The Importance of Interdisciplinary Studies in Growth Studies and Japan's Long Stagnation

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<Summary>

After reviewing trends in economic growth studies since the mid-1980s, this paper argues the importance of interdisciplinary studies in growth studies. In addition, I present several hypotheses from the perspective of interdisciplinary research on the "long-term stagnation of the Japanese economy," which is an interesting theme in growth studies, and discuss the validity of these hypotheses.

Introduction

Growth studies, which study the determinants of income in each country, are considered to be the central theme of development economics. The term "economic development" can be thought of as a phenomenon that includes not only the improvement of income, but also the evolution of social organizations and institutions.

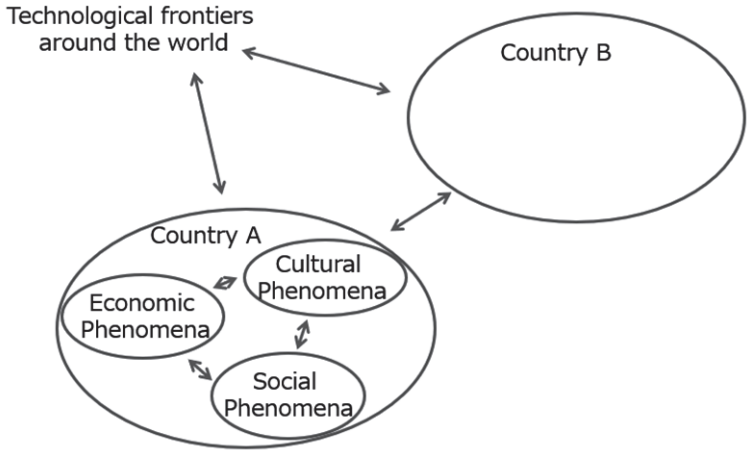
However, as Hayami and Godo (2005) point out "If so, in addition to the analysis of economic growth, the study of economic development must investigate the influences of institutional and cultural factors on economic growth as well as the impacts of economic growth on those factors"(p.4), we must not forget that economic growth and the non-economic factors inherent in economic growth influence each other.

In addition to the interaction of the two factors Hayami and Godo point out, "economic factors" and "non-economic factors," the author also argues that interactions including "influences of other countries" and "global technological frontiers" have impacts on the income level of one country. This is as shown in Fig. 1.

Income level is one of the economic phenomena, but there are interactions between cultural and social phenomena. The author believes that the income level of country A is influenced not only by these events, but also by other countries and the technological frontiers of the world. Country B is depicted here as one country, but in reality there are many countries. In addition, the technological standards established by each country will become the technological frontiers of the whole world. Since growth research studies the determinants of income levels, which are economic phenomena in Country A, the author believes that it is necessary to analyze the interrelationships between these phenomena.

Since the mid-1980s, empirical analysis of economic growth has become popular due to the development

Figure 1: Environment Surrounding Economic Events in a Country



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of comparable cross-country income data. Nearly 40 years have already passed, but in my opinion, it is difficult to say that a consensus has been reached in the academic world as to what factors cause economic growth. The reason for this is thought to be insufficient analysis of the impact of non-economic factors on income.

Below, after a brief review of trends in growth studies since the mid-1980s, I will examine the impact of non-economic factors, such as policies of other countries and global technological progress, on economic growth. Finally, I would like to present several hypotheses about the factors behind the long-term stagnation of the Japanese economy, which is an interesting theme in growth research, and discuss each of them.

1. Changes in Empirical Studies on Economic Growth

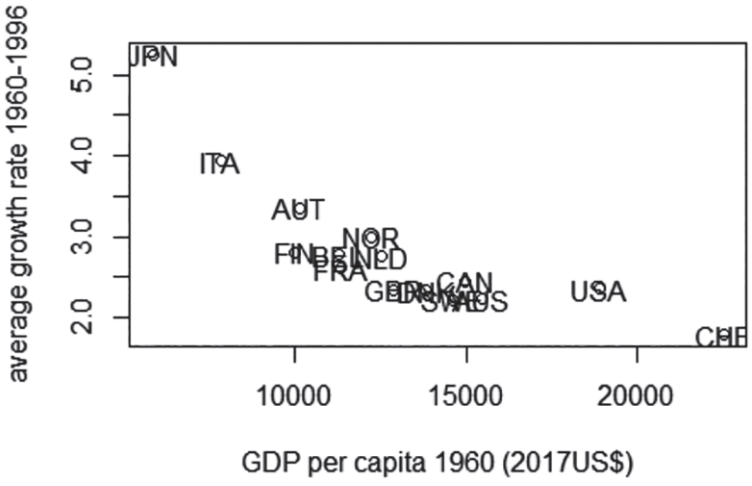
In the mid-1980s, with the availability of data that made it possible to compare incomes of different countries, research into statistical analysis of the factors behind economic growth suddenly flourished. Until then, even though there was research on growth theory, it was not possible to determine whether it was empirically correct or not.

