

Strategic Environment in 2040 surrounding Japan

Research Division/TERCOM

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The opinions expressed in this research are the researchers own and don't reflect the view of JGSDf.

Introduction

Purpose

Purpose : To think about Japan Ground Self Defense Force Future Concept.
Scope : Around 2030s–2040s

Materials and Methods

We assessed future strategic environment around Japan based on some various open source static data to develop the theme for Japan's strategic environment in 2040.

Data sheets of the future estimation

1 The world situation

- World Population Prospects (WHO)
- Long term GDP forecasts(OECD)
- World trade (Chatham house)
- Energy Outlook (BP)
- Climate change (IPCC)

2 The domestic situation

- Estimation of population in the future (Institute of the population)
- Estimation regarding finance and economy in medium and long term
- Future image of the population, society, local community (Cabinet Office)
- White paper on science and technology (Ministry of Education, Culture, Sports, Science and Technology)
- Trade white paper (Ministry of Economy, Trade and Industry)

Publication of future prediction

1 The world situation

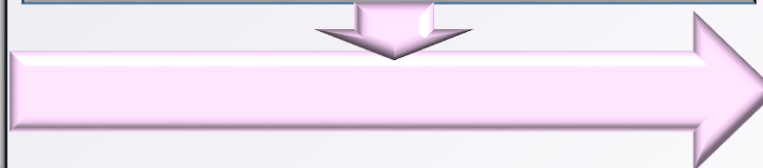
- Global Trends2040(US Intel Council)
- Global Strategic trends(UK MOD)
- Future Operational environment (US Army Future command)
- 党的二十大精神指引国家安全新征程 (总体国家安全观研究中心课题组)

2 The domestic situation

- Change and problem which apparent in 2040
- Prospective study of science and technology (Consideration of aiming society in 2040 (Ministry of Education, Culture, Sports, Science and Technology))
- Local government strategy 2040 (Workshop of conception)

Strategic environment in 2040 around Japan

- Global strategic environment
- Indo-Pacific strategic environment
- Japanese domestic situation

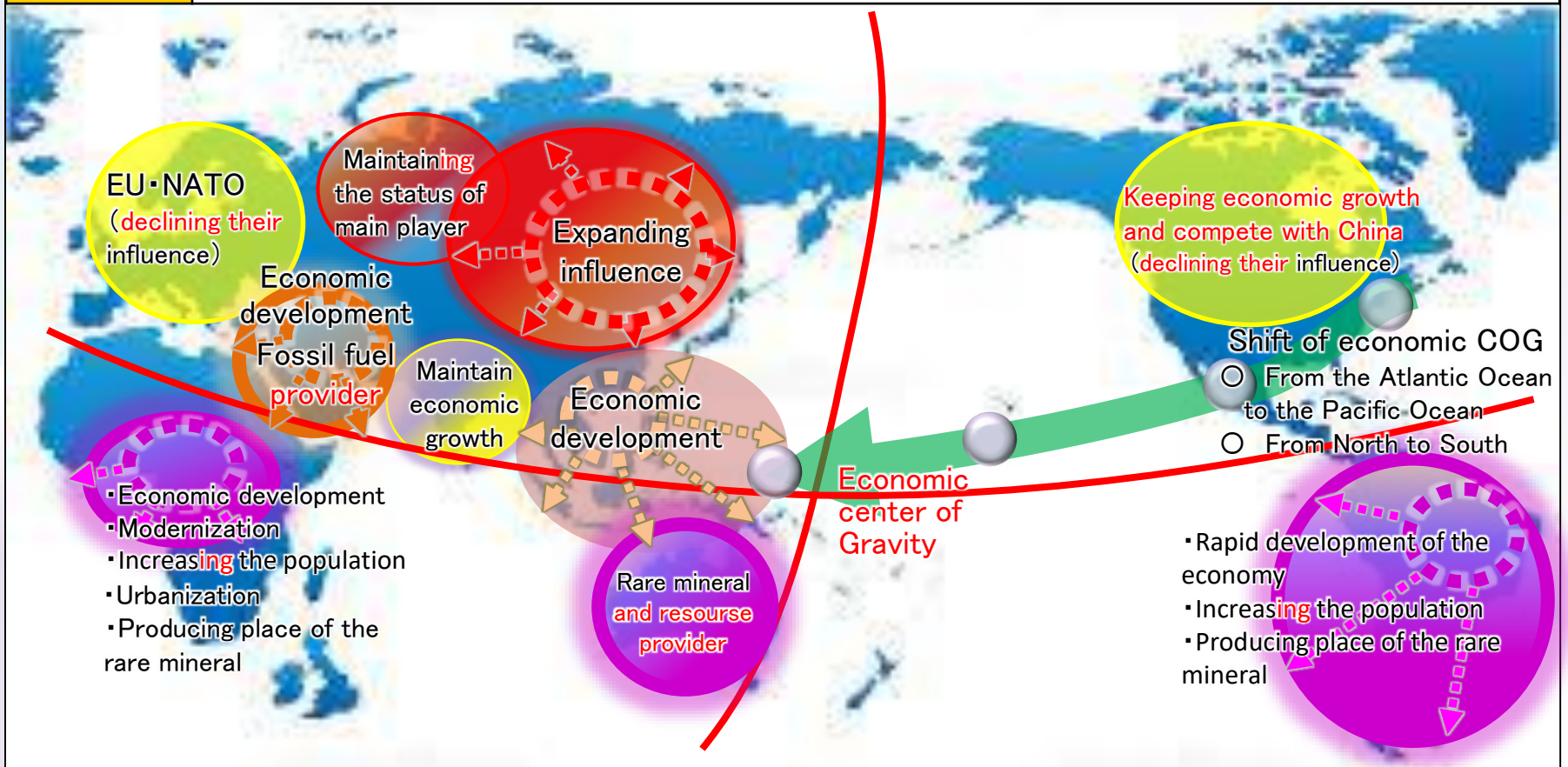


General Remarks

The global order is changing from Global West centric to multiple and complex relations. Each different political systems, social, and cultural actors will be cooperating, competing and conflicting at various issues. Their group members will be different at each issues. Emergence of developing countries promote this change.

In the future, there will be no global power. Many issues will be hard to manage because of increasing interdependence and continuing globalization.

The tendency of globalization will be remaining, especially information, data, communication field because of high tech society. On the other hand, political and important supply chain field will be direction to de-globalization and shaping some blocks for keeping state's autonomy and legitimacy.



Global strategic environment in 2040 (2/2)

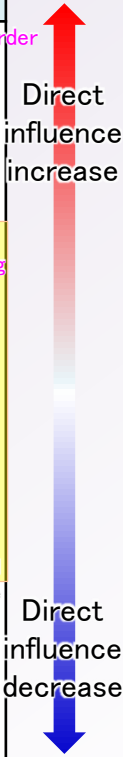
<p>Society</p>	<ul style="list-style-type: none"> ○ Polarization into two groups: nations with continuing population growth and those with declining birthrates and aging populations that make it difficult to maintain economic and social structures. ○ Social transformation due to immigration, conflict between the rich and the poor, and inadequate government resolution of disparities and conflicts, resulting in poor state governance. ○ The probability of pandemic outbreaks and the speed of spread increase as urbanization progresses and mega-cities become larger and larger.
<p>Economy</p>	<ul style="list-style-type: none"> ○ The economic scale of developing countries has surpassed developed countries, and the influence of developed countries in the global economy has declined. On the other hand, some of the developing countries will be left behind the economic growth, and the North-South gap is growing between some countries. ○ Economic growth in China, India, and other Asian and African countries and the development of emerging cities in Asia, Africa, and South America will gradually shift the center of the economy from west to east and from north to south. ○ Individual or group will become main actor of the global economy, because government's influence will decrease.
<p>Technology</p>	<ul style="list-style-type: none"> ○ The society, culture, and sense of values will change in the short term because of technological development such as information and communication, computing, nanotechnology, quantum technology, energy technology, biotechnology, neuro technology, space technology, etc. ○ Advances in weapons systems and dispersal to the private sector have changed the form of conflict and the concept of security.
<p>Energy and Resource</p>	<ul style="list-style-type: none"> ○ Demand from developed countries for fossil fuel will decrease because of increasing in rate of renewable energy. The importance of fossil fuel for developing countries will continue, because the demand for fossil fuel will increase as the population, industrialization, urbanization increases. On the other hand, competition for getting resources will intensify with global demand for resources. ○ Competition for getting resources will intensify with continued demand for energy and minerals, but for the time being, resources from the earth will meet the need.
<p>Natural environment</p>	<ul style="list-style-type: none"> ○ The requirement of disaster relief will increase, because natural disaster will be frequent and devastating, such as sea level rise, flood, drought, typhoon, and so on, by climate change and global warming. ○ Regulations to curb global warming have become a political issue as they affect the growth of emerging countries. In addition, there is a growing tendency to avoid or condemn the generation of large amounts of CO₂ for the sake of environmental protection. ○ If Earth becomes hard to live due to lack of safety or resource, people will look to other planets or want to explore space.
<p>International relations</p>	<ul style="list-style-type: none"> ○ The situation will continue in cooperation with each country regarding global issues. World order will change to the multi-polarization, because influence of the developed countries will relatively decrease. Consensus building based on the norm or common sense will become difficult because of different values, compromise between each country, by absence of the crucial influential country. ○ The vulnerability of each country will increase because their mutual influence and globalization will continue. ○ The system of Nuclear deterrence regime will shift from a bilateral US-Russia nuclear balance to a trilateral - USA, China, Russia - balance with the risk of strategic nuclear use increasing while the threshold for tactical nuclear use decreases. ○ If China continues the economic growth and increase global influence, the competition between USA and China will increase.

Expected breadth and focus on foreign affairs

Methods The future trends of major actors influencing the global and Indo-Pacific strategic environment around 2040 are proposed, focusing on the increase or decrease of direct threats to Japan and the possible scope of internal and external developments. Next, we set the focus of our discussion based on the direction of long term estimation for JGSDF.

Main actors Selecting the state using influence with field of the economy, military, diplomacy, and so on in global or Indo-Pacific. On this occasion, Choosing US and China as driving force.

USA ★	China★	Russia	North Korea	India ★	Europe	Japan	International organization
<ul style="list-style-type: none"> ◆ Isolationism, internal disunity ◆ review the alliance ◇ Change important area (Atlantic Ocean, Arctic Ocean) ◇ Europe's participation increase ◆ US-China War ◆ Diplomacy (US-China) ◆ China-Republic of China conflict ◆ China-Republic of China conflict ◆ Sea of Okhotsk become sanctuary ◆ confrontation between China and Russia ◆ Japan-China alliance 	<ul style="list-style-type: none"> ◆ Super power, New system ◆ democratization ◆ expanding dominated area ◆ China-Republic of China Unity ◆ China-Republic of China conflict ◆ confrontation between China and Russia ◆ Japan-China alliance 	<ul style="list-style-type: none"> ◇ Return large country ◇ Normalization of relation between Europe and Russia ◇ Far East expansion ◇ Expanding influence with former Soviet ◆ under the protection of China ◆ Sea of Okhotsk become sanctuary ◆ confrontation between Europe and Russia ◆ Absorb neighboring countries ◆ Japan-Russia alliance 	<ul style="list-style-type: none"> ◇ Unity of Korea foreign expansion ● System breaking (Outflow of refugee) ◇ united north-south ◆ under the protection of China ◇ Cyber become invincibly ◆ Cooperation north-south ◆ Secure nuclear deterrent ○ Normalization of the diplomatic relations between JPN and NK ● System breaking (Non-unity) 	<ul style="list-style-type: none"> ◆ internal disunity ◇ Normalization of relation between China and India ◆ India-Pakistan conflict ◆ religious opposition ◇ strengthening of relations between India-Russia ◆ Democratic large country ○ Joining alliance democratic large country ○ Super power 	<ul style="list-style-type: none"> ● Europe-Russia war ● Dividing in Europe ○ Sharpening confrontation between Europe and Russia ○ Normalization of relation between Europe and Russia (Shift Pacific Ocean) 	<ul style="list-style-type: none"> ● Economic stagnation ◆ internal disunity ◆ serious consideration of national interest ◆ Foreign compromise ○ Economic recovery ● review the alliance 	<ul style="list-style-type: none"> ◆ Multi-agency disorder ◆ Member state sharp decrease ● review the permanent member ◆ Appropriation of specific countries ◆ Insufficiency ◆ Consensus building become difficult ◆ Buildup obligation and restraining force of the member countries ◆ Making the law for infraction
<p>Continue to use global influence</p> <p>(confrontation between US and China)</p> <p>◆ Expanding allied country</p> <p>◎ Spread of the democracy model</p> <p>○ Become super power</p>	<p>Get interests and position as large country</p> <p>◆ domestic problem become serious (Foreign enforcement)</p> <p>◆ confrontation between China and Russia</p> <p>● Internal disunity</p> <p>○ Japan-China alliance</p>	<p>Keeping position of principal nation</p> <p>Decreasing national strength (Punishment, war exhaustion)</p> <p>◆ Decreasing influence</p> <p>● Sharpening confrontation between Europe and Russia</p> <p>● Absorb neighboring countries</p> <p>● disruption of the national system</p> <p>◆ Japan-Russia alliance</p>	<p>Maintaining the status quo (Confrontation between US and China)</p> <p>○ Normalization of the diplomatic relations between JPN and NK</p> <p>● System breaking (Non-unity)</p>	<p>Interests as large country, obtaining position (Strategic autonomy)</p> <p>◆ Democratic large country</p> <p>○ Joining alliance democratic large country</p> <p>○ Super power</p>	<p>Stabilization (Confrontation between Europe and Russia)</p> <p>◆ Military buildup</p> <p>○ Normalization of relation between Europe and Russia (Shift Pacific Ocean)</p>	<p>Keeping position of principal nation</p> <p>Protection of universally value (Japan-US Alliance)</p> <p>◆ Foreign compromise</p> <p>○ Economic recovery</p> <p>● review the alliance</p>	<p>Raising global problem, framework of solution</p> <p>◆ Buildup obligation and restraining force of the member countries</p> <p>◆ Making the law for infraction</p>



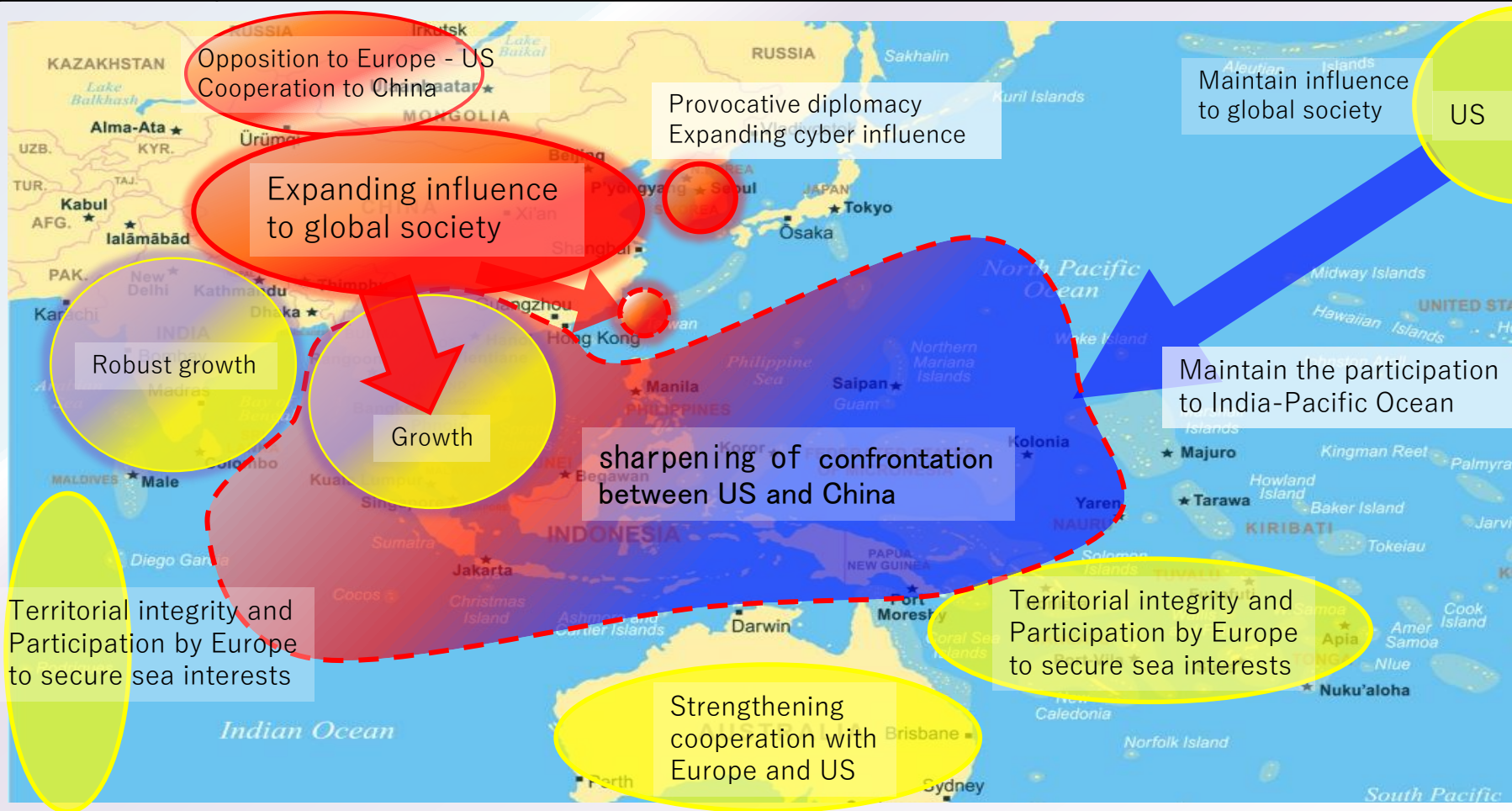
Summary Focus on the environment, threats, and events that are likely to occur within the foreseeable extension of the current situation.

