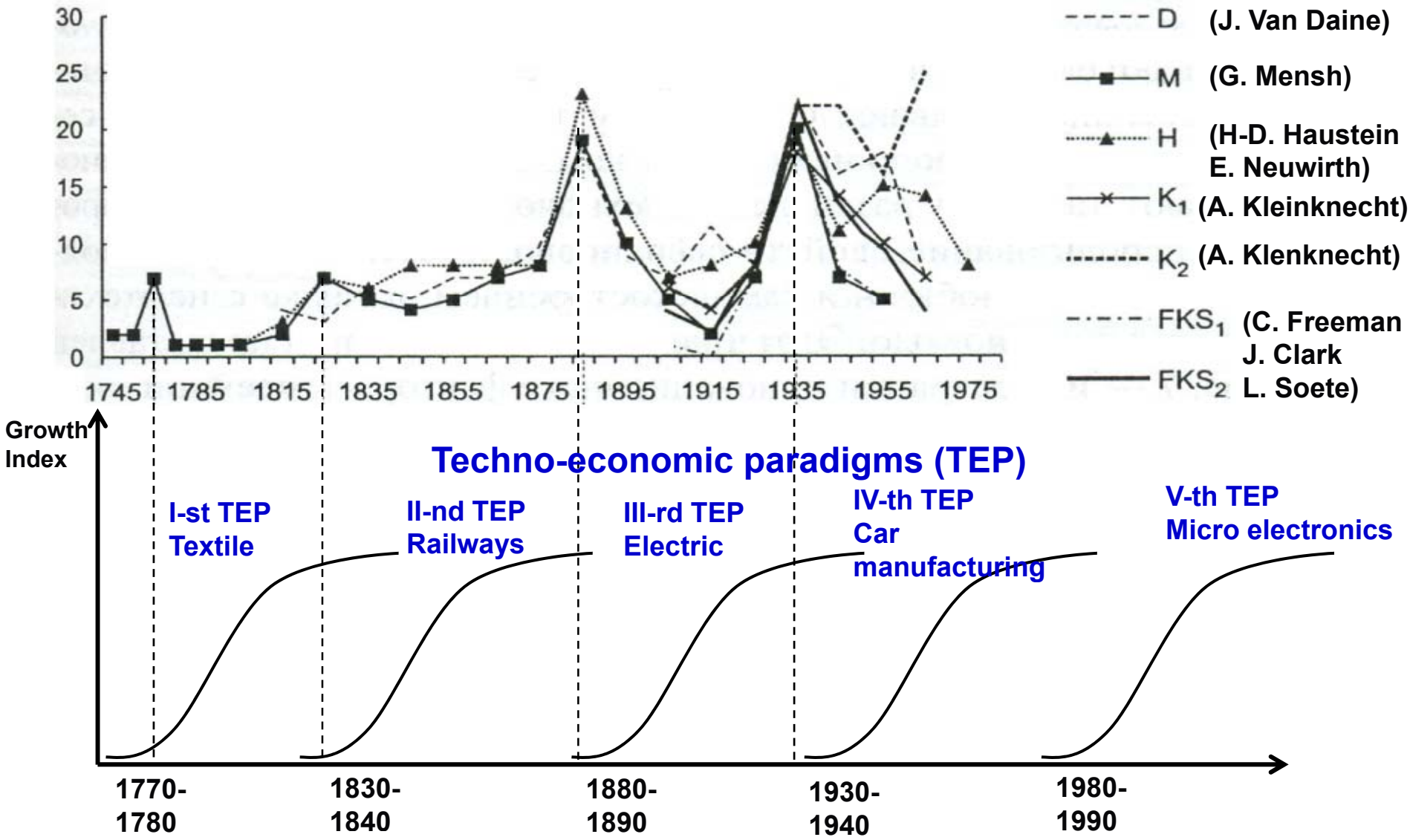
Source: Н.П. Кузнецова Н.П. Экономический рост в историческом контексте. СПб., 1996. С. 106

3.2. Long waves in the economy: a multivariate analysis

Factor-Tendencies	Process-stream	Cumulative process
Innovation	rate of innovation	technological paradigm, the degree of maturity of the technology, the quality characteristics of its possible improvements, the type of introduced innovation
Resources	intensity of use, price	type of energy source, its availability, the degree of exhaustion
Monetary	value of the monetary unit, the quantity of money in circulation	Financial style, types of financial structures, types of money, the structure of the money supply
Informational	number of information in society, including the degree of deviation of prices for the products of the actual cost of production costs	type of information (price, telecommunications)

