Level-Specific Modernization

5

So many countries, so many customs (American proverb); while so many layers, so many features. Modernization takes place in almost all countries and at all layers of human civilization including the world, international, national, regional, organizational, and individual layers. As the important part of modernization science (Fig. 5.1), level-specific, stage-related, and field-relative modernization overlaps with each other. There are both similarities and differences among all level-specific modernizations. The adaptability of the core theory of general modernization varies at different levels. Country is the basic unit of modernization, so modernization at every layer is closely related to national modernization.

5.1 World Modernization

World modernization may refer to either modernization at the world level or modernization in the world (Fig. 5.2). In this section, it is the first case. In other words, world modernization here means a way how the modernization phenomenon is presented to us and a level at which we analyze the phenomenon.

5.1.1 Studies

World modernization, which started in the 1760s, is believed to last 340 years until the end of the twenty-first century, and new changes are expected in the twenty-second century. The research into world modernization can begin with early eighteenth century and be approached from three perspectives including its past, present, and future. Since world modernization is a very complex phenomenon, a multidisciplinary, multidimensional, and gradual approach should be taken so as to take advantage of the complementarities and cross-examination of multiple disciplines.

C. He, *Modernization Science*,
DOI 10.1007/978-3-642-25459-8_5,

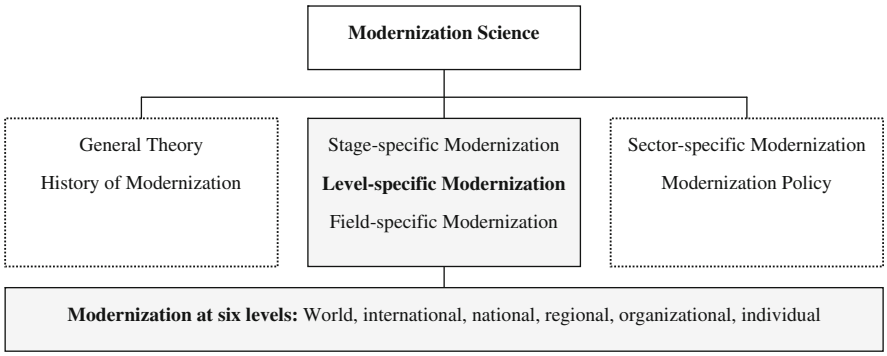


Fig. 5.1 Positioning and structure of level-specific modernization

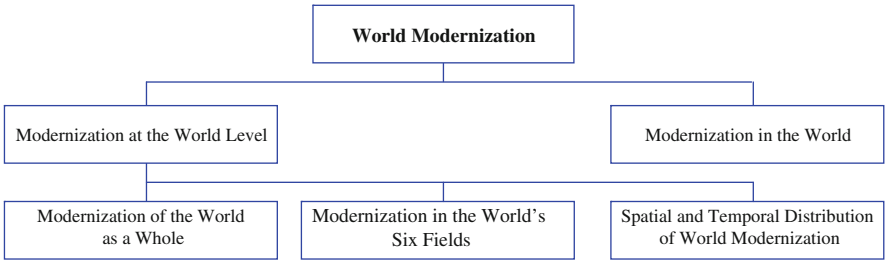


Fig. 5.2 Analytical structure of world modernization. Note: there are many explanations about world modernization. Modernization in the world includes the national and regional modernization across the world. National modernization across the world will be discussed in the third section of this chapter, while regional modernization will be addressed in the fourth section

5.1.1.1 Research Paradigm

World modernization research is the study of modernization at the world level.

(1) Research Matrix

The research objects in world modernization research include modernization of the world as a whole, modernization in the world's six fields, as well as the spatial and temporal distribution of world modernization; the research contents include the modernization of world behaviors, structures, institutions, and concepts, as well as the process, results, dynamics, and models of world modernization. All these factors can constitute a research matrix (Table 5.1).

(2) Research Method

Since world modernization study is a type of modernization study, the methodologies of modernization study can also be adopted here such as the positivist approach in sciences, the interpretivist approach in humanities, and the realist approach in policy studies. In addition, world modernization research

Table 5.1 Matrix of the world modernization study

Content		Object		
		Human civilization	Economies, societies, politics, cultures, environment, and humans of the world	Spatial and temporal distribution of human civilization
		World modernization as a whole	Modernization in the world's six fields	Spatial and temporal distribution of world modernization
Element	Behavior	Modernization of world's behaviors, structures, institutions, and ideas	Behavioral, structural, institutional, idea's modernization in the world's six fields	–
	Structure			
	Institution			
	Idea			
Aspect	Process	Process, result, dynamics, model of the world modernization	Processes, result, dynamics, model of modernization in the world's six fields	Geographical, population and level's distribution, international system of the world modernization
	Result			
	Dynamics			
	Model			

Note: the world's six fields are where human civilization is distributed (Fig. 2.1), and environment refers to natural environment only here. World modernization research also covers other contents such as analysis of human civilization frontiers, trend analysis, frontier process analysis, catch-up process analysis, international competition analysis, as well as the interaction between the elements and fields of world modernization. The modernization studies in the world's six fields will be addressed in Chap. 6

requires the use of multidimensional, multidisciplinary, and comprehensive analysis such as the coordinate analysis in modernization research.

(3) Research Purpose

World modernization study is conducted for both academic and policy purposes.

In academic terms, as an important part of modernization study at large, world modernization study is to reveal the basic facts, principles, and history of modernization at the world level and to improve and enrich the understanding of modernization and modernization theory.

In policy terms, world modernization is the international environment for national modernization so world modernization study is also to provide the theoretical base, historical experience, and policy recommendations for national and international modernization strategies.

5.1.1.2 Facts About World Modernization

China Modernization Report 2010: World Modernization Outline 1700–2100 (RGCMS 2010) gives a systematic analysis of the 300 years of history of world modernization as follows:

(1) Modernization of the World as a Whole

First, process of world modernization involves the start and stages of world modernization.

Table 5.2 Outcome of modernization of the world as a whole between 1760 and 1970 (Example)

Cross section: year 1760	Cross section: year 1970	Outcome of modernization between 1760 and 1970
The world was characterized by agriculture. Differentiation was low; gaps between nations were narrow; the international system was quite simple. Agricultural civilization was dominant; some regions were primitive societies; Industrialization and urbanization emerged in Europe. The world's average life expectancy was relatively short	The world was mixed. Differentiation was very high; gaps between nations were very wide; the international system was quite complicated. Industrial civilization was dominant but most countries were agricultural societies; some regions were primitive societies. The world's average productivity and standard of living was obviously higher over 1760; life expectancy far exceeded that of 1760. Environmental pollution was very serious	Differentiation was increased; gaps between nations were widened; the international system was more complicated. Industrial civilization was dominant; the world's average productivity and standard of living was improved; life expectancy was increased. Industrial civilization was mainly characterized by industrialization, urbanization, market orientation, democratization, secularization, rationalization, welfare society, and universal compulsory education

Source: RGCMS (2010)

No consensus has been reached on the start of world modernization yet. Currently, there are three main arguments in this regard, the third of which is most supported. The first one holds that the Scientific Revolution of the sixteenth and seventeenth centuries represents the start of world modernization; the second one believes it is the enlightenment of the seventeenth and eighteenth centuries; the third one believes it is the Industrial Revolution in England and the French Revolution of the eighteenth century. In *China Modernization Report,* the Industrial Revolution of the eighteenth century is regarded as the start of world modernization.

The next step is to identify the exact year when world modernization started. In regard, there is no consensus, either. The optional years include 1750, 1760, 1763, and 1770. Considering that James Watt began to improve the steam engine in 1763 and patented his steam engine in 1769 and that the invention and application of the steam engine is the most representative feature of the Industrial Revolution, it is desirable to take the 1760s as the starting years of world modernization.

There is still a lack of consensus on the stages of world modernization. The phasing of modernization's frontier process, discussed in Chap. 2, is actually in line with that of world modernization. Generally, world modernization consists of the preparatory stage, the first modernization, and the second modernization. The year 1970 marks the division of latter two stages.

Second, outcome of world modernization is related to the start cross section, end cross section, and time span of the process.

For example, by comparing the cross sections of years 1760 and 1970, we can find the major differences between the two sections, namely, the outcome of world modernization during the 210 years (Table 5.2). Likewise, by comparing the cross sections of years 1970 and 2005, we can find the major differences between the two

Table 5.3 Outcome of modernization of the world as a whole between 1970 and 2005 (Example)

Cross section: year 1970	Cross section: year 2005	Outcome of modernization between 1970 and 2005
The world was mixed. Differentiation was very high; gaps between nations were very wide; the international system was quite complicated. Industrial civilization was dominant, but most countries were agricultural societies; some regions were primitive societies. The world's average productivity and standard of living were obviously higher over 1760; life expectancy far exceeded that of 1760. Environmental pollution was very serious	The world was mixed. Differentiation was very high; gaps between nations were very wide; the international system became more complicated. Knowledge civilization was dominant; most countries are industrial societies; some countries are agricultural societies; some regions are primitive societies. The world's average productivity and quality of life were obviously higher over 1970; life expectancy far exceeded that of 1970. Information gap and cybercrime emerged	Differentiation was increased; gaps between nations were widened; the international system was changed. Knowledge civilization prevailed; the role of industrial civilization was weakened. The world's average productivity and quality of life were improved; life expectancy was increased. Knowledge civilization was mainly characterized by knowledge-intensity, information-intensity, globalization, greening, individualism, diversity, humanity, and universal higher education

Source: RGCMS (2010)

sections, namely, the outcome of world modernization during the 35 years (Table 5.3).

Third, driving force of world modernization is of diversity. Generally, innovation is the fundamental driving force of modernization. Other factors such as the dissemination of innovations, market competition, power competition, class competition, international competition, and capital accumulation also have considerable influence on world modernization.

Fourth, models and paths of world modernization are of diversity. Generally, between 1760 and 1970, the basic path of world modernization is the first modernization where industrialization, urbanization, and democratization progressed hand in hand. Between 1970 and 2100, world modernization takes multiple paths including the second modernization path where knowledgeablization, informatization, and greening went hand in hand; the catch-up modernization path (first modernization and then second modernization); and the integrated modernization path.

(2) Modernization in the World's Six Fields

(a) *Process of Modernization in the World's Six Fields*. Like modernization of the world as a whole, modernization in the economical, social, political, cultural, and individual fields consists of the preparatory stage, the first modernization, and the second modernization. In the ecological field, the relationship between national modernization and natural environment is a form of commensalism in the process of the first modernization where economic development causes environmental pollution but a form of mutualism in the process of the second modernization which is called "ecological modernization."

Table 5.4 Main features of the historical process of modernization in the world's six fields

Feature	Implication
Stage-based	Modernization in every one of the world's six fields is a stage-based historical process, and the modernization in most fields includes the first and second modernization
Asynchronous	Modernization in the six fields is not going simultaneously. For example, ecological modernization did not emerge until late twentieth century
Nonlinear	Modernization in economic, social, political, and cultural fields is nonlinear including the transformation from tradition to modernism and from modernism to postmodernism
Reversible	Modernization in economic, social, political, and cultural fields is partially reversible. Setbacks, interruptions, regression, and repetition may happen
Diverse	The processes and models of modernization in the world's six fields are different. It is impossible to find the same models of modernization in two different fields
Complex	The implications of the modernization in the six fields are very complicated, involving the changes in life, structure, institutions, and concepts
Prolonged	Modernization in the world's six fields is bound to be a long-term process. It is impossible to complete the process in a short period of time
Interactive	There are interactions between modernization in the six fields such as between economic and social modernization, political and cultural modernization, cultural and individual modernization, political, ecological modernization, etc.
Synergy-based	There are some synergistic effects in the modernization of the world's six fields, such as the synergies between economic, social, political, and cultural modernization
Global	Modernization in the world's six fields is a global phenomenon

Source: RGCMS (2010)

There are different views on the features of modernization in the world's six fields. The general consensus is that modernization in the six fields is stage based, asynchronous, nonlinear, reversible, diverse, complex, prolonged, interactive, synergy based, and global (Table 5.4).

(b) *Outcome of Modernization in the World's Six Fields*. At different cross sections of history, modernization in the world's six fields has different standards, levels, and characteristics. By comparing these standards, levels, and characteristics, we can find out the main outcomes of the modernization process in the six fields between the two cross sections.

(c) *Driving Force of Modernization in the World's Six Field*. The driving force varies from field to field, and the modernization in the six fields may affect each other. If the modernization in one field goes ahead of the rest, it may drive or facilitate the modernization in other fields.

(d) *Paths and Models of Modernization in the World's Six Fields*. Generally, between 1760 and 1970, the basic path of modernization in the world's five fields (excluding ecological modernization) is the first modernization; between 1970 and 2100, modernization in the six fields takes multiple paths including the second modernization path, the catch-up modernization path, and the integrated modernization path.

Table 5.5 Geographical distribution of world modernization (regions covered by modernization)

Stage		Time (year)	Europe	America	Oceania	Asia	Africa
First modernization	Preparatory stage	1300–1763	Western Europe				
	First wave	1763–1870	Western Europe	North America	Australia, New Zealand		
	Second wave	1870–1945	Europe	America	Australia, New Zealand	Part of Asia	Part of Africa
	Third wave	1946–1970	Europe	America	Oceania	Asia	Africa
Second modernization	Preparatory stage	1905–1970	Western Europe	North America			
	Fourth wave	1970–2020	Europe	America	Oceania	Asia	Africa

Note: the first modernization spread gradually; the second modernization spreads rapidly although most regions in the world have not finished the first modernization. If the beginning of the fourteenth century Renaissance is taken as the start of the first modernization, its preparatory stage lasted about 400 years. If the introduction of relativity (revolution in physics) in the twentieth century is taken as the start of the second modernization, its preparatory lasted some 60 years
Source: RGCMS (2010)

(3) Spatial and Temporal Distribution of World Modernization

(a) *The Geographical Distribution of World Modernization* (Table 5.5). In the eighteenth century, world modernization started in a small number of Western European countries. In the first half of the century, it spread to other parts of Western Europe, North America, Australia, and New Zealand. In the second half of the nineteenth century, it spread further to Eastern Europe, Southern Europe, Latin America as well as some Asian and African countries. In the first half of the twentieth century, it had covered most regions and countries in the world. In the second half of the twentieth century, the first modernization spread across the globe; the second modernization started and spread all over the world.

Where modernization started early kept a relative high level. In the past 300 years, Western Europe, the United States, Canada, Australia, and New Zealand which have maintained relatively high economic levels constitute the first cluster; Southern European countries which have lower economic levels than Western Europe but higher than other regions constitute the second cluster; Eastern Europe, Latin America, and Asia whose economic levels are very close constitute the third cluster; African countries whose economic levels are quite low constitute the fourth cluster. Asia was degraded to the fourth cluster in the first half of the twentieth century but rebounded to the third cluster again in late twentieth century.

Geographically, between 1950 and 2005, Europe had a quite high level of modernization; America and Asia had similar levels of modernization (lower than Europe but higher than Africa); Africa's modernization level was quite low.

(b) *The International System of World Modernization*. The international system has a quite stable horizontal structure in the term of the level of modernization. Between 1960 and 2005, by modernization index, the proportions of developed, moderately developed, preliminarily developed, and underdeveloped countries are 13–15%, 12–21%, 25–35%, and 33–45%, respectively (RGCMS 2010).
The structure of international system in the process of modernization kept changing. Between 1960 and 2005, the number of countries completing the first modernization rose from 2 to 34, and the proportion of such countries in the international system increased from 2% to 26%; the number of countries entering the second modernization stage rose from 0 to 28, and the share of such countries increased from 0% to 21%; the number and proportion of countries as traditional agricultural societies fell (RGCMS 2010).

(c) *Population Distribution of World Modernization*. Between 1960 and 2005, the proportion of the population of advanced countries fell from about 20% to 14%; that of the population of moderately developed countries dropped from about 13% to 9%; that of the population of preliminarily developed countries grew from about 12% to 39%; that of the population of underdeveloped countries decreased from about 55% to 42%. Since 1960, the population of advanced countries has been growing at a decreasing rate; some developed countries have even witnessed negative population growth (RGCMS 2010).

Between 1960 and 2005, the population of countries completing the first modernization grew from about 200 million to some 1.1 billion, and the proportion of such population rose from around 7% to some 18%; the population of countries entering the second modernization stage increased from some 230 million to 950 million, and the proportion of such population grew from about 7% to some 15%; the population of countries still at the first modernization stage ran up from about 1.85 billion to 5.06 billion, and the share of such population rose from some 67% to 87%; the population of countries as traditional agricultural societies fell from about 920 million to 230 million, and the proportion of such population dropped from about 33% to 4% (RGCMS 2010).

5.1.1.3 Future of World Modernization

China Modernization Report 2010 also gives a systematic analysis of the 100 years of future of world modernization as follows. The linear analysis gives estimation based on the average annual growth rates in the past 25 or 15 years of 131 countries whose population combined accounts for 97% of the world's total. The twenty-first century is full of uncertainties. Due to the influence of many factors, the change of some factors may not be linear. The linear analysis of future prospects reveals some possibilities about the future.

(1) Modernization of the World as a Whole in the Twenty-First Century

Major factors that affect the modernization of the world as a whole in the twenty-first century include the development path of civilization, major scientific and technological breakthroughs, and the strategic needs of international interaction. Based on the experience in the last 300 years as well as the development trend of

science and technology in the twenty-first century, we can take a look into the future of modernization of the world as a whole in the twenty-first century.

(a) *Path of World Modernization*. Unless major global crises happen, the path of world modernization in the twenty-first century will be the continuation of the twentieth century. It will be a mix path or a collection of several paths. The main paths include the second modernization path, the catch-up modernization path, and the integrated modernization path.

(b) *Level of World Modernization*. Main factors that will affect the level of modernization of the world as a whole in the twenty-first century include major scientific and technological breakthroughs, the dissemination speed of major innovations, value orientation of world cultures, and the rationality of international competition.

If the frequency of scientific and technological breakthroughs, the dissemination speed of innovations, as well as the rationality of world cultures and international competition, are not worse than those in the second half of the twentieth century and if no major crises that will change the destiny of mankind-like nuclear crisis, energy crisis, or crisis of the universe happen, we can extrapolate the modernization level of the world as a whole in the twenty-first century based on the modernization level and speed of the world in late twentieth century. But the twenty-first century is full of uncertainties, so extrapolation analysis can only provide a possibility rather than necessity or certainty.

The most advanced level of world modernization (Table 5.6) can be represented by the average level of advanced countries (high-income countries). The rough estimate is that the second modernization index of 2050 will be twice that of 2005 and that the index of 2100 will be about 2.5 times that of 2050 and about five times that of 2005.

A rough estimate is also done about the average level of world modernization. The world's average value of the level of the first modernization will reach 100 in 2020, which means that the world will have completed the first modernization in average terms (although many countries have not yet); the world's average second modernization index will stand between 85 and 103 in 2050, roughly equivalent to the level of advanced countries in 2005; the world's average second modernization index will stand between 159 and 235 in 2100, roughly equivalent to the level of advanced countries in 2050. The average level of world modernization is about 50 years behind the world's advanced level (RGCMS 2010).

Table 5.6 Most advanced level of modernization of the world as a whole (second modernization index)

Growth rate	2005	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
1.67	100	109	128	151	179	211	249	293	346	408	482
1.73	100	109	129	154	182	217	257	305	363	430	511

Note: the growth rates of the second modernization index are the average annual growth rates between 1980 and 2005 as well as between 1990 and 2005, respectively
Source: RGCMS (2010)

(2) Modernization in the World's Six Fields in the Twenty-First Century

(a) Paths of Modernization in the World's Six Fields. The paths will be consistent with the modernization path of the world as a whole. The modernization in economic, social, political, cultural, and individual fields will take mixed paths including the second modernization path, the catch-up modernization path, and the integrated modernization path. In the ecological field, the paths of interaction between national modernization and natural environment include all-round ecological modernization, integrated ecological modernization, and the ecological corrections to modernization.

(b) *Levels of Modernization in the World's Six Fields*. The frontier level of modernization in the six fields can be represented by the average level of high-income countries, and the bottom level can be represented by the average level of low-income ones. *China Modernization Report 2010* analyzes the frontier and bottom levels of modernization in the world's six fields. In the twenty-first century, international gaps may widen in about 44% of the analysis indicators and may narrow down in about 42% of the analysis indicators.

(3) Spatial and Temporal Distribution of World Modernization in the Twenty-First Century

(a) *Geographical Distribution of World Modernization*. In the twenty-first century, the modernization levels of Europe, America, and Asia are expected to remain higher than that of Africa. More countries and regions will enter the second modernization stage; fewer countries and regions will stay in the first modernization; there will be the smallest number of agricultural and primitive societies.

(b) *The International System of World Modernization*. In the second half of the twentieth century, the proportional relation between the 130 countries was roughly 15:20:28:37 or 20:25:35:50 (developed ones/moderately developed ones/preliminarily developed ones/underdeveloped ones). Thus, unless radical changes or major crises happen, the international system will maintain such a proportional structure in the twenty-first century almost, and the proportion of advance countries may be increased a little (RGCMS 2010).

The number and proportion of countries entering the second modernization stage will increase; those of countries at the first modernization stage will fall; there will be almost no countries which are still traditional agricultural societies.

(c) *Population Distribution of World Modernization*. In the twenty-first century, the population of countries completing the first modernization will grow from 1.1 billion in 2005 to about 6.9 billion in 2050 and then to 7.2–7.8 billion in 2100; the proportion of such population will increase from the 17% in 2005 to 75% in 2050 and then to 79–86% in 2100 (RGCMS 2010).

The population of countries entering the second modernization stage will grow from the 1.1 billion in 2005 to 4–4.7 billion in 2050 and then to 6.4–6.7 billion in 2010; the proportion of such population will increase from the 17% in 2005 to 44–51% in 2050 and then to 70–74% in 2100. Not considering the change in the grouping of countries, the population of advanced countries will reach

820–1,510 million, and the share of such population will stand around 11–17% (RGCMS 2010).

The population enjoying a modernized life was about one billion in 2000 and will reach 1.2–1.5 billion in 2050 and 1.2–1.7 billion in 2100. Among the 700 million of increased population enjoying a modernized life in the twenty-first century, around 500 million people may come from developing countries (RGCMS 2010).

For countries at different levels of modernization, the proportion of people enjoying a modernized life varies from country to country. Generally, the proportion is 90–95% in advanced countries and about 5% in developing countries (10–20% in moderately developed ones, 2.5–5% in preliminarily developed ones, and 0% in underdeveloped ones). If a developing country becomes a developed one, the proportion of population enjoying a modernized life will rise (RGCMS 2010).

5.1.2 Theories

World modernization theory is a type of theoretical explanation of the world's modernization phenomena and a level theory of the Second Modernization Theory and modernization science. World modernization is modernization at the world level; it has the general features of modernization and also its specific characteristics. The core theory on general modernization (Table 2.1) basically applies to world modernization.

Generally, world modernization theory includes general theory, branch theories, and relevant theories (Table 5.7). What is going to be introduced here is the general theory which covers five aspects, namely, its definition, process, results, dynamics, and models (Table 5.8).

Table 5.7 Structure of world modernization theory

Category	Theory	Main contents
General theory	Core theory	Definition, process, result, dynamics, and model of world modernization
Branch theories	Stage theory	First modernization of the world, second modernization of the world
	Field-related study	World modernization in the fields such as economy, society, politics, culture, natural environment, and humans
	Sector-related study	World modernization in the sectors such as agriculture, industry, education, science and technology, national defense, and transportation
Relevant theories	Other modernization theories	Classical modernization theory, world-system theory, second modernization theory, etc.
	Other relevant theories	Theory of civilization, theory of development, theory of evolution, theory of transformation, international study, etc.

Table 5.8 General theory on world modernization

Aspect	Main contents
Definition	World modernization, modernization at the world level, refers to the frontier changes and international differentiation of human civilization since the Industrial Revolution of the eighteenth century including the formation, development, transformation, and international interaction of modern civilization; the innovation, selection, diffusion, and exit of the elements of modern civilization; as well as the international competition, differentiation, and change of the international system in the process of catching up with, reaching, and maintain the world's advanced level
Process	World modernization is a complex which involves the change of human civilization and international differentiation, the change of the international system, and the change of world behavior, structure, institution, ideas, etc. Between the eighteenth century and the twenty-first century, the frontier process of world modernization consists of the first and the second modernization. During the process, ten principles are followed, namely, asynchronous process, uneven distribution, structural stability, early bird effect, fast–fast effect, power effect, adaptation effect, latecomer effect, creator effect, and Matthew effect
Result	The formation and spreading of modernity, diversity, and side effects including the improvement of productivity and quality of life, social progress, political democracy, cultural diversity, ecological changes, overall development of mankind, widening income gap worldwide, international differentiation, and changing international system. The horizontal structure of the international system is basically stable; the proportion of advanced countries is about 20%, the rest being about 80%. Some traditional values continue to exist and play their roles
Dynamics	Driving forces include innovation, competition, adaptability, communication, etc., at microlevel as well as national modernization, international competition, etc., at macrolevel. International competition is the asymmetric competition among four groups of countries. The competitiveness of a country is closely related to its history, current conditions, innovation, learning and game capacities, path selection, and the international system. The motivation model may be seen in Table 2.20
Model	World modernization takes different models in different periods of history. Before 1970, it was the first modernization model. Since 1970, it has taken a mixed model consisting of the first and second modernization. There is no standard model of international competition but path dependence. The international system changes but has structural stability

Note: there are many explanations about world modernization. The "world modernization" in world modernization theory refers to modernization at the world level
Source: RGCMS (2010)

5.1.2.1 Definition

World modernization, a way how modernization is presented, is modernization at the world level.