【凡例】★: driving force (Yellow background): within the limits of sit out from current extended line Same color: high affinity phenomenon

Indo - Pacific region's strategic environment in 2040 (1/2)

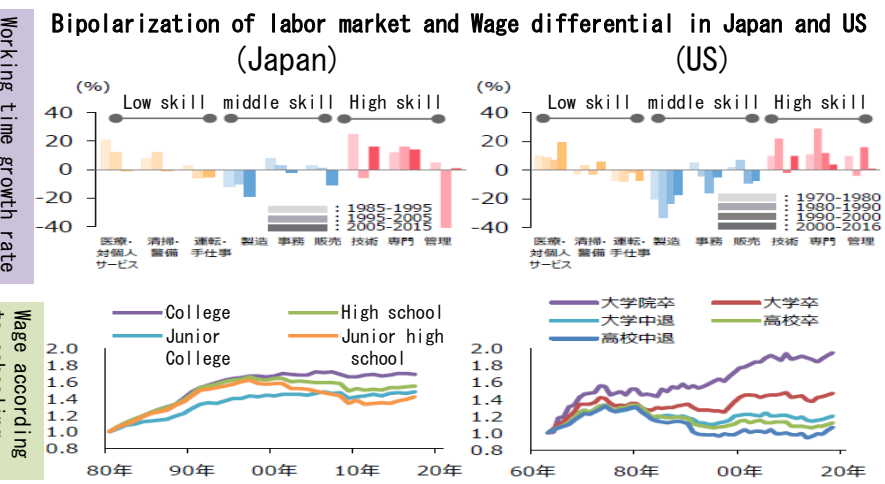
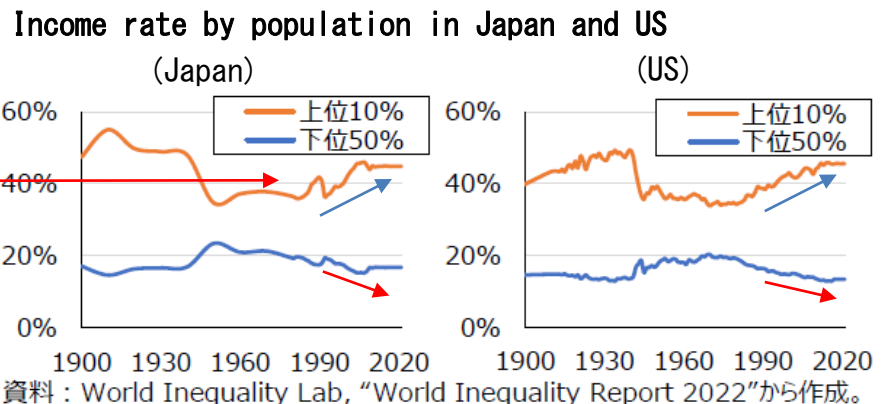
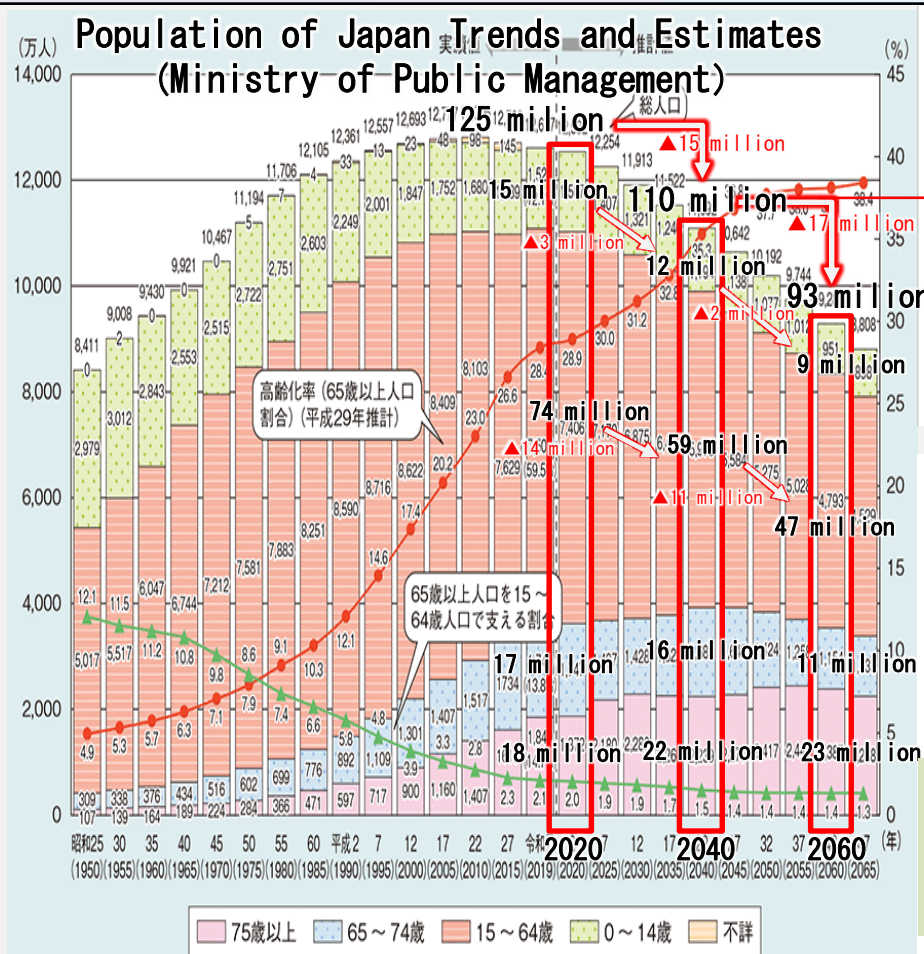
Strategic Environment (Indo-Pacific)

- Japan's security environment in 2040 is likely to be one in which the current US-China competition becomes even more heightened. At this time, there will be fluctuations depending on the success or failure of China's expansion policy.
- In addition, the future strategic environment will be influenced by European countries that have interests in the Indo-Pacific, by India expanding its influence both within and beyond the region, and by the Russia-Ukraine War.



Indo – Pacific region’ s strategic environment in 2040 (2/2)

The U.S.	<ul style="list-style-type: none"> ○ Strategic competition with China will intensify, and the confrontation with Russia on the European front may lead to a two-front response to the Indo-Pacific and Europe. ○ Although the US is experiencing a decline in relative influence, it is expected to continue a certain level of influence over the international community 	
China and Republic of China	<ul style="list-style-type: none"> ○ Expanding influence to global society with steady economic growth by strengthening one-party dictatorship political system. ○ Depending on the China–Republic of China relation, China’ s influence may fluctuate. <ul style="list-style-type: none"> ▪ If China does not conduct an invasion of Republic of China, the status quo in China–Republic of China relations will be maintained and the status quo in neighboring areas will continue to be altered. ▪ If China seizes Republic of China, Chinese influence will expand to international society including neighboring countries. ▪ If Chinese invasion fails or China declines without invasion, there will be some possibility of decreasing Chinese global influence. 	
Russia	<ul style="list-style-type: none"> ○ While growth is likely to slow regardless of the outcome of the Ukraine invasion, there is a possibility that the threshold for the use of military force will lessen and Russia will become a militaristic state. ○ Maintaining a confrontational structure with the West and increasing diplomatic and military actions with China. 	
North Korea	<ul style="list-style-type: none"> ○ Korean Peninsula will remain two separate countries. North Korea will continue its self defense strategy using nuclear weapons and missiles, but if their domestic economy worsens, there is a possibility of adopting a policy of accommodation with neighboring countries. ○ Expand its influence in the cyber domain through state-sponsored initiatives such as foreign currency acquisition through cyber. Possibility of becoming virtually invincible in the cyber field as there is no target for cyber attacks against itself. 	
Others	South Asia	<ul style="list-style-type: none"> ○ India will grow steadily; maintaining strategic autonomy and expanding influence within and beyond the region while improving its own position. ○ Increased value of chokepoints in the Indian Ocean as trade routes outside the Strait of Malacca are developed.
	South east Asia	<ul style="list-style-type: none"> ○ Acceleration of China’s status quo and expansion of its presence in the East and South China Seas and the South Pacific. ○ ASEAN countries, especially Indonesia, Philippines, and Vietnam whose populations continue to increase, will continue to grow economically and increase their presence.



Summarization

- economic global influence will decrease because of decreasing domestic demand, decreasing birthrate and aging population, increasing cost of social security, and decreasing international competitive power of basic industry.
- Division of society will accelerate because of depopulation, aging, impoverishment of middle class.
- drastic strengthening of defense power will be promoted for protection of democracy, contribution of international order stabilization because of worsening national security environment surrounding Japan. On the other hand, there is a possibility that security policy will be revised due to the Russia-Ukraine War, division of domestic public opinion caused by the foreign policies of neighboring countries, and worsening economic conditions

Politics	<ul style="list-style-type: none">○ Although the Japan–U.S. alliance is the cornerstone, there is a wide range depending on domestic public opinion, social factors, and threats and trends in neighboring countries.<ul style="list-style-type: none">▪ Maintain the policy based on the Japan–US Alliance.▪ Seek new allies to expand influence and normalize the security environment▪ enhancement of defense capability by own efforts, keeping influence to global society by self – defense.○ The country is both economically dependent on China and politically and socially dependent on the West., and the intensification of the U.S.–China confrontation has the potential to fragment the country.
Defense	<ul style="list-style-type: none">○ Begin to strengthen defense capabilities by focusing on the enemy's capabilities○ Defense spending may be reduced if the threat in the surrounding environment declines or policy priorities change
Economy	<ul style="list-style-type: none">○ Economic presence will relatively decrease depend on the growth of developing nation.○ Although a certain level of economic growth is expected to be maintained, there is a possibility of negative growth if the effects of policies and other measures are insufficient.
Society	<ul style="list-style-type: none">○ The matter of depopulation and aging will become the social problem, and the cost of social security will continuously put pressure on public finance. Renewal cost will increase the pressure on public finance with deterioration of public infrastructure.○ As the working population declines, expectations for robots and AI as labor replacements are increasing, and the immigration debate is progressing.○ Global environmental changes are causing more frequent and severe disasters, and defense-related issues, such as the declining birthrate, aging population, and response to threats from neighboring countries, are likely to become more apparent

Strategic Environment in 2040 surrounding Japan (Reference)

Research Division/TERCOM

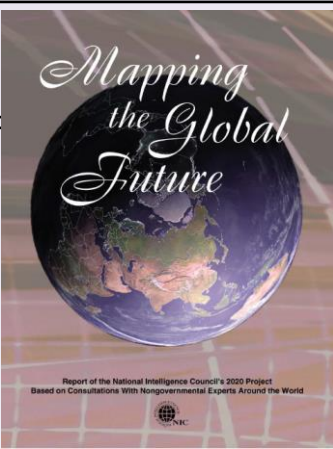
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This research is researcher's personal view, it is not reflect official perspective.

Analysis and assessment of future prediction method (1/2)

(Global Trends 2020 (U.S Intel council 2004))

Reference 1 – 1

<p>Aim</p>	<p>Analysis and assessment future prediction method, and understanding dependability and limit future prediction method</p>	
<p>Assay evaluation of future prediction method</p>	<p>1 View of analysis and assessment</p> <ul style="list-style-type: none"> ○ Reviewing output of future prediction method by using prediction publication (Global Trends 2020 (2004 edition)), high dependability, and analysis and assessment about dependability and limit future by comparison of situation future prediction. ○ Considering expectation and consideration in this strategic environment depend on the analysis and assessment about dependability and limit. <p>2 Summary of Global Trends 2020</p> <p>(1) Analysis procedure</p> <ul style="list-style-type: none"> ○ Considering about Key drivers of change and Regional themes with reference <u>main analysis future prediction</u> ※ <ul style="list-style-type: none"> ※ Shell international' s scenario building effort, The strategic trends(UK), Global revolutions(RAND), National security agency project tech 2020(NSA) ○ Considering population movement,economy,relationship between nations and so on. ○ Direction of future environment is invented 4 scenario with Key drivers and Regional themes <p>(2) Output (environment and scenario 2020)</p> <ul style="list-style-type: none"> ○ The world in 2020 will be different from 2004, US will be required new challenge. <ul style="list-style-type: none"> 【Direction of environment】 <ul style="list-style-type: none"> ▪Change of globalization ▪Social change by technology ▪Increase risk of terrorism ▪Rise new actor with increase population ▪Expanding unfairness and age ▪Increase pressure of international organization ▪Unsafe environment ▪Deterioration democracy ○ The key elements in creating the future environment and corresponding scenarios are as follows <ol style="list-style-type: none"> ① If stable economic growth is emphasized, there will be a “cooperative international environment (Davos World).” ② If each country pursues its own interests, there will be “American hegemony (Pax Americana)” where national power is superior. ③ If a new political/governance system emerges, it will be called “New Caliphate.” ④ If various threats (terrorism, WMD, internal picture, conflict) increase and each country places emphasis on dealing with them, a “chain of fear” 	

Assay
evaluation
of future
prediction
method

3 Analysis and assessment

- (1) Viewpoint of assessment : compatibility with the actual environment (evaluation of output), necessity of analysis method (evaluation of analysis method).
- (2) Analysis and assessment
 - Evaluation of output

Output	Output suitability assessment (real environment)
【Environmental direction】 <ul style="list-style-type: none"> ▪ Transformation of globalization ▪ Rise of new actors due to population growth(BRICs) ▪ Unsafe environment ▪ Social changes due to science and technology ▪ Increasing social inequality and aging ▪ Regression of democracy expansion ▪ Increased risk of terrorism, spread of WMD ▪ Increasing pressure from international organization 	<ul style="list-style-type: none"> ○:(US-China conflict, direction of de-globalization after COVID, etc.) △ : There are rising nations (China, Brazil) and nations that don't raise. ○ : Conflicts in in religion, race, immigration, and governance systems, outbreak of large-scale conflict. ○ : Social changes due to information and communications, space, computers, and AI. ○ : Increasing wealth inequality in developed and developing countries, and aging population in developed countries. ○ : Conflict between democracy and authoritarianism, decrease in number of democratic countries. △ : Partial success in containing terrorism, increasing threat of national conflict. × : The influence of international organizations is on the decline.
【Scenario and important elements】 <ul style="list-style-type: none"> ① Cooperative international environment ② American hegemony ③ Rise new caliph ④ Chain of fear 	【Blue text : Scenario that is close to the real environment, Red text : Scenario that includes elements in the real environment】 <ul style="list-style-type: none"> ① Cooperative international environment ② American hegemony ③ Rise new caliph (rise of undemocratic states) ④ Chain of fear ※ Prediction and evaluation of events with low probability but high impact <ul style="list-style-type: none"> ▪ Pandemic outbreak (COVID) ▪ No prediction (Financial crisis, large-scale conflict)
<p>(Partial conclusion) 1 The direction of the environment depicted as the output of future predictions generally matches the actual environment, and the part of scenario can be evaluation as being close to reality.</p> <p>2 Although the accuracy of predicting factors based on numerical values such as demographic trends and economic power trend in each country is high, confidence regarding matters related to interstate relations, international order, and the occurrence of unexpected situations is low.</p>	

○ Evaluation of analysis method

- Procedure of analysis regarding cross-national relationship as the standard each country's national strength that are composed of element, economy, and so on, with estimating economic transition based on the population movement.
- Secure reliability by enumeration plural possibility (scenario) without conclusive future prediction, because each country's policies and cross-national relationship have large width and difficulty of prediction.
- It's necessary to consider that unexpected situation will happen.

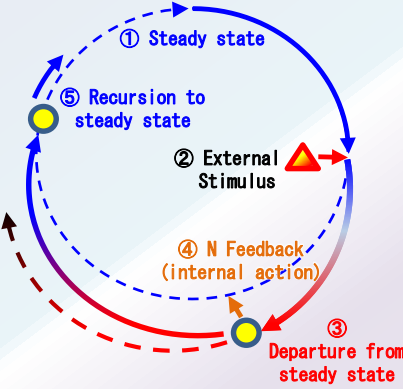
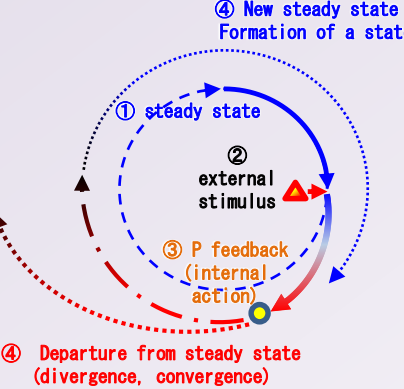
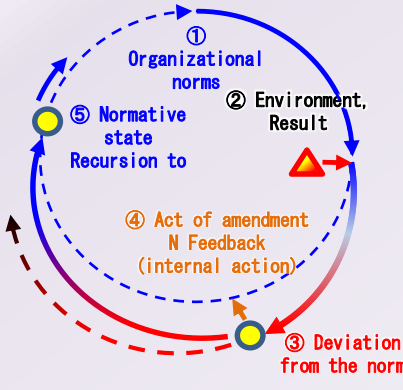
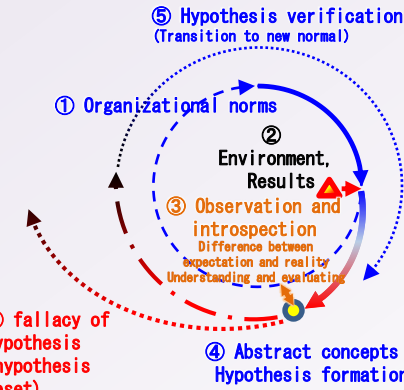
Future Forecasting Methods (Changes in Planning Methods)

Reference 2

Attitude		The transition of the general future prediction method and the scenario planning method which is a typical method are grasped, and the fund of the future research method is obtained.			
Transition of the future prediction method	Introduction Period	<ul style="list-style-type: none"> ○ During WWII, U.S. military operations began using the system. ○ After WWII, RAND Corporation used the scenario planning method to predict the future of the civilian area, and Herman Kahn of RAND Corporation established the method. The Hudson Institute further refined the scenario planning method (The year 2000). 			
	Development period	<ul style="list-style-type: none"> ○ The early scenario planning was identical to the classical planning of “make predictions and manage based on them” ○ Scenario planning since the 1960s has derived multiple projections and probabilities to derive the “most likely future” ○ On the other hand, from doubts and limitations *¹ to the method of predicting the future, we switched to another method around the 1980s. ○ In scenario planning since the 1990s, we do not think about the future in terms of probabilities, but rather say, “What will happen in the future and why will that future happen? We consider what will happen in the future, and finally turn it into a story.”*² <p>*¹ Shell, an oil company, has continuously implemented and evaluated the scenario planning method. At that time, major oil companies only focused on over- and under-supply based only on demand growth (6% per year) and supply (presence or absence of underground oil wells), and said that supply was a definite matter. Shell, however, evaluated the human element of suppliers as uncertain, and increased its market share by preparing for an oil crisis.</p> <p>*² Today, Shell’s scenario planning is based on multiple equivalent scenarios unrelated to the “global scenario” used by top management to formulate a company-wide strategy framework. It is used as a “focus scenario” to consider the direction of the future based on a possible future vision.</p>			
With the theory of management strategy Scenario planning relationship between		Strain	Rationalist school	Evolutionary school	Process-oriented school
		Strategy the basis of thinking	<ul style="list-style-type: none"> ○ The answer is one, and the purpose of the strategy is to get closer to the correct answer ○ The subjectivity of the individual or the analyst is not important the ideal answer for anyone with the right ingredients can be reached ○ Each actor is rational and the strategy is feasible It is assumed that 	<ul style="list-style-type: none"> ○ Emergent strategy: Based on past events Reading patterns and thinking about ourselves Reflecting and projecting on (H. Mintzberg) ○ Difficult to predict and uncontrollable based on the idea of chaos theory 	<ul style="list-style-type: none"> ○ There is no right answer and we do not ask for it ○ The success of a business cannot be regulated. In order to succeed, you have to be involved in the business and you need the unique thinking of the people who are ○ The resources of the organization are the brains of the employees, the networks, the ideas, the innovation. It is important to create a system that generates
		Strategy Formulation Procedure	<ol style="list-style-type: none"> 1 Mission Definition 2 SWOT Analysis (Strengths, Weaknesses, Opportunities, and Threats) 3 Enumeration and Selection of Options 4 Execution 5 Evaluation and control 	<ul style="list-style-type: none"> ○ Time because of the large amount of information and rapid change to develop and review strategies that are of low value. ○ Competition in response to what is currently visible Enhance your abilities by surviving in 	<ul style="list-style-type: none"> ○ Establishment of learning loops (processes) for growth within the organization <p>【Learning Loop】</p> <ol style="list-style-type: none"> ① Concrete Experiences → ② Observation and Introspection → ③ Abstract Concepts and Hypothesis Formation → ④ Hypothesis Testing under New Situations → ① ② ...
		Scenario Planning Approach	<ul style="list-style-type: none"> ○ While recognizing that the future is uncertain, painting a picture of one future ○ The future is an extension of the past Assuming that ○ Analysis is invalid if the assumptions are different. 	<ul style="list-style-type: none"> ○ H. Mintzberg, Emergent Strategy and Pure Pure planning is at the opposite end of the line and it’s a pure emergent strategy that doesn’t have a plan, it’s a pure that doesn’t have a learn (fix) ○ The use of planning is an emergent strategy and a method for interaction with is ambidextrous planning (right-handed: conventional objective and numerical analysis and left-handed: straight perspective and interactional) 	<p>【Concept】 Successful competitive strategies are independently developed by the organization</p> <p>【Procedure】</p> <ol style="list-style-type: none"> 1 Systematization of events and environmental patterning. Recognition of uncertainty 2 Dialectical * Conversation of diverse ideas 3 Adopting internal knowledge and external perspectives 4 Organizing in line with the organization’s strategic thinking <p>*Unlike the method of reasoning, which lists the grounds that support a claim, the philosophical method of reaching a higher level of recognition from the pairing and contradictions between different opinions</p>

Future forecasting methods (feedback systems and learning processes)

Reference 3

General	<p>In the field of complex systems, a system of how an organization or system responds to external stimuli there is a theory called a modified feedback system. In the theory of organization, how the organization receives external information into the organization and processes it, there is a type of learning loop system</p>	
feedback system and each learning loop differences	<p style="text-align: center;">negative feedback system</p>  <div style="border: 1px dashed black; padding: 5px; margin-top: 10px;"> <p>A system is basically stable, and when it tries to leave equilibrium or steady state, it tries to return to steady state, which is called a negative feedback system. An organism maintains its body temperature and environment, which is not a negative system.</p> </div>	<p style="text-align: center;">positive feedback system</p>  <div style="border: 1px dashed black; padding: 5px; margin-top: 10px;"> <p>A system is fundamentally unstable and attempts to move away from equilibrium or steady state is called a positive feedback system. This system generates the butterfly effect in chaos theory, emergence in complex systems, and self-organization phenomena. Small differences and effects self-sand produce large differences. trengthen, self-organize,</p> </div> <p style="font-size: small;">*Nonlinear deviation from steady state</p>
	<p style="text-align: center;">single-loop learning</p>  <div style="border: 1px dashed black; padding: 5px; margin-top: 10px;"> <p>A concept in organizational psychology. a system in which learning as an organization takes place by adhering to values and norms that have been held for a long time and promptly correcting them when actions and results deviate from them. In this system, value standards are not updated, and activities are continued as the old norms are deemed desirable.</p> </div>	<p style="text-align: center;">double-loop learning</p>  <div style="border: 1px dashed black; padding: 5px; margin-top: 10px;"> <p>the concept of organizational psychology. Based on information obtained from the environment, values and norms that have been held for a long time are reviewed and modified as necessary to form an information processing loop and to realize learning as an organization. It is considered to be a necessary form of learning in the VUCA era, but it is not applicable to all.</p> </div>
Aggregate	<ul style="list-style-type: none"> ○ Negative feedback and single-loop learning, positive feedback and double-loop learning are each highly related ○ Plan and adapt reality to plan as uncertainty and uncontrollability are accepted by strategy and management theory The adoption of double-loop learning methods has progressed from single-loop learning to continuously search for new optimal solutions in an ever-changing environment 	

Forecasting Methods (Scenario Planning Methods)

Reference 4 – 1

Scenario Planning Approach

Scenario planning is the process of figuring out in advance what will happen if you map out a number of ways that the environment will change, and then figuring out what that means.