Source: *Rumyantseva S. Long Waves in the Economy; multivariate analysis. St. Peterburg university Press. 2003. P. 52*

3.2.1. Structure of Innovation Factor-Tendency



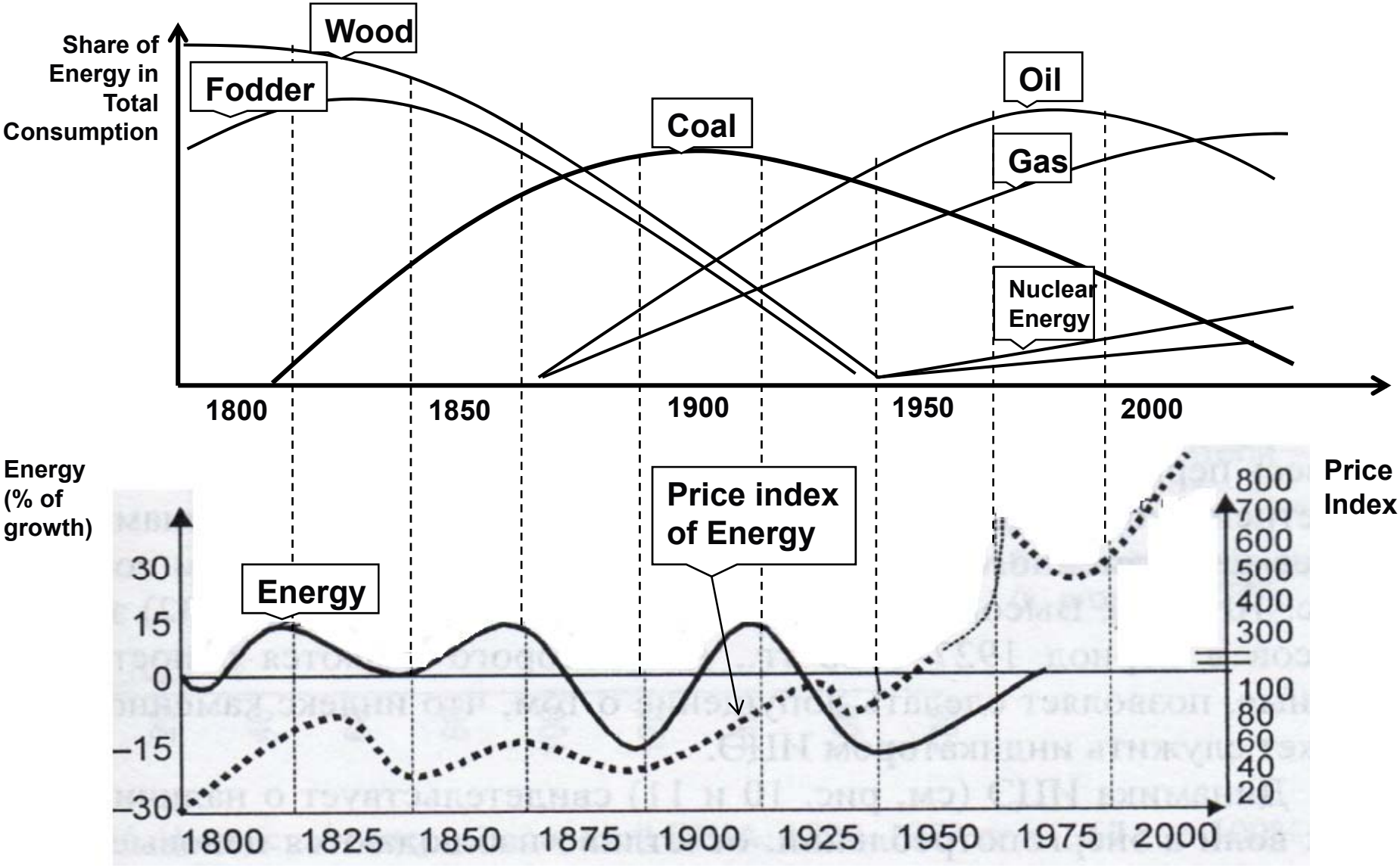
Sources: Lukashevich IV Theory long waves and problems of scientific and technological progress. St. Petersburg. 1993. P. 114-116; *Rumyantseva S. Long Waves in the Economy; multivariate analysis. St. Peterburg university Press. 2003. P. 55*