The Intension. World modernization is a sort of change of human civilization and international differentiation. It is a frontier process of the formation, development, transformation, and international interaction of modern civilization; a complex process of the innovation, selection, diffusion, and exit of the elements of modern civilization; as well as the international competition, differentiation, and

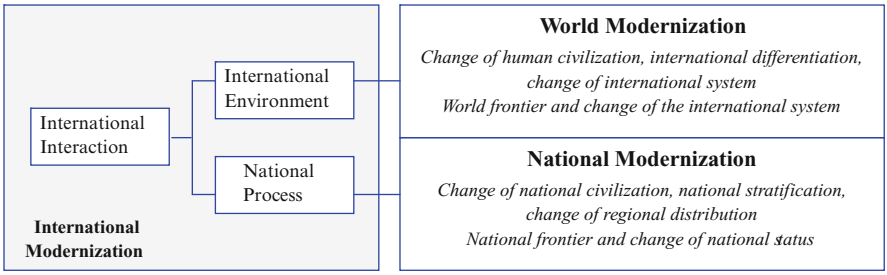


Fig. 5.3 Relations among world modernization, international modernization, and national modernization. Note: national process refers to the process of national modernization. International interaction includes international exchange, cooperation, competition, conflicts, etc. Source: RGCMS (2008)

changing international system in the process of catching up with, reaching, and maintaining the world advanced level.

The Extension. World modernization includes the modernization of the world as a whole, modernization in the world's six fields, the spatial and temporal distribution of world modernization, as well as the modernization of world's behavior, structure, institution, and ideas.

Generally, world modernization refers to the world frontiers of human civilization and the process and action to reach these frontiers. Country is the basic unit of world modernization. Modernization at the world level is just a concept for study rather than an operable unit in the development of modernization. So far, there has been not a "world government" which assumes the functions of a national government. The United Nations seems to be one like that, but it still has only some elements of a "world government."

Modernization at the world level is not an "independent unit" of modernization but just a unit of the level analysis. World modernization is related to national and international modernization. Generally, world modernization is the international environment of national modernization; national modernization is an important basis for world modernization; the interaction between national modernization and international environment is international modernization (Fig. 5.3).

5.1.2.2 Process

World modernization is a complex and long-term process. Between the eighteenth century and twenty-first century, the frontier process of world modernization consists of the first and the second modernization. The first modernization is the transformation from agricultural to industrial civilization; the second modernization is the transformation from industrial to knowledge civilization and from material to ecological civilization. Ten principles are followed in the process (Table 5.9).

Table 5.9 General principles of world modernization

No.	Principle	Content
1	Asynchronous process	World modernization in different regions and fields is asynchronous
2	Uneven distribution	World modernization is distributed unevenly in different regions and fields
3	Structural stability	The horizontal structure of the international system in world modernization is relatively stable
4	Early bird effect	Whoever goes earlier goes always ahead of others and gets more opportunities to succeed
5	Fast–fast effect	Whoever goes faster at first goes always faster and gets more opportunities to succeed
6	Power effect	Whoever is stronger at first is always more powerful and gets better right to speak
7	Adaptation effect	Countries adaptive to international competition benefit and those which cannot adapt have to pay the price
8	Latecomer effect	Latecomers can learn from and draw upon forerunners' experience and expertise and thus save the cost of time
9	Creator effect	Creators of knowledge and institutions will get due intellectual property or substantial relevant benefits
10	Matthew effect	Advanced countries become increasingly rich; underdeveloped countries get relatively more impoverished. The international income per capita gap is widened

Source: RGCMS (2010)

5.1.2.3 Result

The outcome of world modernization includes the formation and spreading of modernity, diversity, and side effects (Table 5.8).

Between 1760 and 1970, the outcome of world modernization is the formation and spreading of the first modernity and diversity. Countries are categorized into traditional and industrialized ones and developing and developed ones. There are side effects like environmental pollution and so on. Some traditional values continue to exist and play their roles.

Since 1970, the outcome of world modernization has been the formation and spreading of the first modernity, the second modernity, and diversity. Countries are categorized into traditional, industrialized, and knowledge-based ones and developing and advanced ones. There are side effects like cybercrime and so on. Some traditional values continue to exist and play their roles.

The development level of the international system keeps growing. Since 1760, the number of countries starting and completing the first modernization has been on the rise. Since 1970, the number of countries starting the second modernization and completing the first modernization has been increasing, while the number of traditional countries has been falling.

The horizontal structure of the international system is basically stable. Over the past 300 years, advanced countries make up about 20%, while developing countries, about 80%. In the last 100 years, about 90% of advanced countries

have maintained their status as being developed, and some 10% of them have been degraded; about 5% of developing countries have become developed ones.

5.1.2.4 Dynamics

The driving forces of world modernization include those at micro- and macrolevels (Table 5.8).

International competition is mostly not fair in the first modernization and asymmetric in the second modernization. The competition among the four groups of countries in the twenty-first century is asymmetric international competition. The driving models may be seen on Table 2.20.

5.1.2.5 Model

World modernization takes different models in different periods of history.

Between 1760 and 1970, it took the first modernization model.

Since 1970, more and more countries have entered the second modernization stage and fewer are still at the first modernization stage. Thus, world modernization takes a mixed model involving two stages of modernization.

Since countries entering the second modernization stage are independent from those still at the first modernization stage and there is no coordination mechanism between them, it is not fair to say that world modernization is a type of comprehensive modernization which requires the coordinated development of the two stages of modernization.

There is no standard or best model for international competition. It calls for rational selection and has path dependence.

The changing international system is structurally stable. The proportions of developed and developing countries are relatively stable.

5.2 International Modernization

Generally, the survival and development of a country is restricted by two environmental factors, namely, natural environment and international environment, which overlap. If the interaction between and reciprocal coupling of national modernization and natural environment means ecological modernization, then the interaction between national modernization and international environment can be called international modernization for short (Figs. 5.3 and 5.4). International modernization is modernization at transnational level, which is a manifestation and analysis level of modernization phenomena.

5.2.1 Studies

The United Nations (UN) currently has 192 memberships. The success or failure of national modernization is determined jointly by self-endeavor and international environment. International modernization research is intended to unveil the

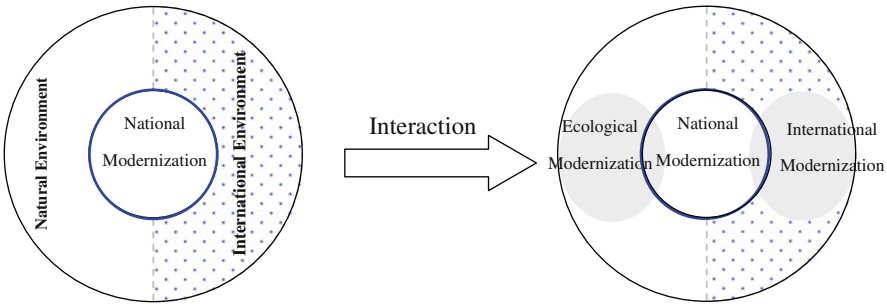


Fig. 5.4 Relationship between national modernization and international environment. Note: international modernization is the interaction between national modernization and international environment, while ecological modernization is the interaction between national modernization and natural environment. The international environment includes the international natural environment and human environment and focuses on international human environment here, while natural environment includes the internal and international natural environment and focuses on internal natural environment here. Source: RGCMS (2007)

characteristics and laws of the interaction between national modernization and international environment and provide a theoretical basis and international reference for making international strategies supporting national modernization, and it can be regarded as a branch of international relations or international politics.

5.2.1.1 Research Paradigm

International modernization study is the modernization study at transnational level.

(1) Research Matrix

The research object of international modernization study is the interaction between national modernization and international environment ("international interaction" for short), which includes international interaction at different levels and in different fields. Research contents include the modernization of international behavior, structures, institutions, and concepts, as well as the process, results, dynamics, and models of international modernization, which make up a research matrix (Table 5.10).

International environment refers to a summation of external factors for national modernization, which is generally divided into international natural environment and international human environment. The international natural environment, the part of the natural environment, is further divided into the geographic environment and ecological environment. International human environment is further divided into international economic, social, political, cultural, and individual environments. International environment can be also divided into world environment, transnational regional environment, and neighboring environment by scope; into general environment and the environment in different fields by content; and into historical environment, present environment, and future environment by time.

Table 5.10 Matrix of the international modernization study

Content		Object		
		International interaction	International interaction at different levels	International interaction in different fields
		International modernization	World, transnational region, neighbor, country	Economy, society, politics, culture, natural environment, humans
Element	Behavior	Modernization of international behavior, structure, institution, and idea	Modernization of international behavior, structure, institution, idea at four levels	Modernization of international behavior, structure, institution, idea in six fields
	Structure			
	Institution			
	Idea			
Aspect	Process	Process, result, dynamics, model of the international modernization	Processes, result, dynamics, model of international modernization at four levels	Process, result, dynamics, model of international modernization in six fields
	Result			
	Dynamic			
	Model			

Note: research on field-relative international interaction also includes the studies on geographic influence

International interaction refers to the interaction between national modernization and international environment. According to different interaction objects, international interaction can be divided into level-specific and field-specific international interaction. Level-specific international interaction includes the interaction a country has with the world, transnational regions, neighboring countries, and other countries. Field-specific international interaction occurs in six fields including economy, society, politics, culture, ecology, and individuals, which also includes geographic influence.

Many international relations scholars think that the real world is an anarchic international system which is quite similar to the self-organization system defined in the systems theory and can be researched according to the principles of the self-organization theory. Most modern countries open up to the outside world; they are open systems exchanging materials and energy with the external environment. The interaction between national modernization and international environment includes the exchange of materials and energy or specifically the flows of population, capital, commodities, pollution, information, and knowledge. Such interaction determines the change in the international system structure and in the model of national behavior. From the perspective of the systems theory, the material flow, energy flow, system structure, and the change of national behavior are also research contents of international modernization (Fig. 5.5).

(2) Research Method

International modernization research is a type of modernization study, where the methodology of modernization study can be employed.

International modernization research requires multidimensional analysis, hierarchy analysis, case studies, interdisciplinary research, and comprehensive research, including the coordinate analysis of modernization study. The focus of

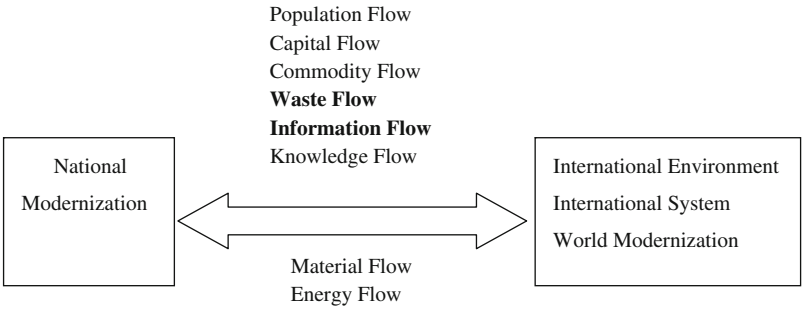


Fig. 5.5 Six flows between national modernization and international environment. Note: commodity flow includes the flows of goods and services. Other flows include the flows of ideas, species, pathogens, air, water, etc. Source: RGCMS (2007)

hierarchy analysis is placed on international system, transnational, and national layers.

The international system in international modernization study is different from that in international relations and international politics. The latter is an international system based on national strength and power distribution, while international institutions and cultures also have an influence, more exactly increasing influence, on national behavior. The international system in international modernization study is one based on national level of development and the distribution thereof, while national strength and power distribution also play an important part. The relationship between national level of development and national strength is complex and nonlinear. The international system based on national strength and the international system based on national level of development represent two analysis perspectives or two dimensions of the international system. International modernization research focuses on the international system based on national level of development while analyzing the role and influence of the international system based on national strength.

(3) Research Purpose

International modernization research is for both academic and policy purposes.

International modernization research is an important aspect of modernization study, with the aim of discovering the basic facts, characteristics, and principles of international modernization and enriching the modernization theory through systematic and overall research into the interaction between national modernization and international environment. International modernization research serves as an integral part of international relations research.

The success or failure of national modernization is determined by internal and external causes. Countries that hope to achieve and maintain success in modernization undoubtedly need appropriate international strategies to direct and effect their interaction with international environment. The facts and principles unveiled by international modernization research can provide a theoretical basis and references for countries to make international strategies.

5.2.1.2 Facts About International Modernization

China Modernization Report 2008: International Modernization Study (RGCMS 2008) gives the time series analysis, cross-sectional analysis, and country-relative analysis of the 300-year (1700–2005) historical process of international modernization, covering five fields (economy, society, politics, culture, and ecology) and four elements (international interaction, structure, system, and concepts). The time series analysis is at international system and national levels, and the cross-sectional analysis covers two dimensions (national level and national strength) and eight cross sections. Below is a brief introduction to the international interaction and historical experience in four fields. The followings came from this report:

(1) International Interaction in the Economic Field

The international interaction in the economic field was continuous and active, occurring in different sectors such as agriculture, industry, and service sector, and in diverse aspects, like raw material, production, market, capital, technology, information, and labor service, in a variety of types or manifestations (Fig. 5.6). Generally, the international interaction is of diversity in terms of form, type, and degree. For example, it can be divided into cooperation, exchange, competition, and conflict according to its nature, and into low, intermediate, and high-level interaction according to its intensity. Here, the focus is placed on the analysis of international trade, investment, and debts.

From the eighteenth century onward, the proportion of international trade in GDP increased, with a changing trade structure; the proportion of international investment in GDP rose, but differed considerably from country to country. From the nineteenth century, international debts rose, with developing countries being debt-ridden. In the twentieth century, the number of multinational companies grew, and tariffs declined on average; the proportion of international trade in GDP was not obviously related to national level and strength, but had positive correlation with national influence and competitiveness; developed countries contributed to about 80% of the international investment, while the rest contributed 20%.

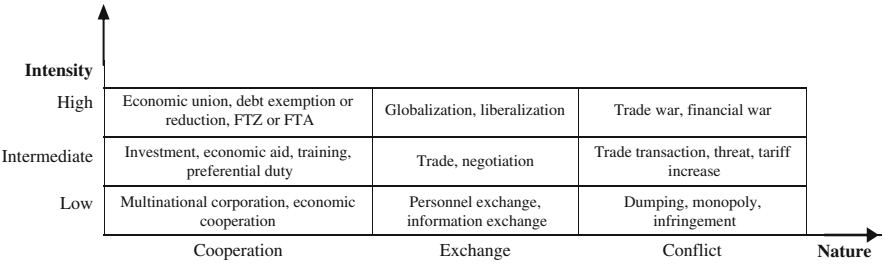


Fig. 5.6 Type and intensity of international interaction in the economic field

(2) International Interaction in the Social Field

The international interaction in the social field occurred in different social sectors such as population, education, health, social security, transportation and communications, and tourism, as well as in different aspects like movement of population, educational exchange, health cooperation, information exchange, and international crime, involving a variety of types or manifestations (Fig. 5.7). Here, the focus is placed on the analysis of international migration, international tourism, and international organization.

From the eighteenth century on, international migration increased at fluctuating rates. In the twentieth century, international migration changed in the direction of flow, with developed countries becoming countries of net immigration. In the late twentieth century, the percentages of aliens, as well as alien students, in developed countries rose, and the size of international tourism continued to expand. International organizations have increased in quantity since the eighteenth century. Currently, the number of NGOs (nongovernmental organizations) is about ten times that of IGOs (intergovernmental organizations).

(3) International Interaction in the Political Field

Generally, the political sphere involves such aspects as national territory, sovereignty, government, distribution of powers, national interests, national security, military affairs, diplomacy, and so on. International interaction in the political field involves political elements of actors, the process of international interaction, international politics, international political system, and so on; interactive forms include international recognition, respect for sovereignty, respect for territorial integrity, international security, international war, international blockade, international threat, international sanction, trade in arms, international assistance, diplomacy, intelligence, intergovernmental organizations, international exchange, and international cooperation (Fig. 5.8). Below is a discussion of international war, trade in arms, and international assistance.

The number of modern states and intergovernmental organizations increased from the eighteenth century onward, and in the second half of the twentieth century, the number of established diplomatic relations and international interdependence grew. From the eighteenth century, the frequency of international war did not fall, but differed greatly from country to country; the distribution of international wars

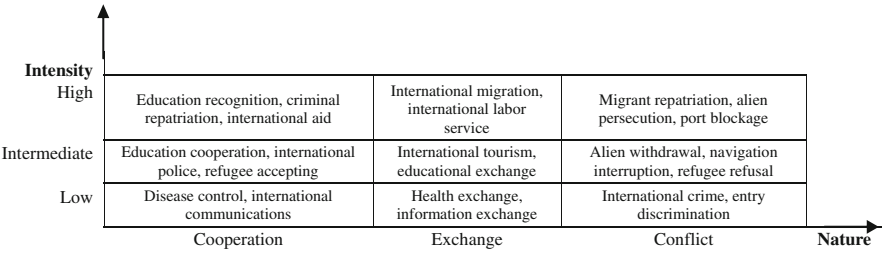


Fig. 5.7 Type and intensity of international interaction in the social field

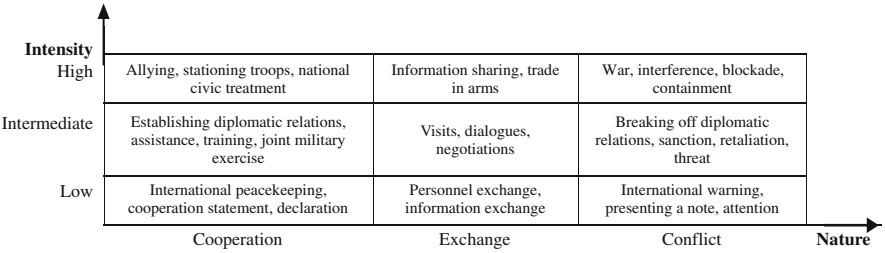


Fig. 5.8 Type and intensity of international interaction in the political field

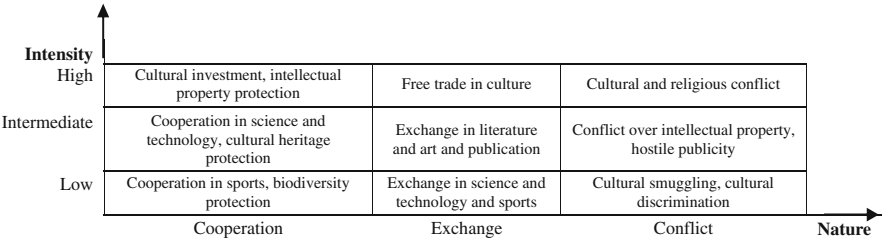


Fig. 5.9 Type and intensity of international interaction in the cultural field

and the structure of belligerent countries changed. In the late twentieth century, the international trade in arms fluctuated. In the last 40 years of the twentieth century, the total foreign assistance that developing countries received as well as per capita international aid increased, while there was a decrease in its proportion in the GDPs of developed countries and of recipient countries.

(4) International Interaction in the Cultural Field

International interaction in the field of culture, with a variety of types or manifestations, occurred in different cultural sectors such as press, publication, literature and art, sports, science and technology, as well as in diverse aspects like cultural trade, cultural exchange, athletics, intellectual property, and cooperation in science and technology (Fig. 5.9). Below is an analysis of cultural trade, technology trade, and international sports.

In the late twentieth century, international trade in information and culture developed rapidly, and the export of high technologies saw fast growth, with technology trade growing faster than economic growth; technology trade of developed countries accounted for over 90% of the world's total, while that of low-income countries was $<1\%$. In the twentieth century, international exchange in sports developed rapidly, and that in science and technology as well as international conferences saw fast growth.

The analysis of international interaction at national level covers the international interaction at different levels and in different fields.

5.2.1.3 Historical Experience of International Modernization

China Modernization Report 2008 gives an analysis and summary of the historical experience of international modernization in the past 300 years as follows:

(1) General Experience of International Modernization

First, we cannot act blindly for international modernization. The structure of the international system is of relative stability. Without an adequate material basis and an appropriate international environment, attempts to change the international structure and world order unilaterally can hardly lead to success. Though the theory of hegemony cycle transfer is much criticized, the hegemony cycle is closely linked to the stability of the international system.

Second, we need patience for international modernization. A country may change its international status, but this is not probable in a short or medium term. For example, only a few countries successfully shifted from economically developing countries to developed ones (classified by GDP per capital); among them were the United States in the eighteenth century, Australia, New Zealand, and Argentina in the nineteenth century, as well as Finland, Japan, and Singapore in the twentieth century.

Third, the role of international modernization cannot be overestimated. Success or failure of modernization of a country is determined by the country's endeavor and its international environment. International modernization cannot determine success or failure of countries, but it can exert an influence on their success or failure and accelerate their differentiation. Generally, international dependence may be used as a short-term strategy, but not a long-term one.

Fourth, internal causes cannot be overlooked in international modernization. In the process of international modernization, in most cases, failure of developing countries is attributed largely to internal factors. Among internal causes which may lead to failure, the roles of geographic conditions, social systems, cultural beliefs, and the role of people cannot be underestimated. In the process of international interaction, some people may betray their countries or compatriots for personal benefit or seek private gains at public expense. Though the number of people of this kind is quite small, harm caused can be devastating.

Fifth, international modernization is not something of wishful thinking. The international interaction of international modernization is two-way behavior, and wishful thinking does not work. In the process of international modernization, pursuing international cooperation and communication unilaterally is likely to draw a blank at great cost, as if a person is lovesick. According to the interest interaction rule, interests are the decisive factor of international interaction, and the international interaction built on mutual benefit is likely to be lasting and trustworthy.

Sixth, we cannot put the cart before the horse when it comes to international modernization. National modernization is the ultimate goal, while international modernization is a measure. International modernization is a way of increasing the national level of development, rather than the goal. International modernization is not the goal, nor is the level of internationalization a performance indicator. The

level of internationalization is only an indicator for analysis and reference. We cannot seek internationalization and globalization in a one-sided way. And internationalization and globalization must be geared to the strategic needs of national modernization as well as to national interests.

Seventh, we cannot expect perfection in terms of international modernization. In many ways, international modernization is an international game featuring information imperfection, status asymmetry, and rapid environment changes. It may be a zero-sum game or a non-zero-sum one. In some cases, a seemingly desirable international interaction is likely an international trap. International misleading and fraud happen from time to time. There is no best model, but only rational choice, for international interaction.

Eighth, lagging behind may be vulnerable, and agricultural civilization is powerless against industrial civilization. A backward small country may draw no attention, but a backward big country is frequently the target others nibble away at. An underdeveloped big country cannot be a major player in the world stage and, often, the object of division by developed countries. What was divided were political interests including land and right that in the eighteenth and nineteenth centuries, economic interests including resources and markets in the twentieth century will be strategic interests including values and knowledge in the twenty-first century. In a knowledge era, someone believe that developed countries are likely to become brain countries and underdeveloped countries the trunk ones and agricultural civilization is powerless to compete with industrial civilization, while the latter can hardly rival knowledge civilization.

Ninth, we should look at international trade and investment in a rational way. The percentages of international trade and international investment in GDP are not the higher the better, but require rational analysis. According to statistics in 2004, there is no obvious relationship between the percentage of international trade and the national income per capital and between the percentage of foreign investment stock and the national income per capita, and that there is significantly positive correlation between the percentage of overseas investment stock and the national income per capita and between the percentages of foreign and overseas investment stock and the national income per capital. Countries may be put into three categories according to the percentages of international trade and international investment in GDP, namely, countries with high levels of trade and investment (both above 80%), countries with moderate levels of trade and investment (both at about 60%), and countries with low levels of trade and investment (both generally below 40%). The distribution of countries in terms of international trade and investment is unbalanced, and there is no simple linear relationship between trade and investment models and the development levels of countries.

Finally, we must be on full alert to international wars. According to statistical analysis on international war, if differences in the size of wars are not considered, the frequency of international wars in the past two centuries has never fallen. International competition in the twenty-first century, some scholars believe, will continue to be fierce; the competitions for strategic resources, space resources, and cyberspace are likely to escalate, and the risk of international wars still exists.

