Differentiation Strategies of Private Universities: The Japanese Case

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November 16, 2022

Abstract

In this paper, we analyze differentiation strategies among Japanese private universities in the higher education service market. We suggest that some Japanese private universities focus primarily on educational activity while others focus on advertisement activity. We also suggest that the institutions evaluating the quality of university education do not work well and propose that the public sector improves the functioning of the institutions providing information on Japanese private universities. Further, the sector should also educate Japanese consumers so that they could fully understand and evaluate the services that universities provide.

Differentiation Strategies of Private Universities: The Japanese Case[1]

October 19, 2022

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In this paper, we analyze differentiation strategies among Japanese private universities in the higher education service market. We suggest that some Japanese private universities focus primarily on educational activity while others focus on advertisement activity. We also suggest that the institutions evaluating the quality of university education do not work well and propose that the public sector improves the functioning of the institutions providing information on Japanese private universities. Further, the sector should also educate Japanese consumers so that they could fully understand and evaluate the services that universities provide.

Keywords: university management, differentiation strategy, higher education policy

1. Introduction

Since 1990, the global rate of tertiary school enrollment has consistently increased[4]. Many people in the world have enrolled in tertiary education since the 20th century and universities have come to play an important role in global development[5]. To continue playing this role in society, all countries must focus on university management as an important agenda. In Japan, universities have played the role of supplying key workers to society since the 20th century. Japan has more private universities than other types of universities and the number of students in private universities is likewise the largest. Thus, in the Japanese higher education market, private universities play an important role.

In this paper, we analyze the functioning of private universities in the Japanese higher education market. According to Shy (1995), there are four stylized facts associated with many industries (Concentration, Product characteristics, Costly activities, Research and development)[6]. With respect to costly activities, firms in an industry may be engaged in repeated costly activities aimed at increasing sales and enhancing the brand, and the costs of such activities may exceed even production costs for the product itself. These costly activities consist of advertising, quality control, product differentiation, marketing, and dealership. We consider the provision of educational services by universities to be part of a separate industry that also has similar stylized facts. In this paper, we show the stylized facts in the Japanese private universities industry. We also discuss the policy implications of our analysis results.

Management researchers have long studied the relationship between various firm factors including strategies and performance (Christensen and Montgomery, 1981, Yadong, 1995, Pelham and Wilson, 1996). In a work closely related to our analysis, of the university industry, Kathenya et al. (2020) analyze the relationship between the strategic responses and organizational performance of public universities in Kenya. However, the number of the researches focusing on the differences in the strategies among players in university industry is scarce.

Globally, many researchers in educational studies analyze the university from the perspective of efficiency (Visbal-Cadavid et al. (2017), Tran et al. (2022), Torre et al. (2017), Sagarra et al. (2017), Mammadova and Aypayb (2020), Mikušová (2015), Kuoa and Hob (2008), Daraio et al. (2021), Celik and Ecer (2009), Carter (1972), Arcelus and Coleman (1972), Abbott and Doucouliagosa (2003)). Researchers in Japan have analyzed universities from similar perspectives, such as estimating the cost function and efficiency (Akai et al. (2009), Kawasaki (2020), Shima (2021), Kitasaka (2013), Senoh (2004), Sugawara (2009)). However, they do not examine the differentiation strategies adopted by various universities.

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[4] https://data.worldbank.org/indicator/SE.TER.ENRR
(Accessed on September 23, 2022.)
[5] https://blogs.worldbank.org/education/what-role-universities-global-development
(Accessed on September 23, 2022.)
[6] p.1

Further, studies have analyzed the strategies of universities from various perspectives (e.g., Lombardi et al. (2019), Rahmat (2017), Harris (2010)). For example, Kelly and Shaw (1987) compare their findings from two surveys of Australian corporations and academic institutions on strategic planning practices and identify the similarities and differences between the them. Our approach can provide fresh insights that these related studies do not provide.

The remainder of the paper is structured as follows. In section 2, we describe our hypotheses and the role of Japanese private universities in the Japanese higher education service market. The data and methodology are discussed in section 3 and section 4 presents the results. In section 5, we discuss the results and section 6 provides our concluding observations.

2. Hypotheses and the role of Japanese private universities in the higher education service market

Here, we examine the question of how Japanese private universities differentiate their management strategies. In Japan, large cramming schools—firms that help students prepare for entrance examinations to Japanese universities—announce T-scores for Japanese universities based on their information on the examinations students take. The university rankings that cramming schools announce are based on these T-scores[7] and students and parents pay usually consider these rankings when they apply to universities.

Thus, these rankings may influence the choice of Japanese university by Japanese consumers. This may indicate that the top-ranked universities succeed in their differentiation strategies because being in the top-ranked of the rankings itself may influence the choice of consumers. Therefore, we propose the following hypotheses:

Hypothesis 1: The Japanese private universities in the top position of the T-score rankings announced by cramming schools do not adopt strategies for differentiation from other top universities because the number of top universities in Japan is small and they already have a higher position than many other universities.