First, Baumol (1986) tested whether the Convergence Hypothesis was correct. The convergence hypothesis is a hypothesis obtained from the Solow model that states that countries with low income have a high growth rate, and as income increases, the growth rate decreases, and eventually converges to a certain level of income. Using data from 1870 to 1979 for 16 developed countries, including the United Kingdom, the United States, and Japan, he plotted a graph of output per hour of labor in each country in 1870 and its subsequent growth rate. The graph was downward sloping to the right. In other words, the convergence hypothesis was supported by the data.

Figure 2 plots the correlation between real per capita income in 1960 and average growth in per capita income from 1960 to 1996, using data from the Penn World Table for the countries used by Baumol (Germany, where East and West were united, is excluded). The unit of real income is the 2017 US dollar. The Penn World Table is a data set that makes it possible to compare the income of each country using the purchasing power parity theory. Looking at this graph, it seems that convergence has indeed occurred.

However, De Long (1988) argued against Baumol's study that convergence had not occurred, including data from other countries. In fact, when the same graph is drawn with data from other countries included in the sample, the graph certainly does not show convergence. Figure 3 is the same time period as Figure 2 and is plotted for all countries for which data are available. The country code is omitted because it is difficult to

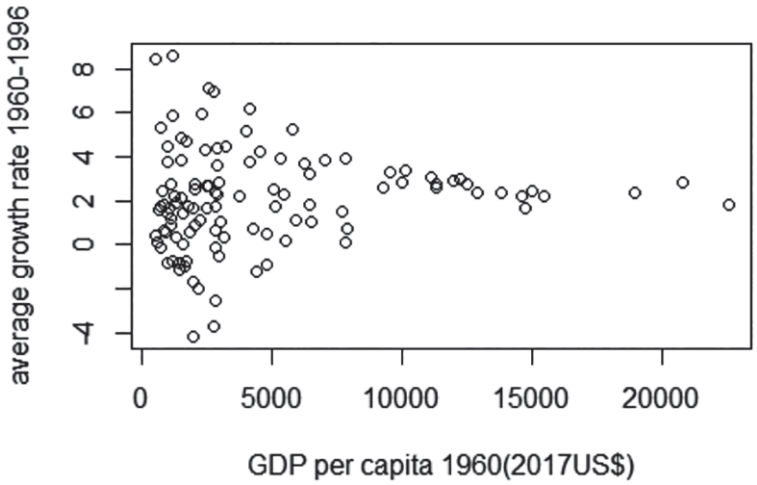
Figure 2: Initial Income and Subsequent Growth: Developed Countries



Data Source: Penn World Tables

(Note) Please refer to the end of the article for the country code in the graph.

Figure 3: Initial Income and Subsequent Growth: Worldwide



Data source: Same as Figure 2.

see in Figure 3.

When all countries were included, the convergence hypothesis was rejected. As you can see in Figure 3, there are many low-income countries with low growth rates.

However, as Baumol discovered, the convergence hypothesis appears to hold within the current group of developed countries. The convergence hypothesis might hold within a group of countries with certain similar characteristics. In other words, "other factors" other than income may lead to different income levels at the convergence point. This is called the "Conditional Convergence Hypothesis." For example, a group of highly educated countries will converge on higher income levels, while less educated countries will converge on lower income levels. If so, it is possible that there are countries with low growth rates even if their incomes are low due to their low levels of education.