Therefore, peace-loving countries need to be prepared for promoting peaceful development on the one hand and for keeping high alert to and making preparations for international wars on the other.

(2) Country-Relative Experience of International Modernization

In the past 300 years, some countries have succeeded, while others have not. Country-specific experience of international modernization is worthy of attention. There are four pieces of experience that are common among the United Kingdom (UK), the United States (USA), Japan, and Latin American countries.

(a) *Be Adept at Grasping International Opportunities*. The UK, the USA, Germany, and Japan are all adept at grasping international opportunities. The UK seized the historical occasion of Industrial Revolution in the eighteenth and nineteenth centuries to become the world's superpower. After becoming a European power through the second industrial revolution in the nineteenth century, Germany took advantage of two industrial revolutions in the twentieth century to become a developed country. Japan realized its economic takeoff in the nineteenth century by taking advantage of the diffusion of the second industrial revolution and the postwar recovery in the twentieth century by seizing the opportunities of the third industrial revolution and cold war, thereby becoming an economic power and developed country. By grasping the opportunities of the cold war and second industrial revolution, South Korea approached the level of developed countries in the end of twentieth century. In the fourth industrial revolution in the twentieth century, Finland and Ireland became developed countries with the world's top competitiveness.

(b) *Cooperation with Developed Counties is Conducive to Development*. "Keep good men company and you shall be of the number" is an English proverb which applies to the international modernization. Cooperation between developed countries and between developing and developed countries can improve national levels of development. Such examples include Japan, South Korea, and Singapore. The case of Japan provides some food for thought. Both the time and origin of modernization in Japan and China were roughly the same. In the 1860s or so, both countries were opened up by Western powers by force, but they chose different paths which turned out to bring considerably different results. Japan actively promoted overall modernization, gave equal emphasis on institutional and industrial modernization, and learned from the systems, cultures, and technologies of the West. China launched the Westernization Movement, adopted the pattern of industrial modernization, learned from Western modern technology and military, but overlooked institutional modernization. Thirty years later, Japan became an industrial power in the East by seizing the opportunity of the diffusion of industrial revolution, while China became a semifeudal and semicolonial country. In the second half of the twentieth century, Japan, South Korea, and Singapore saw rapid growth in technology and economy in partnership with developed countries and approached or reached the levels of developed countries one after another.

(c) *Attaching Importance to Science, Technology, and Education*. The USA, Germany, and Japan are countries giving top priority to education. Developed national education and higher education have helped to improve the competence of their people, which is an important condition for the pursuit of modernization. The UK, the USA, Germany, and Japan all attach importance to the roles of science and technology. Though these countries have distinctive science and technology systems, for example, the basic research system of the UK, the knowledge and technology innovation systems of the USA and Germany, and the technology innovation system of Japan, the roles that science and technology play in ensuring the success of these countries and maintaining their leading positions in the world are almost alike.

(d) *The Synergy of Internal and External Factors*. The success of the UK, the USA, Germany, and Japan is all dependent on the synergy of internal and external factors. External factors include historical opportunities in world development as well as favorable changes in international environment; internal factors include rational policies and measures adopted to promote modernization across the board. Latin American countries started modernization early, but there has been no case of complete success so far. The Dependency Theory alleges that the underdevelopment of Latin America was the inevitable result of Western capitalism. This view is reasonable in some way, but it is improper to attribute the underdevelopment of Latin America totally to external factors. Within Latin American countries, political corruption and turmoil, gap between rich and poor and social split, stressing economy while overlooking society are common phenomena, which also play a part in causing the underdevelopment there.

5.2.2 Theories

The international modernization theory gives theoretical explanation for international modernization phenomena and is a level theory in the second modernization theory and modernization science. Part of the core theory of the general modernization (Table 2.1) also applies to international modernization.

Generally, the international modernization theory includes the general theory, branch theories, and relevant theories (Table 5.11). Here, the focus is on the discussion of the general theory which covers five aspects including the definition, process, results, dynamics, and models of international modernization (Table 5.12). Raised by Chinese scholar Chuanqi He, the international modernization theory is built on the analysis and systematic theoretical summarization of the 300-year process of international modernization. It is an alternative theoretical explanation of the interaction between national modernization and international environment between the eighteenth and the twentieth centuries and can be a supplement to the international relations theory.

Table 5.11 Structure of international modernization theory

Category	Theory	Main contents
General theory	Core theory	The definition, process, result, dynamics, and model of international modernization
Branch theories	Stage theory	International interaction in the process of the first modernization, dependence theory, and world systems theory; international interaction in the process of the second modernization, globalization theory, etc.
	Field-related study	International interaction in the fields such as economy, society, politics, culture, humans, and natural environment
	Sector-related study	International interaction in the sectors such as agriculture, industry, education, science and technology, national defense, and transportation
Relevant theories	Other modernization theories	Ecological modernization theory, reflexive modernization theory, second modernization theory, etc.
	Other relevant theories	International relations theory, social interaction theory, conflict theory, game theory, regional cooperation, international study, etc.

Note: generally, international relations study is the study of the international environment and interaction based on national strength (from the perspective of international politics or politics), and international modernization study is the study of the international environment and interaction based on national level of development (from the perspective of modernizations). They both have their own emphasis and can be tested and supplemented by each other
Source: RGCMS (2008)

5.2.2.1 Definition

International modernization, a manifestation of modernization, is modernization at transnational level.

The Connotation. International modernization is an interaction between national modernization and international environment, as well as an international interaction in the process of modernization. International modernization is a complex process and transnational behavior, occurring at multiple levels and in many fields.

The Denotation. International modernization includes international interaction in the process of modernization at different levels and in different fields and the modernization of international behavior, structure, institution, and ideas. It involves three aspects: national modernization, international environment, and international interaction (Table 5.13; Fig. 5.10).

There are different types of international environment, for example, level-specific environment, field-specific environment, and time environment (Fig. 5.11). There are different types of international interaction, such as level-relative interaction (interaction with level-relative environment), field-relative interaction (interaction with field-relative environment), and geographic influence. There are also different ways of international interaction, such as international cooperation, international exchange, international conflict, and international competition (Fig. 5.11).

Table 5.12 General theory on international modernization

Aspect	Main contents
Definition	International modernization is transnational modernization, an interaction between national modernization and international environment, and an international interaction in the process of modernization
Process	International modernization is a historical process, including the changes of the behavior, structure, institution, and ideas of international interaction; in the terms of eighteenth to twenty-first century, international modernization can be divided into two stages, namely, international modernization in the age of industry (1760–1970) and that in the age of knowledge (1970–2100). There are four principles (synergy, interest-driven interaction, path selection, and quadrant interaction) as well as eight rules (acting and reacting force, different effects, like attracts like, good infection, goal orientation, national interests, maxmini, and bounded rationality) on the process
Result	The outcome of international modernization includes three types of change: national changes, for example, in national behavior, international status, and ideology; changes of the international environment, for example, in international structure, institutions, and ideology; and changes of international interaction, such as international behavior
Dynamics	Driving forces of international modernization include human nature, national interests, capital accumulation, international competition, epoch-making innovation, informatization, globalization, strategic resources, environmental pressure, etc. International interaction in different periods and of different types is different in the structure of driving forces
Model	There are diverse paths and models for international modernization, which have starting-point dependence and path dependence and are subject to the historical, geographic, level, strength, position, institutional, and ideological factors. Four basic paths: international cooperation, exchange, competition, and conflict. Four basic models: comprehensive interaction, lateral interaction, upward interaction, and downward interaction (vertical interaction)

Source: RGCMS (2008)

There can be many types of international interaction according to nature and purpose (Table 5.14). Sometimes, the nature and purpose of interaction does not completely match the outcome of interaction. The classification of interaction purpose and nature has only relative meanings.

If mutualism and synergy are regarded as the basic concepts of international interaction, the implications of international modernization will be enriched. In such an ideal scenario, international modernization refers to the interaction and mutualism between national modernization and international environment.

5.2.2.2 Process

The process of international modernization may be divided into two major stages. Theoretically, they are international modernization in the first modernization and that in the second modernization (Table 5.15). From the perspective of policy, they are international modernization in the age of industry and that in the age of knowledge (Table 5.16). The two stages are different in contents and features.

The process of international modernization roughly has 12 features: universality, diversity, stage-relative, complexity, evolution, nondetermination, differentiation between countries, effect of national level, effect of national strength, continual

Table 5.13 Main concepts of international modernization

Concept	Main contents
National modernization	Modernization at national layer, including modernization in a country as a whole, modernization in the six fields of the country, and the change in spatial and temporal distribution of national modernization, etc.
International environment	The sum of external factors of national modernization, including systems and concepts regarding world modernization, international system, and international interaction. It has a variety of forms of classification, for example, level-specific environment, field-specific environment, historical environment, present environment, and future environment
International interaction	In the process of modernization, the action a country takes toward other country and international environment in an alternate or exchange way, or its response to the action or change of other country and international environment. It is an important aspect of national modernization
International status	A country's position generally accepted in the international system, which can be defined according to the country's relative level or strength
Status quadrant	International status determined by national level and strength can be shown in a diagram with four quadrants: the first quadrant (high level and high strength), represented by the USA; the second quadrant (high level and low strength), represented by Luxemburg; the third quadrant (low level and high strength), represented by India; and the fourth quadrant (low level and low strength), represented by Burundi
International differentiation	The change of a country in international division of labor, international status, and international gap, including the country's role in international division of labor and market, international status division, and the widening of international gap and difference, as well as national stratification and mobility
National stratification	A country's grade, level, and change thereof in the hierarchy of the international system, including national mobility
National mobility	The change of a country's status in international system. It is the change from one international grade to another, or in international rankings, with certain probability
International structure	Way of association of various factors (e.g., countries) of the international system, with relative stability
	Development level: developed, moderately developed, preliminarily developed, and underdeveloped countries
	National strength: world powers, moderate powers, elementary powers, and weak countries
	National scale: large, medium-sized, small-sized, and mini countries

Source: RGCMS (2008)

existence of international war, gradually enhanced international cooperation, and effect of industrial civilization (Table 5.17). The age of industry is different from the age of knowledge in terms of the features of international modernization.

There are four principles on the process of international modernization, namely, synergy, interest-driven interaction, path choice, and quadrant interaction (Table 5.18). And they are theoretical explanations for the meaning, process, selection, and quadrant interaction.

A comparison of international status between two countries in the international status quadrants roughly leads to three results: they have roughly the same

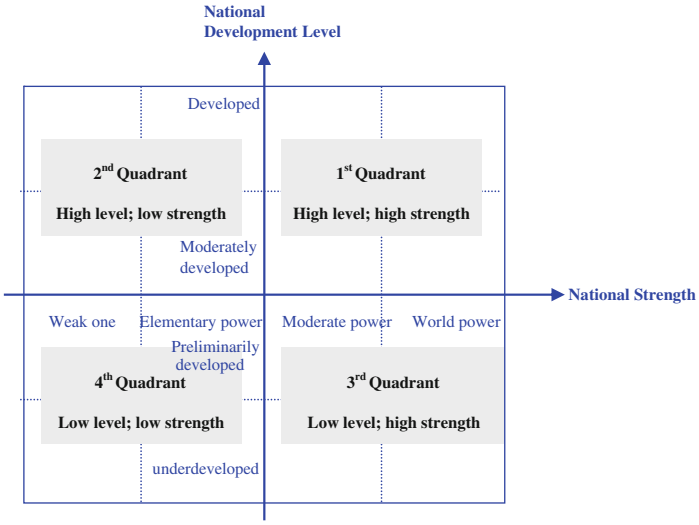


Fig. 5.10 Quadrants of international status. Source: RGCMS (2008)

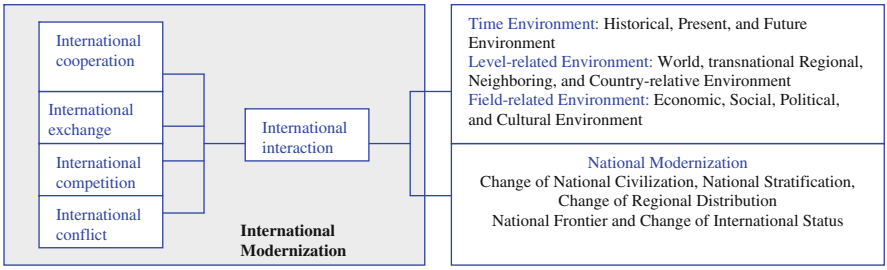


Fig. 5.11 Environments and paths of international modernization. Source: RGCMS (2008)

Table 5.14 Main types of international interaction

Classification by	Types of international interaction	Classification by	Types of international interaction
Motive	Goodwill, neutral, hostile interaction	Nature	Equal, unequal interaction
Outcome	Mutual-benefit, biased, mutually harmful interaction	Norm	Institutional, noninstitutional interaction
Meaning	Strategic, tactic, conventional interaction	Scope	All-round, partial interaction
Level	High-level, moderate, low-level interaction	Attitude	Active, passive interaction

Source: RGCMS (2008)

Table 5.15 Two stages of international modernization in theory

Item	International modernization in the process of the first modernization	International modernization in the process of the second modernization
Approximate time	1763–1970	1970–2100
Competition focus	Power, markets, resources, religion, territory, colonies, etc.	Knowledge, information, markets, strategic resources, outstanding talents, etc.
Main features	Hegemony competition, competition for existence, less international cooperation, etc.	Competition in cooperation, development competition, more international cooperation, etc.
International wars	Frequent	Less frequent between countries in the second modernization stage
Relevant theories	Dependency theory, world systems theory, realism, etc.	International modernization theory, interdependence theory, etc.

Source: RGCMS (2008)

international status, the international status of one country is higher than that of another, or the international status of one country is lower than that of another. Corresponding to its relative international status, a country's international interaction may have three forms: lateral interaction happens when its international status is roughly the same as another country's, downward vertical interaction happens when its international status is higher than another country's, and upward vertical interaction occurs when its international status is lower than another country's (Fig. 5.12). Policy for downward interaction is not thoroughly the same as policy for upward interaction. A country with downward interaction generally has superiority in psychology, development level, and strength, as well as greater initiative and option, while a country with upward interaction is generally disadvantaged in psychology, development level, and strength, as well as relative option and dependence possibility.

As a matter of fact, the correlation between national development level and national strength may form multiple combinations, making national behavior in the international status quadrants rather complex. Notwithstanding, there are two basic types of international interaction in the international status quadrants: lateral interaction and vertical interaction. For a specific country, vertical interaction can be either upward or downward.

There are eight rules on the process of international modernization: acting and reacting force, different effects, like attracts like, good spreading, goal orientation, national interests, maxmini, and bounded rationality (Table 5.19). These rules are relative and have many exceptions such as activities by international humanitarian organizations.

5.2.2.3 Result

The direct outcome of international modernization is reflected in three aspects: change of national modernization, including in national development level, international status, and international concepts; change of international environment,

Table 5.16 Two stages of international modernization in reality

Item	Industry age	Knowledge age
Rough time	1763–1970	1970–2100
Competition focus	Similar to international modernization in the process of the first modernization	Between countries in the second modernization stage: Knowledge, information, culture, markets, strategic resources, outstanding talents, etc.
		Between countries in the first modernization stage: power, capital, markets, resources, territory, religion, etc.
		Between countries in different stages: national independence, resources, markets, human rights, strategic interests, etc.
Main features		Between countries in the second modernization stage: development competition, mutualism, frequent war, etc.
		Between countries in different stages: hegemony competition, development competition, international cooperation, frequent war, etc.
International wars		Between countries in the second modernization stage: generally, no war or less frequent war
		Between countries in different stages: widespread international wars; no decrease in frequency
Relevant theories		International modernization theory, globalization theory, etc.

Note: countries in different stages refer to countries in the first and second modernization, respectively
Source: RGCMS (2008)

including in international structures, institutions, and concepts; and change of international interaction, including in the process, features, nature, and scale of international interaction.

The role of international modernization is manifested at three levels: change at national level, for example, in national behavior, national development level, international status, and concepts; change at international system level, for example, in national stratification and the structure, institutions, and concepts of international system; and change at transnational level, for example, in international differentiation and international interaction.

International modernization has three national objectives: lifting the national development level and international status, which is the ultimate goal; improving international environment to maintain a favorable international environment for itself; and increasing the ability of international interaction to ensure fulfillment of the previous two objectives.

Table 5.17 Twelve features of international modernization

Feature	Explanation
Universality	International interaction in modernization is a universal phenomenon as well as objective reality
Diversity	International interaction occurs at all levels and in all fields and aspects of modernization
Stage-relative	The process of international modernization can be divided into two major stages, with different contents and features in different stages
Complexity	International interaction depends on multiple factors, rather than some single factor. Among others, geographic locations, competence of the people, science and technology, national awareness, international structure, international systems, and international concepts all have an important influence on international interaction
Evolution	International modernization is a process of continual evolution, and international interaction shifts gradually from competition for existence to that for development and from strength competition to that in development level, with the ideal of mutualism and synergic development
Nondetermination	International modernization is an important influencing factor, rather than a decisive factor, that makes or breaks a country
Differentiation between countries	Differences in international modernization exist widely between developed and developing countries, between big and small countries, as well as among developed countries, developing countries, big countries, and small countries
Effect of national level	National development level has a great influence on the international interaction and national interests in national modernization
Effect of national strength	National strength has a great influence on the international interaction and national interests in national modernization
Existence of international wars	International war exists widely and in a long-standing way. But in the last 30 years of the twentieth century, there was no war fought between developed countries, but between developed and developing countries as well as between developing ones
Enhanced international cooperation	International cooperation and interdependence tends to gain momentum
Effect of industrial civilization	Traditional agricultural civilization is powerless against industrial civilization

Source: RGCMS (2008)

5.2.2.4 Dynamics

International modernization is the synergy of diverse factors, including humanity, interests, competition, science and technology, etc. First, international interaction is a kind of human behavior, while all human behavior is governed by humanity and values (biological instinct and socialization). Second, international behavior is a kind of national behavior, while all national behavior is driven by interests which may be national interests, government interests, group interests, or the interests of a group of people. Third, competition is a basic form of international interaction and also the driver of international interaction; because strategic

Table 5.18 Four principles of international modernization

Principle	Main contents	Remark
Synergy	Performance of national modernization is determined by national modernization and international environment. International interaction of national modernization does not decide the rise or fall of a country, but affects its success or failure and accelerate its differentiation	Meaning of interaction
Interest-driven interaction	Interests are the decisive factor of international interaction. National awareness, international concept, international system, and structure are influencing factors of international modernization, while interest maximization and loss minimization are basic principles	Process of interaction
Path selection	The interaction between national modernization and international environment is similar—to a certain extent—to that within biological species. International interaction can be seen as a composite manifestation at transnational level of a country's biological instincts and humanity and explained in part by biological species interaction for its selectability and variability	Selection of interaction
Quadrant interaction	International interaction of national modernization is closely related to a country's international status. Interaction between countries within the same international status quadrant is generally lateral interaction, while that between countries within different international status quadrants is generally vertical interaction; lateral interaction and vertical interaction have different features	Characteristics of interaction

Source: RGCMS (2008)

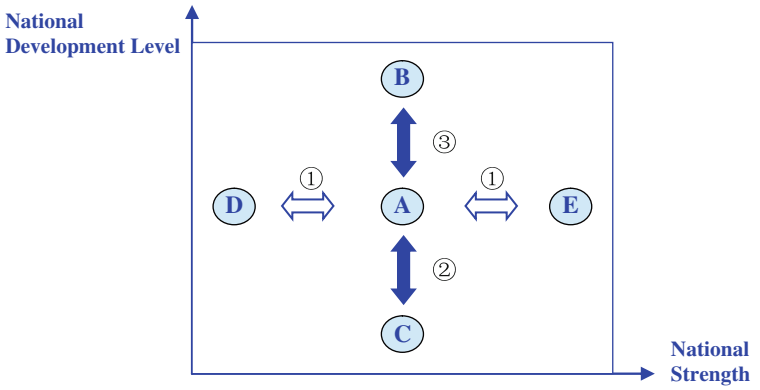


Fig. 5.12 Relative international status and behavioral choice. Note: country A's international behavior: (1) lateral interaction, (2) downward interaction (vertical interaction), and (3) upward interaction (vertical interaction). Source: RGCMS (2008)

resources and foundational interests are limited, rational competition for resources and interests become the strong motive of international interaction. Fourth, both the process and means of international interaction are subject to

Table 5.19 Eight rules of international modernization

Rule	Main contents
Acting and reacting force	International interaction in the process of modernization is a two-way process. One country exerts an acting force on another country and is inevitably subject to the reacting force from this country. Newtonian mechanics' acting and reacting force theorem applies roughly to international interaction analysis
Different effects	In the process of international interaction, if one country's acting force on another country is equal to the reacting force from this country and both countries differ in development level and strength, then the equal acting and reacting force have different effects of action on each other. International interaction with different countries has different effects of action
Like attracts like	"Birds of a feather flock together" is an English proverb which fit to the international modernization. The frequency of international interaction between countries with the same international status is higher, while that between countries with different international status is lower except the international union. Developed countries have more international interaction with developed countries. Like attracts like—a phenomenon widely existing in the process of international interaction of modernization
Good spreading	International interaction with high-level countries does much to improve national development level, while that with low-level countries helps little. Going with success will experience the success, while going with failure maybe share sadness
Goal orientation	Generally, international interaction is a kind of behavior with definite purpose and goal and is guided by its goal. Nevertheless, international interaction is complex, international change is rapid, and the purpose and goal may also change
National interests	National interests and humanitarianism are two root causes of international interaction. More often, the effect of national interests is more outstanding and even has a decisive influence
Maxmini	International interaction is an international game. The maxmini principle applies to international interaction alike. Maximization of gains and the minimization of cost and loss are principles for decision making in international interaction
Bounded rationality	International environment changes rapidly, and decisions on international interaction are a choice based on limited amounts of information. Limited by incomplete information, state rationality is only bounded rationality; there is neither best option nor optimal international interaction

Source: RGCMS (2008)

the influence of the science and technology development, while scientific and technological advances promote international interaction.

International interaction in international modernization has a variety of forms. The most basic forms are international exchange, cooperation, conflict, and international competition, whose driving forces are different. Main driving forces of international exchange are humanity, interests, informatization, globalization, etc. Main driving forces of international cooperation include humanity, interests, scientific and technological progress, and environmental pressure. International conflict has such driving forces as humanity, interests, capital accumulation, and strategic

resources, and interests, resources, innovation, and market are the main driving forces of international competition.

In the process of international modernization in the age of industry, competition for powers and existence was the powerhouse of international interaction, while in the process of international modernization in the age of knowledge, cooperative competition and development competition serve as the boosters of international interaction. Competition in the age of industry was for national strength, with the aim of maintaining the right of national existence and contending for world hegemony; it was the powerhouse of international interaction. Competition in the age of knowledge is for improvement of national development level, necessary to maintain leading positions and catching up with advanced levels in the world; it is the powerhouse of international interaction.

5.2.2.5 Model

International modernization has four paths: international cooperation, exchange, competition, and conflict generally.

International modernization has four models, namely, comprehensive interaction, lateral interaction, downward interaction, and upward interaction. Downward interaction and upward interaction can be called lateral interaction collectively.

What path and model to take for international interaction is related to interactive counterparts, stakeholders, and the international system. A country generally chooses an interaction strategy through comparison with the counterpart country.

There are two strategies for international modernization: international interaction between countries in the same international status quadrant is generally equal and symmetrical lateral interaction, while that between countries in different international status quadrants is generally unequal and dissymmetrical vertical interaction.

There are four strategies for international modernization: for international interaction between countries in the same international status quadrant, lateral interaction is generally selected; interaction of one country with higher status with another with lower status is generally downward; interaction of one country with lower status with another with higher status is generally upward; if two countries have overlapping yet not the same international status, lateral and vertical interaction, or comprehensive interaction, may happen at the same time.

International interaction in the process of modernization generally includes the following six steps:

(a) *Acting according to actual circumstances*. Choose the interaction path and model appropriate for the needs of the country according to its international status, the counterpart's international status, and the international environment.
(b) *Rational assessment*. Assess the process, risk, cost, benefit, and effect of the chosen interaction path and model by using the cost-effectiveness analysis method.
(c) *Correlation analysis*. The assessment of the interaction path and model, which is conducted mainly through analysis on benefit and cost of the interactive parties, may not overlook the response from the third party, the fourth party, and

so on (if any) as stakeholders, as well as international influence and hierarchy. Correlation analysis helps correct or improve the results of a rational assessment.

(d) *Rational anticipation*. International interaction is an international game, with results subject to game rules, the development level, and strength of game parties, decision making in the process of the game, game environment, and condition and often hardly to be predicted precisely. Such extremities as idealism, pessimism, heroism, capitulationism, arrogance, and self-underestimation are harmful to international interaction.