It helps you understand what that means. Scenario planning can't eliminate uncertainty, but it can make certain decisions happen in the future. It can help us determine whether everything in our environment is tolerable enough, and the uncertainty in our future can help us determine whether something is manageable.

Prediction is like driving in a car with lights on during a blizzard night. You can't see far when you look ahead. Drivers try to avoid danger by relying on what they can see. To do this, they have to understand that visibility is limited and adjust their speed to prepare for sudden, large obstacles. Obstacles may appear suddenly, and drivers need to be aware of obstacles outside their field of vision, so they need to adjust their speed to their perceived limits. In other words, they need to predict. You can't drive a car with the lights off just because the prediction doesn't work. The important thing is to know the limits of vision. (Albert Orenzak, Sun Oil Strategist)

a category of uncertainty

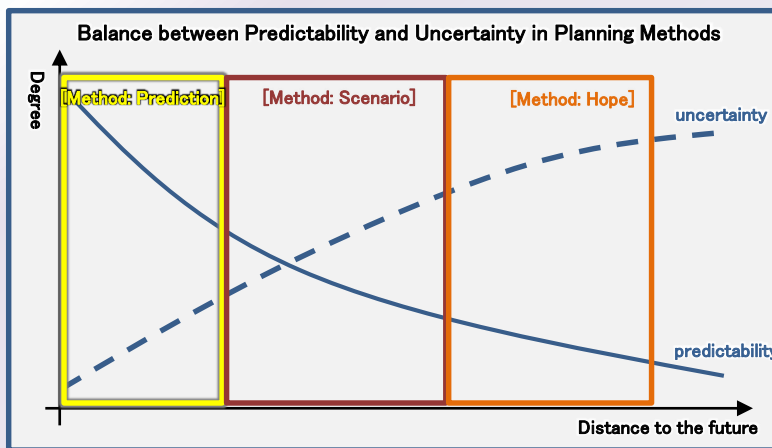
【Elements that can be predicted (to a certain extent) in scenario planning】

- Ongoing events, future manifestations (e.g., demographics), and system constraints (limits of growth, physical limits, etc.)
- Behavioral patterns generated by feedback loops, system and nature laws, and character logic and motivation

【Elements that are difficult to predict in scenario planning】

- 1 Predictable risk: something that has occurred in the past and is expected to occur as well. something for which the probability of occurrence can be determined
- 2 Structural uncertainty: something for which the probability of occurrence cannot be determined, but the probability of occurrence can be pointed out from a causal relationship
- 3 Unknown events: unimaginable events, black swans

Predictability and Uncertainty



- In looking ahead, predictability gradually decreases, while uncertainty increases. very short-term generally preferred because of high predictability between planning forms are frequent "predictions." over a fairly long period of time then everything is uncertain and the effectiveness of planning wanes.
- The breadth of the strategy depends on the degree of environmental uncertainty of the uncertainty faced, according to the theory of environmental adaptation. It is dangerous to make a strategic plan without fully recognizing the degree of the problem. In the area beyond "prediction," in scenario planning, making predictions can lead to excessive expectations of planning and excessive feelings of security.

○ Looking far into the future is not necessarily the same as looking closer. Players of chess, shogi, and go, as well as AI, do not read the moves ahead in depth and exhaustively. The top player looks at the board, predicts only 1 move of all the pieces, selects the 1~2 most suitable moves, and reads deeply how the game will play out. The number of options to think about explodes exponentially with each move read deeply. But a good player focuses his thoughts on just 2~3 moves and occasionally reads deeply. That's when a sense of experiential importance, danger, etc. comes into play.

○ "This is a time when we cannot read ahead, so we focus on a few moves ahead and respond according to the situation at that time. We live in such a time (Yoshiharu Hanyu)"

Forecasting Methods (Scenario Planning Methods)

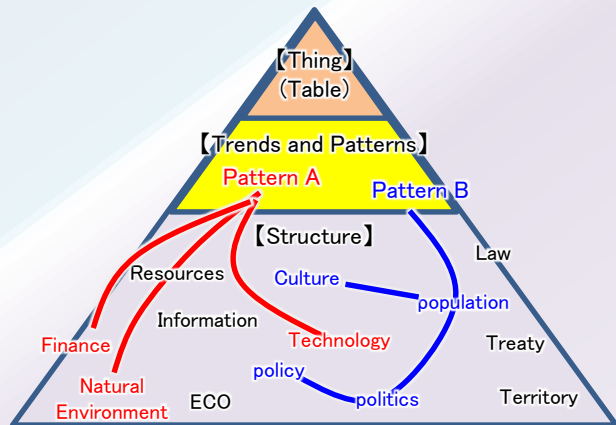
Reference 4 – 2

【General】

1 In scenario planning, in order to see a complex and uncertain future, determinants and uncertainties are identified, and factors to be considered and scenarios to be considered are clarified.

2 As an analysis of individual events, a mental map is made to determine the background of events by Iceberg analysis, and based on the map Definite elements and uncertain elements are analyzed to determine the important elements for bifurcating scenarios, and a framework for scenarios is constructed

Mental map creation using Iceberg analysis

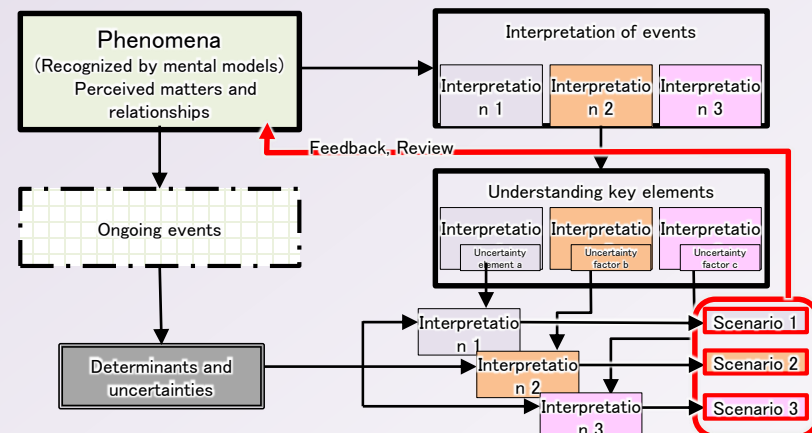


Iceberg analysis refers to knowledge as “events” and “trends and patterns” It divides knowledge into three categories: “structure,” background of events, and factors A method to infer the relationship between important elements of the structure

After understanding the expected trend and structure of the relationship to the event, the causality of each element (temporal order, correlation, spatiotemporal proximity, similarity of forms and patterns)

to determine the structural significance of the event. Deepen consideration of matters and uncertainties

A framework for scenario construction



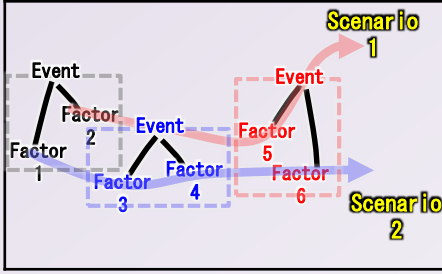
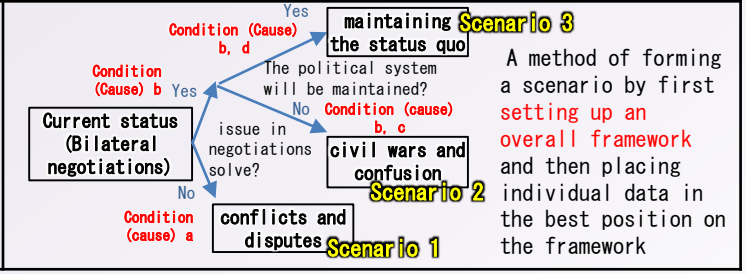
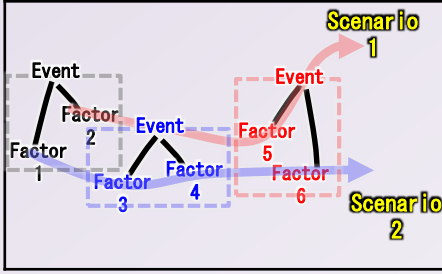
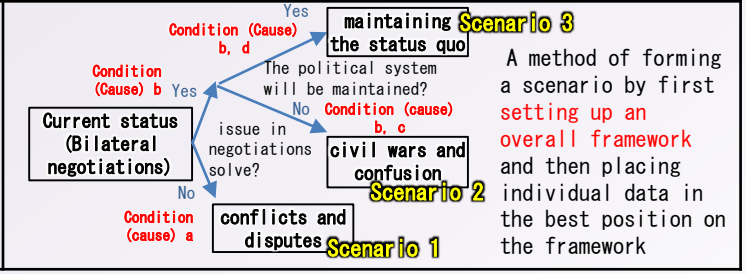
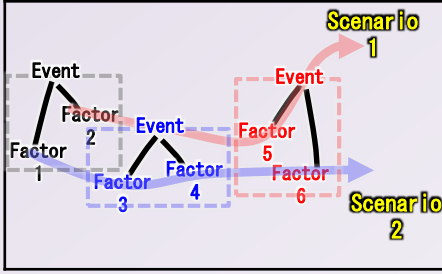
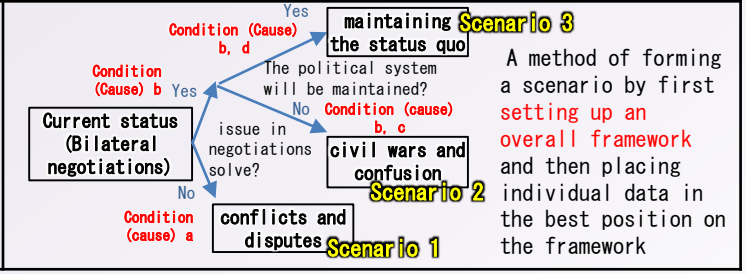
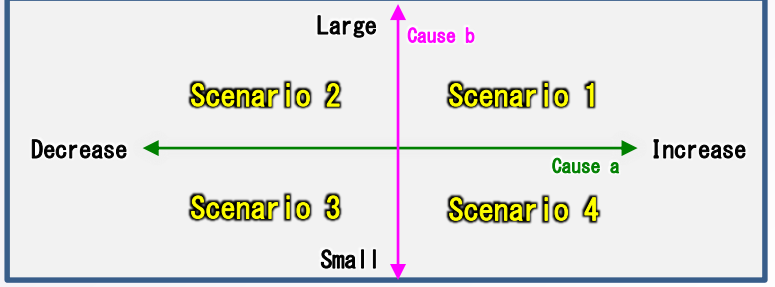
- In scenario planning, uncertainty affects the situation. It works in the case. Uncertainty is essential and meticulous analysis doesn't make sense. Just the elements that have the broadest grasp and most influence to classify and extract scenarios
- The higher the uncertainty, the more certain elements have more influence than others, and the higher the uncertainty, the lower the number of factors to consider.
- Evaluate the scenario over time and repeat the interpretation review

Scenario
Construction
Method

【General】

Double-loop learning is the standard for scenario construction in scenario planning, and it is **hypothesized that future scenarios will be created**. It is only a formation, and a **learning loop that tests hypotheses according to the passage of time**, evaluates whether an interpretation passes or fails, and continues hypothesis formation again. It is necessary to understand that a scenario exists.

Forecasting Methods (Scenario Planning Methods)

<p>Scenario Planning Notes</p>	<ul style="list-style-type: none"> Requires at least two scenarios that incorporate uncertainty. On the other hand, more than five scenarios are difficult to handle. Scenarios are stories that can happen and are logically constructed causally from past and present perspectives. Scenario stories must be consistent, and each event in the scenario must have a causal relationship or context. Scenarios must give users new ideas and new perspectives. 				
<p>Scenarios Formulation procedure</p>	<p>1 Primary data analysis A holistic view of the data to clarify the relationship between the variables and the data and what drives the system (what is the driving force)</p> <p>2 Historical considerations <ul style="list-style-type: none"> Interpret the relationship between past and current trends by looking back at the past Interpret historical developments to change how we find continuity into the future and change future scenarios (An example of a discussion perspective) List major patterns and trends Develop causal relationships into impact diagrams List underlying drivers Rank drivers in order of unpredictability and impact on strategy List many potential interpretable uncertainties </p> <p>3 Drivers <ul style="list-style-type: none"> List multiple variables that are considered to be important for the situation in question, and specify the variables (Rise, fall, steady, repeat, etc.). Only the variables are expanded into an impact diagram, and then the causes of the variables are selected from structural factors in line with the idea of the Iceberg analysis. </p> <p>Drivers of events as they occur by identifying the factors that influence the factors that influence them, particularly the factors that drive them(positive feedback) by inferring patterns to maintain multiple interpretations of the causal relationships that make up the whole as hypotheses</p> <p>predict future trends based on several hypotheses and develop multiple scenarios</p> <p>4 Create scenarios</p> <table border="1" data-bbox="473 768 1899 1092"> <thead> <tr> <th data-bbox="473 768 1149 821">Inductive method</th> <th data-bbox="1149 768 1899 821">Deductive method</th> </tr> </thead> <tbody> <tr> <td data-bbox="473 821 1149 1092">  <p>A method of arranging available data so that the structure of a scenario automatically emerges from its relationship to each other</p> </td> <td data-bbox="1149 821 1899 1092">  <p>A method of forming a scenario by first setting up an overall framework and then placing individual data in the best position on the framework</p> </td> </tr> </tbody> </table>	Inductive method	Deductive method	 <p>A method of arranging available data so that the structure of a scenario automatically emerges from its relationship to each other</p>	 <p>A method of forming a scenario by first setting up an overall framework and then placing individual data in the best position on the framework</p>
Inductive method	Deductive method				
 <p>A method of arranging available data so that the structure of a scenario automatically emerges from its relationship to each other</p>	 <p>A method of forming a scenario by first setting up an overall framework and then placing individual data in the best position on the framework</p>				
<p>Organize scenarios (grouping)</p>	<ul style="list-style-type: none"> If you can narrow down the critical drivers to 2-3, you can typify the scenarios around the factors that cause them to diverge organize the framework Interpret the past and future by finding independent axes can generate new perspectives and storylines on 				

GSDF long-term research scenario planning considerations for application to	conventional methodical reputation	<ul style="list-style-type: none"> ○ The GSDF's long-term research procedures are expected to be in the future for about 10 to 20 years. After considering the strategic environment and operational environment, formulation of operational plan, necessary capabilities, etc. The environment in about 10 to 20 years will be highly uncertain. ○ Consider the future simply based on scenario analysis has a wide range of considerations, complex scenario divergence, and a huge range of research 		
	With each scenario	<ul style="list-style-type: none"> ○ Multiple scenarios with high uncertainties and large swings ○ Strategies and operational plans derived from them and necessary ○ The relationship between capabilities needs to be sorted out 		
	With each strategy relationship with options for (O/C)	inclusive	<ul style="list-style-type: none"> ○ Conduct the entire system to respond to all scenarios ○ Comprehensive Strategy and Operation Plan by Scenario (Situation), Comprehensive ability to respond to all cases ○ If the direction of each scenario is different, the strategy and capability is not uniform, and the required capacity is huge 	
	With each strategy relationship with options for (O/C)	branching type	<ul style="list-style-type: none"> ○ Strategies and capabilities held for each scenario ○ select in accordance with environmental changes based on review strategies and required capabilities ○ Preparation time for required capabilities in times of sudden environmental change insufficient 	
Overall	Overall	<ul style="list-style-type: none"> ○ Potential or high-priority scenarios as a basis, the idiosyncrasies of other scenarios were partially adopted to develop strategies and capabilities When the assumptions of the strategic environment are very different review the strategy 		
		The relatively predictable future due to the large swings in the long-term strategic environment, the large number of divergences, and the difficulty of forecasting the future direction as the underlying scenario, and considering the idiosyncrasies of other characteristic scenarios, the future vision and capabilities		

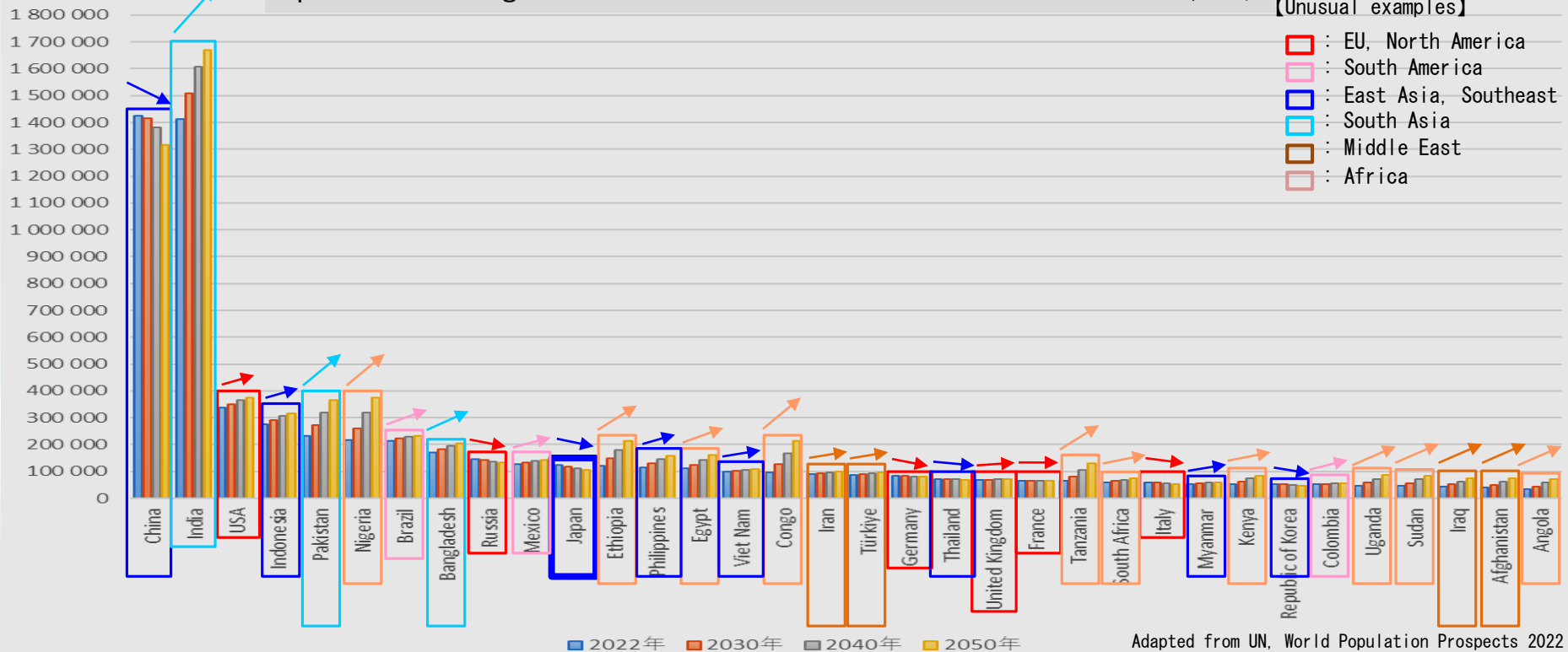
future population estimates for each country