Since the late 1980s, empirical studies have denied absolute convergence and suggested the possibility of conditional convergence. However, regarding "other factors" other than income, many researchers have not yet been able to find something that satisfies them. Specifically, various factors such as "education", "geography", "ethnic division", "institutions", "governance", and "leadership" were raised as candidates for "other factors", and various empirical analyzes were conducted. A detailed explanation can be found in Togo (2009), but the important research is introduced below.

Acemoglu et al. (2001) have published a study showing that the environment at the time of settlement is important for subsequent economic development. Specifically, when Europeans settled in developing countries, the environment was bad (for example, due to malaria damage, high temperature and humidity) and the mortality rate was high, so they created "institutions" that can expropriate from the people. If the environment at the time of settlement was good and the mortality rate was low, they would create "institutions" similar to those of the Western world where they lived with the intention of permanent residence. The conclusion of their empirical research is that the difference in the institutions determines subsequent economic performance.

Glaeser et al. (2004) pointed out that there was a problem with the instrumental variable method of Acemoglu et al. (2001). By their own econometric analysis, they showed that "education" is more important to income level than "institution". Since the details of this argument are technical issues related to the method of regression analysis, they will not be discussed in this paper. In empirical research in economics, statistical analysis methods have become more sophisticated, and it is also true that it is becoming difficult to adopt appropriate statistical methods.

Table 1: Years of schooling and subsequent growth: Asia and Latin America

	Average years of schooling in 1970	Average per capita income growth rate in the 1970s
Argentina	5.88	1.08
Chile	5.48	1.33
Hong Kong	5.11	6.68
South Korea	4.76	5.50
Taiwan	4.39	7.69
Singapore	3.74	7.56
Thailand	3.54	4.54
Mexico	3.31	4.11
Malaysia	3.05	7.18
Brazil	2.92	6.09

(Source) Average years of schooling are from Barro and Lee (2000).
Per capita income growth is Heston, etc. (2009)

Then, how important is the “education” pointed out by Glaser et al (2004)? Table 1 shows the average number of years of schooling in 1970 and the average growth rate throughout the 1970s for representative economies in East Asia and Latin America. Looking at this, Argentina, which has the highest average number of years of schooling at 5.88 years, has the lowest average growth rate after that at 1.08%. Taiwan, which had the highest growth rate, has an average number of years of schooling of 4.39 years, indicating that the number of years of education is not particularly high. The average number of years of schooling in Singapore, which later achieved high growth, is 3.74, not much different from Thailand. Table 1 suggests that the number of years of schooling does not necessarily raise the growth rate, even though the sample size is small, for Asian and Latin American countries.

I do not think that empirical research on the conditional convergence hypothesis has reached consensus that everyone can agree on regarding "other factors" that determine income levels. This is because even if we create variables such as “institutions” and “education” in cross-country research, it is clear that their contents will differ from country to country.

It would be complete nonsense to use the number of years of schooling as an indicator of the level of "education". The most obvious example is the large gap in study hours between Japanese and American university students. In other words, there is a big difference in knowledge and thinking ability among the university graduates in two countries. This point will be discussed later. It is also clear that the content and level of primary and secondary education will vary greatly from country to country.

Empirical analyses of growth using cross-country data have declined due to differences in the content of such "other factors" among countries and the difficulty of the instrumental variable method described above. Instead, randomized controlled trial (RCT) is becoming more popular recently. However, an analysis using randomized controlled trials is an analysis using micro data. The results cannot be used to discuss the determinants of a country's economic growth since economic growth is a macro phenomenon.

2. Economic Growth Studies and Interdisciplinary Studies

Under these circumstances, Rodrik (2003) argues that case studies and cross-country econometric analysis should be complementary, and points out the importance of case studies (p.10). In other words, the results of econometric analysis must be consistent with case studies. Case studies provide hints for econometric analysis. Case studies can also be thought of as “historical research” in a sense.

I think Rodrik's argument is valid, but I think it's not enough if the content of "historical studies" is focused only on the history of the country concerned. As a reason for thinking so, I have the experience of seeing one documentary movie. It is the documentary "Revolution.Com" (France, 2005) broadcasted on NHK's "BS World Documentary"[1]. It showed that American conservative political groups and NGOs were active in the background of the democratic revolutions in Georgia, Ukraine, and Kyrgyzstan, the so-called "democratic dominoes." "Democratization," which is thought to bring about "growth" in one country, was

[1] Wanting to confirm this documentary again, the author participated in the NHK Archive Academic Use Trial and browsed the archives database within NHK. However, this documentary did not exist. It is deplorable that a work that has already aired was not in the archive.

actually greatly influenced by organizations in other countries.