(e) *Dynamic monitoring*. The international climate is unpredictable, and international interaction just takes place in such uncertain international environment. Moreover, national interests change too. The dynamic monitoring of the process of interaction is an important measure to increase the probability of success and gains.

(f) *Timely adjustment*. In most cases, international interaction proceeds according to international arrangement and established policy. But timely adjustment is necessary when major interests change, international changes or behavioral changes have happened or are happening, and these changes will affect for sure the achievement of the anticipated goals of international interaction.

International interaction involves a great many stakeholders and influencing factors. In some sense, international interaction strategies are different combinations of these factors. Choosing a strategy, in essence, is choosing an advantageous combination.

5.3 National Modernization

National modernization generally has two meanings, i.e., modernization at national layer and modernization of a single country. In modernization study, national modernization generally refers to that at national layer, including worldwide national modernization and national modernization of individual countries (Fig. 5.13); it is a form of manifestation and a level of analysis of modernization phenomena. Generally, country is the basic unit of modernization study and development. The process of national modernization is not only a relatively independent process but also a process of international interaction. National

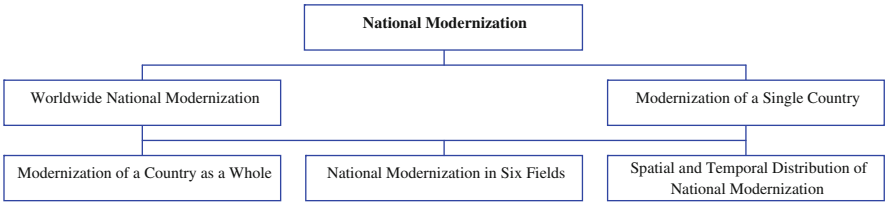


Fig. 5.13 Analytical structure of national modernization. Source: RGCMS (2010)

modernization serves as an important foundation for world modernization and international modernization; it is the domestic environment of regional, institutional, and individual modernization.

5.3.1 Studies

National modernization is the basic unit of modernization. National modernization study may be conducted from three perspectives, i.e., the past, present, and future. Relatively speaking, national modernization study and modernization policy are closely related.

5.3.1.1 Research Paradigm

National modernization study is the modernization study at national layer.

(1) Research Matrix

The research object of national modernization study includes modernization of a country as a whole, modernization of the country in six fields as well as the spatial and temporal distribution of national modernization. Research contents include modernization of national behavior, structures, institutions, and concepts, as well as the process, results, dynamics, and models of national modernization. They all together constitute a research matrix (Table 5.20).

Table 5.20 National modernization research matrix

Content		Object		
		National civilization	Economy, society, politics, culture, natural environment, and humans of the state	Spatial and temporal distribution of national civilization
		National modernization as a whole	Modernization in the national six fields	Spatial and temporal distribution of national modernization
Element	Behavior	Modernization of national behaviors, structures, institutions, and ideas	Behavioral, structural, institutional, idea's modernization in the national six fields	–
	Structure			
	Institution			
	Idea			
Aspect	Process	Process, result, dynamics, model of the national modernization	Processes, result, dynamics, model of modernization in the national six fields	Geographical, population, level's, and regional distribution of the national modernization
	Result			
	Dynamics			
	Model			

Note: national modernization study also includes many other contents, for example, the frontier, frontier process, and catch-up process analysis on national civilization, international competition analysis, international gap analysis, domestic gap analysis, elements of national modernization, and interaction between different fields

(2) Research Method

National modernization study is a level-relative modernization study and may use the methodology of modernization study. The research scope can be a particular country or countries throughout the world. The time span can be the total process or some particular stage.

National modernization is a complex multidimensional and multilevel analysis, requiring multidimensional analysis, hierarchy analysis, case study, and interdisciplinary and comprehensive studies, including the coordinate analysis method in modernization study.

The process study of national modernization generally adopts the research methods of positivism and interpretivism. The reality study of national modernization generally adopts the research methods of positivism, interpretivism, and realism. The prospect study of national modernization generally adopts the research methods of positivism, interpretivism, and futurology.

(3) Research Purpose

National modernization study is mainly for academic and policy purposes.

From the academic point of view, national modernization study is an important part of modernization study, with the aim to discover the basic facts, fundamental principles, and historical experience of national modernization and to enrich the implications of the modernization theory.

From the policy point of view, national modernization is the basic unit of modernization practice, and the purpose of national modernization study is to provide the theoretical basis, historical reference, and policy options for the practice of national modernization.

5.3.1.2 Facts About National Modernization

China Modernization Report 2010: World Modernization Outline 1700–2100 (RGCMS 2010) provides a systematic analysis of national modernization worldwide which involves 131 countries whose population was over one million in 2000 and statistic data was available as follows:

(1) Process of National Modernization

First, on the starting years of national modernization. American scholar Black (1966) found that different countries differed greatly in the start of modernization, the time required for the consolidation of modernization leadership, the time required for social and economic transition, etc. (Table 5.21). The process of modernization that Black (1966) described is in fact the process of the first modernization typical of industrialization, urbanization, and democratization.

According to research by Professor Black (1966), the 18 modernization foregoers (today's developed countries) took about 50–180 years (about 80 years on average) for the consolidation of the first modernization leadership and about 40–100 years (about 70 years on average) for the completion of economic and social transition; the starting time of the first modernization in developing countries

Table 5.21 Comparison between countries in starting and transition years

Type and country	Consolidation of modernization leadership	Economic and social transition	Social integration	Starting time difference	Years for consolidation	Years for transition
Type I						
UK	1649–1832	1832–1945	1945–	–	183	113
France	1789–1848	1848–1945	1945–	29	59	97
Type II						
USA	1776–1865	1865–1933	1933–	16	89	68
Canada	1797–1867	1867–1947	1947–	37	70	80
Australia	1801–1901	1901–1941	1941–	41	100	40
Type III						
Germany	1803–1871	1871–1933	1933–	43	68	62
Italy	1805–1871	1871–	–	45	66	–
Type IV						
Brazil	1850–1930	1930–	–	90	80	–
Mexico	1867–1910	1910–	–	107	43	–
Type V						
Russia	1861–1917	1917–	–	101	56	–
Japan	1868–1945	1945–	–	108	77	–
China	1905–1949	1949–	–	145	44	–
Type VI						
India	1919–1947	1947–	–	159	28	–
Indonesia	1922–1949	1949–	–	162	27	–
Type VII						
Nigeria	1960–	–	–	200	–	–

Note: (1) the years in this table are what were given in the original book (Black 1966), and some of them might be inaccurate. For example, the starting year of modernization in China, according to some Chinese scholars, is 1840 or 1860, while it is 1905 in this table, decades earlier. (2) This table reveals the view of the author of the original book published in 1966. From 1966 onward, the world saw great changes and modernization study led to many new results. (3) "Starting time difference" is the difference between the "starting year for consolidation of national modernization leadership" and the "starting year of world modernization" (approximately 1760). (4) "Years for consolidation" are the years which consolidation of modernization leadership took. (5) "Years for transition" are the years which economic and social transition took. The data of this table comes from Black (1966)

was about 60–200 years later than that of world modernization. Therefore, the task of modernization in developing countries is still formidable.

Second, on the stages of national modernization. The process of worldwide national modernization mainly includes the preparatory stage, the first modernization, and the second modernization. Different countries differ in the phasing and time of modernization.

Professor Black held that the process of modernization (classical modernization) could be divided into four stages: challenge of modernity, consolidation of modernization leadership bloc, social and economic transition, and social integration (Black 1966).

Third, on the common features of the process of national modernization. From the national perspective, national modernization roughly has ten features, i.e., predictable, multistages, long-term, revolutionary, progressive, adaptable, nonlinear, reversible, complex, and side effects. From the perspective of the international system, it roughly has ten main features, i.e., predictable, multistages, long-term, reversible, asynchronous, allometric, competitive, interactive, diverse, and stable. On the whole, the process of national modernization roughly has 16 features (Table 5.22), which overlap in part with the features of the frontier process of modernization (Table 2.11).

Fourth, on the diversity in the process of national modernization. The process of worldwide national modernization has not only generalities but also many

Table 5.22 Features of worldwide national modernization

Feature	Description
Basic features at national layer	
Predictable	A partly predictable process, with changes in one field affecting those in other fields
Multistages	A historical process consisting of several stages, roughly including the first and second modernization
Long-term	A long-term historical process, impossible to finish in a short term
Revolutionary	A revolutionary process, including far-reaching changes in politics, culture, etc.
Progressive	A progressive process, including improvement of productivity and of quality of life
Adaptable	An adaptable process, including adaptable changes in new science and technology and in new environment
Nonlinear	A process of transition (nonlinear process), including from tradition to modernity and from modernity to postmodernity
Reversible	A reversible process, including reversibility of political and cultural changes, frustration and repeat of modernization, etc.
Complex	A complex process, including changes in the six fields of a country—which may be at a different pace
Side effects	A process with side effects such as polarization between the rich and the poor and environmental pollution
Main features at international system level	
Asynchronous	Countries differ from each other in the start of modernization; they may be in different stages of modernization on some particular historical cross section
Allometric	Countries differ from each other in the pace and level of modernization
Interactive	National modernization is affected by international environment, and international interaction affects the performance of national modernization
Competitive	Countries compete with each other in terms of modernization; modernization is an international contest
Diverse	No two countries have completely the same features of modernization
Stable	The international system structure of world modernization is of relative stability; though positions of countries may change, advanced countries are likely to maintain their positions, while underdeveloped ones are more likely to be "locked" in the state of underdevelopment

Source: RGCMS (2010)

Table 5.23 Diversity in worldwide national modernization

Feature	Description
Different starts	One country is different from another in the start of modernization, either early or late
Different initial time	One country is different from another in the initial time of modernization; they have historical and traditional differences
Different paths	One country is different from another in the path of modernization; they have path dependence
Different models	One country is different from another in the model of modernization, which is diverse
Different dynamics	One country is different from another in the driving forces of modernization
Different policies	One country is different from another in the polices for modernization, which are different in different stages
Different paces	One country is different from another in the pace of modernization, which is different in a different stage or period
Different levels	One country is different from another in the level of modernization, which is also different in gap to the world's advanced level
Different outcomes	One country is different from another in the outcome of modernization, which is influenced by their history and path
Different features	One country is different from another in the features of modernization
Different challenges	One country is different from another in the challenges to modernization; countries differ in major problems
Different environments	One country is different from another in the environment of modernization; different countries have different international and internal environments

Source: RGCMS (2010)

differences. For example, a great many international differences exist in the start, initial time, path, model, driving force, policy, pace, level, outcome, feature, challenge, and environment with regard to the process of modernization (Table 5.23).

Fifth, on the complexity of the process of national modernization. It took developed countries about 160 years on average to complete the first modernization; some developed countries suffered setbacks and repetition in the first modernization, for example, the repetition in the process of establishing democracy in France and Spain. Many developing countries gained independence in the twentieth century, and their efforts to pursue the first modernization so far have been <100 years. If they borrow the experience of developed countries, it will still take some time for them to complete the first modernization. Around the 1960s, some developing countries saw setbacks and repetition in their fast modernization. This has led some scholars to question the practicability of the modernization theory. But if we negate the modernization theory just because of some setbacks and repetition, we might lose the chance of success for fear of failure.

(2) Main Outcomes of National Modernization

Generally, we may analyze the main outcomes of worldwide national modernization both on a national layer and on an international system level.

First of all, on a national layer, worldwide national modernization will lead to two outcomes: common outcomes and diversity of national modernization (Fig. 3.49). In analyzing the outcomes of national modernization, the following three points require particular attention:

(a) *There is the need to conduct a stage-relative analysis and make cross-sectional comparison*. At different historical cross sections, national modernization has different indicators, levels, and features. By comparing two cross sections in indicators, levels, and features, we can analyze the main outcomes of national modernization between the two cross sections. The main outcomes of the first modernization of a country are totally different from those of its second modernization.

(b) *There is a need to sum up the common outcomes and also recognize the diversity*. The United Nations (UN) currently has 192 member countries, and the outcomes of worldwide national modernization involve national modernization in all these countries. How to sum up the common outcomes of national modernization? Is that the collection of all national modernization outcomes? Apparently not. A general method is identifying the generality and diversity in the main outcomes of national modernization.

(c) *There is a need to find an appropriate analysis method*. National modernization covers modernization in the fields of economy, society, politics, culture, individuals, and natural environment, and the outcomes of national modernization include modernization outcomes in the six fields. This entails an appropriate method used to extract the outcomes of national modernization from the modernization outcomes in the six fields.

Second, on an international system level, worldwide national modernization will lead to two outcomes: the change of the international status of countries and structural change of the international system. In general, the structure of the international system is relatively stable, and the change in international status has its laws (RGCMS 2010).

Transition probabilities of four groups of countries over the last 100 years: there is an approximately 8–23% probability that developed countries go down; an approximately 0–42% probability that moderately developed countries go up; an approximately 0–24% probability that preliminarily developed countries go up to moderately developed countries and approximately 2–5% directly to advanced countries; and an approximately 0–14% probability that underdeveloped countries go up to preliminarily developed countries, approximately 0–12% directly to moderately developed countries, and approximately 0–4% directly to advanced countries (RGCMS 2010).

Transition probabilities of four groups of countries over the last 45 years: there is an approximately 6–12% probability that developed countries go down and an approximately 18–25% probability that moderately developed countries go up; an approximately 14–20% probability that preliminarily developed countries go

Table 5.24 Rise and fall of status in national modernization

Time	Upgraded from developing to advanced country	Downgraded from advanced to developing country
Eighteenth century	USA	Portugal
Nineteenth century	Canada, Argentina, Ireland, Australia, New Zealand	Spain, Italy, and Norway
Twentieth century	Finland, Japan, Singapore, South Korea, Israel, etc. (Italy, Spain, and Norway)	Argentina and Russia (USSR) (New Zealand and Venezuela)

Note: between the nineteenth century and the twentieth century, such countries as Italy, Spain, Norway, Ireland, New Zealand, and Venezuela saw fluctuations in their international status
Source: RGCMS (2010)

up to moderately developed ones and approximately 3–4% directly to developed ones; and an approximately 4–10% probability that less-developed countries go up to elementarily developed ones, approximately 3–5% directly to moderately developed ones, and approximately 0% directly to developed ones (RGCMS 2010).

Transition probabilities of two groups of countries over the last 100 years: there is an approximately 8–23% probability that advanced countries go down and an approximately 1–8% probability that developing countries go up to advanced ones. Aside from three countries with fluctuating status, the probability that developing countries go up is about 1–5% (RGCMS 2010).

Transition probabilities of two groups of countries over the last 45 years: there is an approximately 6–12% probability that advanced countries go down and an approximately 5–7% probability that developing countries go up to advanced ones. Aside from two countries with fluctuating status, the probability that developing countries go up is approximately 5% (RGCMS 2010).

Historical data show that over a span of 100 years, there was an approximately 5% probability that developing countries went up to advanced ones and an approximately 10% probability that advanced countries went down to developing ones and that there was mobility between developing and advanced countries (Table 5.24).

(3) Driving Force of National Modernization

The dynamics of worldwide national modernization has been dealt with in Chap. 2. Generally, innovation is the fundamental powerhouse of modernization. The first modernization and the second modernization, modernization foregoers and latecomers, and different models, all differ in driving forces.

(4) Paths and Models of National Modernization

Generally, between 1763 and 1970, the basic path of national modernization was the first modernization; in between 1970 and 2100, the basic paths of national modernization are diverse, including the second modernization of advanced countries, and the first modernization, second modernization, and integrated modernization of developing countries.

There has been substantial research on main models of national modernization.

Three Models of European Modernization. European scholars thought that modernization had different models, for example, the British model (industrialization is the leading factor; it promotes democratization and then bureaucratization), the French model (bureaucratization and democratization are the leading factors, while industrialization is a latecomer), and the German model (the combination of bureaucratization and democratization brings modernization, and democratization is always absent).

Seven Models of Political Modernization. Divided according to the political challenge to and starting years of modernization, they are the British–French model, the West-derived country model, model of other European countries, the Latin American model, the independent country model, the former colonial country model, and the Africa country model (Black 1966).

Main Types of the First Modernization. According to the different source of knowledge, institution, thought of modernization, and the industrialization, the first modernization can be divided into innovative modernization, follow-up modernization, grafting modernization, and learning modernization (Table 5.25). According to different factors, the first modernization can also be divided into many types, such as early bird and latecomer modernization, endogenous and exogenous modernization, active and passive modernization, and market-oriented and planned modernization; Latin America, East Asia, Eastern Europe, and Middle East have their distinctive features in modernization.

Element Mix Models of the First Modernization. The first modernization includes many elements, such as industrialization, urbanization, democratization, and international interaction. Different countries adopted different strategies in different periods and gave priority to developing a particular element in a particular period, thereby forming different models (Table 5.26) such as dependent development, catch-up industrialization, import substitution, and export-oriented industrialization.

Table 5.25 Four types of first modernization

Type	Source of knowledge	Source of thought	Source of institution	Occurrence of industrialization	Representative countries
Innovative	Mostly independent innovation	Mostly independent innovation	Mostly independent innovation	Spontaneous and endogenous	UK and France
Follow-up	Innovation and learning	Learning and innovation	Learning and innovation	External diffusion and conscious development	USA, Canada, Southern Europe, and Japan
Grafting	Passive learning	External input	External imposition	Externally input and exogenous	Former colonial countries
Learning	Active learning	Learning	Active imitation	Reactively introduced and exogenous	Latin American countries, South Korea, and Thailand

Source: He (1999)

Table 5.26 Element mix models in the first modernization

Element mix	Model	Representative countries
Industrialization and democratization	Giving priority to industrialization, or democratization, or developing in a coordinated way	Germany, France, UK, etc.
Industrialization and urbanization	Giving priority to industrialization, or urbanization, or developing in a coordinated way	Finland, Australia, UK, etc.
Economy and education	Giving priority to economy, or education, or developing in a coordinated way	UK, Germany, Italy, etc.
Market and planning	Free market economy, planned commanded economy, or mixed economy	UK in the nineteenth century, USSR and USA in the twentieth century, etc.
Catch-up industrialization	Import substitution, export orientation, or coordinated development	Latin American countries and East Asian countries in the 1960s, etc.
International interaction	Protectionism, free trade, colonization, or dependent development	Germany, UK, and Latin American countries in the nineteenth century, etc.

Note: industrialization is represented by the percentage of industrial value added in GDP, democracy by universal suffrage, urbanization by the percentage of urban population in total population, economy by the percentage of industrial value added in GDP, and education by adult literacy and popularization rate of primary education
Source: RGCMS (2010)

Element Mix Models of the Second Modernization. The second modernization includes many elements, such as knowledgeablization, informatization, ecologicalization, and international interaction. Different countries adopted different strategies in different periods and gave priority to developing a particular element in a particular period, thereby forming different models (Table 5.27), for example, giving priority to knowledgeablization, informatization, or ecologicalization and developing in a coordinated way.

Element Mix Models of Integrated Modernization. Integrated modernization is the coordinated development of the first and second modernization and the transition toward the second modernization, including many elements of the first and second modernization, such as industrialization, urbanization, democratization, knowledgeablization, informatization, ecologicalization, and international interaction. Different countries adopted different strategies in different periods and gave priority to developing a particular element in a particular period, thereby forming different models (Table 5.28), for example, giving priority to industrialization, knowledgeablization, and informatization, and coordinated development between knowledgeablization and industrialization, between informatization and industrialization, or between industrialization and ecologicalization. Because integrated modernization is the coordinated development of the first and second modernization, several models of the first and second modernization, such as giving priority to education, economy, society, or ecology and the coordinated development of economy, society and ecology also apply to comprehensive modernization.

Table 5.27 Element mix models in the second modernization

Element mix	Model	Representative countries
Knowledgeablization and informatization	Giving priority to knowledgeablization (or intellectualization), or informatization, or developing in a coordinated way	USA, Japan, UK, etc.
Knowledgeablization and ecologicalization	Giving priority to knowledgeablization, or ecologicalization, or developing in a coordinated way	Finland, UK, Japan, etc.
Informatization and ecologicalization	Giving priority to informatization, or ecologicalization, or developing in a coordinated way	Norway, Germany, Canada, etc.
International interaction	High-level trade and investment, moderate-level trade and investment, low-level trade and investment	Ireland, Germany, USA, etc.
Economy and society	Giving priority to economy, or society, or developing in a coordinated way	Japan, Sweden, Netherlands, etc.
Economy and ecology	Giving priority to economy, or ecology, or developing in a coordinated way	USA, Switzerland, Germany, etc.
Society and ecology	Giving priority to society, or ecology, or developing in a coordinated way	USA, Switzerland, and Denmark
Economy, society, and ecology	Developing in a coordinated way	France, Denmark, UK, etc.

Note: knowledgeablization is represented by the rate of popularization of higher education, informatization by the rate of diffusion of the Internet, and ecologicalization by the rate of treatment of domestic sewage. High-level trade and investment: international trade and investment accounting for $\geq$100% in GDP. Moderate-level trade and investment: international trade and investment accounting for $\geq$50% and $<$100% in GDP. Low-level trade and investment: international trade and investment accounting for $<$50% in GDP. Economy, society, and ecology are represented by their indexes of modernization, respectively
Source: RGCMS (2010)

5.3.1.3 Future of National Modernization

China Modernization Report 2010 provides an analysis of the prospects of worldwide national modernization in the twenty-first century as follows:

(1) Path Analysis on National Modernization

National modernization has path dependence, and what path to choose is subject to historical tradition, level of start, and international environment.

According to the second modernization, worldwide modernization in the twenty-first century has three basic paths: second modernization, catch-up modernization (from the first to second modernization), and integrated modernization (coordinated development of the first and second modernization).

On an international system level, the number of countries choosing either the path of second modernization or the path of integrated modernization will increase, while that of countries choosing the path of catch-up modernization will gradually decrease; developed countries will all choose the path of second modernization,

Table 5.28 Element mix models in comprehensive modernization

Element mix	Model	Representative countries
Knowledgeablization and industrialization	Giving priority to knowledgeablization, or industrialization, or developing in a coordinated way	Greece, Mexico, Chile, etc.
Informatization and industrialization	Giving priority to informatization, or industrialization, or developing in a coordinated way	Malaysia, Indonesia, Thailand, etc.
Industrialization and ecologicalization	Giving priority to industrialization, or ecologicalization, or developing in a coordinated way	Malaysia, Costa Rica, Chile, etc.
Urbanization and ecologicalization	Giving priority to urbanization, or ecologicalization, or developing in a coordinated way	–
Urbanization and Informatization	Giving priority to urbanization, or informatization, or developing in a coordinated way	–
International interaction	High-level trade and investment, moderate-level trade and investment, low-level trade and investment	Malaysia, China, India, etc.
Economy and education	Giving priority to economy, or education, or developing in a coordinated way	–
Economy and society	Giving priority to economy and society, and developing in a coordinated way	–
Economy and ecology	Giving priority to economy, or ecology, or developing in a coordinated way	–
Society and ecology	Giving priority to society, or ecology, or developing in a coordinated way	–
Economy, society and ecology	Developing in a coordinated way	–

Source: RGCMS (2010)

while developing countries have three path options, namely, second modernization, catch-up modernization, and integrated modernization.

On a national layer, the path selection in national modernization is closely connected with what stage of modernization a country is in.

First, countries that have completed the first modernization and entered the second modernization will choose the path of second modernization.

Second, countries that have not yet completed the first modernization have three options: catch-up modernization, integrated modernization, and second modernization. It is generally inappropriate for them to take the path of second modernization.

Third, countries as traditional agricultural societies generally choose the path of catch-up or integrated modernization.

(2) Scenario Analysis on National Modernization

A scenario analysis on national modernization in the twenty-first century involves a great many elements. Below is a discussion of the timeline and national layer.

First, time to complete the first modernization. The time a country completes the first modernization is the time it reaches the criteria of the first modernization. So far, there has been no agreement over the criteria of completion for the first

modernization. Generally, typical features of the first modernization include industrialization, urbanization, and democratization. Whether or not to have completed industrialization, urbanization, and democratization may be used as the basic criteria of completion for the first modernization. Modernization is also a sort of international competition and change in international status, and the relative level of a country's modernization is closely connected with its international status. For example, by 1960, most of industrialized countries had completed industrialization, urbanization, and democratization, and they stood for the world's advanced level of modernization in 1960; they completed the first modernization in 1960.

Considering above-mentioned elements, *China Modernization Report* uses industrialization, urbanization, and democratization as the basic criteria of completion for the first modernization, with the average development level of high-income countries (industrialized countries) in 1960 being regarded as the primary criterion of completion for the first modernization.

On an international system level, by 2005, about 34 countries, including all developed countries and a number of developing ones, had completed their first modernization. About 86 countries will complete their first modernization by 2050, and 99–107 will complete their first modernization by 2100 (Table 5.29).