Note: *The number of basic innovations collated according to the received economists mentioned above*

MAIN TECHNOLOGICAL WAYS
(by S. Glaziev)

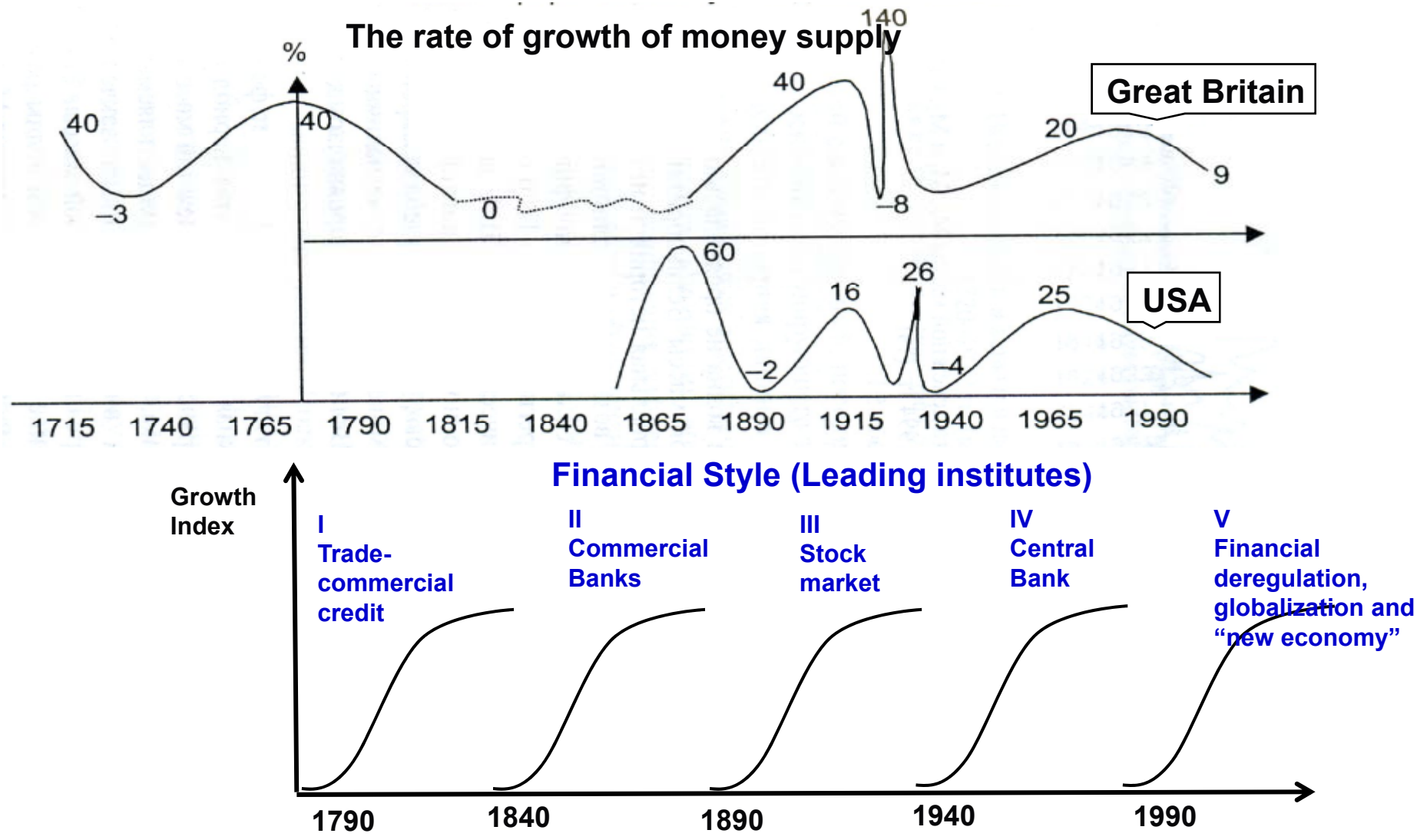
Technological ways	The 1st	The 2nd	The 3rd	The 4th	The 5th
The period of dominance	**1770 – 1830 th**	**1830– 1880th**	**1880– 1930th**	**1930- 1980th**	**from 1980th**
Key factor	Textile machines	Steam-engine	Electric motor, engine	Internal combustion engine, oil	Micro-electronics
Leader industries	Textile industry	Mechanical engineering, coal industry	Electrical appliances, production & distribution of steel	Car-production, mining & processing of oil	Electronics industry, software