In other words, if the crossroads that separate rich and poor countries are influenced not only by the intentions and actions of the country itself, but also by the intentions and actions of other countries, economic growth will have different conclusions depending on the influence of other countries.

After noticing this fact, I conducted research to see if the policies and actions of other countries could affect the economic growth of a country, and confirmed some of these facts.

For example, Togo (2013) confirmed that the starting point of Japan's high economic growth was the change in US policy toward Japan (the so-called "reverse course"). In 1945, immediately after Japan's defeat in the war, the Reparations Committee, chaired by Edwin W. Pauley, issued the "Reparations from Japan, Immediate Program" (commonly known as the " Pauley Interim Report") prepared and submitted to the President. In the Pauley Report, the Japanese people were to be allowed a standard of living that did not exceed that of the countries in Asia that Japan had occupied, and surplus heavy industry plants and overseas assets exceeding the minimum level necessary for maintaining a peacetime economy were designated to be turned over primarily to the countries in Asia that had suffered damage due to Japan's military actions.

If the contents of this report had been implemented as they were, it is not hard to imagine that the standard of living of the Japanese would have been considerably lower than it is today.

However, in 1946, a civil war broke out in China, and communist activities intensified in the Philippines and Vietnam. The distrust between the Soviet Union and the United States, which had been growing since the war, intensified, leading to the "Cold War". In response to this, the US government's policy toward Japan also changed.

On January 6, 1948, General Kenneth C. Royall delivered a speech announcing a policy shift toward Japan. Furthermore, on October 7, 1948, this policy change was stipulated in the "Recommendations with Respect to United States Policy toward Japan (NSC13/2)." In it, it is clearly stated that "Second only to U.S. security interests, economic recovery should be made the primary objective of United States policy in Japan for the coming period."[2] In other words, the purpose of US policy toward Japan was to restore Japan's economy.

As a result, the so-called "reverse course" has been implemented. Concrete measures for this "reverse course" include a drastic reduction in the scale of dissolution of Zaibatsu and relaxation of compensation conditions. From the perspective of Japan's economic growth, the implementation of this "reverse course" is considered to have had a significant impact.

These facts can be confirmed with official documents held in the National Diet Library in Japan and the National Archives in the United States. In recent years, the digitization of official documents has progressed, and verification can be performed efficiently. The work of verifying official documents is not in the field of "economics," but in the fields of "political science" and "history." However, isn't the work of confirming policy objectives in official documents important as part of growth research?

Similarly, Togo (2015) pointed out the importance of the Vietnam War in the rapid growth of East Asia. During the Vietnam War, the US fiscal and trade deficits widened. Due to this "Vietnam special demand", Singapore, Thailand, South Korea, Taiwan, Japan, etc. were able to boost their gross national products.

However, there are few papers that analyze the economic impact of the Vietnam War on high economic growth in Asia. Stubbs (2005) is a book by an international political scientist on the impact of the Cold War on high growth in East Asia. It has reviewed numerous papers and "suggested" that the wars that continued in Asia, such as the Korean War and the Vietnam War, had an impact on the high economic growth of East Asia, but did not conduct its own analysis.

Regarding China's high growth, knowledge other than economics is very important. Pillsbury (2015)

[2] National Diet Library（https://www.ndl.go.jp/modern/img_t/M008/M008-002txja.html）

makes it clear that the United States has helped China's economic development in various ways since President Nixon's visit to China in 1971. The author, Pillsbury, is a leading Chinese expert who has worked in government agencies for three decades since the Nixon administration. At first, as a "panda hugger" (pro-China faction), he was actually involved in the formulation of measures to support China, and later he began to warn of China's long-term strategy for world hegemony, so his description is detailed.

Beginning with President Nixon's visit to China in 1971, preparations were made to help China develop. Specifically, after the establishment of diplomatic relations in January 1979, Deng Xiaoping signed an agreement with the United States to accelerate scientific exchanges. During the first five years, some 19,000 Chinese students studied at American universities, mainly in physical sciences, health sciences, and engineering, and the numbers continued to grow (p.71). In addition, the Carter administration promised most-favored- nation status to China as a trading partner.