On a national layer, by 2005, 34 countries had completed their first modernization, while others had not. For these 34 countries, the average time spent to complete the first modernization was about 150 years. When estimated according to the average growth rates in the term of 1980–2005 and 1990–2005, countries which have not yet completed their first modernization will differ in the time spent to complete their first modernization. Here, we take 15 countries as an example (Table 5.30).

Second, time to complete the second modernization. The time a country completes the second modernization is the time it reaches the criteria of the second modernization. Currently, the frontier of world modernization has already arrived at the development stage of the second modernization; no country has completed the

Table 5.29 Predictions about national modernization in the twenty-first century

Item	2005	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
Prediction S1	28	33	37	54	59	64	71	79	81	83	84
Prediction S2	28	36	44	58	65	74	76	79	83	87	89
Prediction F1	34	38	60	69	79	86	90	96	104	106	107
Prediction F2	34	39	61	69	80	86	89	93	97	98	99

Note: predictions S1 and S2 refer to the number of the countries entering the second modernization. Predictions F1 and F2 refer to the number of the countries completing the first modernization. This analysis covers 131 countries whose population was over one million in 2000. The number of countries entering their second modernization is predicted according to the average annual growth rate of second modernization indexes in 1980–2005 and 1990–2005: when a country's second modernization index reaches or exceeds 70, it enters its second modernization. The number of countries that have completed their first modernization is predicted according to the average annual growth rate of first modernization levels in 1980–2005 and 1990–2005: when a country's first modernization level reaches 100, it has completed its first modernization
Source: RGCMS (2010)

Table 5.30 Time spent for the first modernization in 15 countries (Year)

Country	Starting year	Actual year of completion	Actual years spent	Predicted year of completion	Years already spent	Years still needed	Total years spent
USA	1776	1960	184				184
Canada	1797	1960	163				163
Japan	1868	1970	102				102
Germany	1803	1970	167				167
UK	1649	1970	321				321
France	1789	1970	181				181
Australia	1801	1970	169				169
Italy	1805	1970	165				165
Mexico	1867	2005	138				138
Russia	1861			2020	149	10	159
Brazil	1850			2020	160	10	170
China	1840			2020	170	10	180
Indonesia	1922			2020	88	10	98
India	1919			2040	91	30	121
Nigeria	1960			2070	50	60	110

Note: "Starting year" is based on the views of Black (1966). "Year of completion" refers to the year when the level of first modernization reaches "the average level in 1960 of high-income countries." "Years already spent" refer to the span of years from "starting year" to 2010. "Years still needed" refer to the span of years from 2010 to "predicted year of completion." "Total years spent" refer to the actual or predicted years needed to complete the first modernization
Source: RGCMS (2010)

second modernization; the criteria of completion for the second modernization are not yet to be determined.

According to the second modernization theory, the time span of knowledge civilization is about 130 years, and currently, the second modernization has such features as knowledgeablization, informatization, and ecologicalization. There are many methods to make predications about the second modernization. For example, based on the history between 1970 and 2005, it is estimated that about six countries will join the ranks of the second modernization drive every 10 years from 2001 to 2100.

On an international system level, by 2005, all advanced countries and a number of developing countries, about 28 together, had entered the second modernization. The number of countries which enter the second modernization will reach 64–74 by 2050 and 84–89 by 2100 (Table 5.29), and in the meanwhile, advanced countries will have completed the second modernization.

On a national layer, by 2005, 28 countries had entered their second modernization, while others had not. In the twenty-first century, countries will differ for sure in their time to enter and complete the second modernization, which entails special research.

Third, national modernization level. According to an analysis in which one developed country respectively from Europe, America, and Asia as well as one

Table 5.31 Predictions about national modernization levels in the twenty-first century (second modernization index)

Nation	Growth rate	2005	2010	2020	2030	2040	2050	2080	2100	2100/2005
Germany	1.55	89	97	113	131	153	179	283	385	4.33
	1.39	89	96	110	126	145	167	253	333	3.74
USA	1.60	111	121	141	166	194	227	366	503	4.53
	1.69	111	121	143	169	200	237	391	547	4.93
Japan	1.66	102	111	131	154	182	214	351	489	4.79
	1.27	102	109	123	140	159	180	263	338	3.31
Brazil	2.25	47	53	66	83	103	129	251	392	8.34
	1.74	47	52	61	73	87	103	173	244	5.19
India	1.82	24	26	32	38	45	54	93	134	5.58
	2.29	24	27	34	42	53	67	132	208	8.67
Nigeria	0.96	16	17	19	21	23	25	34	41	2.56
	1.35	16	17	20	23	26	30	45	59	3.69

Note: growth rate is the average annual growth rate in 1980–2005 and 1990–2005, respectively
Source: RGCMS (2010)

developing country respectively from America, Asia, and Africa (Brazil, India, and Nigeria) (Table 5.31) are chosen to be the object, the modernization level of developed countries is likely to increase 2.3–3.9-fold, and the level of developing countries is likely to increase 1.6–7.7-fold; some developing countries is likely to reach the level of developed countries, while some will see a widening gap to developed countries (RGCMS 2010).

(3) International Status in National Modernization

According to the historical experience over the past 300 years, in 100 years to come, the probability that a developed country descends into a developing one is about 8–23%, and the probability that a developing country ascends to a developed one is about 1–5%. If the historical experience works, in the twenty-first century, about 2–4 developed countries are likely to descend into developing ones, and about 1–5 developing countries are likely to ascend to developing ones. There are of course great uncertainties in the twenty-first century, which will make it impossible to predict accurately the future based on history (RGCMS 2010).

If the above predictions are proved to be true, international competition will remain fierce in the twenty-first century. Developed countries have to strive to maintain their international status, while developing countries will strive for ascension to the club of developed countries as soon as possible. For the over 100 developing countries, there are only about five "tickets" to the club of developed countries (Modernized Countries Club) in the twenty-first century.

5.3.1.4 Inspiration from the History of National Modernization

First of all, modernization needs both vertical and horizontal comparison. The vertical comparison of modernization reflects the progress in civilization and analyzes the increases in absolute levels of countries, while the horizontal

comparison of modernization reflects the international difference and geographic distribution of civilization development and analyzes the changes in relative levels of countries and their international status. If the growth rate of the absolute level of a country is lower than other countries, this country's relative level and international status decline; on the contrary, they rise. An international comparison of modernization must be scientific and rational; some indicators, for example, language, are unsuitable for an international comparison of development levels.

Second, a latecomer may learn from the experience of a foregoer whereby it sees the epitome of its future civilization structure and quality of life in the developed country. But different countries differ in both lifestyle and culture to which new changes will happen with scientific and technological progress. The cross-sectional structure of world modernization is the epitome of its historical structure, while that of human civilization is the epitome of human civilization's historical structure. For example, the cross-sectional structure of 2,000-year human civilization is the epitome of the process of human history from the origin of human beings to the year 2000 and that 2,000-year world modernization is the epitome of the process of modernization from its' start to the year 2000, with the world's average level about 50 years behind the world's advanced level.

Third, there is no best model of modernization but only rational choice. Over the past 300 years, some countries have maintained their status as developed countries, some have successfully ascended, and some have descended. A comparison between their development models leads to no results of obvious orientation (Table 5.32). In the process of the first modernization, those ascending countries gave priority to industrialization, democratization, or urbanization, or to economy or education, or developed in a coordinated way; in the process of the second modernization, they gave priority to knowledgeablization, informatization, or ecologicalization or developed in a coordinated way. Therefore, countries need to research and find models appropriate to them, rather than simply copying the practices of other countries.

Fourth, modernization is subject to the Matthew Effect, with the international gap in per capita income widening constantly. In the international system, though most countries have seen an increase in per capita income, rich countries have become richer and poor countries have become poorer, with low-income countries tending to be impoverished. If the GDP per capita calculated based on prices in 2000 is used as the analytical index, from 1960 to 2000, the absolute difference between high-income and low-income countries widened from approximately 8,584 to 25,767 USD, and the relative difference increased from 42-fold to 66-fold. If the GDP (PPP) per capita calculated based on prices in 1990 is used as the analytical index, from 1960 to 2000, the absolute difference between high-income and low-income countries widened from approximately 6,577 to 21,163 international dollars, and the relative difference increased from 6-fold to 21-fold.

If both developed and developing countries take measures to control and narrow international income differences, a win–win situation is likely to happen. But international gaps between rich and poor countries continue to widen, and international conflicts are likely to intensify and lead to a situation harmful to both sides.

Table 5.32 Element mix models of different types of countries

Country and type	Element mix of the first modernization		Economy and education	Element mix of the second modernization		Informatization and ecologicalization
	Industrialization and democratization	Industrialization and urbanization		Knowledgeablization and informatization	Knowledgeablization and ecologicalization	
Ascending						
USA	Coordinately	Industrialization first	Education first	Knowledgeablization first	Knowledgeablization first	Coordinately
Canada	Industrialization first	Industrialization first	–	Coordinately	Coordinately	Coordinately
Australia	Democratization first	Urbanization first	–	Coordinately	–	–
Finland	Democratization first	Industrialization first	Economy first	Knowledgeablization first	Knowledgeablization first	Ecologicalization first
Greece	Coordinately	Coordinately	Coordinately	Knowledgeablization first	Knowledgeablization first	Ecologicalization first
Japan	Industrialization first	Industrialization first	Education first	Informatization first	Coordinately	Informatization first
South Korea	Industrialization first	Coordinately	Education first	Knowledgeablization first	Knowledgeablization first	Coordinately
Singapore	Industrialization first	–	Coordinately	–	–	–
Kuwait	Industrialization first	–	Economy first	–	–	–
Fluctuating						
New Zealand	Democratization first	Urbanization first	Education first	Coordinately	Coordinately	Coordinately
Ireland	Democratization first	Urbanization first	Education first	Knowledgeablization first	Coordinately	Ecologicalization first
Descending first and ascending later						
Italy	Industrialization first	Urbanization first	Coordinately	Knowledgeablization first	Coordinately	Ecologicalization first
Norway	Democratization first	Industrialization first	Education first	Informatization first	Coordinately	Informatization first
Spain	Industrialization first	–	Economy first	Knowledgeablization first	Ecologicalization first	Ecologicalization first
Ascending first and descending later						
Argentina	Industrialization first	Urbanization first	Coordinately	Knowledgeablization first	–	–
Russia	–	–	–	Knowledgeablization first	–	–
Venezuela	–	Coordinately	Economy first	Knowledgeablization first	–	–
Descending						
Portugal	Industrialization first	Industrialization first	Economy first	Knowledgeablization first	Coordinately	Ecologicalization first

Note: Industrialization first refers to giving the priority to industrialization, democratization first refers to giving the priority to democratization, coordinately refers to developing in a coordinated way, and so on

Source: RGCMS (2010)

Fifth, in the twenty-first century, developing countries still have prospects of success but have few possibilities of ascending to developed ones. According to the historical experience over the past 300 years, in the twenty-first century, there will be some 20 developed countries and more than 100 developing countries (based on samples of 131 countries), and about 1–5 of these developing countries are likely to ascend to developed ones, implying a fierce contest for the tickets to the club of developed countries. And in this century, some 700 million more people may possibly enjoy a modern life, about 500 million of whom are likely to come from developing countries; the population of developing countries is likely to reach 8–10 billion. That means some 10 billion people in developing countries will compete for 500 million tickets to a modern life. The international competition in the twenty-first century, therefore, will still be intense yet rational.

5.3.2 Theories

The national modernization theory is a theoretical explanation for national modernization phenomena; it is a level theory in the second modernization theory and modernization science. National modernization is modernization at national layer, which has not only generalities of modernization but also particularities. The core theory (Table 2.1) on the general modernization applies to national modernization on the whole. National modernization is the basic unit of modernization, and to a certain extent, the modernization theory is a theory on national modernization and a national-level theory.

Generally, the national modernization theory includes the general theory, branch theories, and relevant theories (Table 5.33). Below is a discussion of its general theory, including the definition, process, result, dynamics, and models of national modernization (Table 5.34). Because of the high consistency of the national modernization theory with the general theory on modernization, the discussion of the national modernization theory is greatly simplified.

Table 5.33 Structure of national modernization theory

Category	Theory	Main contents
General theory	Core theory	The definition, process, result, dynamics, and model of national modernization
Branch theories	Stage theory	National first modernization, second modernization, or integrated modernization
	Field-related study	National modernization in the fields such as economy, society, politics, culture, natural environment, and humans
	Sector-related study	National modernization in the sectors such as agriculture, industry, education, science and technology, national defense, and transportation
Relevant theories	Other modernization theories	Classical modernization theory, reflexive modernization theory, second modernization theory, etc.
	Other relevant theories	Civilization theory, state theory, development theory, transformation theory, area study, etc.

Table 5.34 General theory on national modernization

Aspect	Main contents
Definition	National modernization, i.e., modernization at national layer, is a sort of frontier change and international competition of national civilization since the Industrial Revolution in the eighteenth century. It includes the formation, development, transformation, and international interaction of national modern civilization; the innovation, selection, diffusion, and recession of the elements of national modern civilization; the international competition for catching up with, reaching, and maintaining the world advanced level; and the change in national stratification and civilization distribution
Process	National modernization is a complex process, including the change of national civilization, stratification, and civilization distribution and the change of national behavior, structure, institution, and ideas. The frontier process of national modernization in the eighteenth to twenty-first century may be divided into two stages: the first modernization, transformation from agricultural to industrial civilization, and the second modernization, transformation from industrial to knowledge civilization and from material to ecological civilization. It follows ten principles (Table 2.15): asynchronous process, uneven distribution, structural stability, status changeability, behavioral predictability, incremental demand, diminishing utility, optional paths, no repeated state, and axis transition
Result	The formation of modernity, particularity, diversity, and side effects, including the following: the improvement of labor productivity and quality of life, social progress, political democracy, cultural diversity, ecological change, and overall development of human; the change of national level, international status, and civilization distribution; and the persistent existence and functioning of a portion of traditional values. The main outcome of the first modernization includes the formation of first modernity, particularity, and diversity, with side effects including environmental pollution and periodic economic crises. The main outcome of the second modernization at present includes the formation of second modernity, particularity, and diversity, with side effects including information divide and cybercrime
Dynamics	Driving forces of national modernization include innovation, competition, adaptation, exchange, national interest, and market demand. Dynamic theories include innovation drive, three-innovation drive, two-wheel drive, associative action, four-step super cycle, composite interaction of three types of civilization, innovation diffusion, innovation spillovers, and competition drive (Table 2.20). Driving forces in different countries and stages are different, and different paths and models differ in their driving forces
Model	National modernization has path diversity, model diversity, and path dependence. There are roughly three basic paths and over 50 models (Table 2.21)

Source: He (2003)

5.3.2.1 Definition

National modernization is a manifestation of modernization at national layer.

The Intension. National modernization is a sort of change of national civilization and international competition; it is the frontier process of the formation, development, transformation, and international interaction of national modern civilization, as well as a composite process of alternate innovation, selection, diffusion, and recession of the elements of national modern civilization; it is also the change in

international competition, national stratification, and civilization distribution with the aim of catching up with, reaching, and maintaining the world advanced level.

The Extension. National modernization includes modernization of a country as a whole, modernization in six fields, and the change in the spatial and temporal distribution of national modernization, as well as the modernization of national behavior, structure, institution, and ideas.

Generally, national modernization refers to the world frontiers of national civilization and the process and action to reach these frontiers. It is the basic unit of modernization study and practice. In the process of modernization study and practice, national modernization is at the core. In the system of modernization theories, the national modernization theory and the general theory on modernization have the highest degree of consistency with each other.

Modernization in the six fields including national economy will be dealt with in Chap. 6.

5.3.2.2 Process

National modernization is a complex, long-term process (Table 5.34). Between the eighteenth century and the twenty-first century, the frontier process of national modernization is divided into two stages, the first modernization and the second modernization, each having different features (Table 2.13).

The process of national modernization has not only common features (Table 5.22) but also diversity (Table 5.23).

National modernization follows ten fundamental principles of modernization (Table 2.15).

5.3.2.3 Result

Since the 1950s, there has been a correlation between the outcome and objective of national modernization, and this correlation has been gradually formed and enhanced.

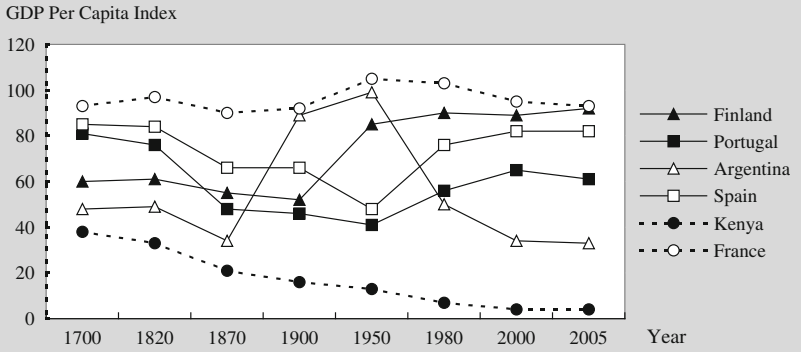
The outcome of national modernization includes, among other things, the formation of modernity, particularity, diversity, and side effects (Table 5.34). Different countries have both common features and differences in this regard, along with changes in national levels and international status (Example 5.1).

Example 5.1 Change of National Modernization Level

The changes from 1700 to 2005 in national modernization level mainly include ascending, descending, ascending first and descending later, descending first and ascending later of international status; rise first and decline later, decline first and rise later, continuous decline, and sharp fluctuation and smooth fluctuation of national level. Status ascending refers to the transition from developing to developed countries, and status descending refers to the change from developed to developing countries. Smooth fluctuation includes high-level fluctuation (among developed countries) and

(continued)

medium-level fluctuation (among moderately and preliminarily developed countries). During the period, developed countries converged in the level of development, and gaps between developed and developing countries widened.



Change of national modernization level from 1700 to 2005. Note: according to the change of GDP (PPP) index calculated based on constant prices in 1990, the average modernization level of high-income countries (Western European countries) is 100.

Between 1760 and 1970, the outcome of national modernization included the formation of first modernity, particularity and diversity, and side effects such as environmental pollution, with a portion of traditional values continuing to exist and function.

From 1970 onward, the outcome of national modernization included the formation of first modernity, second modernity, particularity and diversity, as well as side effects such as cybercrime, with a portion of traditional values continuing to exist and function.

Theoretically, the goal of national modernization includes completing the first and second modernization, catching up with, reaching, and maintaining the world's advanced level of development.

From the policy perspective, the goal of national modernization includes improving productivity and quality of life and promoting social equity and progress, overall development of human, and the mutualism of humanity and the nature; the policy goal of developed countries is to maintain the world's advanced level of development and that of developing countries is to catch up with and reach that level.

5.3.2.4 Dynamics

Analysis on dynamics of national modernization covers dynamic factors and models (Table 5.34).

The driving forces of modernization may differ from country to country, stage to stage, path to path, and model to model. The motivation models may be seen on Table 2.20.

5.3.2.5 Model

Between 1760 and 1970, national modernization adopted the path of first modernization with some 19 element mix models (Table 5.26) and four types (Table 5.25).

From 1970 on, some countries adopted the path of second modernization with approximately 22 element mix models (Table 5.27); some adopted the path of integrated modernization with approximately 31 element mix models (Table 5.28); others adopted the path of first modernization but were affected by the second modernization. There are three basic paths in the twenty-first century: second modernization, catch-up modernization, and integrated modernization.

The choice of stage-related goal, path, and model of national modernization is strategically at the core of national modernization policy.

5.4 Regional Modernization

Regions can be understood—as the case may be—as transnational regions, the different areas in the world, or domestic regions, the different areas within a country. Here, regional modernization refers to modernization of domestic regions, including worldwide regional modernization, nationwide regional modernization, and regional modernization of individual region (Fig. 5.14). Regional modernization is a manifestation and analysis level of modernization phenomena and an integral part of national modernization; it is not only relatively independent but also governed by national modernization.

5.4.1 Studies

Regional modernization study may be conducted from three perspectives, i.e., history, reality, and future, and research can be conducted on worldwide, nationwide, or individual regional modernization.

5.4.1.1 Research Paradigm

Regional modernization study is an integral part of modernization study at regional level.

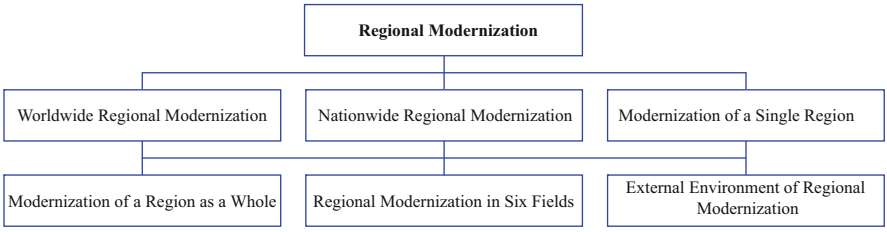


Fig. 5.14 Analytical structure of regional modernization. Note: worldwide regional modernization refers to regional modernization indifferent countries throughout the world

Table 5.35 Matrix of regional modernization study

Content		Object		
		Regional civilization	Regional economy, society, politics, culture, natural environment, and humans	Regional interaction
		Regional modernization as a whole	Modernization in the regional six fields	Interaction in regional modernization
Element	Behavior	Modernization of regional behaviors, structures, institutions, and ideas	Behavioral, structural, institutional, idea's modernization in the regional six fields	–
	Structure			
	Institution			
	Idea			
Aspect	Process	Process, result, dynamics, model of the regional modernization	Processes, result, dynamics, model of modernization in the regional six fields	International and internal environment and interaction of the regional modernization
	Result			
	Dynamics			
	Model			

Note: regional modernization study also includes many other contents, for example, the frontier, frontier process, and catch-up process analysis on regional civilization, regional competition analysis, regional gap analysis, elements of regional modernization, and interaction between different fields

(1) Research Matrix

The research object of regional modernization study includes modernization of a region as a whole, modernization in regional six fields, and interaction of regional modernization. Research contents include regional behavioral, structural, institutional, and ideal modernization, as well as the process, result, dynamics, and model of regional modernization, which constitute a research matrix (Table 5.35).

(2) Research Method

Regional modernization study is a level-relative study of modernization study and may use the methodology of modernization study.

The scope of regional modernization study can be one or more regions, worldwide or nationwide regions, or regions inside developed or developing countries. The time span can be the whole process or a particular stage.

Regional modernization may adopt multidimensional analysis, case study, and comprehensive study, such as the coordinate analysis method in modernization study.

The process study of regional modernization generally adopts the research methods of positivism and interpretivism. The reality study of regional modernization generally adopts the research methods of positivism, interpretivism, and realism. The prospect study of regional modernization generally adopts the research methods of positivism, interpretivism, and futurology.

(3) Research Purpose

Regional modernization study is mainly for academic and policy purposes.

From the academic perspective, regional modernization study is an important part of modernization study, with the aim to discover the basic facts, fundamental principles, and historical experience of regional modernization and thus enrich the implications of the modernization theory.

From the policy perspective, regional modernization is a unit of modernization practice, and the purpose of regional modernization study is to provide the theoretical basis, historical reference, and policy options for the practice of regional modernization.

5.4.1.2 Facts About Regional Modernization

China Modernization Report 2004: Regional Modernization Study (RGCMS 2004) analyzes the historical statistics on the development in the twentieth century of more than 170 regions in 18 countries, quotes extensive analysis results from scientists, and summarizes some basic facts and field-relative facts about regional modernization as follows:

(1) Basic Facts About Regional Modernization

First of all, regional modernization exists objectively. During the development of 171 regions in 18 countries, universal phenomena includes, among others, narrowing and widening of regional economic gaps, convergence and divergence of regional development levels, and catch-up and regress of relative regional levels. The changes in relative regional levels include the advanced becoming more advanced, the advanced keeping advanced, the backward one catching up with the advanced, the advanced becoming backward one, and the backward one remaining backward one. These roughly accord with the phenomena of national modernization (RGCMS 2004).

Second, regional modernization follows the general laws of modernization. In the process of regional modernization of the 18 countries, the basic laws of modernization such as the industrialization and urbanization in the first modernization and the knowledgeablization and informatization in the second modernization have all been verified by regional historical statistics and by scholars' analysis. Regional modernization includes political modernization whose subjects are countries. Although a region can also introduce innovation in the political system, its political modernization is determined by the politics of its country. Apparently, without political modernization, there will be no all-round national modernization and regional modernization.

Third, regional modernization is not simply a mini version of the modernization of the country to which the region belongs. A region is part of a country, and its modernization is part of the country's modernization. The average level of regional modernization is roughly equal to the country's level of modernization. But there is a variety of models and paths for regional modernization inside a country. For example, the modernization of 195 counties in 50 US states is greatly different

from the country's national modernization in such aspects as industrialization and urbanization (RGCMS 2004).