Reference 6

Future of each country
Population estimates
Trends

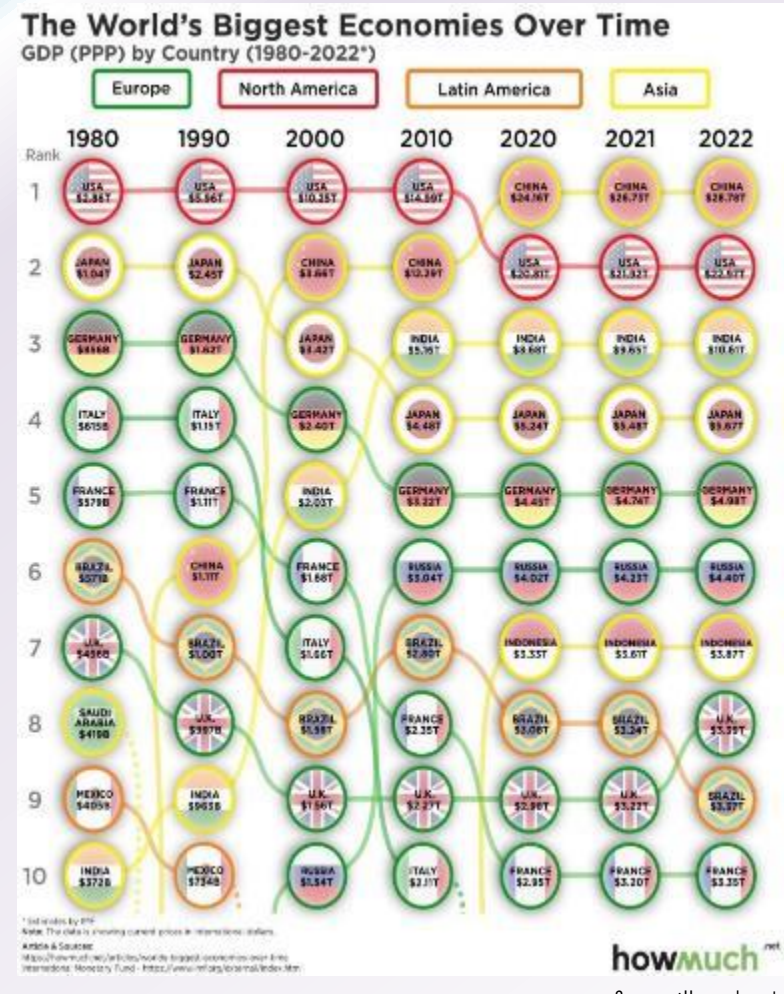
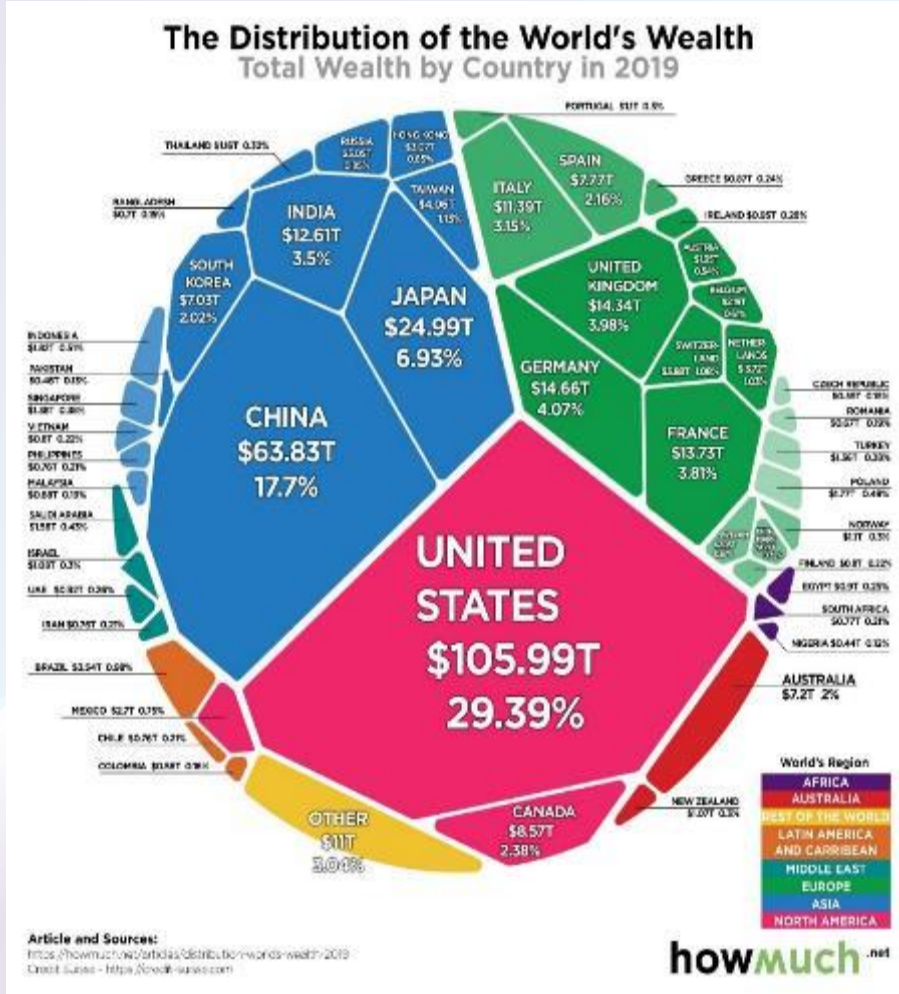
- The world's total population continues to increase
- The world's number one population will shift from China to India by 2030. Since 2030, China has seen a sharp decline in population
- The majority of countries in Europe and North America have seen their population decline. Population growth continues in the United States, Britain and France
- In East and Southeast Asia, the population of countries with declining trends (China, Japan, Thailand and South Korea) and countries with increasing trends (Indonesia, Philippines, Myanmar) Both exist.
- Many countries in South Asia, the Middle East and Africa continue to experience significant population growth.

Population change estimate of each countries in 2022~2050 (WHO)



General

- While the population of many developed countries, such as Japan and the EU, is on the decline, the population of many emerging countries continues to increase.
- In developed countries, where the population is declining and aging, the number of countries that choose immigrants as their labor force is increasing, and the supply of human resources is increasing in accordance with the national possibility of becoming one of the components of power



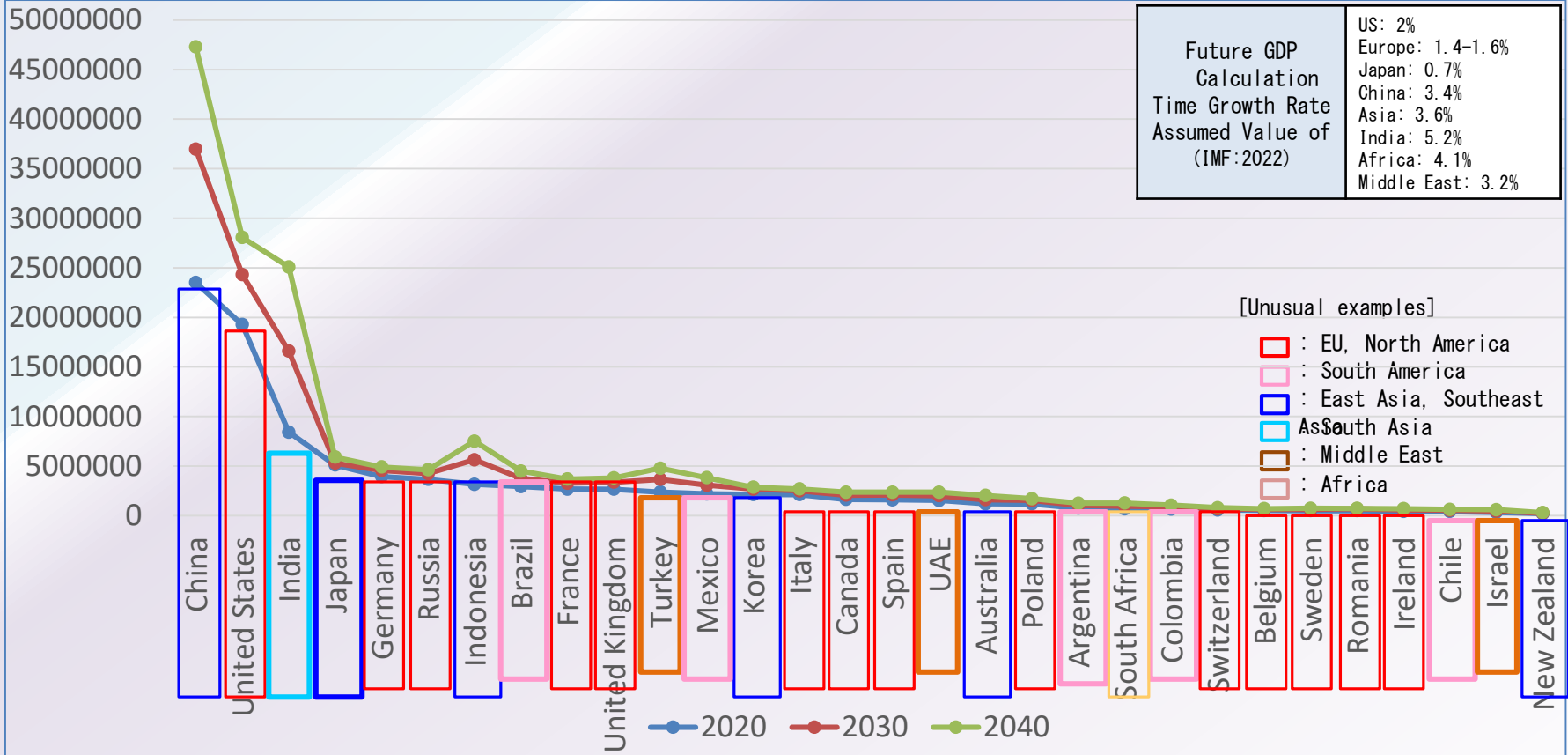
Aggregate

- In the 40 years from 1980 to 2020, the economic advantage gradually shifted from Western countries to non-Western countries in terms of rank and ratio.
- In 2020, the United States was the largest economy, China was about 2/3 the size of the United States, and the size of the EU as a whole was almost the same as the United States.

Estimated changes in GDP of major countries from 2020 to 2040

of major countries Trends in GDP Trends in Estimates

- Top 3 GDP for the future will remain unchanged until 2040. At this time, China and India's share of the global economy grew in size
- Countries with large GDP are concentrated in the EU, Europe, the United States, East Asia, and Southeast Asia. Turkey is the largest economy in the Middle East, the UAE, and Israel. In Africa, only South Africa
- Excluding China and India, the countries expected to experience rapid economic expansion between 2020 and 2040 are Indonesia, Turkey, and Mexico. Around 2040, Japan's GOD ranking fell from fourth to fifth, overtaken by Indonesia.



Developed based on OECD, Long term GDP forecast

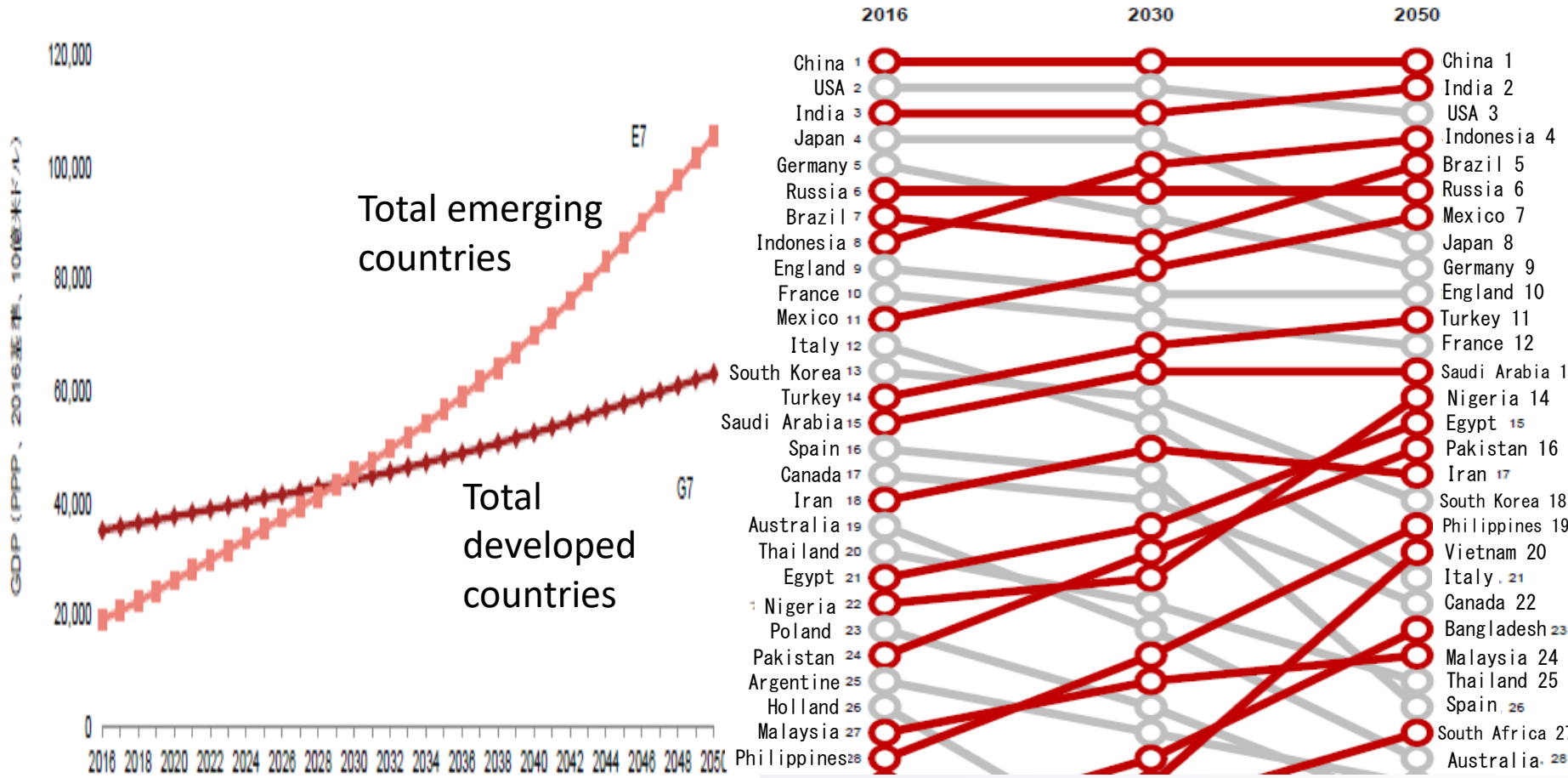
Aggregate

- The global economy around 2040 was dominated by the presence of Central American India. Regionally, Asia, Europe, the United States, and South America were the major countries.
- Although Africa and the Middle East are expected to grow, their share of the global economy is small.

Estimated changes in GDP of major countries from 2020 to 2050

Overview

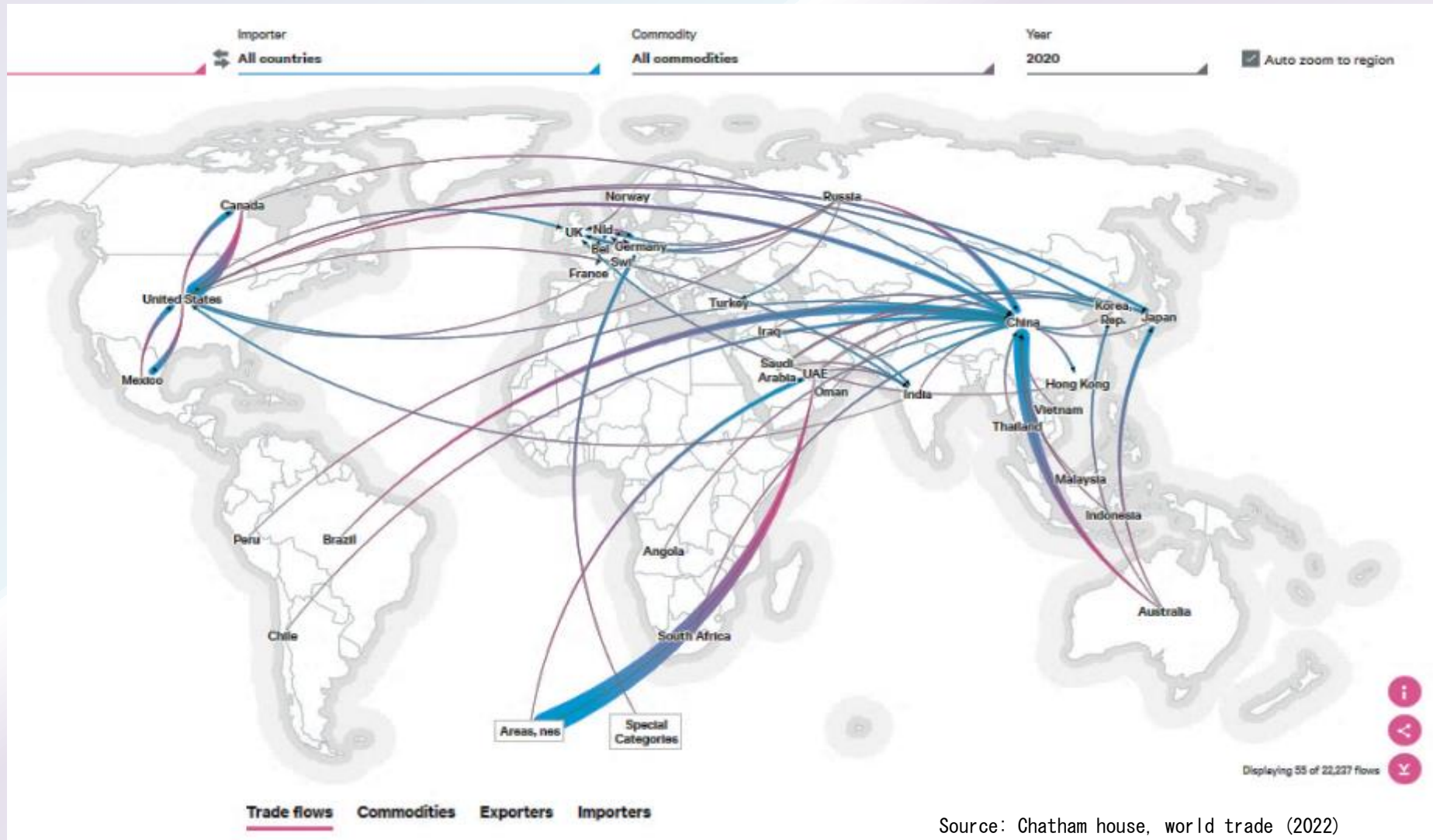
○ The GDP trends of major countries by 2050 based on the IMF's 2016 forecast
 The GDP growth of emerging countries was large, and the total GDP of developed and emerging countries reversed after 2030.
Shift to the dominance of emerging countries
 ○ Japan's GDP fell from fourth place around 2030 to **eighth * around 2050**
 *At the estimation stage, Russia was expected to continue its economic growth, but due to the situation in Ukraine, Russia's assessment needs to be revised.