3.2.2.Structure of Resourses Factor-Tendency



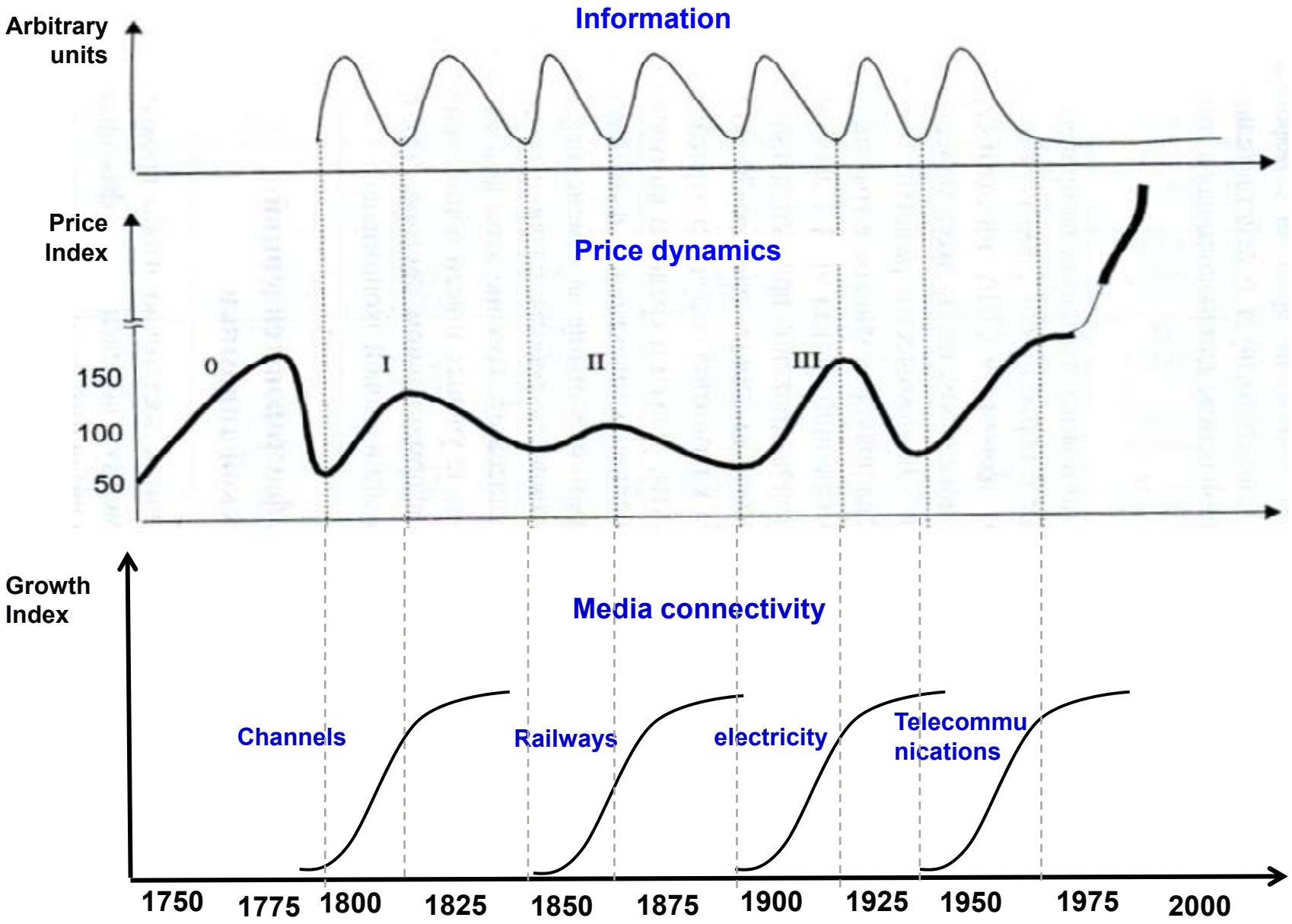
Sources: *Nakicenovic N. Technological substitution and Long Waves in the USA// The Long Wave Debates/ Ed. by T. Vasko. Berlin. 1987.*