World Bank officials met with President Deng Xiaoping in 1983, and two years later the Bank published a report on how China could catch up with the developed world[3]. Naturally, the World Bank also provides loans to China. The President of the World Bank has been an American since its establishment, and it is thought that the intention of the US government is also strongly reflected.

In other words, China's high growth could not have achieved the current level of income without the change in the strategy of the United States toward China and the accompanying numerous support measures. It would have been difficult to know this fact had it not been for the publication of a book by a China expert who has been engaged in policy planning in the US government.

To summarize the above, the economic growth of a country is greatly influenced (possibly positively or negatively) not only by the policies of that country, but also by the policies of other countries. And in order to know the "facts", we have to read official documents, history, international politics, and other books. Documentaries are also important. When I saw “Revolution.com,” I was shocked, and I think the “facts” shown there are as important as official documents. In other words, in the analysis of economic growth, these official documents, research results on history and international politics, and media works will give us great hints, and research without such knowledge will be naive.

In addition to the above, knowledge of "technology" is considered essential for growth research. Advances in computer technology have greatly changed the way we live and work. The first industrial revolution was industrialization by steam engines. The second industrial revolution was mass production using electric power. The third industrial revolution is due to the shift from analog technology to digital technology. The fourth industrial revolution is currently underway due to the development of IoT (Internet of Things) using digital technology and the spread of AI and virtual reality. It is very important to look at how such changes in "technology" interact with our "economic, cultural, and social phenomena." I hope that you now understand the importance of interdisciplinary research in economic growth analysis.

3. Long stagnation in Japan

After understanding the above, it is very interesting to consider the long-term stagnation of the Japanese economy. Japan achieved rapid economic growth after the war under the US policy change of “reverse course,” and in the mid-1980s, Japan seemed to have caught up with and overtaken the US. However, after the collapse of the bubble economy, Japan fell into a long-term economic stagnation after 1997, and is now in a situation where it is likely to fall out of the list of developed countries. Japan is a very interesting sample for growth research that explores the factors behind growth.

[3] World Bank, “China-Long-Term Development Issues and Options” (October 31, 1985), 13364

Figure 4 shows the correlation between real per capita income in 1997 and the average growth rate from 1997 to 2019 for the same sample of countries as Figure 2. It can be seen that only Japan (JPN) has an extremely low growth rate[4].

Did the factors that encouraged Japan's post-war high growth disappear after 1997? Or have new factors emerged since 1997 that have caused long stagnation? To answer these questions, I would like to consider the following three hypotheses. All of them seem to require verification based on rigorous data and historical facts, but due to space limitations, only logical considerations will be given here.

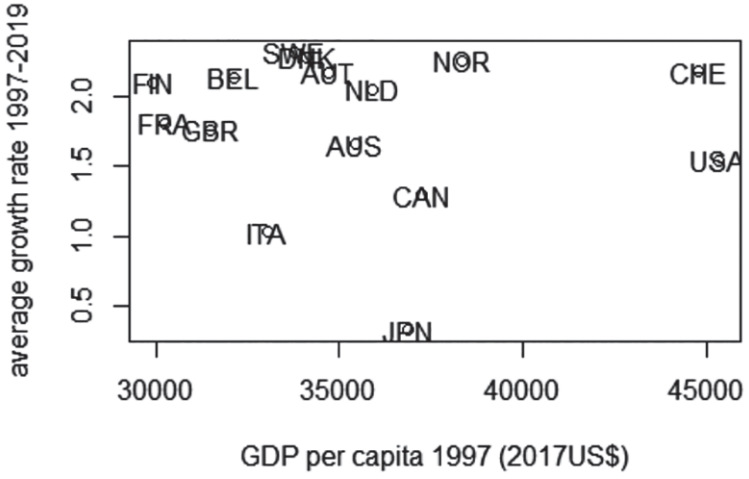
Hypothesis 1: Change in U.S. policy toward Japan (after the Plaza Accord) is a factor behind low growth
Hypothesis 2: Japan's politicians-bureaucrats-business leaders triangle is the reason for its low growth
Hypothesis 3: Higher education in Japan is a factor behind low growth

I believe that the 1985 Plaza Accord was the event that changed US policy toward Japan in Hypothesis 1. The Plaza Accord was a meeting of G5 finance ministers and central bank governors at the Plaza Hotel in New York on September 22, 1985. At the hotel, they agreed to implement foreign exchange interventions in each country to correct the strong dollar.