***Bold: Emerging countries; Gray: Developed countries**

Trade situation between countries around 2020 (Global)

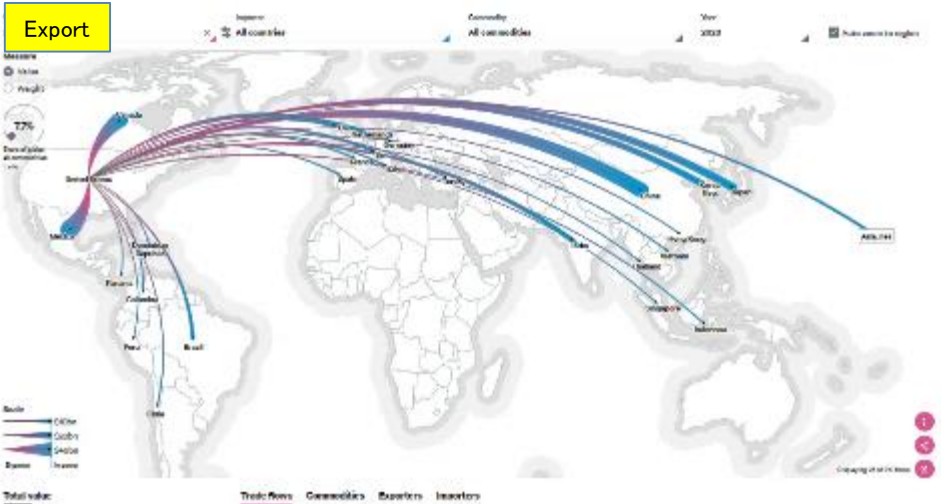
Reference 10 – 1



Aggregate

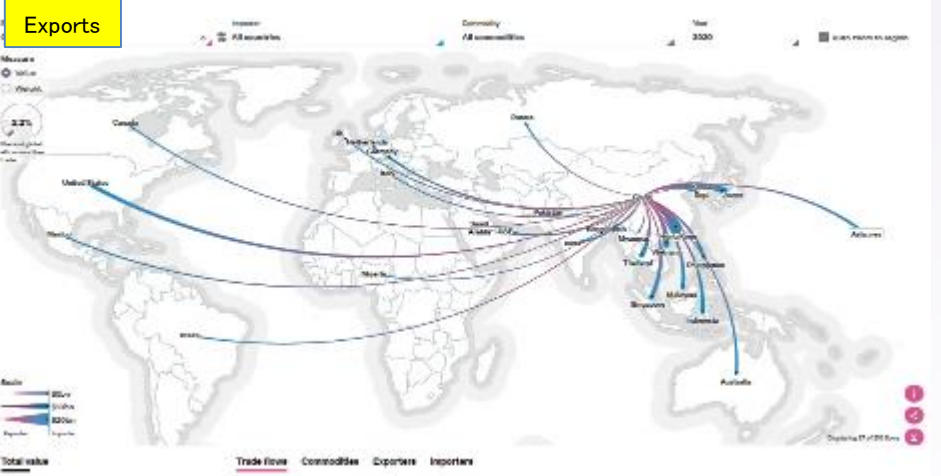
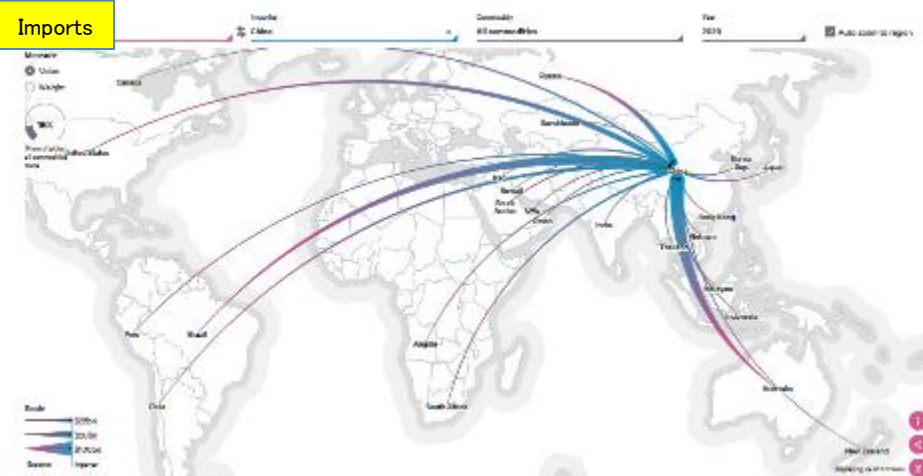
- The global trade situation is **dominated by China, Europe and the United States**
- The United States carries out a lot of **trade within the North American continent**, while **Europe and China** carry out trade with the whole world. In particular, China has a lot of trade partners that are far away from its neighbors

Trade situation between countries around 2020 (US: Top row, China: Bottom row)



Trade conditions of the US

- The major sources of U.S. imports are Canada, Mexico, and South America, followed by Europe, Russia, and India.
- The major destinations of U.S. exports are Canada, Mexico, South America, China, Japan, Korea, India, Europe, Southeast Asia, and other countries in the world. The volume of trade with China is also large.

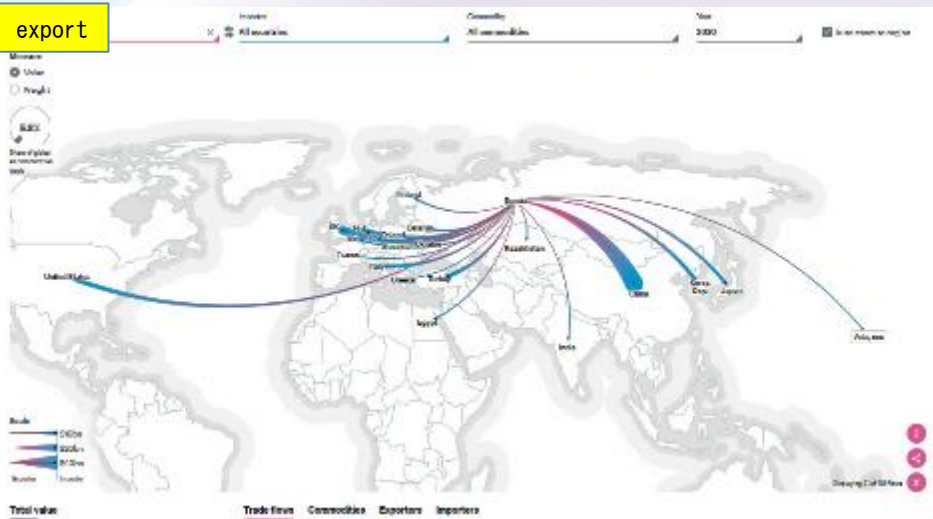
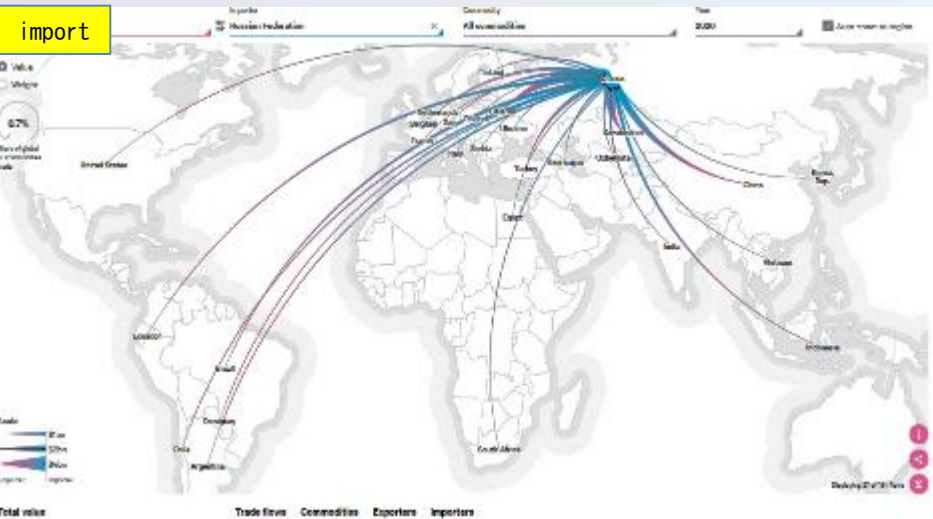


Source: Chatham house, world trade (2022)

Chinese Trade situation

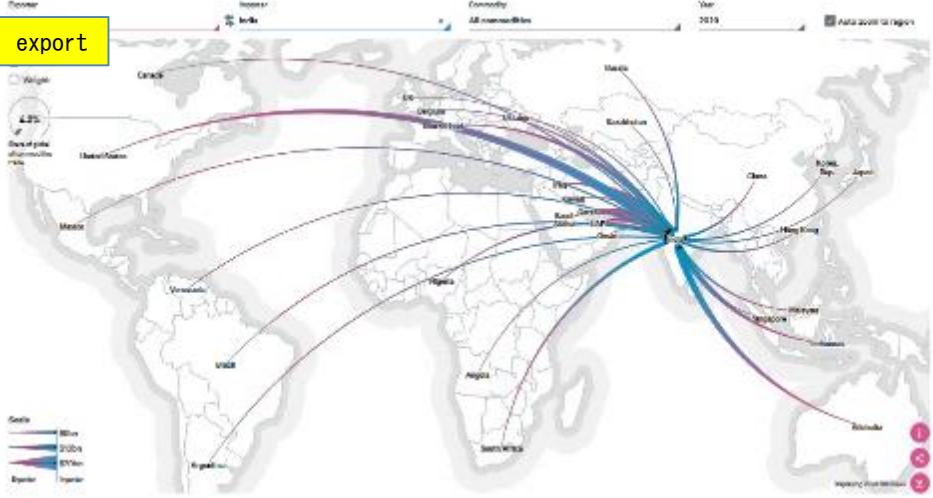
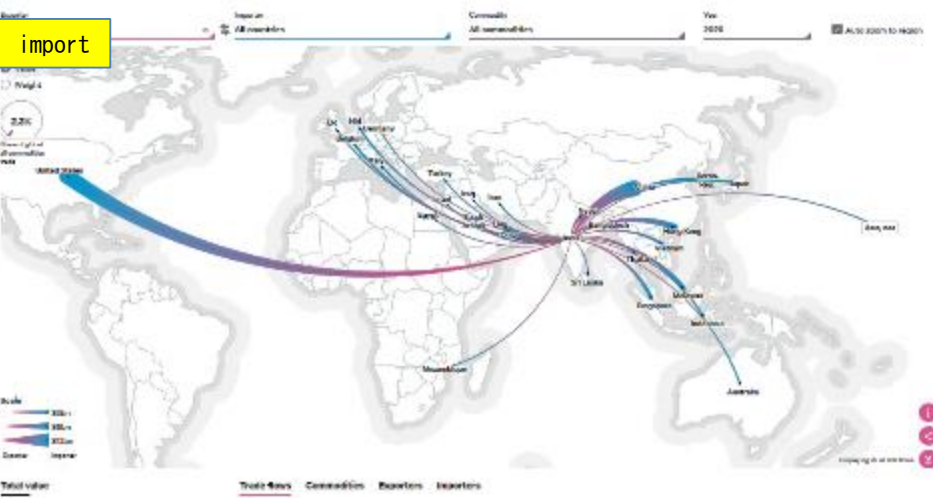
- China's main sources of imports are Australia, Southeast Asia, South America, Russia, the Middle East, Africa, the United States, Canada and other global countries and trade
- China's main destinations are Japan, South Korea, Southeast Asia, the Americas, Russia, Australia, Europe, the Middle East, Africa and other global countries and trade

Trade situation between countries around 2020 (Russia: Upper, India: Lower)



Russian Trade situation

- Russia's main sources of imports are Europe, South America, the United States, China, India and South Korea, Southeast Asia and South Africa.
- Russia's main destinations are China and Europe for the most part, as well as the United States, Japan, South Korea and India, Asian countries and Egypt.

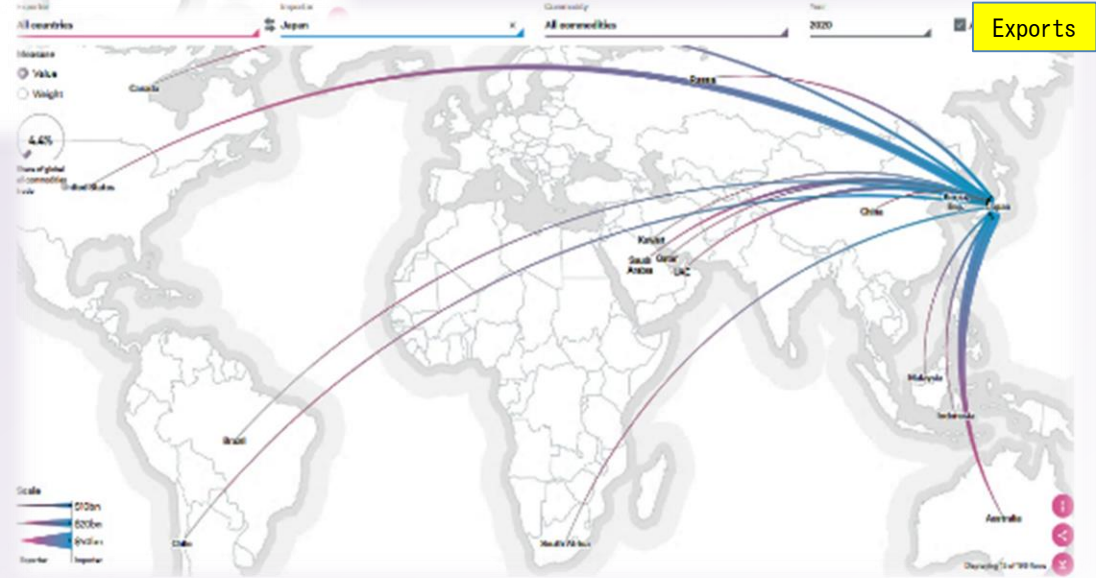
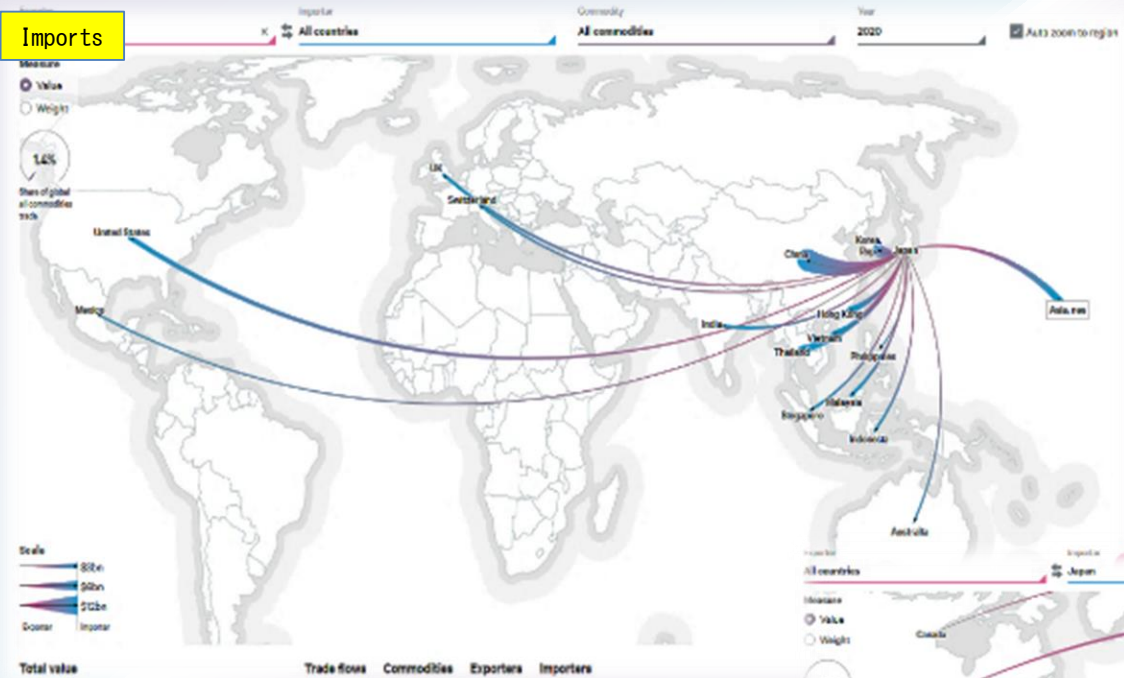


India's trade situation

- The major source of India's imports is the United States and China, together with imports from Europe, the Middle East, Southeast Asia, Africa, Japan and Australia.
- The major destinations of India's exports are the Americas, Europe, China and Russia, Africa, Japan, South Korea and Australia, and Southeast Asia.

Japan's trade situation around 2020

Reference 10 - 4



trade situation of Japan

- China is the dominant source of Japan's imports, followed by the United States, Asian countries, and Australia and Europe
- Japan's main export destinations are the United States, China and Australia, Southeast Asia, Russia and Europe, and the Middle East

Analysis for global strategic environment development around 2040 (1/3)

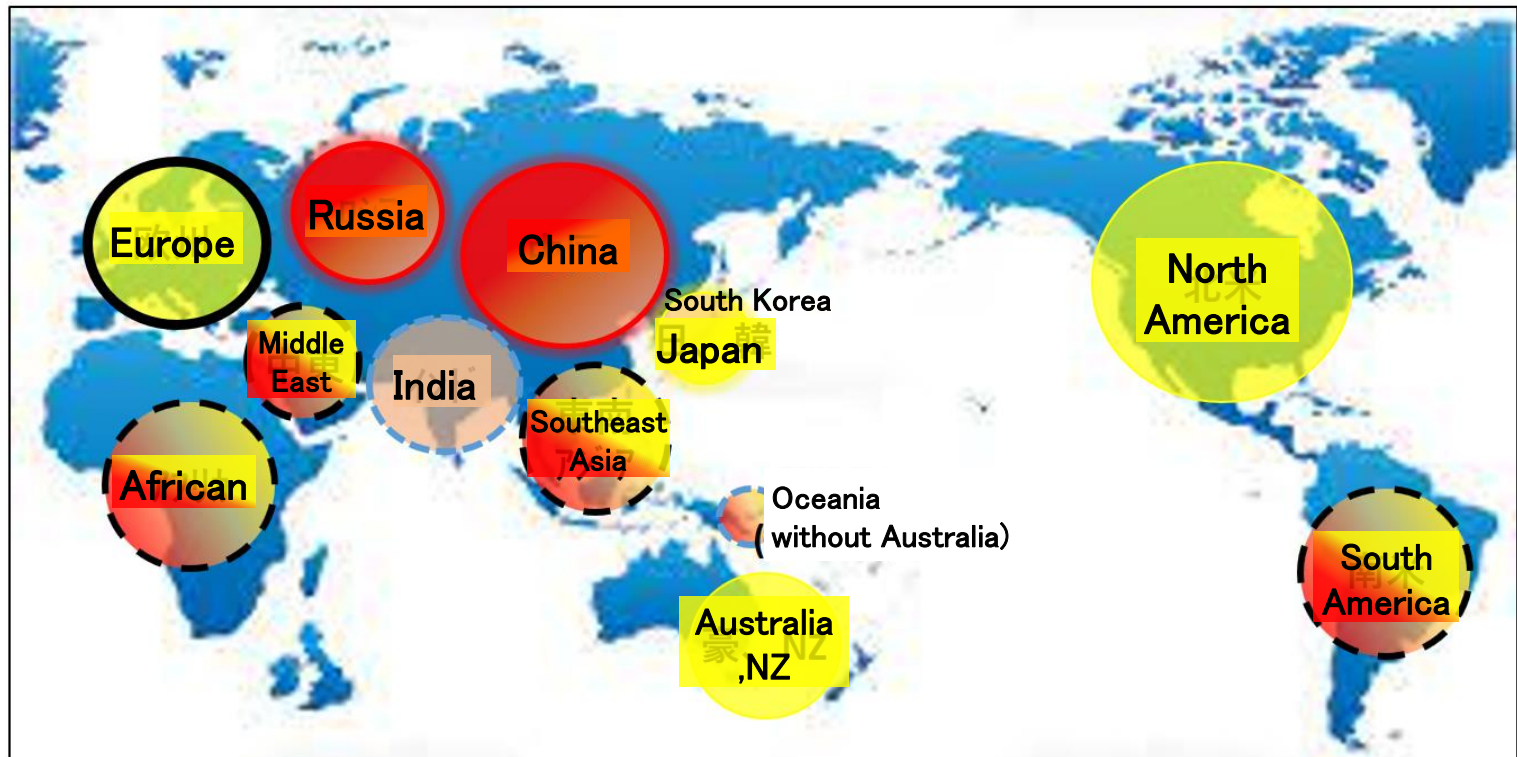
Reference 11 - 1

Produced
way of
thinking

- In order to develop the direction of the global strategic environment, taking into consideration population, economic strength, etc., one country or region
- Communities are listed as key actors in the future The relationships between the listed actors, depending on whether they are in conflict or collaboration Summarize into representative types and consider the direction of each strategic environment and their relationships with each other

Key actors
Enumeration

- The major actors listed are as follows
- As a regional community, each country should be a community rather than a conflict of national interests or various issues regions where political integration is progressing are shown as solid lines, while non-integrated communities are shown as dashed lines



Major actors as countries or regional communities circa 2040

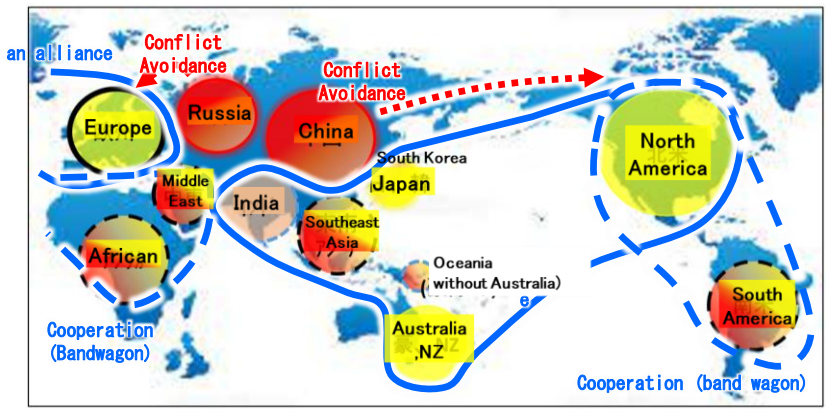
Analysis for global strategic environment development around 2040 (2/3)