3.2.3. The structure of the monetary and credit factor-trends.



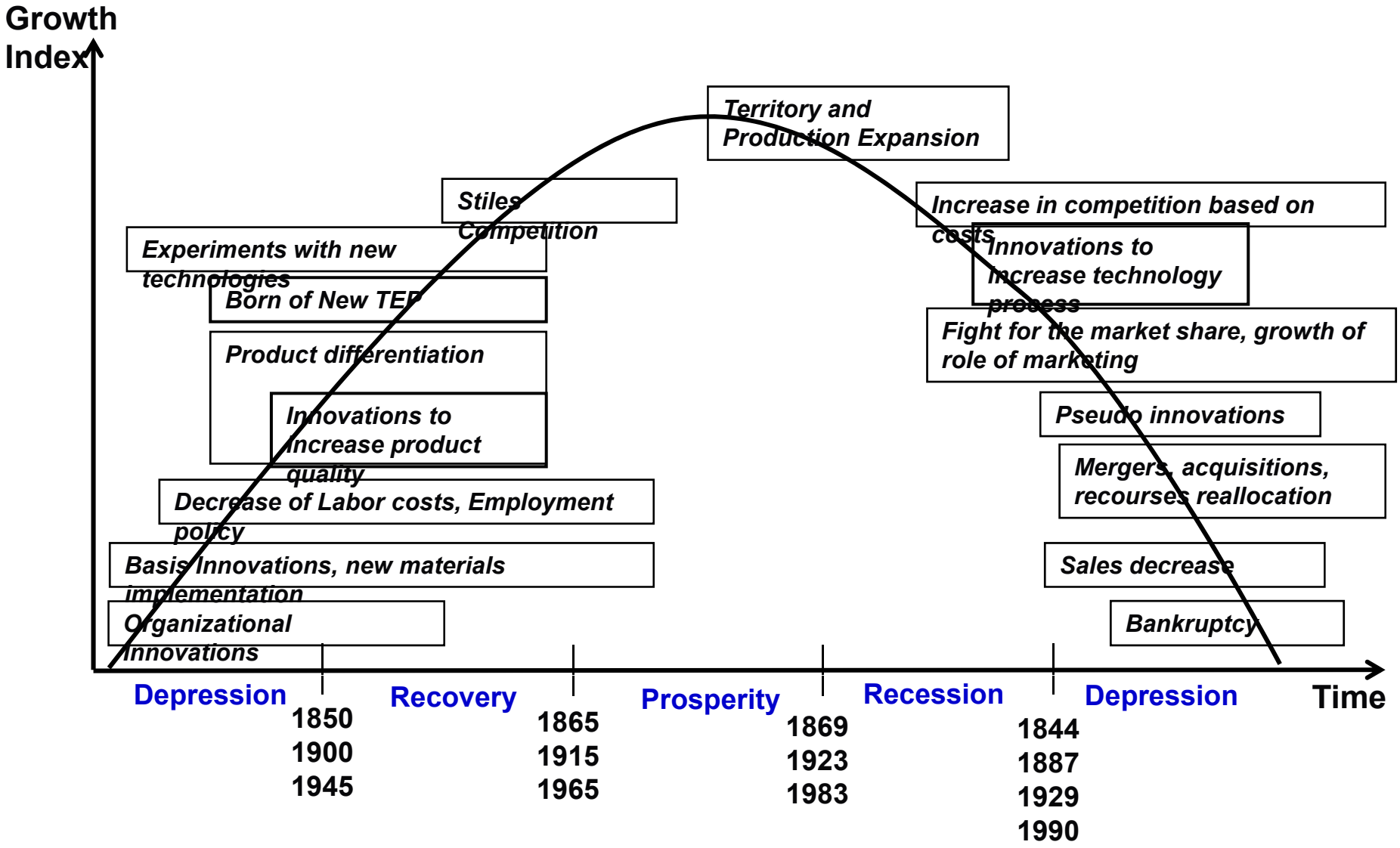
Source: *Rumyantseva S. Long waves in the economy; multivariate analysis. Ed. St. Peterburg university. 2003. P. 75*

3.2.4. The structure of information factor-trends.



Source: *Nakicenovic N. Technological substitution and Long Waves in the USA// The Long Wave Debates/ Ed. by T. Vasko. Berlin. 1987; Rumyantseva S. Long waves in the economy; multivariate analysis. Ed. St. Peterburg university. 2003. P. 95*

3.3.Corporate Strategy on Kondratiev' Wave Scale



Source: *Rumyantseva S. The strategy of the company in the longwave cycle. Vestnik. St. Peterburg University. Ser. Economics. 1999. Vol. I (№5)*

3.4.R. Nelson and S. Winter

Farther along are the creators of the evolutionary theory of economic

R. Nelson and S. Winter:

- *trying to overcome the typical neo-classical principle of methodological individualism;*
- *consider that the main factor of economic change is not only technological, but organizational progress is occurring primarily and mainly at the micro level.*
- *develop and apply computer simulation models as potential development opportunities.*

Representatives of evolutionary economics drew attention to the ambiguity of the results of technical progress for the participating firms.