Fourth, regional interaction and interdependence exist in the process of regional modernization. Regions not only compete with and depend on each other. Under the condition of free competition, a region with a higher level of modernization may diffuse its modernization outcome into a region with a lower level of modernization; meanwhile, it may also absorb important resources for modernization (including human capital, financial capital, and material resources) from the latter and is likely to transfer to the latter some adverse factors (e.g., polluting industries), thereby leading to a widening gap between the regions. Economic and population flows between regions, and state intervention [e.g., by means of financial and policy levers (transfer payment, preferential policy, etc.)] may promote the coordinated development of the regions.

Fifth, modernization of a region is closely connected with the region's basic capacity. For example, successful EU regions in the process of modernization all have the following features (Cuadrado-Roura 2001):

- A region's city system plays an important role in economic growth and production activity. Medium-sized cities as well as small cities with a population of 40,000–150,000 have obvious advantages, and big cities are particularly suitable for attracting and developing new industries. Urban competitiveness reflects regional competitiveness.
- Be easy to acquire human capital, have stable supply of qualified labor forces, and give publicity to the local high-level education via media.
- Accessibility. Have a high degree of openness which makes it easy to enter international markets, and be able to participate in national politics and the formulation of economic policies and to carry out innovation and technological development quickly. Relevant infrastructure such as information centers, research institutes, and technology centers may serve as channels and networks conducive to the capacity. Of course, it is also necessary to be able to accept these factors from outside.
- Be easy to acquire advanced production services, for example, regarding strategic planning, technical consultancy, commercialization and export, research and development, and professional financial services.
- The regional organization system is very important. Competitive local governments' ability to form a network of cooperation with the central government, other authorities, and nongovernmental organizations and to apply for and develop new programs.
- Have the "appeal" to external investment, or be able to take part in the cooperative development in the Pacific region.
- For regional development, having large-sized enterprises in declining and struggling industries is an adverse factor; to the contrary, having advantageous small-sized enterprises engaging in different production activities is a positive factor.

Sixth, regional modernization is unbalanced. Based on the development levels and stages of regional modernization in the 18 countries, countries differ greatly in regional modernization. Advanced countries have smaller regional gaps than

developing countries, and countries which have entered their second modernization have smaller gaps than those which are in their first modernization.

The regional modernization of advanced countries has undergone two stages, i.e., first and second modernization. In the process of first regional modernization, basic contents are industrialization, urbanization, "deagriculturalization," and universal free compulsory education. In the USA, the relative gaps between regional economies shift from widening to narrowing, with widening absolute gaps; the income distribution inequality shift from widening to narrowing. In the process of second regional modernization, basic contents are knowledgeablization, informatization, deindustrialization, "deurbanization" (suburbanization and so on), and universal higher education. During this process, the narrowing trend of relative gaps between US regional economies and of income distribution inequality ends, while the trend of fluctuation and widening appears. The regional modernization of developing countries, which now is in the process of first modernization, still highlights industrialization and urbanization and, meanwhile, is affected by informatization.

(2) Economic Facts About Regional Modernization

In the economic sphere, regional modernization roughly has the same laws as national modernization, but they have some different features. Moreover, the regions at province level (equivalent to provincial regions in China) differ from the regions at county level (equivalent to counties in China) in the contents and features of economic modernization, which needs to be treated differentially.

First, as with national economic modernization, the basic characteristic of regional economic modernization is the improvement of productivity level, along with the steady increase of regional GDP per capital and regional labor productivity (GDP per work hour).

Second, if the decrease in the percentage of agriculture in GDP is described as "deagriculturalization," then "deagriculturalization" is the basic characteristic of economic modernization in a country and its province-level regions, and it is not absolute in the county-level regions.

In the province-level regions of developed countries, the percentages of value added of agriculture and agricultural labor force have decreased to about 2%; in the county-level regions of developed countries such as the USA, the percentages of value added of agriculture and agricultural labor force tend to decrease, but the percentage of value added of agriculture is not apparently relevant to the level of modernization (in fact, it is closely related to countries' agricultural policy), and the percentage of agricultural labor force still have a negative correlation with the level of modernization (RGCMS 2004).

The USA's county-level regions differ considerably in their percentages of agriculture. In 2000, for example, of the 195 counties in three states, six counties had a percentage of agricultural labor force below 1% (one of them was 0%), 19 counties exceeded 90%, 42 counties had a percentage of value added of agriculture below 1% (two of them were 0%, and 16 were negative), and 10 exceeded 20% (RGCMS 2004).

Third, the regional industry, which had a percentage increasing and then decreasing, experienced two stages, i.e., industrialization and deindustrialization;

some regions had already entered the stage of deindustrialization when they did not complete industrialization.

The developed countries did not enter the stage of deindustrialization until they had completed industrialization. From the 1980s onward, some developing countries saw the decrease in the percentage of industrial value added in GDP as well as fluctuation and even decrease in the percentage of industrial labor force when they had not complete industrialization, showing some features of deindustrialization. This suggested that developed countries' transition toward deindustrialization had already a massive influence on developing countries (RGCMS 2004).

Among province-level regions (50 states) in the USA, some regions experienced two typical stages, i.e., industrialization and deindustrialization; some began transition to deindustrialization in the medium stage of industrialization (proportion of industry in economy reaches 30%), and others began transition to deindustrialization at "the early stage of industrialization" (proportion of industries in economy $<$20%). But they all completed the "deagriculturalization" (RGCMS 2004).

In county-level regions in the USA, the transition from industrialization to deindustrialization is the trend of development, but they differ greatly from each other. In 2000, for example, of 195 the counties in 3 US states, 13 counties had a percentage of industrial labor force below 10% (2 counties were 0), 8 counties were over 40%, 9 counties had a percentage of industrial value added in GDP below 10% (2 counties were 0), and 12 counties were over 50% (RGCMS 2004).

Fourth, if the great increase in the percentage of service industries is described as service-oriented economy, then regional service-oriented economy is inevitable. For countries and their province-level regions, the percentages of service industries have increased and converged. In county-level regions of the USA, the percentages of service industries have increased and converged, but the regions differ greatly from each other. In 2000, of the 195 counties in three US states, 19 counties had a percentage of labor force in service industries above 80% (2 of them were over 90%), 9 counties were below 50%, 26 counties had a percentage of value added of service industries in GDP above 80% (4 of them were over 90%), and 24 counties were below 50% (3 of them were below 40%).

(3) Social Facts About Regional Modernization

In the social sphere, regional modernization roughly accords with national modernization. But because the development of different regions inside a country is not at the same pace, the regional social modernization is diverse as compared with the country's national modernization.

First, as with the social modernization of a country, the basic characteristic of the social modernization of a region is the improvement of residents' standard of living. It includes the following: raised up the level of medical services, prolonged life expectancy, increased survival rate of infants, improved quality of living environment, increased disposable income per capita, decrease of Engel's coefficient (decreased percentage of food consumption to total spending), reasonable increase in protein intake (increase within a reasonable range), increased coverage of social

security system, improved the quality, and increased popularization of domestic consumer durables (such as home appliances and cars).

Second, if the massive concentration of population in cities is defined as "urbanization" and the massive dispersal of urban population into suburbs and towns as "deurbanization," then for a country and its province-level regions, social modernization experiences two stages, i.e., urbanization and deurbanization. In essence, "deurbanization" is the diffusion of urban civilization into suburbs and towns. For this reason, *China Modernization Report 2002* described "deurbanization" as "urban diffusion." In the stage of "deurbanization," urban population diffuses gradually; in the meanwhile, some old cities are expanding and new cities are emerging. The main features are, among others, rapid growth in suburban population of the central city (suburbanization), rapid growth in population of the metropolis (the central city and its suburbs), and decrease of urban and metropolitan population density.

In the process of social modernization of a country, urbanization and deurbanization are two natural stages. In province-level regions, both urbanization and deurbanization are diverse. For example, in the second half of the twentieth century, 3 out of the 50 US states saw a decrease in the percentage of urban population when they did not complete urbanization (with the percentage of urban population below 60%), and four saw a decline in their metropolitan population. Since the 1970s, seven metropolitan counties in the UK have seen a drop in their total populations (RGCMS 2004).

The evolution of cities in developed countries since the 1960s has been obviously different from the urbanization in the period of their industrialization. In the academic community, there are such concepts as "metropolitanization," "suburbanization," "counterurbanization," and "reurbanization." "Reurbanization," also known as "urban renaissance," means the flow of suburban and town population back into cities, thereby gross urban population and its percentage increase. The percentages of urban population in developed countries increased at the end of the twentieth century, which was much attributed to international migration rather than the mere concentration of domestic population into cities. In the late twentieth century, the majority of rural residents in developed countries were already no longer farmers.

Third, regional modernization includes the modernization of social infrastructure which experiences two development stages, i.e., "material life infrastructure" and "knowledge information infrastructure." A region's "material life infrastructure" includes its public utilities (supply of water, electricity, and gap), public traffic infrastructure (railways, civil aviation, expressways, etc.), logistics infrastructure, public health infrastructure, communications infrastructure typical of the age of industry (telephone, TV, etc.), and so forth. A region's "knowledge information infrastructure" includes "information network infrastructure" (information superhighway, etc.), satellite and mobile communications infrastructure, databases and knowledge bases, and innovation infrastructure (institutions of higher learning, scientific research institutions, etc.). In developed countries, the two stages of regional infrastructure development happened one after another; in developing

countries and regions, the ongoing regional modernization includes the contents of the two stages concurrently.

(4) Knowledge Facts About Regional Modernization

In the knowledge sphere, regional modernization, for the most part, accords with national modernization. Because knowledge has such characteristics as free flow and interest overflow, a country and its province-level and county-level regions differ in strategy choice and manifestation of modernization in the sphere of knowledge.

First, as with national modernization in the sphere of knowledge, the basic characteristic of regional modernization in the sphere of knowledge is the improvement of production capacity and popularization of scientific knowledge and information. It includes the following: increased adult literacy, increased popularization of compulsory education and higher education, continuous development of vocational education, adult reeducation and lifelong learning, increased the proportion of labors with high education degree, increased capacity for knowledge production and innovation (intensity of investment in science and technology, fund, and manpower), increased popularization of telephone and TV (including telephone, mobile phone, fax, radio, TV, etc.), and increased popularization of computers and the Internet and so forth.

Second, developed countries' regional modernization in the sphere of knowledge experienced two stages, i.e., "popularization of compulsory education, telephone, and TV" and "knowledgeablization and informatization." Around the 1970s, regions of developed countries already completed the popularization of 12-year free compulsory education, telephone, and TV, as well as the dissemination of knowledge and information necessary for industrialization. Since the 1970s, the knowledgeablization and informatization, which was technically based on personal computers, the Internet, and mobile communications and featured mainly by universal higher education and lifelong learning, has become the theme of the second knowledge modernization.

Third, developing countries differ from developed ones in development models for regional modernization in the sphere of knowledge. The two stages of developed countries' regional modernization in the field of knowledge happened one after another, having the feature of "natural evolution." Developing countries' regional modernization in the sphere of knowledge has two models: copying in a follow-up way the two-stage model of developed countries, and advancing knowledgeablization and informatization while popularizing free compulsory education, telephone, and TV.

The above-mentioned facts of regional modernization are only a part of the basic facts.

5.4.1.3 Inspirations from the History of Regional Modernization

China Modernization Report 2004 analyzes the important inspirations from 18 countries in regional modernization as follows:

First, in province-level regions, regional modernization is highly consistent with national modernization. As seen by the historical statistics and research findings on modernization of province-level regions in the 18 countries, this region's modernization is consistent with modernization of their countries. Though they differ from their countries in such aspects as industrialization and urbanization, their modernization is similar to worldwide national modernization. The modernization of province-level regions inside a country not only follows the general laws of national modernization, but also has a variety of manifestations.

Second, in county-level regions, the relationship between regional and national modernization is diverse. From the historical statistics and research findings on modernization of 195 counties in three US states, the modernization of county-level regions is basically consistent with national modernization, but the correlation of regional modernization with national modernization vary from field to field. For example, on the economic front, the correlation of the economic and employment structures in county-level regions with their levels of modernization and productivity is weaker than the country; on the social front, the modernization of county-level regions is more correlated with national modernization; on the knowledge front, county-level regions' modernization differs considerably from national modernization in terms of development models (for instance, not every county-level region has a university of the world's advanced level, but the country must have a university system of the world's advanced level).

Third, the phenomenon that the processes of regional modernization are not at the same pace and are unbalanced is widespread. The historical truth about the modernization of 171 regions in the 18 countries is that in the same year in history (e.g., in 2000), different countries differ in the development stage and level of regional modernization, and different regions inside the same country differ from each other in the development stage and level of modernization. The historical truth about the US regional modernization is that, in the nineteenth and twentieth centuries, differences between US province-level regions in the development stage and level of modernization existed all the way. The degree of regional differences changes with ages, but regional differences do exist.

Fourth, the widening and narrowing of per capital income gaps between regions is widespread. If regional gaps linger on, the widening and narrowing of them is bound to exist objectively. Is there a natural law that governs such widening and narrowing? The neoclassical growth theory and the new growth theory have different explanations for this. This issue can be analyzed at two levels, namely, worldwide regional gaps and those inside countries.

In the 1960s, American economist Williamson raised an inverted U-shape curve model for regional economic gaps, holding that in the process of economic development, the change of regional economic gaps from widening to narrowing follows an inverted-U-shaped track (Williamson 1964). However, the inverted U model is not totally consistent with the actual changes in regional gaps in the USA. According to existing research papers and historical data, in the process of regional modernization, the widening and narrowing of regional gaps seems rather complex and has no simple model (Table 5.36).

Table 5.36 Per capita GDP gaps between tier-one administrative regions in four countries

Item	India		Mexico	UK		USA		
Year	1990/1991	1999/2000	2000	1990	1999	1980	1990	2000
Maximum GDP per capita ($)	634	824	13,870	19,423	27,280	37,331	45,044	46,767
Minimum GDP per capita ($)	165	146	2,273	11,190	16,220	8,541	15,214	23,380
Average ($)	317	381	5,210	14,618	20,147	12,170	22,108	33,663
Standard deviation	115	163	2,465	2,140	3,270	4,241	5,009	5,723
Absolute gap ($)	469	678	11,598	8,233	11,060	28,790	29,830	23,387
Relative gap	3.8	5.6	6.1	1.74	1.68	4.4	2.96	2.00
Coefficient of variation	0.364	0.427	0.473	0.146	0.162	0.348	0.227	0.17

Note: Absolute gap = Maximum–Minimum, Relative gap = Maximum/Minimum, Coefficient of variation = Standard deviation/Average
Source: RGCMS (2004)

Some scholars found that gaps in per capita income between countries throughout the world were widening from the nineteenth century into the twentieth century (Clark and Feenstra 2001). But some held that in the last 40 years of the twentieth century, the gaps between countries in per capita income based on PPP narrowed (Melchior et al. 2000), and the gaps in the standard of living (including life expectancy, survival rate of infants, composite enrollment rate, adult literacy, and popularization of telephone and TV) narrowed (Neumayer 2003). If national gaps widen, worldwide regional gaps are bound to widen. If national gaps narrow, there is the need for further research into worldwide regional gaps.

In both developed and developing countries, the widening and narrowing of regional gaps is a widespread phenomenon. The change of both absolute and relative gaps between regions is different. In the 1990s, absolute gaps between regions inside developed countries were greater than those inside developing countries, while relative gaps between regions inside developing countries were greater than those inside developed countries (Table 5.36).

An interesting phenomenon can be observed when the relative gaps between regions inside the USA and EU: during their process of industrialization (from the nineteenth century to around 1960s), the curve of change in the regional relative gap experienced the upward and downward stages; the downward trend was over as industrialization was completed. Around the 1970s, the curve of change fluctuated; from the 1980s onward, the curve took on an upward trend, but the gap was not greater than the past. Of course, this curve is not smooth, but wavy. The widening of the regional relative gap since the 1980s was undoubtedly related to the new industrial revolutions (information revolution and knowledge revolution). During the twentieth century, the absolute regional gap (standard deviation) was widening.

Given this situation, the curve of change in the regional relative gap is more like a declining curve of fluctuation. This phenomenon could be observed in the US change of regional relative gap in per capital income between 1840 and 2000, in the

fluctuation in regional gap in GDP per capita between 1977 and 2000 in 50 US states, in the change of regional relative gap in GDP per capita in West Germany (Federal Republic of Germany), the UK, France, Italy, Spain, and Portugal in the 1960s–1990s, and even in the change of regional relative gap in GDP per capita and labor productivity (GDP per worker) in Mexico between 1940 and 2000.

Perhaps this is right the form of evolution of regional gap convergence and divergence in the process of regional modernization. Its basic characteristic is that the curve of change in regional relative gap is a declining curve of fluctuation and, in the meanwhile, the curve of change in regional absolute gap is likely an expanding curve of fluctuation (Fig. 5.15). Further research is required as to when the expanding curve of absolute gap will decline.

In the process of regional modernization, the curve of fluctuation in the change of regional relative gap is not absolute. It might be one form of change in regional relative gap. We can find examples different from such curve of change. For example, between 1911 and 1993, the regional relative gap in per capita income between all 24 counties in Sweden converged all the way (Persson 1997). Therefore, there is supposed to have other forms of change in regional relative gap, for example, the conditional convergence in regional economic gap.

Fifth, the fluctuation and narrowing of urban–rural gap is widespread. In the process of industrialization, urbanization is inevitable, thereby forming the dualistic urban–rural structure. Generally, the urban–rural gap is existent objectively. Currently, the economic gap between urban and rural areas inside developed countries is already very small, while, because countryside has better natural environment, urban residents are moving into suburbs and rural areas, and the majority of rural residents are nonfarmers. In developing countries, the urban–rural gap is still very large, and because rural infrastructure is backward relatively, rural population continues to flock to cities and the level of urban modernization is apparently higher than rural modernization.

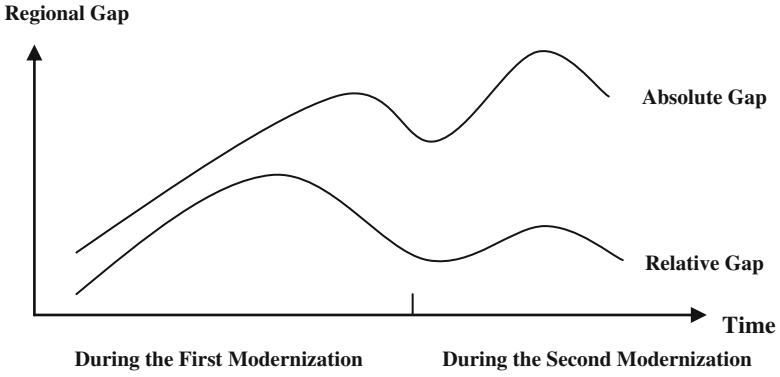


Fig. 5.15 Change of absolute and relative gaps in regional per capita income. Note: absolute gap is an expanding curve of fluctuation, and relative gap is a declining curve of fluctuation

In developed countries, for example the USA, there was a process of evolvement in the gap between urban and rural areas. When industrialization began, the urban–rural economic gap widened; when industrialization ended, the urban–rural economic gap narrowed; when informatization began, the urban–rural economic gap fluctuated. The urban–rural difference in natural environment always existed. From the 1820s, the US urban areas had higher labor productivity and wages than rural areas, but health conditions in rural areas were better than those in urban areas. Because of the poor sanitary conditions and high popularity density in cities, the life expectancy of the US urban population shortened. In 1900, the life expectancy of the urban population was averagely 10 years shorter than that of the rural population, along with higher urban adult and infant mortality rates than rural areas. The US urban–rural health gap began narrowing at the turn of the twentieth century until around 1940 when urban health conditions caught up with those in rural areas (Kim and Margo 2003). In the middle of the twentieth century, the USA completed its urbanization, with the narrowed economic gap between urban and rural areas. Because of traffic and environmental problems, urban residents' quality of life and economic efficiency were affected, and high-income urban residents began moving to suburbs and rural areas, leading to a drop in urban population density. In the meantime, the US rural population decreased, agriculture saw an improved efficiency, and the government's agricultural subsidy policy compensated in part for the natural risk and loss of agriculture; the urban–rural gap in per capital income narrowed. In the US Pacific coastal areas in 1975, the ratio of metropolitan to nonmetropolitan (urban to rural) per capital income was 1.1:1. In the late twentieth century, with knowledgeablization and informatization developing, the importance of geographic distance declined, but there was a certain gap between urban and rural areas in capability of acquiring and applying new knowledge and information for it took time for diffusion of knowledge and technology, leading to fluctuations in the economic gap between urban and rural areas.

The change of the urban–rural gap inside developing countries did not accord with that in developed countries. In the early and middle stages of industrialization, the economic gap was large between urban and rural areas. Currently, the urban–rural gap inside developing countries is somewhat obvious. The urban–rural economic gap is expected to narrow in the late stage of industrialization. In the early stage of knowledgeablization and informatization, the urban–rural gap is likely to widen and the "digital divide" between urban and rural areas can hardly be avoided. This gap is likely to narrow as the second modernization is advanced.

Sixth, the widening and narrowing of income gap is widespread, and income distribution requires government intervention. Undoubtedly, modernization should increase welfare for the whole of society, rather than only for a minority of people. In the process of modernization, however, income inequality exists for a long term. Without policy intervention by government, income inequality will follow the "Matthew Effect"—the rich get richer and the poor get poorer. To what extent policy intervention is applied by countries and regions results in different changes in income inequality.

In 1955, American economist Kuznets raised an "inverted U" model for income inequality, suggesting that income inequality increases during early industrialization, stabilizes during mid-industrialization, and decreases during late industrialization (Kuznets 1955). Though many still have questions over this, the "inverted U" model for income inequality during industrialization has been supported by massive facts (Chen 1994).

From the 1970s onward, however, massive changes happened in developed countries in trends of income inequality. In the 1970s, income inequality stopped narrowing and began widening in the USA (USCB 2002); income inequality has widened in the UK since the mid-1970s, and it was widening in Belgium, Sweden, Netherlands, Finland, Italy, and Germany from the mid-1980s to the mid-1990s (Förster and Pearson 2002).

According to economists (Piketty and Saez 2001) at the National Bureau of Economic Research, the widening of income inequality in developed countries since the 1970s poses no challenge to Kuznets' "inverted U" model. The fact is that new situations have happened to it because of new industrial revolutions and innovations, and this inequality will begin narrowing at some point.

If the above notion is tenable, the "inverted U" model for income inequality should be extended. And the new feature of income inequality in developed countries since the 1970s should be included.

In fact, the "inverted U" model is a visualized metaphor: the track of income inequality in the USA during industrialization is not a smooth curve, but a wavy curve typical of an inverted U shape. Coupled with the widening of income inequality since the 1970s and its possible future narrowing, the curve of change in income inequality can be imagined to be a fluctuating curve of periodic decline with the amplitude of knowledgeablization smaller than that of industrialization.

Seventh, the changing distribution of population and economic activities can be divided into two stages: concentration and decentralization. During its regional modernization, the US spatial distribution of population and production factors experienced the stages of concentration and dispersion. During the industrialization, the regional population, production factors, and industrial and economic activity converged into cities, leading to the increase of economic efficiency. During the late industrialization, or from the 1940s onward, the suburbanization of US population was very obvious. By 1960, the percentages of population in central cities and suburbs had been basically in balance, the density of urban population had declined rapidly, and the spatial distribution of population has entered a stage of relative divergence. American scholars attribute the dispersion of urban population mainly to the income increase of urban residents and the development of vehicles. Undoubtedly, the process of informatization will drive the dispersion of urban population. In 2000, 50% of Americans lived in suburbs, 30% lived in central cities, and 20% lived in the countryside (Hobbs and Stoops 2002).

If we say that the concentration of US population and economic activity was basically in a step with each other, then the dispersion of its urban population and economic activity happened step by step. The first wave was the suburbanization of

urban population, and the second one was the suburbanization of urban economic activities (Glaeser and Kahn 2001). The US urban population began moving into suburbs at the end of the nineteenth century, and by 1960, 63% of jobs concentrated in central cities and 51% of urban residents lived in suburbs. People lived in suburbs, yet they worked in central cities. As urban population moved out of cities, jobs also flowed into suburbs. At the end of the twentieth century, for 150 cities in the USA, averagely 18% of population and 26% of jobs concentrated in central urban areas (three miles from city center) and 65% of population and 27% of jobs scattered in areas five miles farther from central business districts of cities (Glaeser and Kahn 2001). American scholars also found that in a relative sense, commercial services such as banking concentrated, manufacturing dispersed, and knowledge information-intensive industries concentrated (Glaeser and Kahn 2001).

Eighth, developed countries' regional modernization involves two stages and a variety of development models. As with national modernization, regional modernization is a long-term historical process, which is bound to have some development stages. The division of development stages is both artificial and objective because criteria for division are made by people based on objective facts. In different stages of regional modernization, a region is different from another in development concept and strategy as well as in model and path. For example, the US regional modernization can be divided into two development stages: first modernization and second modernization, which differ essentially in development model (RGCMS 2004).