Reference 11 - 2

Typical typologies

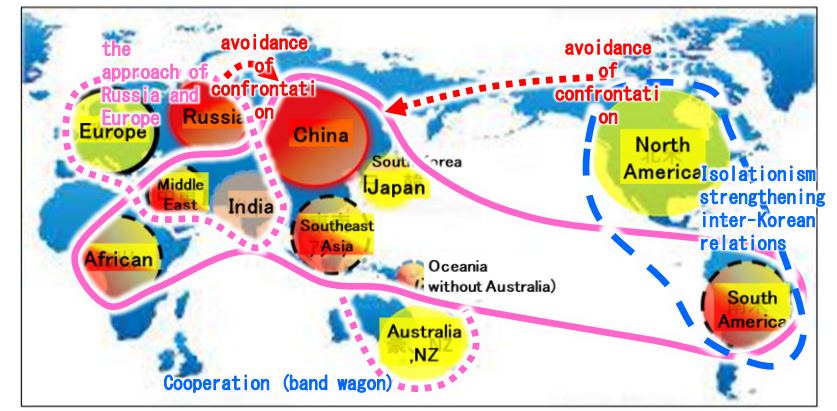
1 Polarization (mainly in the United States)

- The United States, in addition to its traditional allies, has a political system and economic ties strengthen relations with countries that have strong ties
- China, Russia and other countries avoid direct confrontation with the United States and are generally stable



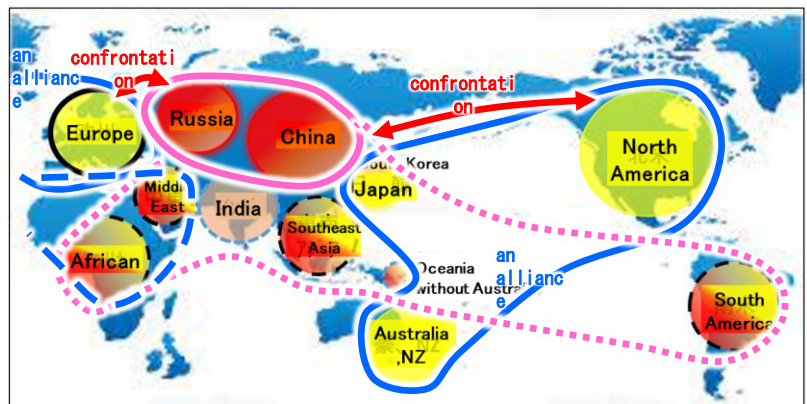
1 Polarization (mainly in China)

- China exports development models to developing countries. The United States and China avoid confrontation and emphasize strengthening ties within the U.S. continent
- Russia approaches Europe to keep a certain distance from China's sphere of influence



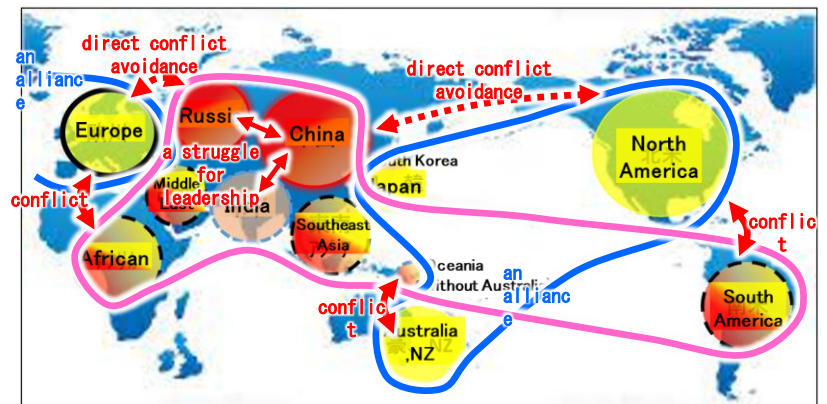
2 Polarization (US-China confrontation)

- The United States and Europe strengthen their relations with their traditional allies, while maintaining ties with China and Russia Expand and strengthen cooperation with countries at the halfway point
- China and Russia seek to expand their influence in neighboring countries and engage in conflict with the United States and Europe



2 Polarization (North-South (between developed and developing countries) Conflict)

- Increased conflict between developed countries such as the United States, Europe and Japan and emerging and developing countries, especially intensified conflict within the same and neighboring regions
- The United States and Europe and China and Russia do not directly oppose each other. China, Russia and India struggle for leadership



Analysis for global strategic environment development around 2040 (3/3)

Reference 11 - 3

Typical typologies

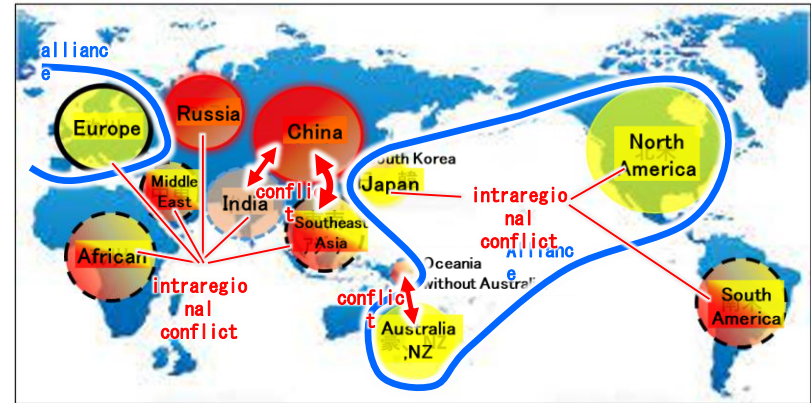
Multipolarity (cooperative tone)

- The United States will maintain ties with its traditional allies and use them to expand stability and cooperation among countries
- China, Russia and others insist on dissolving the alliance to recover from strategic inferiority



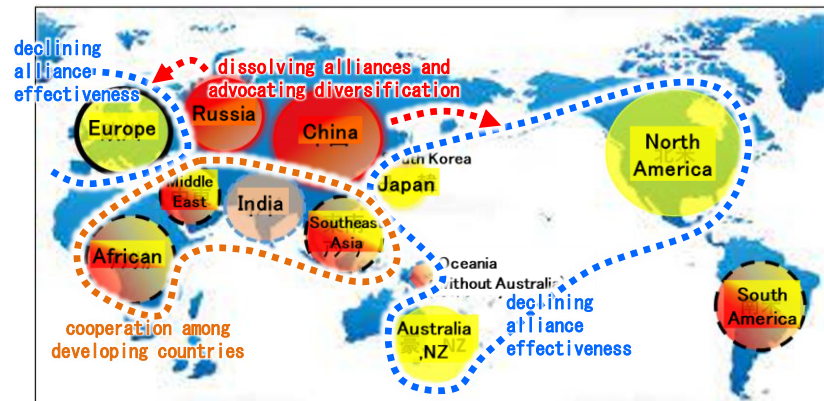
Multipolarity (opposing tone)

- Avoiding direct confrontation between the United States and its allies, China and Russia insist that the United States and Europe engage in conflict with neighboring countries on issues that are difficult to intervene in
- Disputes between neighboring countries in each region tend to escalate into disputes



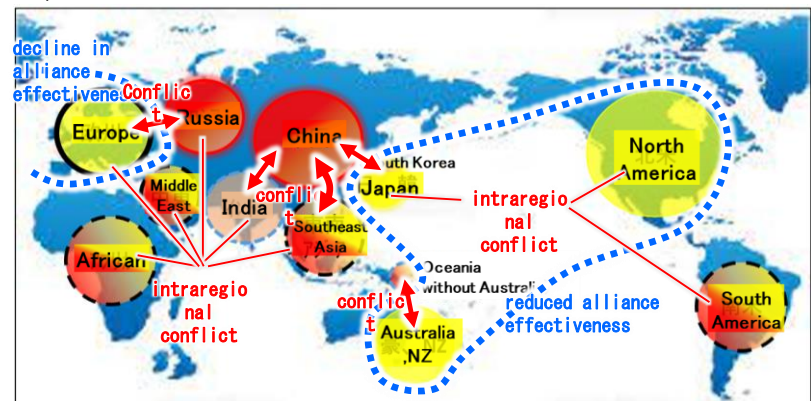
G0 (cooperative tone)

- The United States strives to maintain relations with its traditional allies, but peace will reduce the need and effectiveness of alliances due to dividends
- Cooperation among developing countries to expand economic growth and influence



G0 (opposing tone)

- Difficulty of U.S. and European intervention in China and Russia as U.S. alliance effectiveness declines. Growing conflict with neighboring countries over issues
- Disputes between neighboring countries in each region tend to escalate into disputes



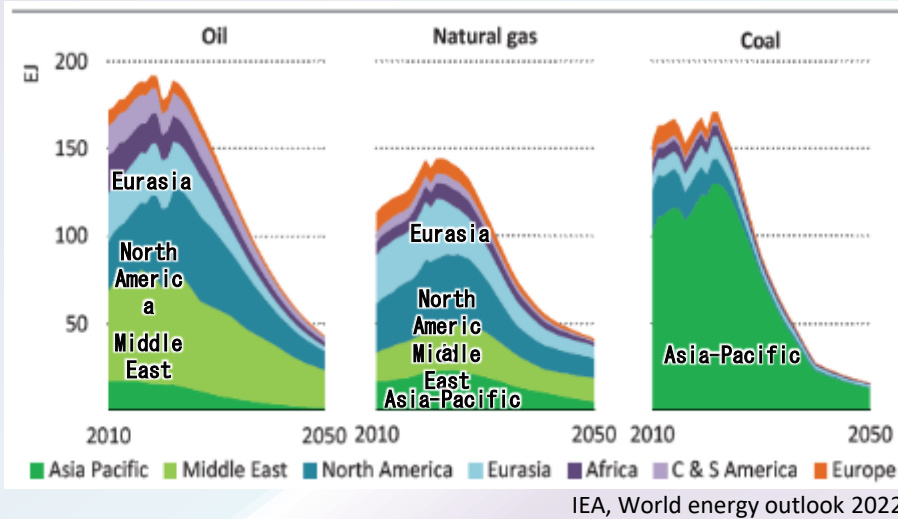
Komat su

Although there is a wide range of trends from multipolarity to G0 and from coordination to confrontation, they can be classified into the same category structurally.

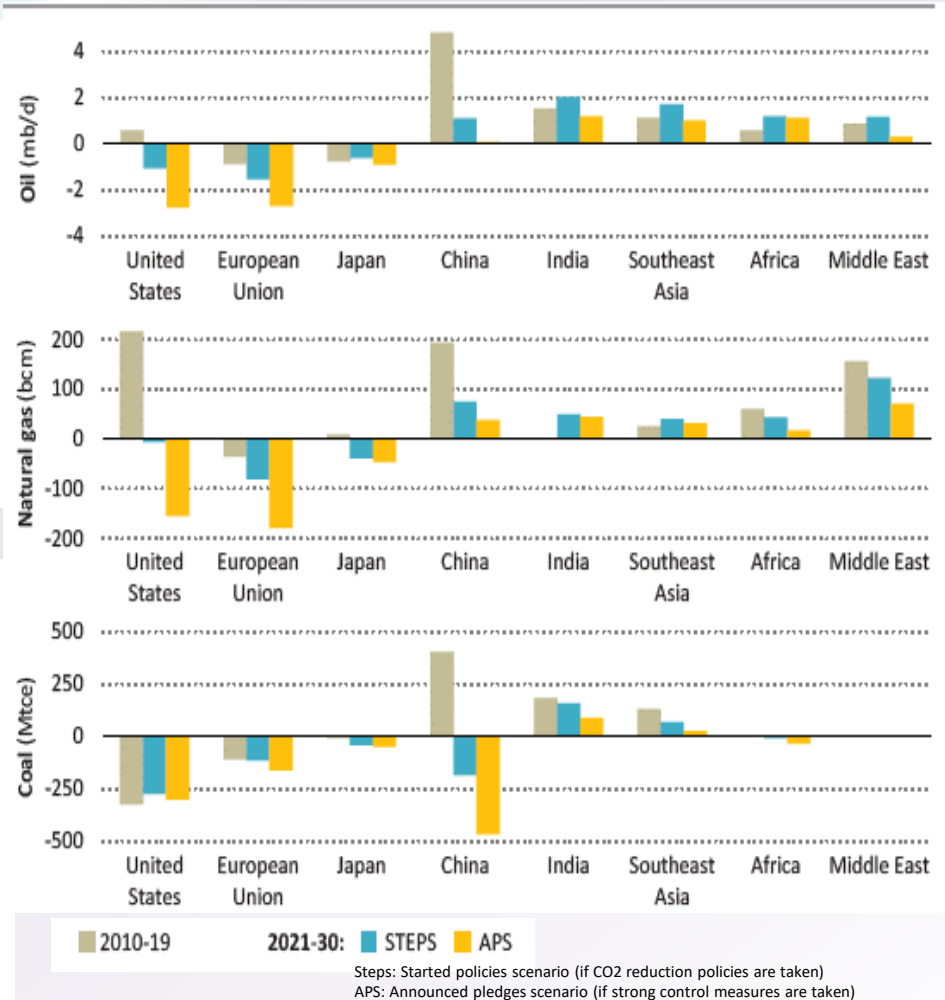
Future projections for fossil fuel substitution

Reference 12

Regional sources of oil, gas, and coal until about 2050

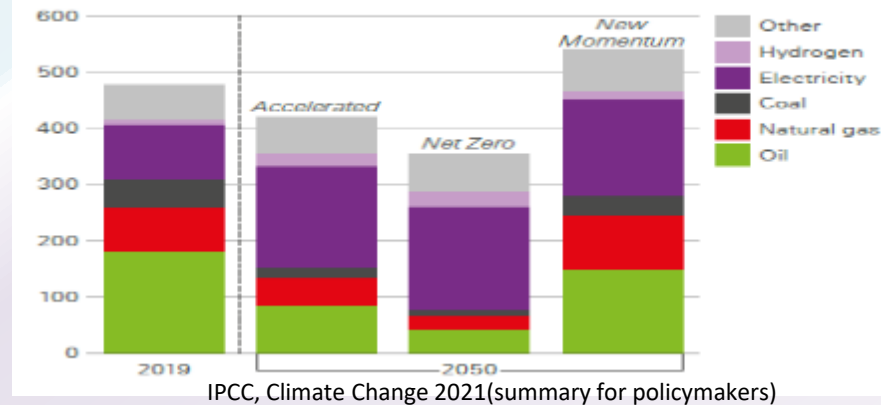


Changes in energy demand by region by future scenario



IEA, World energy outlook 2022

Estimation of various types of energy demand when fossil fuels are substituted



Summarize

- Due to the promotion of CO2 emission control policies, fossil fuel use is expected to decrease in general (upper left) and be replaced by hydrogen, electricity, other energy sources (lower left).
- Although developed countries such as the United States, Europe, and Japan are likely to be able to replace energy sources by reducing CO2 emissions, dependence on fossil fuels in countries such as China, India, Southeast Asia, Africa, and the Middle East is expected to continue for the foreseeable future (right).

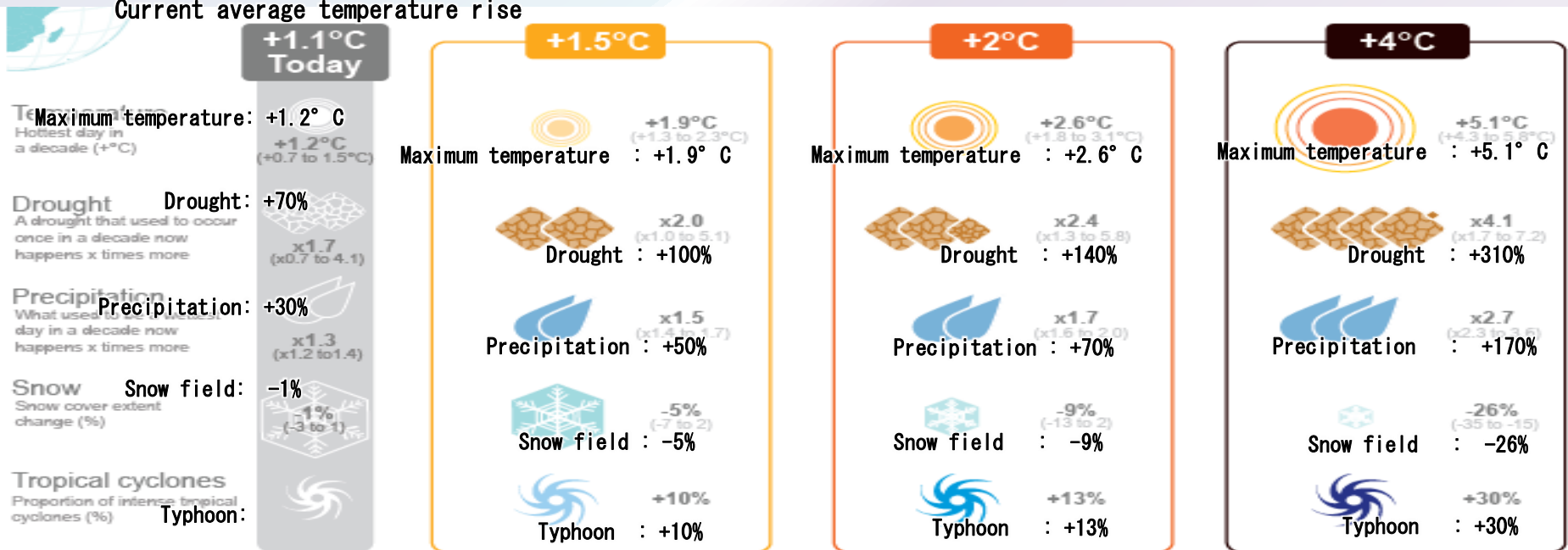
Environmental impacts of climate change, particularly warming

Reference 13

General

- According to an analysis by the International Panel on Climate Change Issues (IPCC), the current average temperature is +1.1° C higher than the world around 1900. As a result, the maximum temperature is +1.2° C, drought is +70%, precipitation is +30%, snowfields are -1%, and typhoons are up from 100 years ago.
- The degrees of temperature, drought, precipitation, typhoons, sea level rise, etc. when the average temperature rises further are as follows:

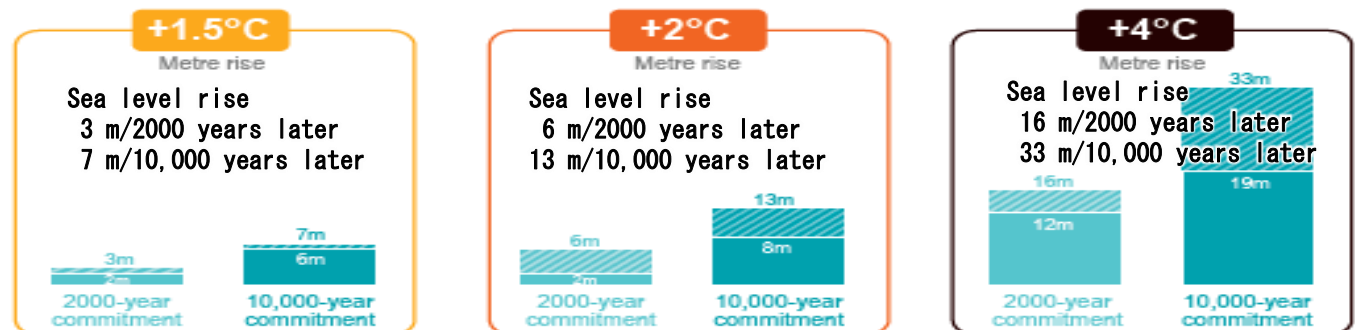
Current average temperature rise



Long-term consequences: Sea level rise

Today, sea level has already increased by 20 cm and will increase an additional 30 cm to 1 m or more by 2100, depending on future emissions.

Sea level reacts very slowly to global warming so, once started, the rise continues for thousands of years.



Impact of the Northern Sea Route

Overview
and
Evaluation

1 Summary

- Traditionally, it is difficult to use the Northern Sea Route due to sea ice. In the 2000s, due to the decrease in sea ice caused by global warming, the Northeast Passage along the Russian coast opened. In the future, sea ice will drastically decrease due to further warming, and the Central Passage is expected to open around 2040 (Figure 1).
- The Northern Sea Route can shorten the distance between East Asia and Europe by more than 30%. It can also avoid choke points (Malacca, near the Red Sea, etc.).
- On the other hand, even when sea ice has almost disappeared, special ships with ice-breaking and ice-resistant specifications are required for the passage of the Northern Sea Route, and there are navigation restrictions that are difficult to resolve, such as ice freezing every winter.
- In addition to the above, the Arctic Circle is an area of natural resource (Oil and LNG) reserves, and because it is the shortest route between the United States and the United States, it is also an important area for nuclear force posture, including ballistic missiles, bombers, and nuclear submarines.