Predicting who will benefit from the innovation may be difficult.

The fact that firms are changing the routine, innovators do not always win the competition.

By reducing the costs of search may benefit firms and imitators.

And in case of failure of innovation winners in the competition may be even firm-conservatives.

3.5.Modern Writers

- Modern writers are increasingly focused on the analysis based on the previous path of development and the initial conditions of the system.

- This is especially important in the analysis of countries have recently switched to a market economy, where its legal institutions are not working at full strength. This fully applies to the entire former Soviet space.

- Let us now see how to implement these approaches in creating long-term development of concepts of modern Russia.

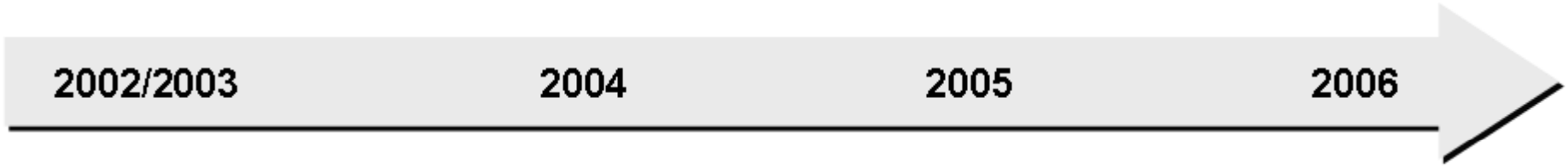
4.Institutional Prerequisites of Innovation Economic Development

4.1.Doing business in Russia (2011-2013)

Ease of...	2011	2012	2013	Rank change
1. Starting a Business;	106	111	101	▲ 5
2. Dealing with Construction Permits;	179	178	178	▲1
3. Electricity receiving;	183	183	184	▼1
4. Registering Property;	51	45	46	▲ 5
5. Getting Credit;	96	98	104	▼8
6. Protecting Investors;	108	111	117	▼9
7. Paying Taxes;	107	105	64	▲ 43
8. Trading Across Borders;	166	160	162	▲4
9. Enforcing Contracts;	19	13	11	▲8
10. Closing a Business.	60	60	53	▲7
Doing Business	124	120	112	▲12

Sourse: Doing Business 2011-2013

4.2.Large-scale initiatives in Russian economic policy in the beginning of XXI century



2002/2003

- New land, labor, and custom laws
- Package of laws to reduce bureaucratic interference in companies
- Start of reforms in the electricity sector
- New banking sector regulations
- New rules and regulations for the judicial system

2004

- Creation of the Stabilization Fund
- Start of acquisitions that significantly increase the share of the government or state-owned companies in the economy