Generally, modernization stages of countries and their province-level regions can be divided according to development levels of their industrial and employment structures, i.e., making reference to their levels of productivity. The division of modernization stages for county-level regions currently has no rational division methods available because of the decreased correlation between their industrial structures and modernization levels, and the method of reference is dividing according to employment structure and productivity level.

Ninth, the transfer probability of the relative position of regional development has some regularity. During regional modernization, regional gaps and phenomena of their widening and narrowing exist all the way. Among advanced regions, some maintained their leading positions, while some fell behind; among intermediate regions, some ascended to higher levels, while some not; among backward regions, some caught up with advanced regions, while some remained backward. So, is there some law about the transfer probability of the relative position of a region?

The answer is YES. Generally, the probability that a region remains its relative position is about 70%, while the probability that a region's relative position ascends or descends is some 30%. This can be demonstrated by research results by European scholars (Table 5.37). For 109 EU regions, among those whose GDP per capita was lowest in 1977, about 77% of them remained lowest in 1994 and about 30% ascended to a higher level; among those whose GDP per capita was highest in 1977, about 48% of them remained highest in 1994 and about 52% descended to a lower level. For 117 EU regions, about 94% of those whose per capita income was lowest in 1988 remained their lowest level in 1998, and about

Table 5.37 Transfer probability of national and regional levels in groups

Indicator	Sample	Period	Transfer probability of lowest level group (%)		Transfer probability of highest level group (%)	
			Unchanged	Upward	Downward	Unchanged
GDP per capita	107 EU regions	1977–1994	70	30	52	48
Per capita income	117 EU regions	1988–1998	94	6	32	68
Labor productivity	117 EU regions	1988–1998	93	7	24	76
Life expectancy	164 countries	1960–1999	78	22	30	71
Infant survival rate	161 countries	1960–1999	71	29	20	80
Composite enrollment rate	74 countries	1965–1999	74	26	28	72
Adult literacy	133 countries	1970–1999	88	12	3	97
Popularization rate of telephone	107 countries	1960–1999	82	18	19	81
Popularization rate of TV	109 countries	1965–1999	71	29	15	85

Source: Cuadrado-Roura (2001), Basile et al. (2001), and Neumayer (2003)

Table 5.38 Structure of regional modernization theory

Category	Theory	Main contents
General theory	Core theory	The definition, process, result, dynamics, and model of regional modernization
Branch theories	Stage theory	Regional first modernization, second modernization, or integrated modernization
	Field-related study	Regional modernization in the fields such as economy, society, politics, culture, natural environment, and humans
	Sector-related study	Regional modernization in the sectors such as agriculture, industry, education, science and technology, national defense, and transportation
	Subregion theory	Modernization in urban and rural areas, suburbs, mountainous areas, plains, hilly area, etc.
Relevant theories	Other modernization theories	Classical modernization theory, postmodernization theory, second modernization theory, etc.
	Other relevant theories	Economic geography, development theory, regional planning, space development theory, area study, etc.

Source: RGCMS (2004)

76% of those whose per capita income was highest in 1988 remained their highest level in 1998. The transfer probability of relative levels of countries is similar during national modernization.

An advanced region is likely to fall behind if it does not work hard, while a backward region is likely to go up if it works hard. Although it is possible for a backward region to catch up with those with higher levels of development, it is not an easy thing to do and requires much more endeavor.

5.4.2 Theories

The regional modernization theory is a theoretical explanation for phenomena of regional modernization; it is a level theory under the second modernization theory and modernization science. A region means one inside a country here. Regional modernization is modernization at regional level, which has not only generalities of modernization but also some particularities. The core theory (Table 2.1) on the general modernization basically applies to regional modernization. Regional modernization is an integral part of national modernization, it is not simply a mini version of national modernization, but also has greater diversity and structural flexibility.

According to Chinese scholar Chuanqi He, the regional modernization theory includes the general theory, branch theories, and relevant theories (Table 5.38), where the general theory includes five aspects of regional modernization: definition, process, result, dynamics, and model (Table 5.39).

5.4.2.1 Definition of Regional Modernization

Regional modernization is a manifestation of modernization at regional level and an integral part of national modernization here.

(1) The Connotation and Denotation of Regional Modernization

The Connotation. Regional modernization is a sort of change of regional civilization and regional competition; it is the frontier process of the formation, development, transformation, international, and interregional interaction of regional modern civilization, as well as a composite process of alternate innovation, selection, diffusion, and recession of the elements of regional modern civilization; it is also the change in regional competition, regional differentiation, and stratification, with aim of catching up with, reaching, and maintaining the world's advanced level of development.

The Denotation. Regional modernization includes modernization of a region as a whole, modernization in regional six fields, interaction of regional modernization, the modernization of regional behavior, structure, institution, and ideas, as well as regional sectoral modernization and the modernization in urban and rural areas, mountainous and plain areas, etc.

Generally, regional modernization refers to the world frontiers of regional civilization and the process and action to reach these frontiers. Regional

Table 5.39 General theory on regional modernization

Aspect	Main contents
Definition	Regional modernization, i.e., modernization at regional level, is a sort of frontier change and regional competition in regional civilization since the Industrial Revolution in the eighteenth century. It includes the formation, development, transformation, and interaction of regional modern civilization; the innovation, selection, exchange, and recession of the elements of regional modern civilization; and the regional competition, differentiation, and stratification for catching up with, reaching, and maintaining the world advanced level
Process	Regional modernization is a complex process, including regional civilization change, regional competition, regional polarization, and stratification, the changes of regional behavior, structure, institution, and ideas. The process of regional modernization between the eighteenth century and the twenty-first century may be divided into two stages: the first modernization, transition from agricultural to industrial civilization, and the second modernization, transition from industrial to knowledge civilization and from material to ecological civilization. The change of economic and social structures during regional modernization is flexible. It follows ten principles (Table 2.15)
Result	The formation of modernity, particularity, diversity, and side effects, including the improvement of labor productivity and quality of life, social progress, political democracy, cultural diversification, ecological change, and overall development of human, and the change of regional level, status, and civilization gap. Overall development of human is the essence of regional modernization. The main outcome of the first modernization includes the formation of first modernity, particularity, and diversity, with side effects including environmental pollution and periodic economic crises. The main outcome of the second modernization includes the formation of second modernity, particularity, and diversity, with side effects including information divide and cyber crime. The two types of regional modernity have great flexibility and regional diversity rather than being absolute; side effects differ from one region to another; and some traditional values continue to exist and function
Dynamics	Main driving forces of the regional first modernization are investment, technological progress, industrialization, and urbanization. Main driving forces of the regional second modernization are knowledge innovation, institutional innovation, and human capital. Main driving forces of regional integrated modernization are education and investment, industrialization and informatization, urbanization and suburbanization, technological and institutional innovation, and so on. Dynamic models include innovation drive, three-innovation drive, two-wheel drive, associative action, four-step super cycle, composite interaction of three types of civilization, innovation diffusion, innovation spillovers, competition drive, and productivity function (Table 2.20). Driving forces in different regions and stages are different, and different paths and models differ in their driving forces
Model	Regional modernization has a variety of paths and models and is influenced by regional geographic conditions, infrastructure, and external environment. Models of regional first modernization are diverse combinations of industrialization, urbanization, etc.; models of regional second modernization are diverse combinations of knowledgeablization, informatization, ecologicalization, suburbanization, etc.; models of regional integrated modernization are diverse combinations of industrialization, informatization, ecologicalization, urbanization, etc.

Note: regions can be divided into advanced regions and developing regions according to the classification of advanced and developing countries as well as the level of regional modernization. Advanced regions are those which have reached the world's advanced level of development, and the rest are developing ones. For the purpose of convenience, we see the words "region" and "area" as synonym and call "regional modernization" and "area modernization" regional modernization collectively

Source: RGCMS (2004)

modernization is a process that advanced regions reach and maintain the world advanced level, and developing regions catch up with the world advanced level.

Regional modernization is also an objective that advanced regions maintain the world advanced level—a level which is a function of continuously changing state, and developing regions catch up with and reach the world advanced level—a level which is a changing objective function.

(2) Relationship Between Regional and National Modernization

First of all, regional modernization is an organic part and the foundation of national modernization. National modernization is the objective environment and condition for regional modernization. Regional modernization must be subordinate to national modernization.

Second, regional modernization follows the general laws of modernization. Regional modernization is not simply a mini version of national modernization. For province-level regions, regional modernization is consistent with national modernization for the most part; for county-level regions, the relationship between regional modernization and national modernization is diverse.

Third, regional modernization is regional behavior and also needs to be subject to national regulation. Because competition and cooperation coexist between regions inside a country, regional modernization needs to be regulated by the country by giving consideration to the overall optimization of national modernization.

Fourth, regional modernization includes political modernization. Countries are basic units of political modernization. When we look at modernization from the political perspective, national modernization is a whole, and regional political modernization is subject to national politics. Generally, without national political modernization, regional political modernization is impossible, though a region may also introduce political innovation. Different regions differ in the level of political modernization. Without political modernization, there is no complete national modernization; without national political modernization, there is no complete regional modernization.

Fifth, regional modernization and national modernization interact with each other, and to what extent they interact is different in different fields. On the economic front, the economic restructuring of regional modernization is elastic, but that of national modernization is a must. On the social front, the urbanization and suburbanization during regional modernization is elastic, but to national modernization is a must.

(3) Relationship Between Regional Modernization and Regional Development

There is no uniform definition of development. French economist François Perroux raised in his book, *A New Concept of Development*, "the concept of global, integrated and endogenous development," exerting widespread social influence. According to him, development is different from both growth and progress. Growth is the expansion of scale, progress is the general expansion of income, and

development involves optimization of structure. Development, or economic development, needs to be understood on three levels: the connection between integral parts of the whole, the action of and interaction between various sectors, and opportunities for human resources in various forms to obtain efficiency and capability. The optimization at the three levels is the basic requirement of development (Perroux 1983).

In general, development is unequal to modernization; modernization is based on development and aims to reach and maintain the world's advanced level of development. The relationship between regional modernization and regional development is complex, and advanced regions differ from developing ones in this regard (Table 5.40).

Table 5.40 Relationship between regional modernization and regional development

Region	Development	Modernization	Type
Advanced regions	Development level rises, maintaining the world's advanced level	Both absolute and relative levels of modernization rise	Modernization
	Development level rises, not maintaining the world's advanced level	Absolute level of modernization rises, while relative level of it declines	Semimodernization[a]
	Development level remains unchanged, not maintaining the world's advanced level	Absolute level of modernization remains unchanged, while relative level of it declines	Stagnation
	Development level declines, with negative development (regression)	Both absolute and relative levels of modernization decline	Regression
Developing regions	Development level rises, with a narrowing gap to the world's advanced level	Both absolute and relative levels of modernization rise	Modernization
	Development level rises, with an unchanged gap to the world's advanced level	Absolute level of modernization rises, while relative level of it remains unchanged	Semimodernization[a]
	Development level rises, with a widening gap to the world's advanced level	Absolute level of modernization rises, while relative level of it declines	Semimodernization[a]
	Development level remains unchanged, with stagnant development	Absolute level of modernization remains unchanged, while relative level of it declines	Stagnation
	Development level declines, with negative development (regression)	Both absolute and relative levels of modernization decline	Regression

[a]"Semimodernization" means that the absolute levels of modernization rise while its relative levels remains unchanged or declines

5.4.2.2 Process of Regional Modernization

(1) Two Stages

The process of regional modernization between the eighteenth century and the twenty-first century is generally divided into two stages. The first stage, called the regional first modernization, refers to the transition from agricultural to industrial civilization, including the transformation from agricultural to industrial economy, from agricultural to industrial society and from agricultural to industrial culture. The second stage, called the regional second modernization, refers to the transition from industrial to knowledge civilization and from material to ecological civilization, including the transformation from industrial to knowledge economy, from industrial to knowledge society, from industrial to knowledge culture, and from material and ecological culture. The regional second modernization is not the end, and there will be new changes in the future.

During regional modernization, the change of economic structure, as well as urbanization and suburbanization, is not absolute but elastic. And the change of society and civilization is bound to happen.

(2) Main Features

First, general features. Regional modernization is nonlinear, accelerated, out-of-step, long-term, progressive, and global and has multiple paths as well as path dependence and involves risk and side effects.

Regional modernization is a process involving a chain of economic and social transitions. Social costs need to be paid for every economic and social transition, along with enormous risks. Failure of such transition will lead to the break of modernization and even regression.

Second, development models. During the regional first modernization, economic development is primary, with material production aimed to expand the space of material life necessary to satisfy the material pursuit and economic security of humankind. In the process of the regional second modernization, quality of life is primary, with knowledge and information production aimed to expand the space of spiritual life necessary to satisfy humankind's pursuit of happiness and self-expression; the quality of material life might converge, but the spiritual and cultural life will be highly diversified.

Third, change of income inequality. A relative common change model for income inequality is: during the first modernization of a region, the phenomenon described by Kuznets' "inverted U" model happens, with income inequality changing from widening to narrowing; when the region enters its second modernization, income inequality stops narrowing and is likely to widen and fluctuate.

Fourth, change of regional income gap. A relative common change model for regional gap is: during the first modernization of a region, the phenomenon described by Williamson's "inverted U" model happens, with the region's relative economic gap changing from widening to narrowing, but its absolute economic gap widens; when the region enters its second modernization, its relative economic gap is likely to widen and fluctuate, and its absolute economic gap will continue to widen and fluctuate.

Fifth, change of urban–rural income gap. A relative common change model for a region's urban–rural economic gap is: during its first modernization, the urban–rural economic gap changes from widening to narrowing; when it enters its second modernization, the urban–rural gap is likely to expand and fluctuate.

Sixth, concentration and dispersion of population and economic activities. A commonly seen change model for the distribution of a region's population and economic activities is: during its first modernization, the population and economic activities converge toward cities; when it enters its second modernization, the population and economic activities tend to disperse.

Seventh, industrialization and deindustrialization. If industrialization is seen as the transition from agricultural to industrial civilization, then regional industrialization is a must. If industrialization is defined as the change of industrial and employment structures from agriculture to industry, regional modernization is of great elasticity rather than being absolute. Deindustrialization is a new stage of economic and civilization development and is fairly elastic in county-level regions.

Eighth, urbanization and suburbanization. If urbanization is understood as a form of transition from agricultural to urban civilization, then regional urbanization is a must. If urbanization is defined as the increase in the percentage of urban population, regional urbanization is of great elasticity. People living in countryside can also have access to urban civilization. Suburbanization is not only the diffusion of urban civilization but also the new development of it, which is fairly elastic.

(3) Differences Between Advanced and Developing Regions

The process of modernization in advanced regions generally undergoes two stages in succession, first modernization and second modernization. Following completion of the first modernization, strategic transitions must be done, including from industrialization to deindustrialization, from urbanization to suburbanization and metropolitanization and from relative concentration to relative dispersion, while popularizing higher education and accelerating knowledgeablization and informatization.

The process of modernization in developing regions can be either catch-up modernization by following and learning the experience of developed regions and engaging in the first and second modernization, or integrated modernization by accelerating the coordinated development of the first and second modernization.

The basic characteristic of catch-up modernization is following and imitating the modernization paths and models of developed countries and regions, and engaging in industrialization and urbanization first and then deindustrialization, informatization, etc. The basic characteristic of integrated modernization is developing in a coordinated way the first and second modernization and continuing the transition to the second modernization, implementing the "canal strategy" for modernization; advancing the innovation of the path, model, and strategy; and walking a new path of modernization featuring the coordinated development of industrialization, shift of industries, and informatization as well as of urbanization, suburbanization, and urban expansion, thereby catching up with the advanced level of developed regions.

(4) Regional Modernization at Different Levels

The modernization of province-level region generally has the apparent features of the first and second modernization. The two stages of modernization occur in succession, particularly in developed regions. Developing regions' first and second modernization may occur in succession or develop in a coordinated way.

The modernization of county-level region has the feature of diversity. Some have the features of the two stages, while some have no obvious features of the two stages. They differ greatly in industrialization and urbanization, with "deagriculturalization" and "deindustrialization" having great elasticity. Nevertheless, knowledgeablization and informatization are inevitable.

(5) Nationwide Regional Modernization

Nationwide regional modernization can be included in or seen as part of national modernization. Involving the spatial distribution of national modernization, it includes the regional distribution of national modernization, as well as cross-regional exchange and cooperation.

First, balanced development of nationwide regional modernization. When a country is small and developed enough, nationwide regional modernization can choose the modernization process of balanced development among its regions. If regional modernization is already unbalanced, measures for balanced development can be adopted to promote the balanced development of regional modernization. If regional modernization is already balanced, the country can promote the modernization process of balanced development.

Second, unbalanced development of nationwide regional modernization. When a country is big and backward one, nationwide regional modernization is generally unbalanced among its regions. Such imbalance will expand given the free market economy. In the case of mixed economy subject to national intervention, there can be two possibilities: pushing the balanced development of regional modernization and pushing the unbalanced development of regional modernization. The latter is just the process of unbalanced development of regional modernization.

Third, the process of nationwide regional modernization is dynamic. When we look at regional modernization on a national layer, there will be leaders, pursuers, innovators, learners, etc., of regional modernization. If nationwide regional modernization is in a process of unbalanced development, a center–periphery structure of regional modernization will appear. In countries with higher levels of modernization, regional relative gaps are smaller, while in those with lower levels of modernization, regional gaps are bigger.

Ten Principles of Regional Modernization

Generally, regional modernization follows ten principles of modernization, and they are asynchronous process, uneven distribution, structural stability, status changeability, behavioral predictability, optional paths, incremental demand, diminishing utility, no repeated state, and axis transition (Table 2.15).

5.4.2.3 Result of Regional Modernization

Since the 1950s, the correlation between the outcome and objective of regional modernization has increased gradually.

(1) Outcome of Regional Modernization

The outcome of regional modernization includes, among others, the formation of modernity, particularity, diversity and side effects (Table 5.40). Overall development of human beings is the essence of regional modernization. The outcome of the first and second modernization is different, and some traditional values continue to exist and function.

Province-level and county-level regions differ in manifestation of the two types of modernity. On the economic and social fronts particularly, province-level regions differ from county-level ones in the two types of modernity, and county-level regions will have greater diversity.

(2) Objectives of Regional Modernization in the Twenty-First Century

Generally, regional modernization has three objectives in the Twenty-first century.

The first objective is to complete the first modernization. Apparently, it is a static objective, roughly reaching the average level of developed industrialized countries (they entered the period of deindustrialization in the 1970s) in the 1960s.

The second objective is to complete the second modernization. In the first 50 years of the twenty-first century or so, it is a dynamic objective, with few countries and regions able to complete the objective; in the second half of the century, some countries and regions will complete the second modernization in succession, entering a mature knowledge society. By then, completion of the second modernization will become a static objective too.

The third objective is to reach and maintain the world's advanced level of development. Apparently, the world's advanced level of development ever changes. Therefore, this objective is a dynamic one.

(3) Realization of Regional Modernization Objectives

The first objective is realizable, but the time for regions to complete it is different.

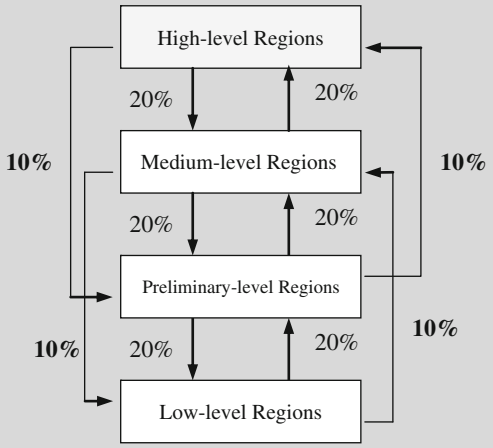
The second objective is realizable, but the time for regions to complete it is different.

As to the third objective, only a portion of regions can realize it (Example 5.2). Advanced regions aim to maintain the world's advanced level of development, while developing ones aim to catch up with the world's advanced level of development.

Example 5.2 Transfer Probability of Regional Modernization

According to the experience of 50 states of the USA in the past 20 years, there was approximately 20% probability that high-level regions descended to medium-level ones, a 20% probability that medium-level regions ascended to high-level ones, a 20% probability that preliminary-level regions ascended to medium-level ones, and a 20% probability that low-level regions ascended to preliminary-level ones.

(continued)



Reference transfer probabilities of tier one regions in 20 years

The third objective of regional modernization in the twenty-first century is to reach and maintain the world's advanced level of development, which generally has the following four features:

Feature 1. Only a portion of regions in the world can realize the third objective. Only a portion of regions in the world can reach the world's advanced level of development, and regions in developing countries cannot reach the world's advanced level at one time.

Feature 2. The third objective cannot be realized once and for all. A region which has already realized the third objective in a year is not necessarily able to realize this goal in the next year. That a region reached the world's advanced level of development in 2000 would not necessarily remain at the level in 2001.

Feature 3. Regions with different levels of development differ considerably in probability of realizing the third objective. For example, according to experience of the USA and EU, in a period of 20 years, the probability that province-level regions realized the third objective was about 70% for developed regions, about 20% for moderately developed regions, about 10% for minimally developed regions, and 0% for low-level regions.

Feature 4. Minimally developed and less-developed regions need to realize the third objective step by step. Generally, there is little probability that a minimally developed region will "skip" into the ranks of developed regions; it needs to go up to a moderately developed region first and then ascend to a developed one. It is generally impossible for a less-developed region to kip directly to a developed one; to change from a less-developed region to a developed one, it needs to go up to a minimally developed region first, then to a moderately developed region and finally to a developed one.

5.4.2.4 Dynamics of Regional Modernization

(1) Main Driving Forces of First Regional Modernization

The basic contents of the regional first modernization are industrialization, urbanization, democratization, etc. During this process, conditions differ considerably from one country to another. For example, during the regional first modernization in European countries, main driving forces were likely capital accumulation, technological progress, industrialization, urbanization, overseas immigration, etc. For the process of the regional first modernization in the USA, main driving forces were likely investment, land development, technological progress, industrialization, urbanization, receiving immigrants, etc. Main driving forces during the regional first modernization in developing countries were likely domestic and foreign investment, technology import and innovation, industrialization, urbanization, etc.

In general, the economic development during the regional first modernization can be explained by classical economic theory and neoclassical economic theory.

(2) Main Driving Forces of Second Regional Modernization

The basic contents of the regional second modernization are knowledgeablization, informatization, greening, globalization, etc. During this process, main driving forces are knowledge innovation, institutional innovation, human capital, and globalization. People's pursuit of the quality of life and sound environment becomes the driving force of regional development, and regional innovation system becomes the powerhouse of the regional second modernization.

A regional innovation system is an innovation cooperation network consisting of institutions and organizations relating to knowledge and technology innovation, including innovation-oriented enterprises, universities, and scientific research institutions, as well as policy makers and intermediary service agencies that promote innovation activities. The regional innovation policy is software of the innovation system, while the regional innovation culture is the soul of the innovation system.

The economic development during the regional second modernization is, for the most part, explained by using the new growth theory, regional new development theory, etc.

(3) Main Driving Forces of Regional Integrated Modernization

Main driving forces of regional comprehensive modernization are likely education and investment, urbanization and suburbanization, industrialization and informatization, technology import and innovation, knowledge innovation and institutional innovation, and so on. The regional innovation system and its innovation activity are the major powerhouse of regional comprehensive modernization of new type.

5.4.2.5 Models of Regional Modernization

There are three paths of regional modernization in the twenty-first century: second modernization, catch-up modernization, and integrated modernization. Regional

modernization has a number of path and model options. There is no best model but only rational choice.

(1) Models of Regional First Modernization

Development models for the regional first modernization are a variety of combinations of industrialization, urbanization, etc. Some regions give priority to industrialization, some give priority to urbanization, and others push industrialization and urbanization in a coordinated way.

For province-level regions, the improvement of productivity and living standard is essential, and things that must be done include deagriculturalization, industrialization, and urbanization; popularization of free compulsory primary education, telephone, and TV; and establishment of social security systems as well as public infrastructure necessary for industrialization. But it is not that every region must increase the percentage of industrial sector to over 40%; industrialization has great elasticity as well as multiple models. Urbanization can also be elastic to some degree.

For example, in some states of USA with higher levels of modernization, industrialization is not adequate, but deagriculturalization is quite adequate with high levels of productivity. Their percentage of industry is not over 30%; what is more is that it is on the decline. They are now in a stage of deindustrialization. In these states, tourism and service industries are generally quite developed; their development relies on their own endeavor, and depends more on the increase of nationwide productivity.