2 Reputation

- The reduction of sea ice due to global warming will continue until 2040, increasing the convenience and availability of the Northern Sea Route
- The economic relationship between East Asia and Europe will be strengthened, and the value of the Northern Sea Route as a shipping route between China and Russia will increase (Figure 2).
- In this case, the confrontation between the United States and Russia in the Arctic will become radicalized, and the regional value of Hokkaido will increase for China and Russia, as Hokkaido (Kushiro Port, Tomakomai Port, etc.) will become the main point of controlling the Northern Sea Route.
- On the other hand, the restriction of navigation in winter will continue, so it cannot be a major alternative route to the Suez Canal.

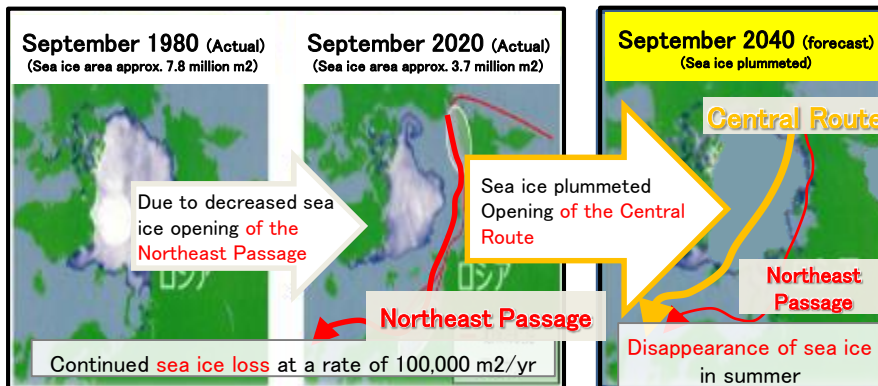


Figure 1: Reduction of Arctic sea ice in summer due to global warming (Actual and forecast)

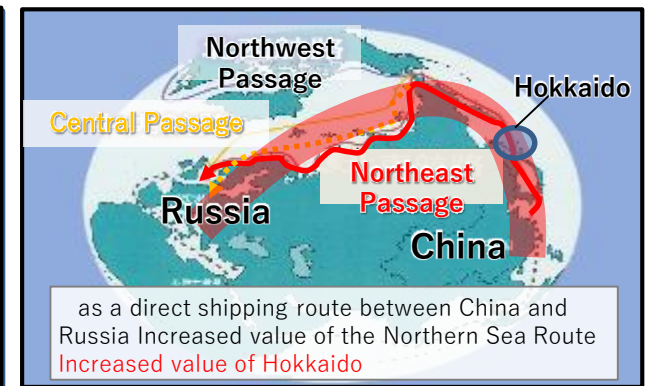


Figure 2: Increasing Value of the Northern Sea Route

Necessity and impact of space utilization and expansion

Overview
and
Evaluation

1 Summary

(1) General

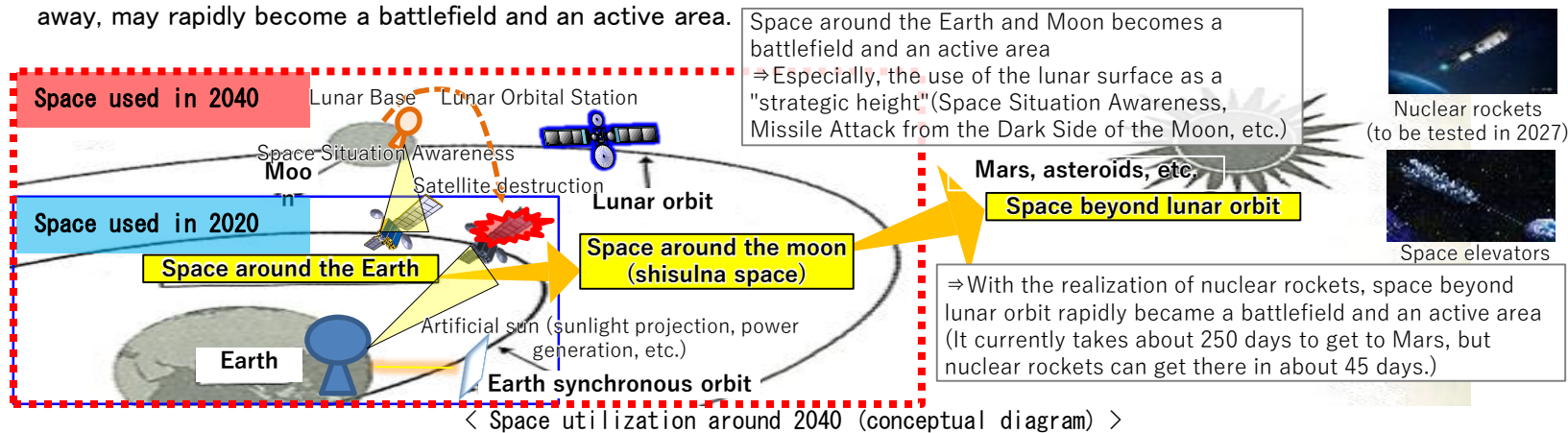
- The use of space has been realized due to the development of technology since the Cold War period. The use of space has become indispensable for the modern civilian and military.
- In terms of military, space has become a "battlefield" due to the interaction between securing its own superiority and destroying or obstructing the capabilities of other countries *1

(2) Expansion of space for use

- The current range of activity is centered on the space around the Earth. In the future, space development by each country is underway with the aim of making the moon and the space around the moon (Shisulna space) "active areas" by 2040.
- The United States plans to conduct manned lunar exploration and construct a space station in lunar orbit by the late 2020s under the Artemis program. China plans to land on the far side of the moon in 2019 under the Chang'e program, to conduct manned lunar exploration by 2030, and to build a base on the moon's south pole in cooperation with Russia in the 2030s.
- In addition, from the 2030s onward, both the United States and China plan to further utilize and advance into space, such as manned exploration in space beyond lunar orbit based on space stations and lunar facilities *2.

2 Reputation

- Until 2040, the need for space utilization and expansion in both civilian and military sectors will increase.
- Potential realization of solar projection outside the daytime and transmission of solar power to the Earth by the artificial sun
- Around 2040, progress was made in making the Shisulna space a battlefield and an active area (use of force in Shisulna space, etc.)
- Around 2050, space elevators and nuclear rockets may be realized. In that case, space beyond the lunar orbit, which is farther away, may rapidly become a battlefield and an active area.



Source: * 1 The fact that military rivalry has arisen due to the deployment of equipment, etc. is used as "battlefield," and the fact that sustained activities such as the establishment of facilities and the long-term stay of personnel have arisen is used as "activity area."

* 2 Yasuhito Fukushima and Masaaki Yatsuka, "Shisulna Security: U.S.-China Activities in Shisulna Space and Future Issues," "Research on Security Strategy," Vol. 3, No. 2, March 2023.

Situation of countries around our country around 2040 (US, China)

Reference 16 – 1

General	<ul style="list-style-type: none"> ○ A broad analysis of the international situation surrounding our country around 2040 from the perspective of PMESIPT and the implications for security in our country. At this time, the underlying trend and the range of fluctuations in the situation are discussed. ○ The Asia-Pacific region and other regions are described based on the analysis of relevant major countries.
The United States	<p>【Politics (P)】</p> <ul style="list-style-type: none"> ○ The strategic competition with China has intensified, and it is recognized as a long-term struggle over the values and governance model of democracy versus authoritarianism. Especially in the Indo-Pacific region, tensions continue to rise due to the conflict over Taiwan, and competition in the region has become the sharpest. At the same time, on the European front, Japan is confronting Russia with NATO, whose threshold for the use of military force has been lowered, and there is a possibility that this will be a two-front strategic response. ○ In addition, due to the relative decline in global influence, Japan will prioritize its own national interests and compromise with other officials, while cooperating with other countries. <p>【Military (M)】</p> <ul style="list-style-type: none"> ○ Recognizing China as a strategic competitor and Russia as an immediate threat, developing concepts with China in mind and emphasizing the need for collective countermeasures ○ Active involvement in strategic deterrence of allies and partners and the possibility of advancing multilateral integration of military infrastructure and maintaining military presence in order to deter the expansion of China's influence in the Indo-Pacific and Russia in Europe <p>【Economy (E)】</p> <p>Continued stable economic growth. On the other hand, in order to prevent the decline in China's relative influence, Japan is strengthening its relations with ASEAN countries and promoting "friend shoring" for the stable supply of supply chains and critical goods.</p> <p>【Society (S)】</p> <p>While the diversification of society, such as race and values, is accelerating, there is a possibility that society will become divided due to widening economic disparities and an increase in the number of people unable to cope with changes, resulting in deterioration of public safety, etc.</p>
China	<p>【Politics (P)】</p> <ul style="list-style-type: none"> ○ Strengthen the one-party dictatorship of the Chinese Communist Party in order to realize the "Dream of China" by 2049, maintain strong leadership, and expand its influence on the international community by hardening its attitude toward Taiwan and accelerating the change of the status quo in the Asia-Pacific region ○ Amid the radicalization of conflicts with democracies, expand the number of partners such as Russia and SCO member states who can share the political system and the sense of international order, and export development models and values to developing countries. On the other hand, a defiant stance toward the existing international order may lead to critical pressure from the international community and a hardening of China policy, thereby reducing its influence. ○ (With or without the invasion of Taiwan, whether or not Taiwan will be occupied as a result of the invasion, and whether the invasion will be abandoned or failed due to the decline of national power) Depending on the situation of the conflict between China and Taiwan, influence may fluctuate. <p>【Military (M)】</p> <ul style="list-style-type: none"> ○ Modernization of the military by around 2035 and construction of a "world-class military" by around the middle of the 21 century in order to counter criticism of the party dictatorship and suppression of external forces. Advancing the development of weapons and equipment using science and technology, aiming to acquire technology comparable to that of the United States, and strengthening the ability to wage war in a hybrid manner, including in the military and non-military fields. ○ On the other hand, if the development of military technology and economic development slows, the modernization of the military may be delayed, and the development of military capabilities may be slowed. <p>【Economy (E)】</p> <ul style="list-style-type: none"> ○ Achieving steady economic growth by creating a stable macroeconomic environment led by China while the working population declines due to a declining birthrate and an aging population ○ On the other hand, there is a possibility that economic growth will slow due to a situation in which supply cannot keep up with increasing energy demand, intensification of environmental problems associated with economic growth, and international policy toward China. <p>【 Society (S) 】</p> <p>There is a possibility that society will be disrupted and divided due to the continued rapid decline in the birthrate and the aging population, resulting in an extreme decline in the labor force. In addition, the government will strengthen security measures to stabilize the domestic situation.</p>

Situation in Countries Around our country Around 2040 (Russia and North Korea)

Reference 16 – 2

Russia	<p>【Politics (P)】</p> <ul style="list-style-type: none"> ○ The scope of Russia as a sphere of influence includes the former Soviet Union, and it maintains a hard-line stance, taking action including the use of military force against acts deemed to be violations of Russia. It maintains a structure of confrontation with Europe and the United States to maintain the legitimacy of the regime. It maintains ties with the non-European United States through food and energy exports, while isolating itself internationally. ○ While national power is on the decline regardless of the outcome of the invasion of Ukraine, the reversal of the power balance with China has led to an increase in diplomatic and military activities in concert with China's actions, while the threshold for military action has decreased and there is the possibility of becoming a military state. ○ Depending on the situation, there is the possibility of a policy change in a pro-Western direction under domestic pressure. <p>【Military (M)】</p> <ul style="list-style-type: none"> ○ Seeing NATO's military expansion and interference in its domestic affairs from the United States and other Western countries as an invasion, the alliance effectively pursues its defense policy under a prolonged war with NATO ○ Prioritizing the development of strategic nuclear forces and shifting to a position where it can withstand a prolonged and exhausting war through a national mobilization system <p>【Economy (E)】</p> <ul style="list-style-type: none"> ○ Continued industrial structure dependent on energy, food and weapons exports. On the other hand, trade with Europe and the United States decreased and relations with China and developing countries strengthened. ○ Continued economic sanctions imposed by Europe and the United States could lead to economic hardship and a significant delay in economic growth and technological progress. <p>【Society (S)】</p> <ul style="list-style-type: none"> ○ Since 2016, the population has decreased, the population is aging, and the percentage of the labor-producing population has decreased since its peak in 2017. At the same time, there is a possibility that domestic public opinion will become uniform and hard-line while growth will slow due to the outflow of intellectual human resources. ○ There is a possibility that anti-government or anti-Western sentiment will increase as the standard of living of the people declines, creating social unrest.
North Korea	<p>【Politics (P)】</p> <ul style="list-style-type: none"> ○ It is a one-party dictatorship of the Workers' Party of Korea and has implemented domestic politics with the continuous goal of building a strong and prosperous socialist country. In addition, the division of the Korean Peninsula is expected to continue, and it will continue provocative diplomacy using nuclear weapons and missiles with the ultimate goal of socialist unification of the Korean Peninsula. ○ If Kim Jong Un judges that the Korean Peninsula is recognized as an international power and a military power, there is a possibility that he will concentrate on economic construction, halt nuclear tests, and conduct nuclear non-proliferation. ○ There is also a possibility that he will conduct conciliatory diplomacy with neighboring countries if his domestic economic situation deteriorates due to provocative diplomacy. <p>【Military (M)】</p> <ul style="list-style-type: none"> ○ The military is strengthened with the aim of maintaining the government by the Kim family and emphasizing nuclear deterrence. The government promotes the introduction of cyber special forces and inexpensive drones to compensate for the inferiority of conventional forces and expands its influence in the cyber field. ○ Possibility of conducting military operations in conjunction with China's foreign military operations due to China's economic dependence <p>【Economy (E)】</p> <ul style="list-style-type: none"> ○ Develop the economy so that industry and agriculture can be produced and supplied domestically, and establish an economic path that does not depend on foreign economies such as imports. At the same time, national promotion of the acquisition of foreign currency through cyber means ○ On the other hand, if the current situation of economic sanctions and the negative growth situation of the domestic economy do not improve, there is a possibility of halting provocative diplomacy and changing to a conciliatory policy. <p>【Society (S)】</p> <p>We will implement social measures to achieve self-sufficiency and self-sufficiency in our own country, but we will also continue trade dependent on China. Depending on the state of trade with China, there is a possibility that domestic food and energy supplies will become unstable and social chaos will occur.</p>

Situation of countries around our country around 2040 (Others)

Reference 16 – 3

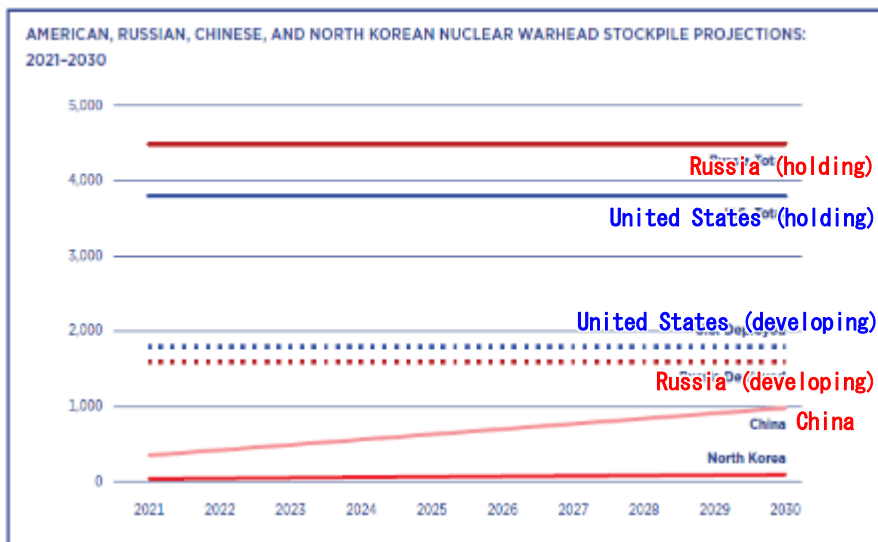
Other	<ul style="list-style-type: none"> ○ Asia-Pacific region <ul style="list-style-type: none"> • As a source of continuous population growth and migration supply, India will increase its influence on countries in and outside the region while growing its economy, but it will continue to have antagonistic relations with China and Pakistan. Pakistan and Afghanistan will continue to engage in clashes and dialogue with neighboring countries, changing defected countries between Russia, China and Muslim countries due to domestic conditions and foreign policies of major countries, while cooperating among Muslim countries. • China's unilateral change of status quo in the East and South China Sea will accelerate. As there are pro-China countries and anti-China families in ASEAN countries, it has been unable to reach a consensus and maintains a neutral posture. Despite the increasing presence of Britain, France and other European countries with territorial and national interests in the Pacific Ocean, there is a possibility of securing choke points in the Malacca, Bathy and Celebes straits, which are further outside the region, as it is not possible to prevent China from becoming an inland sea in the South China Sea. • In the South Pacific region, China's economic and military presence has expanded, and military use of ports and airports has occurred in some regions. In response to issues such as the loss of territory due to sea level rise and the attraction of development, there are countries that are on both sides, the U.S. and Australia and China. • In the Indian Ocean region, the conflict between India, which is expanding its influence based on maritime security with the Indian Ocean as its top priority, and China, which is expanding its influence in the region to realize the Belt and Road Initiative, has intensified. On the other hand, if relations between China and Muslim countries deteriorate, it may be difficult for China to expand its influence in the Indian Ocean. • In the Arctic Ocean region, the use of the Northern Sea Route will increase as glaciers in the Arctic Ocean decrease. As Russia's national power declines, it will become difficult for Russia alone to control the strait, increasing the probability that China will advance into the Arctic Ocean. There may be a difference in the ease of use of the Arctic Ocean between Chinese and Western ships, leading to the use of the Northern Sea Route as a diplomatic card for China. ○ Other regions <ul style="list-style-type: none"> • The balance of power is complicated by the decline in the relative influence of the United States, the development of emerging economies, and the expansion of China's influence.
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Sources: Defence Research Institute East Asia Strategic Overview 2021 and 2022, 2022 Defence White Paper, Japan Institute of International Studies Strategic Annual Report 2022, UK Defence Minister Future Operating Environment 2035, UK Police Academy Future Operating Environment 2040, Defence Research Institute China Security Report 2022 and 2023,

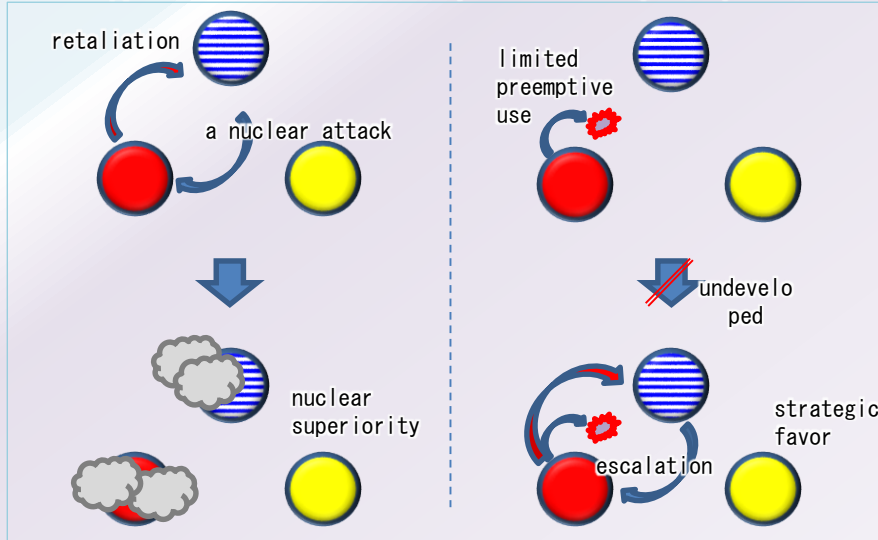
Summary	<ul style="list-style-type: none"> ○ In the Indo-Pacific region around 2040, the conflict intensified as the United States increased its commitment, while China's influence increased. On the other hand, the interests of each country are complicated, and each country has different conflicts and cooperation on specific issues, making it difficult to establish a common understanding. ○ There is the possibility of small scale conflicts to large-scale multilateral wars due to friction between countries, intensification of conflicts, dysfunction of international organizations, and a decline in the sense of law and order.
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Changes in the Nuclear Balance as China Becomes a Nuclear Power

Reference 17



[S. Pettyjohn, "Deterrence in a Multipolar Nuclear Age", May 2022, CNAS]



○ Although China will be inferior to the United States and Russia around 2030, if China's rapid growth continues, the United States, Russia and China may reach similar levels around 2040.