Japan achieved high economic growth after the war and was becoming a "threat" to the US economy. In 1980, automobile production in Japan surpassed 10 million units, surpassing the United States to become the world's largest. In response, there was a growing backlash against Japan in the United States, and from 1981 Japan imposed voluntary restraints on automobile exports to the United States. However, I don't think that this is just Japan's "self-regulation" and that it cannot be said to be a "policy change" in the United States.

On the other hand, the reason why the Plaza Accord can be seen as an "event" of US policy change is that the abandonment of the strong dollar and weak yen marks the end of US support for the Japanese economy. The exchange rate is of course determined by the market. However, I think that having Japan participate in the coordinated intervention was a declaration of intention to treat Japan in the same way as other developed countries and no longer treat it as a special case. In other words, the Plaza Accord abandoned the "reverse

Fig 4：Income in 1997 and subsequent growth: developed countries



Data source: Same as Figure 2.

[4] Taking the sample period from 1997 to 2019, the convergence hypothesis does not seem to hold even for developed countries. I plan to analyze this matter in detail separately.

course" objective of "economic recovery should be made the primary objective of United States policy in Japan."

1985 was the year Gorbachev became General Secretary of the Soviet Central Committee. The Soviet Union, a hypothetical enemy of the United States, showed a friendly attitude toward the West. Japan has become a threat to the US economy. It is reasonable to think that Japan's economic recovery is no longer a US policy goal.

However, this hypothesis is criticized by saying that if the economy is so "developed" that the US wants to stop supporting it, it should be able to achieve economic growth without US support. This point will be discussed in Hypothesis 3.

Hypothesis 2 claims that the politicians-bureaucrats- business leaders triangle is the cause of the low growth, and indeed there are some incidents caused by this triangle. The corruption scandal at the Tokyo Olympics is a direct example of the negative side of this triangle.

However, during the high-growth period, the close relationship in this triangle was praised as the basis for the policy of "coordination" in economic management. Since this triangle existed during both the period of high economic growth and the period of low economic growth, it is difficult to believe that this triangle itself was the cause of Japan's low growth.

The author believes that the hypothesis with the highest probability is Hypothesis 3, that Japan's higher education is the cause of the low growth. First, please take a look at the shocking data. Table 2 compares the study hours (one week) outside class for first-year college students in Japan and the United States. Nearly 60% of first-year college students in the United States spend more than 11 hours a week preparing for and reviewing classes. In contrast, nearly 60% of first-year university students in Japan spend only one to five hours of preparation and review. Furthermore, nearly 10% of students have zero time for preparation and review.

I mentioned above that the quality of education differs in each country. The data in Table 2 show that there is a large difference in the amount of work done by first-year university students in higher education between Japan and the United States. It was 42 years ago when I was a first-year university student, but from my impression, it can be said that the situation was not much different from this number. At that time, the university was called "Leisure Land," but it seems that there is no big change even now. In other words, in Japan's higher education, many university students do not study, so the amount of "knowledge" that workers acquire is small.

When this hypothesis is presented, it is sometimes countered that Japanese university students did not

Table 2: Study time outside class (preparation, review, etc.) (per week) comparison of first-year university students in Japan and the United States (unit:%)

	0 hour	1 – 5 hours	6 – 10 hours	11 hours or more
USA	0.3	15.3	26.0	58.4
Japan	9.7	57.1	18.4	14.8

(Source) Prime Minister's Office "Hitodukuri Kakumei Kihon Kousou Sankou Siryou (Human Resources Revolution Basic Concept Reference Material)", June 2018, p.17.
https://www.kantei.go.jp/jp/content/000023187.pdf

(Original data source) The University of Tokyo University Center for Research on University Management and Policy (CRUMP), "Zenkoku Daigakusei Chousa 2007 (National University Student Survey 2007)"., first-year students (8,529) among the undergraduate students of 127 universities participating in the survey.