2005

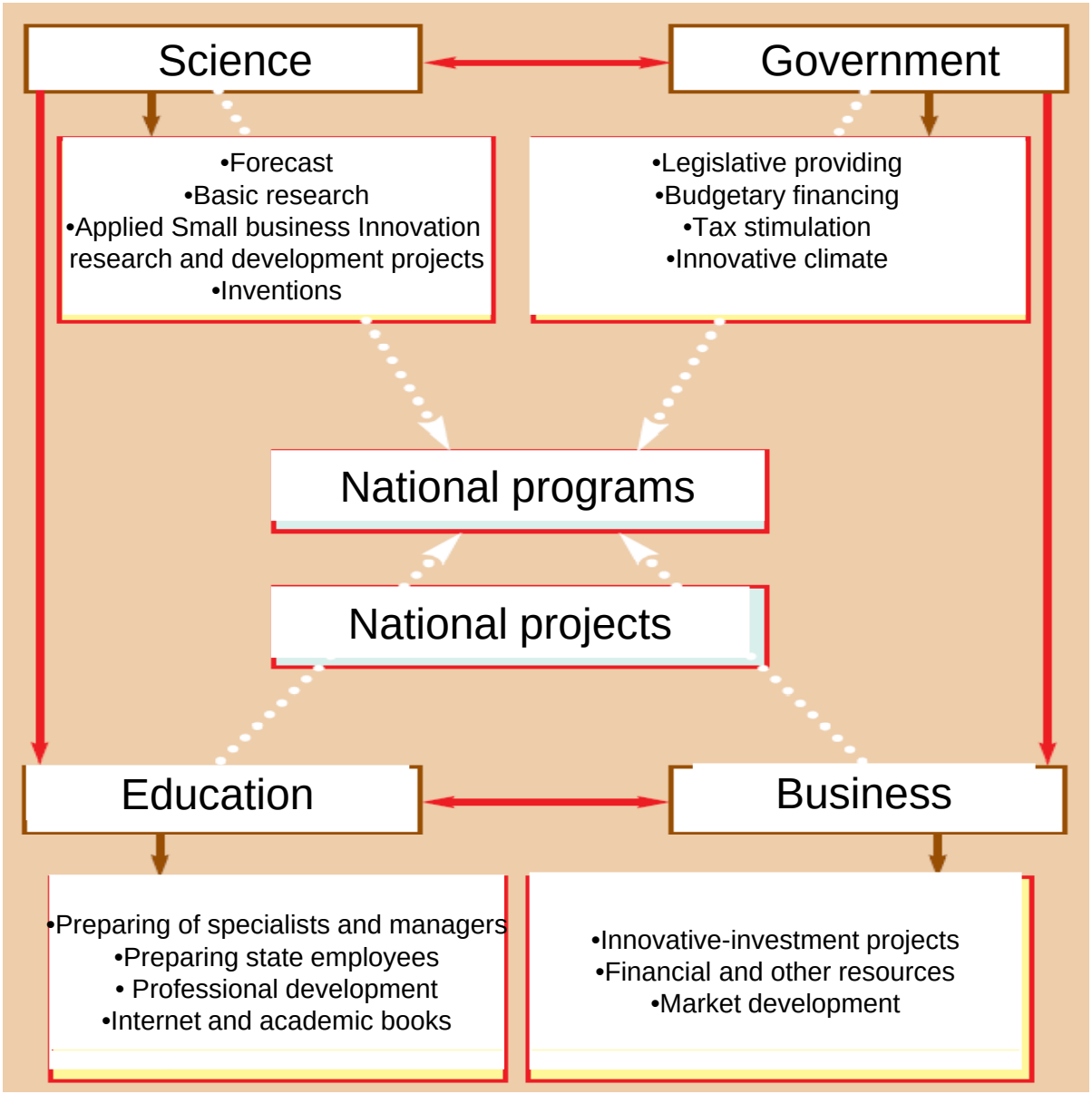
- Administrative Reform Concept
- Law on Special Economic Zones

2006

- National Projects on education, health care, housing, and agriculture
- Investment Fund for infrastructure projects
- Russian Venture Fund and other venture funds
- Competition law
- Discussion on new legislation to limit foreign ownership in “strategic industries”

Source: Porter M., Ketels K. Competitiveness at the Crossroads: Choosing the Future Direction of the Russian Economy p. 76

4.3.Innovative partnership of government, business, science and education



Source: Prediction of innovative – technological and structural dynamic of Russian economy on the period until 2030 year subject to global tendency. M.: Institute of economic Strategies 2006, P. 45

4.4.Constraints

	Internal constraints	External constraints
By efficiency of investments	1) Lack of quality study budget allocation of investments 2) Disparities in the development of investment vehicles 3) The limited forms, methods and motivations of the Investment Management	The low level of executive discipline due to: -shortages, owning modern management techniques - inconsistency of budget and management procedures in time -> *increase in the period between the decision whether to build before it starts* - - the lack of stringent restrictions on the development of the budget law -> *prevent the inclusion in the budget costs of activities for which there is documentation*	1) Relatively high labor costs and the level of insurance premiums 2) Preservation of the existing level of social consciousness 3) Weak institutional environment
By volume of investments		1) The dominance of the principle of balancing the budget (fiscal policy) 2) Competition from the state capital with a low rate of return for the internal financial resources (debt policy) 3) Trends in reducing the public sector (privatization and lower taxes), etc.	

Source: Strategy 2020: New model of Growth – New Social Policy, 2012. p.713

Thank you for your attantion!