For county-level regions, the improvement of productivity and living standard is crucial, and things that must be done include urbanization; popularization of free compulsory primary education, telephone, and TV; establishment of social security systems; as well as public infrastructure necessary for industrialization. But industrialization and deagriculturalization are elastic, and the percentages of industrial and agricultural sectors—rather than being fixed—are more the result of market mechanism regulation and of national economic division of work and are subject to international economic division of work. Though the percentages of industrial and agricultural sectors fluctuate, the industrial and agricultural productivity should reach the average level of national labor productivity.

(2) Models of Regional Second Modernization

Development models of the regional second modernization are a variety of combinations of knowledgeablization, informatization, greening, globalization, suburbanization, innovation system, etc. Some regions give priority to informatization and globalization, and some give priority to knowledgeablization and suburbanization, and regional innovation system is a choice for many regions. Currently, there is little research into models of the regional second modernization.

For province-level regions, the improvement of productivity, quality of life, and production capacity for and popularization of knowledge and information is crucial; things that must be promoted include knowledgeablization, informatization, globalization, suburbanization, and innovation system; popularization of higher

education and lifelong learning, as well as computers and the Internet; establishment of knowledge and information infrastructure; and protection of ecological environment and cultural diversity. Deindustrialization and deurbanization are elastic, and ecological modernization is optional.

For county-level regions, the improvement of productivity, quality of life, and popularization of knowledge and information is crucial. Things that must be promoted are knowledgeablization, informatization, globalization, and suburbanization; popularization of higher education and lifelong learning, as well as computers and the Internet; establishment of knowledge and information infrastructure; and protection of ecological environment and cultural diversity. Deindustrialization and deurbanization are elastic, and innovation system is optional.

(3) Models of Regional Integrated Modernization

Models of regional comprehensive modernization are a variety of combinations of industrialization, informatization, greening, urbanization, suburbanization, etc. In his book, *Renaissance of the East: The Third Path of Modernization*, Chuanqi He (2003) raised the "canal strategy" for comprehensive modernization which requires path innovation, model innovation, and strategy innovation.

For province-level regions, the key to new comprehensive modernization is improving productivity, living standard, production capacity for and popularization of knowledge and information, and giving equal importance to industrialization and shift of industries, urbanization and urban expansion, informatization and knowledgeablization, material infrastructure and knowledge and information infrastructure, and popularization of free compulsory primary education and higher education. A regional innovation system and deagriculturalization must be promoted; ecological modernization is optional.

For county-level regions, the key to new comprehensive modernization is improving productivity, living standard, and popularization of knowledge and information; giving equal importance to informatization and knowledgeablization, material infrastructure, and knowledge and information infrastructure; popularizing free compulsory primary education; establishing a regional innovation system; boosting on a selective basis the industrialization and shift of industries, urbanization, and city modernization; and developing on a selective basis sci-tech industrial parks, eco-industry parks, and eco-agriculture parks.

5.5 Organizational Modernization

Generally, organizations include government agencies, nonprofit organizations, and profit organizations. Organizational modernization means modernization at organizational level, including modernization of global, national, regional, and sector's organizations as well as individual organizations. It is a manifestation and analysis level of modernization phenomena. Modernization of different types of organizations has different features, showing great diversity.

5.5.1 Studies

Organizational modernization study may be approached from three perspectives, i.e., its history, reality, and future, and research can be done about the organizational modernization of global, national, regional, and sector's organization as well as individual organizations.

5.5.1.1 Research Paradigm

Organizational modernization study is a part of modernization study at organization level.

Research Matrix

The research object of organizational modernization study includes modernization of government agencies, nonprofit organizations, and for-profit organizations, and interaction between organizations and environments. Research contents include modernization of organizational behavior, structures, institutions, and ideas, as well as the process, outcome, driving force, and models of organizational modernization, which make up a research matrix (Table 5.41).

Research Method

Organizational modernization study is a part of modernization study at organizational level and may use the methodology of modernization study. The scope of research can be global, national, regional, or sector's or individual organizations. This study may adopt case study, interdisciplinary research, comprehensive research, etc.

Table 5.41 Matrix of organizational modernization study

Content		Object		
		Organization	Government agencies, nonprofit organizations, and profit organizations	Interaction between organizations and environment
		Organizational modernization	Modernization of three types of organizations	Interaction between organizations and environment
Element	Behavior	Modernization of organizational behaviors, structures, systems, and ideas	Behavioral, structural, systematic, idea's modernization in the three types of organizations	–
	Structure			
	System			
	Idea			
Aspect	Process	Process, result, dynamics, model of the organizational modernization	Processes, result, dynamics, model of modernization in the three types of organizations	International and internal environment and interaction of the organizational modernization
	Result			
	Dynamics			
	Model			

Note: organizational modernization research also includes many other contents, for example, the frontier, frontier process, and catch-up process analysis on organizational modernization, international competition analysis, management modernization, and interaction between elements of organizational modernization

Research Purpose

Organizational modernization study is mainly for academic and policy purposes.

From the academic perspective, it is to discover the facts and principles of organizational modernization and enrich the modernization theory.

From the policy perspective, it is to provide the theoretical basis and policy options for the practice of organizational modernization.

5.5.1.2 Facts About Organizational Modernization

Currently, organizational modernization study is a bottleneck of modernization study here. For example, below is a brief discussion about management modernization of the organizations.

Management modernization is an important part of organizational modernization. Management in government agencies generally belongs to public management, and that in profit organizations generally belongs to business management. Public management modernization has different features from business management modernization, which requires separate research.

In the twentieth century, enormous changes happened to business management, with surging management thoughts. Chinese scholar Chuanqi He has concluded nine grades and nine models about the development of business management (Table 5.42), which can be used as a simplified model of business management (He 2000a). According to him, the development of business management is a process of change from elementary to intermediate and then to senior management; management in different grades has different features, which when put together are the basic track and nine models of management modernization, called nine-grades management for short. Generally, empirical management is a business' start of management; the efficiency, cost, and quality management is basic management. The flexible, knowledge, and innovation management is intermediate management (modern management), and the cultural and strategic management is senior management. Business management modernization may progress step by step or with several steps going hand in hand.

Grade 1: *Empirical Management*. A newly founded business generally starts from empirical management. Management of a business depends largely on the owner's personal interest and experience, and it can be random. As the business grows, it will gradually establish simple rules, regulations, and organizational structure, and finally set objectives to direct its development.

Grade 2: EfficiencyManagement. Efficiency is the foundation for the success of a business. After entering the stage of development, it generally pays attention to the improvement of management, with a view of increasing its business efficiency. Efficiency management aims to increase business efficiency. Management methods include scientific management, administrative management, management by objectives, operations, etc.

Grade 3: Cost Management. Cost is the competitive advantage of a business. A business which has entered the stage of development needs not only to increase efficiency but also to endeavor to lower cost while guaranteeing quality, so as to improve competitiveness of its products. Cost management is management

Table 5.42 Nine grades of business management

Grades	Name	Feature	Basic contents			
Grade 1	Empirical management	Experience is start	Random management	Disciplinary management	Management organization	Management objective
Grade 2	Efficiency management	Efficiency is foundation	Planned management	Standardized management	Time control	Customer satisfaction
Grade 3	Cost management	Cost is advantage	Cost planning	Cost center	Profit center	Benefit first
Grade 4	Quality management	Quality is essence	Quality standard	Quality certification	Quality culture	Prestige uppermost
Grade 5	Flexible management	Flexibility is magic weapon	Featured products	Flexible production	Flexible organization	Humanity foremost
Grade 6	Knowledge management	Knowledge is wealth	Knowledge sharing	Organizational learning	Knowledge capital	Knowledge distribution
Grade 7	Innovation management	Innovation is soul	Technology innovation	Knowledge innovation	Innovation culture	Strategy innovation
Grade 8	Cultural management	Culture is value	Culture fostering	Culture shaping	Cultural products	Cultural strategy
Grade 9	Strategic management	Strategy is commander	Business strategy	Featured strategy	Development strategy	Art of strategy

Source: He (2000a)

whereby business cost is controlled. Management methods include cost accounting, value engineering, cost planning, cost effectiveness analysis, environment cost control, etc.

Grade 4: Quality Management. Quality is the essence of a business. Quality management of a business includes officially announcing the general quality principle and direction of the business; defining the quality management objective and responsibility; and fulfilling the quality principle, direction, objective, and responsibility prescribed by the business through systematic activities regarding quality planning, quality control, quality assurance, and quality improvement. Management methods include total quality management, quality control group, lean production, quality certification, etc.

Grade 5: Flexible Management. Flexibility is a magic weapon for a business to gain the upper hand. Flexible management is a humane, soft, and flexible management mode for modern businesses. It requires that the organizational structure of a business is flat and flexible; the business' product development, production, marketing, and services are market-oriented and responsive; information communication is smooth and fast; people's initiative is maximally aroused; and the business is able to react and adjust to market changes. Management methods include agile and smart manufacturing, flexible and intelligent manufacturing, flexible work, contingency management, etc.

Grade 6: Knowledge Management. Knowledge is the fundamental resource and biggest wealth of a business. Knowledge management is maximally satisfying—by means of knowledge creation, identification, sharing, and use—customer needs, thereby improving competitiveness and increasing market value. Management methods include knowledge agenda, knowledge bank, knowledge alliance, knowledge capital evaluation, etc.

Grade 7: Innovation Management. Innovation is the soul of progress for a business. There is innovation in different development stages of a business, but in different stages, the emphasis of innovation is different and the business gives importance to innovation to a different degree. Innovation management, a process of managing a business' innovation activities and capabilities, involves innovation resources, mechanisms and benefits and sees innovation capabilities as the core competitiveness of the business. Management methods include R&D management, innovation network, innovation timing, innovation group, etc.

Grade 8: Cultural Management. Culture means values. Corporate culture, a concentrated manifestation of corporate values, has such carriers as management philosophy, business philosophy, behavior norm, paragon, team spirit, and social image. Managing corporate culture is part, but not all, of what cultural management is about. Cultural management includes culture fostering, culture shaping, and cultural strategy. Management methods include corporate identity, corporate etiquette, cultural product development, cultural diagnosis, etc.

Grade 9: Strategic Management. Strategy is the commander in chief. The corporate strategy of a business represents its direction of development. Strategic management aims to realize the strategic objectives of a business through strategy making, implementation, and routine management. Management methods include

strategic analysis, competitiveness analysis, strategic positioning, corporate reengineering, strategic reorganization, etc.

5.5.2 Theories

The organizational modernization theory is a theoretical explanation for the phenomena of organizational modernization; it is a level theory under the second modernization theory and modernization science. Organizational modernization is modernization at organizational level, which has not only generalities of modernization but also some particularities. The core theory (Table 2.1) on the general modernization basically applies to organizational modernization.

The organizational modernization theory includes the general theory, branch theories, and relevant theories (Table 5.43), where the general theory includes five aspects of organizational modernization: definition, process, result, dynamics, and model (Table 5.44). Government agencies, nonprofit organizations, and profit organizations differ in features of modernization, which should be explained by different theories. The organizational modernization theory is yet to be fully developed.

Table 5.43 Structure of organizational modernization theory

Category	Theory	Main contents
General theory	Core theory	The definition, process, result, dynamics, and model of organizational modernization
Branch theories	Stage theory	First organizational modernization, second organizational modernization
	Field-related study	Organizational modernization in the field such as economy, society, politics, culture, and natural environment
	Type-related study	Modernization of government agencies, nonprofit organizations, and profit organizations
	Crossover study	Organizational management modernization, etc.
Relevant theories	Other modernization theories	Classical modernization theory, postmodernization theory, second modernization theory, etc.
	Other relevant theories	Science of organizational behavior, management science, system theory, control theory, informatization, etc.

Table 5.44 General theory on organizational modernization

Aspect	Main contents
Definition	Organizational modernization is modernization at organizational level; it is the frontier change of organizations in the process of modernization, and a process of the formation, development, reorganization, and interaction of modern organizations; the innovation, selection, diffusion, and regression of the elements of modern organizations; and the organizational competition for catching up with, reaching, and maintaining the world advanced level
Process	Organizational modernization includes the change of organizational behavior, structure, system, and ideas, as well as modernization of organizational management, the world frontiers of organization change, and the process to reach these frontiers. The organizational modernization during the first modernization, called the first

(continued)

Table 5.44 (continued)

Aspect	Main contents
	organizational modernization for short, mainly includes rule by law, bureaucratization, large-scale operation, standardization, systematization, efficiency orientation, and management modernization (the first modernization of organizational management). The organizational modernization during the second modernization, called the second organizational modernization for short, mainly includes knowledgeablization, informatization, networking, flattening, flexibility orientation, learning, humanization, diversification, greening, internationalization, and management modernization (the second modernization of organizational management)
Result	The main outcome of the first organizational modernization is the formation of modern organizations fit for industrial civilization, with features including rule by law, stratification, standardization, mechanization, rigidity, and high efficiency. The main outcome of the second organizational modernization is the formation of organizations fit for knowledge and ecological civilization, with features including agility, smart, flexibility, flatness, organification, humanization, informatization, greening, learning, and innovation at present
Dynamics	Driving forces at microlevel includes innovation, competition, adaptation, exchange, organizational interest, and professionalism; driving forces at macrolevel includes national modernization, world modernization, informatization, and globalization. Driving forces differ in different types of institutions in different periods
Model	Organizational modernization has no standard path and model; it has starting-point dependence and path dependence and is influenced by personal qualities, historical traditions, cultural notions, national level, and international environment

Source: RGCMS (2010)

5.6 Individual Modernization

Generally, individuals are the smallest structural units of modernization which are different in different fields. For example, the smallest structural units are the enterprises and individuals in the economic field, the families and individuals in the social domain, the party and individuals in the political realm, and the groups of people in the cultural sphere.

Individual modernization means modernization at individual level, including modernization of global, national, and regional individuals as well as of single individuals. It is a manifestation and analysis level of modernization phenomena. Individual modernization in different fields has different features, showing great diversity. Individual modernization overlaps with human modernization, organizational modernization, cultural modernization, etc.

5.6.1 Studies

Individual modernization study is an integral part of modernization study. It can be approached from three perspectives, i.e., its history, reality, and future, and research

can be done about the modernization of global, national, or regional individuals or single individuals. Currently, individual modernization study is a bottleneck in modernization research.

5.6.1.1 Research Matrix

The research object of individual modernization study includes modernization of individuals, families, groups of people, and enterprises, as well as interaction between individuals and environments. Research contents include modernization of individual behaviors, structures, institutions, and ideas, as well as the process, result, dynamics, and model of individual modernization, which make up a research matrix (Table 5.45).

5.6.1.2 Research Method

Individual modernization is a level-relative modernization study and may use the methodology of modernization study. The scope of research can be global, national, regional or industrial individual, or single individuals. It may adopt case study, interdisciplinary study, comprehensive research, etc.

5.6.1.3 Research Purpose

Individual modernization study is mainly for academic and policy purposes.

From the academic perspective, it is to discover the facts and principles of individual modernization and enrich the modernization theory.

From the policy perspective, it is to provide the theoretical basis and policy options for the practice of individual modernization.

Table 5.45 Matrix of individual modernization study

Content		Object		
		Individuals	Individuals, families, groups of people, enterprises, etc.	Interaction between individual and environment
		Individual modernization	Modernization of four types of individuals	Interaction between individual and environment
Element	Behavior	Modernization of individual behaviors, structures, systems, and ideas	Behavioral, structural, systematic, idea's modernization in the four types of individuals	–
	Structure			
	System			
	Idea			
Aspect	Process	Process, result, dynamics, model of the individual modernization	Processes, result, dynamics, model of modernization in the four types of individuals	International and internal environment and interaction of the individual modernization
	Result			
	Dynamics			
	Model			

Note: institutional modernization study also includes many other contents, for example, the frontier, frontier process, and catch-up process analysis on individual modernization, international competition analysis, and interaction between elements of individual modernization

5.6.2 Theories

The individual modernization theory is a theoretical explanation for the phenomena of individual modernization; it is a level theory under the second modernization theory and modernization science. Individual modernization is modernization at individual level, which has not only generalities of modernization but also some particularities. The core theory (Table 2.1) on the general modernization basically applies to individual modernization.

The individual modernization theory includes the general theory, branch theories, and relevant theories (Table 5.46), where the general theory includes five aspects of individual modernization: definition, process, result, dynamics, and model (Table 5.47). Individual modernization overlaps much with human modernization discussed in Chap. 6. The individual modernization theory is yet to be developed.

Table 5.46 Structure of individual modernization theory

Category	Theory	Main contents
General theory	Core theory	The definition, process, outcome, driving force, and models of individual modernization
Branch theories	Stage theory	First individual modernization, second individual modernization
	Field-related study	Individual modernization in the fields such as economy, society, politics, culture, and natural environment
	Type-related study	Modernization of individuals, families, groups of people, enterprises, etc.
Relevant theories	Other modernization theories	Classical modernization theory, postmodernization theory, multiple modernity theory, second modernization theory, etc.
	Other relevant theories	Ethology, behavioral psychology, social psychology, developmental psychology, etc.

Table 5.47 General theory on individual modernization

Aspect	Main contents
Definition	Individual modernization is modernization at individual level; it is the frontier change of individuals in behavior, qualities, ability, and ideas in the process of modernization; a composite process of innovation, selection, diffusion, and regression of individual elements; and the individual competition for catching up with, reaching, and maintaining the world advanced level
Process	Individual modernization is modernization of individual behavior, literacy, ability, and ideas, as well as the world frontiers of individual change and the process and action to reach these frontiers. The individual modernization during the first modernization, called the first individual modernization for short, mainly includes rule by law, efficiency orientation, equalization, rationalization, independence, initiative, and mobility. The individual modernization during the second modernization, called the second individual modernization for short, mainly includes knowledgeablization, informatization, greening, individuation, autonomy, learning, and internationalism at present

(continued)

Table 5.47 (continued)

Aspect	Main contents
Result	The main outcome of the first individual modernization is the formation of individual behavior, qualities, ability, and ideas fit for industrial civilization, with features including incorporation, high efficiency, equality, independence, initiative, and mobility. The main outcome of the second individual modernization is the formation of individual behavior, qualities, ability, and ideas fit for knowledge and ecological civilization, with features currently including knowledgeablization, informatization, environmental-friendliness, individuation, lifelong learning, and internationalization
Dynamics	Driving forces at microlevel include innovation, competition, adaptation, exchange, personal interest, and hobbies; driving forces at macrolevel include national modernization, world modernization, and globalization. Driving forces differ in different types of individuals and in individuals in different periods
Model	Individual modernization has no standard path and model; it has starting-point dependence and path dependence and is influenced by historical traditions, cultural notions, social opinion, educational level, national level, and international environment. Individual modernization in different fields has different models

Source: RGCMS (2010)

Summary

Modernization takes place at different levels such as world, international, national, regional, organizational, and individual level. Different levels of modernization have both similarities and differences. Country is the basic unit of modernization, and each level of modernization is closely related to national modernization.

World Modernization

World modernization is a form of manifestation of modernization at world level.

Generally, world modernization is the change of human civilization and international differentiation; the frontier process of the formation, development, transformation, and international interaction of human modern civilization; the composite process of alternate innovation, selection, diffusion, and regression of the elements of human modern civilization; and the change of international system, international differentiation, and international competition for catching up with, reaching, and maintaining the world's advanced level of development. It includes modernization of the world as a whole, world modernization in six fields, and the spatial and temporal distribution of world modernization, as well as the modernization of world behavior, structure, institution, and ideas.

Modern civilization can be divided into two stages, namely, preliminary modern civilization and advanced modern civilization. Preliminary modern civilization means industrial civilization, and advanced modern civilization means knowledge, while ecological civilization is a manifestation or an aspect of knowledge civilization.

Modernization at world level is not an "independent unit" of modernization, but an analysis level. World modernization is connected with national and international modernization. Generally, world modernization is the international environment of national modernization, national modernization is the important foundation for world modernization, and the interaction between national modernization and international environment is international modernization.

World modernization follows ten basic principles. They are asynchronous process, uneven distribution, structural stability, early bird effect, fast–fast effect, power effect, adaptation effect, latecomer effect, creator effect, and Matthew effect.

International Modernization

International modernization is a manifestation of modernization at transnational level.

Generally, international modernization is an interaction between national modernization and international environment. It is international interaction in the process of modernization, including international interactions at different levels and in different fields during modernization, as well as the modernization of international behavior, structure, institution, and ideas. It involves three aspects: national modernization, international environment, and international interaction.

The process of international modernization roughly has 12 features: universality, diversity, stage-relative, complexity, evolution, nondetermination, differentiation between countries, effect of national level, effect of national strength, continual existence of international war, gradually enhanced international cooperation, and effect of industrial civilization. The age of industry is different from the age of knowledge in features of international modernization.

The process of international modernization follows four principles, namely, synergy, interest-driven interaction, path selection, and quadrant interaction, as well as eight rules: acting and reacting force, different action effects, like attracts like, good spreading, goal orientation, national interests, maxmini, and bounded rationality. These rules are relative, and there are many exceptions such as activities by international humanitarian organizations.

National Modernization

National modernization is a form of manifestation of modernization at national layer.

Generally, national modernization is a sort of national civilization change and international competition; it is the frontier process of the formation, development, transformation, and international interaction of national modern civilization, as well as a composite process of alternate innovation, selection, diffusion, and recession of the elements of national modern civilization. It is also the change in international competition, national stratification, and civilization distribution with

the aim of catching up with, reaching, and maintaining the world's advanced level of development. It includes modernization of a country as a whole, modernization in six fields, and the spatial and temporal distribution of national modernization, as well as the modernization of national behavior, structure, institution, and ideas.

National modernization is the basic unit of modernization study and practice. In the process of modernization study and practice, national modernization is at the core. In the system of modernization theories, the national modernization theory and the general theory on modernization have the highest degree of consistency with each other.

National modernization follows ten principles: asynchronous process, uneven distribution, structural stability, status changeability, behavioral predictability, incremental demand, diminishing utility, optional paths, no repeated state, and axis transition.

Dynamic models include innovation drive, three-innovation drive, two-wheel drive, associative action, four-step super cycle, composite interaction of three types of civilization, innovation diffusion, innovation spillovers, and competition drive.

National modernization has three basic paths in the twenty-first century: second modernization, catch-up modernization, and integrated modernization in the term of policy, and first modernization, second modernization, and integrated modernization in the term of theory.

Regional Modernization

If we define regions as domestic regions, then regional modernization is the important foundation and organic part of national modernization. National modernization is the objective environment and condition for regional modernization. Regional modernization interaction is generally subordinate to national modernization. Regional modernization is a manifestation of modernization at regional level.

Generally, regional modernization is a sort of regional civilization change and regional competition; it is the frontier process of the formation, development, transformation, international, and interregional interaction of regional modern civilization, as well as a composite process of alternate innovation, selection, diffusion, and recession of the elements of regional modern civilization. It is also the change in regional competition, regional differentiation, and stratification, with the aim of catching up with, reaching, and maintaining the world's advanced level of development. It includes modernization of a region as a whole, modernization in six fields, interaction of regional modernization, the modernization of subregions such as urban and rural areas, mountainous and plain areas, as well as the modernization of regional behavior, structure, institution, and ideas.

During regional modernization, the change of economic structure (industrialization and deindustrialization), as well as urbanization and suburbanization, is not absolute but elastic, and the change of society and civilization is bound to happen.

Regional modernization is not simply a mini version of national modernization. For province-level regions (at provincial level), regional modernization is highly

consistent with national modernization; for county-level regions (at county level), the relationship between regional modernization and national modernization is diverse.

Organizational Modernization

Organizational modernization, namely, modernization at organizational level, is a manifestation and analysis level of modernization phenomena.

Generally, organizational modernization is a process of the formation, development, reorganization, and interaction of modern organization; the innovation, choice, diffusion, and exit of the elements of modern organizations; and the organizational competition for catching up with, reaching, and maintaining the world's advanced level of development. It includes the modernization of global, national, regional, and sector's organizations as well as individual institutions and that of government agencies, nonprofit organizations, and profit organizations, as well as the modernization of organizational behavior, structure, institution, and ideas.

Modernization of different types of organizations has different features, showing great diversity.

Management modernization is an important part of organizational modernization. Business management is a process of evolution from elementary to intermediate and then to senior management; management in different stages has different features, which when put together are the basic track and nine models of management modernization, called nine-grade management for short. They are empirical management, efficiency management, cost management, quality management, flexible management, knowledge management, innovation management, cultural management, and strategic management.

Individual Modernization

Individuals are the smallest structural units which are different in different fields.

Individual modernization is modernization at individual level; it is the change of individuals in behavior, qualities, ability, and ideas, as well as a composite process of alternate innovation, choice, diffusion, and recession of individual modern elements. It includes the modernization of global, national, and regional individuals as well as of single individuals, as well as the modernization of individual behavior, structure, system, and ideas. It is a manifestation and analysis level of modernization phenomena. Individual modernization in different fields has different features, showing great diversity. Individual modernization overlaps with human modernization, institutional modernization, cultural modernization, etc.

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