Indiana University NSSE (The National Survey of Student Engagement) Annual Report 2007, first-year undergraduate students (135,000) from 610 participating universities.

study even during the high economic growth period, but the Japanese economy was growing at a high rate. But what if the level of knowledge required during the high economic growth period was just the level of high school graduates? If the level of knowledge required in the economic environment at that time was that of a high school graduate, then Japan's level of human capital was sufficient at that time. In fact, Japan at that time was in the era of mass production after the Second Industrial Revolution, and income grew by producing manufactured goods domestically and exporting them. The level of knowledge required on the factory floor will be different than the level of knowledge required in today's digital economy. The comparison of education levels and subsequent growth rates in Asia and Latin America in Table 1 also makes sense with this idea. An average of four years of schooling was sufficient for the level of education required for economic activity in both regions in the 1970s.

Next, I will consider the objection to the claim that, as a weak point of Hypothesis 1, if the Japanese economy is so "developed" that the United States would want to stop supporting it, even without US support, it should be able to achieve economic growth without US support. This argument is premised on the idea that, since Japan has developed, it will be able to formulate its own development strategy using the frontiers of science and technology.

However, is it so? If the business executives and policy makers who formulate Japan's development strategy did not study enough during their university years, their policies would be unsuccessful, and they would not be able to produce sufficient results. For example, in countries such as the United States, there are many policy makers and managers with PhDs, whereas in Japan this is not the case. When I go abroad, most corporate managers have at least a master's degree, but this is not the case in Japan.

Around 1997, when the Japanese economy began to stagnate, was the time when the Internet began to spread. In 1995, Windows 95 was released. Windows 95 was extremely easy to operate due to its GUI (Graphical User Interface), and it was possible to connect to the Internet, so PCs spread rapidly throughout the world. In addition, Google was established in September 1998, and the efficiency of Internet searches increased dramatically. In other words, Japan's economic stagnation began at a time when the digitalization of the economy was progressing rapidly.

While data-based management and further technological innovation are progressing through the use of IT technology and statistical methods, mainly in the United States (see, for example, Ayers (2007)), Japanese managers could not keep up with the progress. In recent years, some Japanese companies have finally succeeded in streamlining their management by focusing on data and IT technology. However, for example, what percentage of Japanese business managers and policy makers can understand the content of DX (specifically, management using SQL, Tableau, etc.) discussed in Takashi Yanase and Mayumi Sakai (2022)? I think it's a very small percentage.

Conclusion

As mentioned above, the author believes that growth studies, which began in the mid-1980s, have yet to come to a conclusion that satisfies everyone, even after more than 40 years. I think the reason for this is that the influences of other countries, cultural and social phenomena, and interactions with technological frontiers have not been sufficiently examined.

Under such circumstances, it would be meaningful from an economic point of view to explore the reasons why Japan, which was once regarded as an economic honor student, has stagnated for nearly 25 years. At this point in time, the author believes that the cause of the "long-term stagnation of the Japanese economy" is the inability of Japanese policy makers and business executives to adequately respond to the changes in the external environment from favorable to severe due to the shift in US policy. And it is Japan's higher education that brought about such incompetence of policy makers and business executives. It means that they have not studied

enough to make full use of the world's technological frontiers.

Due to the change in the policy of the United States, which had given us a good environment until then, we had to think for ourselves and formulate policies. However, Japanese business executives and policy makers with sufficient knowledge of the technological frontier have not been nurtured, and appropriate economic policies have not been implemented. The causes of the Japanese long stagnation can be theoretically attributed to changes in the external environment described in Hypothesis 1 and the problem of higher education in Japan described in Hypothesis 3.

In this paper, I have tried to show the importance of interdisciplinary research on culture, politics, history, technology, etc. in studying economic growth, and also to emphasize the importance of collecting a wide range of information, from books to documentaries. In addition, I have tried to write in this paper so that it can be used as a reference for researchers in other fields and undergraduate students. I would be very happy if they were interested. In the future, I would like to verify the above hypothesis with data as a so-called economics research paper.

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Country ountry codes and country names are as follows.

AUS（Australia）、AUT（Austria）、BEL（Belgium）、CAN（Canada）、DNK（Denmark）、FIN（Finland）、FRA（France）、ITA（Italy）、JPN（Japan）、NLD（Netherlands）、NOR（Norway）、SWE（Sweden）、CHE（Switzerland）、GBR（United Kingdom）、USA（United States）

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