→ With China's rapid increase in its nuclear arsenal the nuclear strategy has shifted China from a two-pole balance between the United States and Russia to an unstable structure, including China

○ Dealing with the U.S., China and Russia's nuclear strategy under each of the three polar regimes is no easier than the three-body problem in physics, and is difficult to predict and control.

○ Under the nuclear tripolar regime, the credibility of the U.S. nuclear umbrella is undermined by the need to hedge against threats from two rival countries.

[A.Krepinevich "The New Nuclear Age", Foreign Affairs May, 2022]

→ As incentives for limited preemptive use of nuclear weapons increase, the credibility of extended nuclear deterrence decreases.

Summary

The U.S. nuclear strategy is expected to be revised due to the trifurcation of nuclear powers, and the expansion of allies the nuclear deterrence strategy may also be reconsidered

Domestic situation around 2040 (analysis)

Reference 18 – 1

general	<p>From the perspective of PMESIPT, we analyze the domestic situation around 2040 and determine the impact on our country's security. At this time, we consider the trends and fluctuations of the domestic situation.</p>
Analysis	<p>【Politics(P)】</p> <ul style="list-style-type: none"> ○ In order to uphold the universal values of a democratic country and contribute to the formation of an international order of coexistence and co-prosperity, the United States and Japan will use their comprehensive national power to address global, Indo-Pacific, and our country security issues through various policies based on the Japan-U.S. alliance, and maintain national interests in protecting the survival, prosperity, and values of our country. ○ On the other hand, there is a possibility that Japan and the United States will maintain the Japan-U.S. alliance, seek new allies, and independently defend itself, depending on domestic public opinion, social factors, and threats and trends in neighboring countries. ○ There is a possibility that domestic public opinion will become divided as the U.S.-China conflict intensifies due to dependence on Europe and the United States in the fields of diplomacy and defense, and dependence on China in the economic field. <p>【Military(M)】</p> <ul style="list-style-type: none"> ○ In light of the dramatic changes in the security environment surrounding the global and our country, we have begun to engage actively in stabilizing the international environment and to drastically strengthen our defense capabilities, focusing on the capabilities of threat actors. Strengthen cross-area operational capabilities, including counter-attack capabilities, and promote government-wide initiatives such as active cyber defense and significant strengthening of the defense production technology base to be realized over the next 10 years ○ On the other hand, a reduction in threats due to the stabilization of the security environment and a shift in policy priorities due to the deterioration of economic conditions may limit the increase in defense spending <p>【Economy (E)】</p> <ul style="list-style-type: none"> ○ With the maturation of the economy, the growth rate has shifted to a low level, and the relative presence has declined in contrast to the growth of emerging economies. On the other hand, there is a possibility that by actively collaborating with Asia and co-creating value, economic growth opportunities will be acquired, and that the economic presence of developed countries can be enhanced by presenting a model for solving social problems in advance and exporting infrastructure. ○ By expanding private demand through successive economic measures and social implementation of science and technology measures, economic growth will be maintained at around 2%. On the other hand, if productivity stagnates due to ineffectiveness of the measures, there is a possibility of negative growth after the 2040s. ○ While progress in digitalization can promote technological innovation and increase productivity, there is a risk of accelerating wealth inequality and the decline in the labor share. In addition, in response to the acceleration in the expansion of the semiconductor and battery markets, there is a possibility that technological innovation will be delayed and economic growth will slow if dependence on certain countries for important products is reduced or if new technologies are not managed appropriately.

Sources: The 2022 White Paper on Defense, the Cabinet Office's Medium- and Long-Term Economic and Fiscal Estimates, the Reiwa 2 and 4 White Paper on Science and Technology, and the the Ministry of Economy, Trade and Industry Green Growth Strategy the Ministry of Economy, Trade and Industry Semiconductor and Digital Strategy, the Ministry of Economy, Trade and Industry Trade White Paper 2022

Domestic situation around 2040 (analysis)

Reference 18 – 2

analysis	<p>【Society(S)】</p> <ul style="list-style-type: none"> ○ The declining birthrate and aging population have led to a decline in the population, impoverishment of the elderly, and isolation. In addition, the burden on households may rise continuously, and social disorder may arise due to an increase in the number of people dissatisfied with the government. ○ Around 2040, social security expenses will increase due to an increase in the number of elderly people whose medical and nursing care needs will increase. In addition, increasing costs related to the renewal of aging public facilities and infrastructure will strain public finances. In addition, due to urban consolidation in rural areas, rural areas will become polarized into urban areas and run-down uninhabited depopulated areas, affecting defense. ○ Due to the aging of the population, the society will become one in which people will continue to work for the rest of their lives, and the elderly will also be utilized in the labor force. In addition, discussions on immigration to compensate for the declining population have accelerated. On the other hand, there is a possibility that jobs with high potential for replacement will be replaced by robots and AI, thereby eliminating the problem of the working population and increasing productivity. ○ As global warming progresses, frequent and severe disasters will accelerate. In addition, the probability of a large-scale earthquake with its epicenter in the trenches around Japan has increased, and the risk of severe damage has increased year by year due to the declining birthrate and aging population. In particular, in the field of defense, the difficulty of securing human resources due to the declining birthrate and aging population, frequent and severe disasters, and the possibility of responding to the increase and diversification of missions, such as responding to threats from neighboring countries.
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Sources: 2022 White Paper on Defense, the Ministry of Education, Culture, Sports, Science and Technology Review of Society for 2040 (Workshop Report), Reiwa 2 and 4 White Paper on Science and Technology, the Ministry of Economy, Trade and Industry Green Growth Strategy, 2021 White Paper on Health, Labour and Welfare, the Ministry of Internal Affairs and Communications Changes and Issues Revealing through 2040

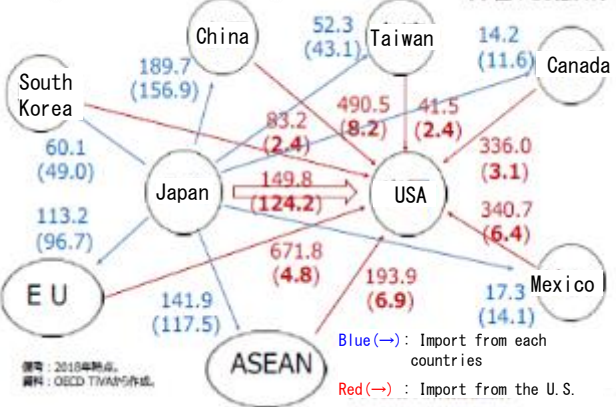
Domestic situation (industry) around 2040

Reference 18 - 3

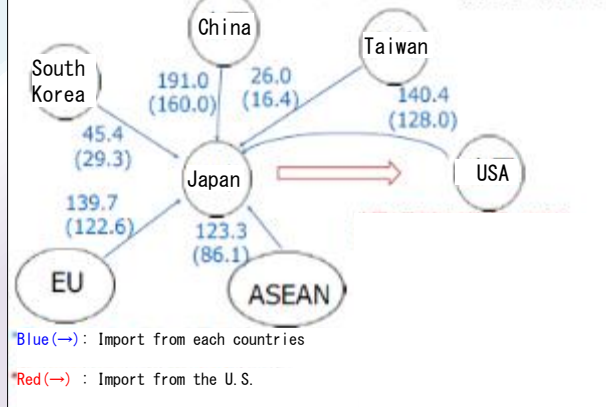
Industrial structure Overview

- The structure that Japan is a processing trading country that exports raw materials with added value has not changed since the postwar economic reconstruction.
- In Japan's foreign trade, ① "Forward participation," in which intermediate goods are exported to China, South Korea, ASEAN, etc., and final goods are manufactured and distributed in each country. There are two forms of "backward participation," in which intermediate goods are purchased from China, South Korea, Taiwan, and Europe, and final goods are manufactured and distributed in Japan. As a ratio Although most of the participants are in the front, the number of participants in the back is also increasing.

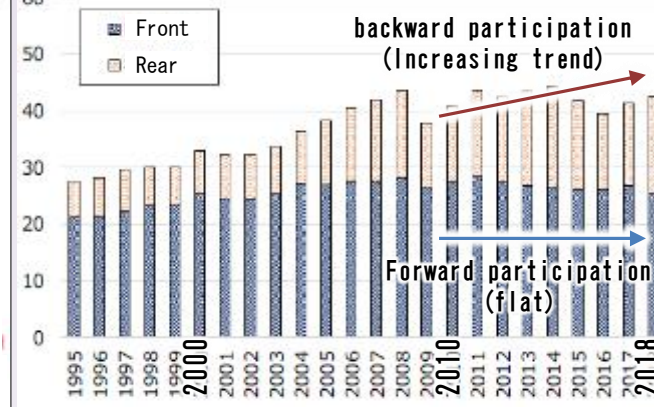
Japan's Participation in Global Value Chains



Japan's Participation in Global Value Chains (後方参加)



Trends in Japan's Participation

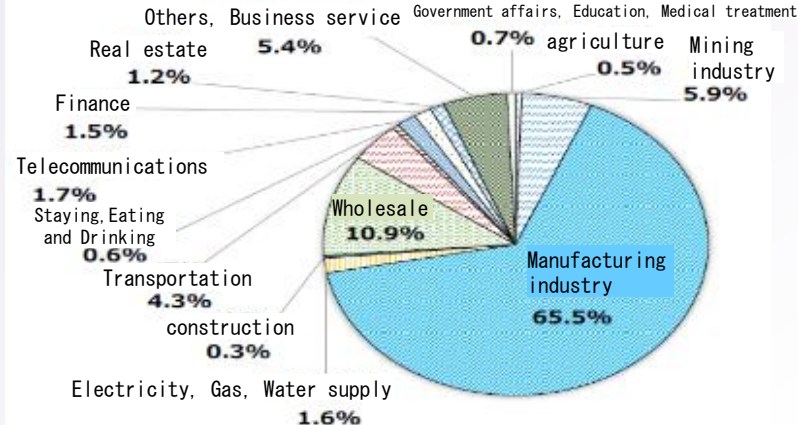
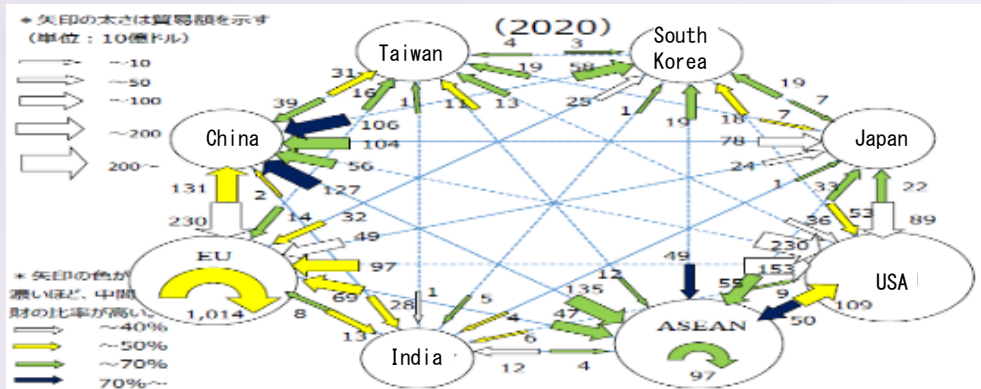


Source: OECD, RIETI- Prepared by the Ministry of Economy, Trade and Industry based on TID (Trade White Paper 2022)

For exports For manufacturing state of affairs

- The state of trade in machinery and materials between the two countries (lower left) shows that **China and ASEAN import a large number of intermediate goods**, and the two regions are the manufacturing sites of final goods. The present situation is remarkable. In other regions, intermediate and final goods are exchanged to the same extent.
- Manufacturing accounts for most of the industries for export (below on the right), followed by wholesale, mining, information and communications, transportation, etc.

Trade Status of Machinery and Materials among Countries



Domestic situation (industry) around 2040

Reference 18 - 4

Industrial Future changes

- As technology advances, simple work itself will be replaced by machines, and the skills and occupations required of human beings will be those for human subjects and machines.
- Work that makes efficient use of machines, and work that cannot be replaced by machines, will increase in weight. The situation in which economic growth cannot be expected without "securing the labor force," "improving productivity," and "stabilizing the world economy and stable supply of resources" as prospects for economic growth in Japan from around 2030

Skills necessary and unnecessary, and occupations that will increase around 2030

	Necessity	Unnecessity	Increasing occupation	
1位	Strategic learning skill	Accuracy of operation	Wind power generation engineer	+68.2%
2位	Psychology	Speed of hand work	Nurse	+52.2%
3位	Leadership	Rate control	Solar power generation engineer	+52.1%
4位	Social insight	Dexterity of hand work	Statistician	+35.4%
5位	Sociology・Anthropology	Dexterity of fingertip	Physiotherapist helper	+35.4%
6位	Pedagogy	Accuracy capability	Information security analyst	+33.3%
7位	Cooperativity	Speed of response	Home helper, personal care Aid	+32.6%
8位	Creativeness	Stability of hand work	Medical treatment, health care	+32.5%
9位	Abundance of idea	Equipment management	Data / mathematical scientist	+31.4%
10位	Active learning	Accuracy of response	Doctor assistant	+31.0%

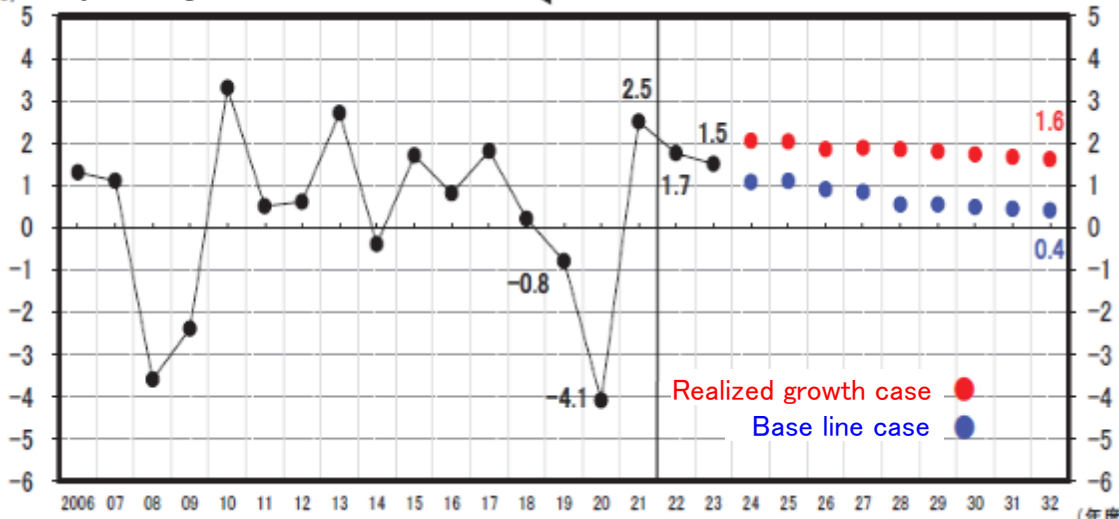
Remarks : Right line of "Increasing occupation" is the rate of increase of employer until 2030

Reference: H. Bakhshi, J.M. Downing, M.A. Osborne, P. Schneider, "The future of skills: Employment in 2030", ministry of labor in USA

Projected changes in employment due to technological developments

- According to an analysis by the U.S. Department of Labor that analyzes future employment based on technological developments, the need for skills such as simple manual work and judgment work has decreased as AI, computing, and information and communication technologies have advanced. On the other hand, the need for skills that require communication, cooperation, and creativity with others is improved.
- Occupations that are expected to increase are energy-related, mathematical analysis-related, and interpersonal services (Medical care, nursing care, etc.).

(%) Projected growth rate of real GDP ← results



Source: Mid- to Long-term Economic and Fiscal Policy Estimates (R 5.1.24 Source: Economic and Fiscal Policy Council)

Prospects for Japan's Future Economic Growth

- According to the government's medium- to long-term economic and fiscal estimates, Japan's economic growth is expected to continue at around 1.6% with the **implementation of appropriate measures.**
- The assumptions of the economic growth continuation scenario include:
 - ① Female labor force participation rate +10%,
 - ② Elderly (65-69) Male labor force participation rate +10%, and
 - ③ Increased acceptance of foreign workers (2.72 million → 3.42 million) since 2021), improvement of productivity (**including investment in people**), **stability of the global economy, and stable supply of resources.**

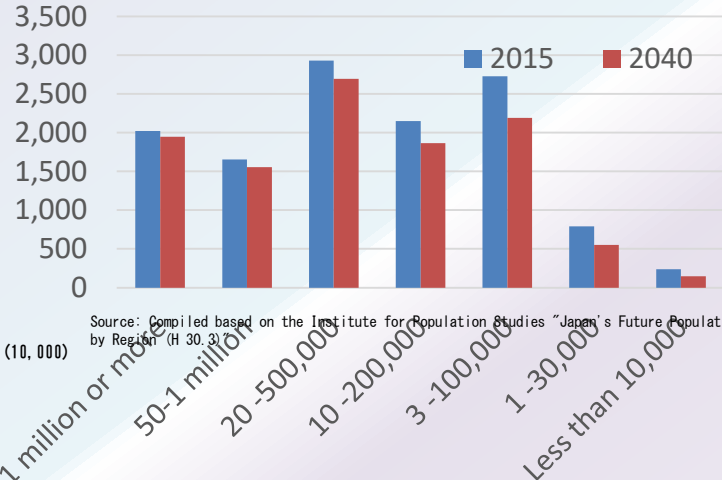
Domestic situation around 2040 (local administration)

Reference 18 - 5

Population decline into rural areas the effect of

- Compared with urban areas, municipalities with a population of 30,000 or less have a greater proportion of population decline. Since around 2030, various types of infrastructure have aged and the need for renovation has increased. However, due to population decline and hollowing out, the number of users has decreased and renovation is inefficient.
- The above problems have become apparent in some cities, and cooperation of urban functions and consolidation of services across municipalities have started. In the future, consolidation of these urban function services may increase in each region.

Changes in each municipality by population stage



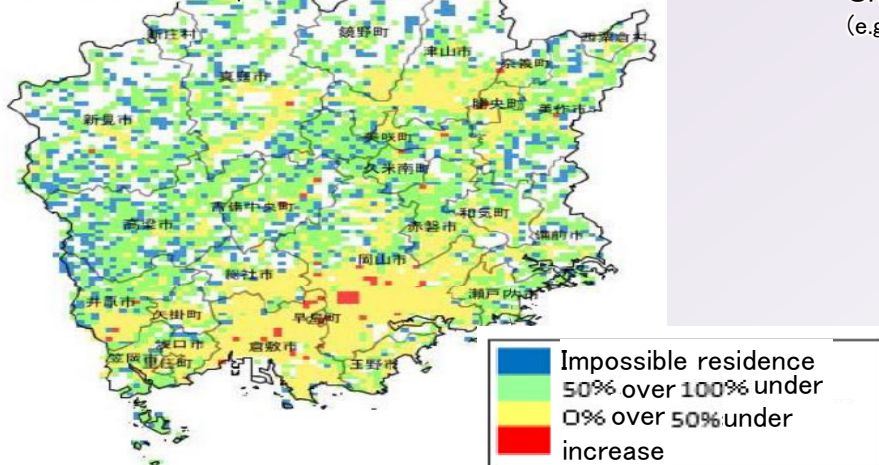
Source: Compiled based on the Institute for Population Studies "Japan's Future Population by Region (H 30.3)"

Percentage of social capital more than 50 years after construction

	Overall	2012	2022	2032
		Road bridge	Approximately 400,000 bridges	16%
Tunnel	Approx. 10,000	18%	31%	47%
River facilities (Floodgates, etc.)	Approximately 10,000 facilities	24%	40%	62%
sewerage	Approx. 440,000 Km	2%	7%	23%
Port Quay	Approximately 5,000 facilities	7%	29%	56%

Source: Compiled based on the Cabinet Secretariat's "Liaison Conference of the Relevant Ministries on Promotion of Measures against Aging of Infrastructure (25.10.16)"

Population increase and decrease in Okayama Prefecture (from 2010 to 2050) (example)



Source: The Ministry of Land, Infrastructure, Transport and Tourism's "Grand Design 2050 (26.7.4)" Reference

Sharing of urban functions and municipal cooperation in regional areas (e.g., Hyogo)



Source: Reference Material for the Ministry of Land, Infrastructure, Transport and Tourism's "Examples of Preceding Initiatives in Intersectoral Cooperation (29.9)"