Hypothesis 2: Universities other than the top universities in the T-score rankings adopt differentiation strategies against other universities in a similar position such as reinforcement of advertisement to consumers or strengthening the quality of education.

According to the report by the Ministry of Education, Culture, Sports, Science and Technology[8],

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[7] For example, Kawaijuku, which is a famous Japanese cramming school, announced this ranking: https://www.keinet.ne.jp/university/ranking/ (in Japanese)(Accessed on September 8, 2022.). The famous cramming school Toshin announced the following rankings: https://www.toshin-hensachi.com/ (in Japanese)(Accessed on September 8, 2022.).
[8] https://www.mext.go.jp/en/policy/education/highered/title03/detail03/__icsFiles/afieldfile/2012/06/19/1302653_1.pdf
(Accessed on September 7, 2022.)

universities are divided into three categories based on how they were founded: national, public, or private[9]. A national university is established by the Japanese government, public universities are established by local governments, and private universities are established by educational corporations. The number of Japanese national, public, and private universities in 2011 were 86, 95, and 599, respectively. In 2011, the total number of students in undergraduate was about 2.6 million, of whom 2 million were enrolled in private universities. Thus, private universities play a major role in providing higher education services in Japan as about 80 percent of all university students join private university. Although private universities are under government regulations, they are operated by educational corporations and are in competition with other universities to acquire new students in the Japanese higher education service market. We hypothesize that they take differentiation strategies to acquire new students.

As explained above, certain major private cramming schools, which are not directly related to the Japanese government, announce the rankings of Japanese universities based on T-scores. These rankings have influenced how Japanese universities are perceived by people in the market.

3. Data and Methodology

We construct seven indexes based on our hypotheses. We use available data to construct the indexes that allow us to check whether a university focuses on educational or advertisement activity from the perspectives of financial information and how the people involved with Japanese universities evaluate it. We construct the following indices:

A. Revenue and expenditure from educational activity: The total amount of educational activity expenditure divided by The total educational activity revenue
     This index indicates the level to which a university focuses on educational activity compared to educational activity revenue. If a university scores lower in this index than other private universities, it indicates that the university has a low level of educational activity.

B. The proportion of tuition in the total amount of educational activity revenue: The total amount of tuition paid by students divided by The total educational activity revenue
     -This is the index indicates the level to which a university depends on student tuition. If this index is low, it indicates that the university has revenue resources other than student tuition. From the students' perspective, it is desirable for a university to lower this index.

C. The proportion of subsidy to expenditure in the total amount of educational activity revenue: The total amount of subsidy to educational activity expenditure divided by The total amount of educational activity revenue

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[9] 6th page. There is not official number of pages on this pamphlet.

-Besides student tuition, a university may receive support from the Japanese central government and local government. The higher this index is, the lower the university's dependence on student tuition.

D. The proportion of advertisement cost in the total revenue from economic activity: Advertisement cost divided by The total educational activity revenue

-This is an index of how much a university focuses on advertisement activity[10]. If this index is higher for a particular university, it indicates that it focuses more on advertisement activity than other universities.

E. The ratio of the number of students to the number of teachers: The number of students/The number of teachers

-This is the student–teacher ratio.

F. The relationship between how high school students and teachers evaluate a university and how personnel and researchers evaluate it: The score of "Outcomes" divided by The score of "Engagement"

-This index is based on the information from the Times Higher Education. According to the website[11], there are four types of scores with respect to Japanese private universities ("Japan university rankings"): "Resources," "Engagement," "Outcomes," and "Environment." We calculate the index of Outcomes /Engagement. Engagement is based on both the High School Advisors Survey and the Japan Student Survey; that is, this score is based on the views of both high school student careers advisors and students. Outcomes is based on both a survey of human resources departments and "votes from Japanese scholars in THE's annual Academic Reputation Survey of leading academics worldwide."[12] Engagement is based on the views of non-professionals and Outcomes is based on the views of professionals. If the index (The score of Outcomes/ The score of Engagement) of a university is much higher than that of other universities, it is evaluated too highly by non-professionals compared to the low and realistic professional evaluation. It may also indicate that the university is successful in its advertisement activity to non-professionals, as it is difficult for universities to improve professional evaluation through advertising.

G. Financial ability: The amount of managed assets divided by The amount of external debts

-This is an index of how well a university operates on its finances. This index is based on the report by the Promotion and Mutual Aid Corporation for Private Schools of Japan[13], which

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[10] The examples of expensive advertisement activity by Japanese private universities include newspaper advertisements and TV commercials.

[11] https://www.timeshighereducation.com/rankings/japan-university/2022
(Accessed on September 2, 2022.)

[12] https://www.timeshighereducation.com/world-university-rankings/methodology-japan-university-rankings-2022
(Accessed on September 2, 2022.)

[13] https://www.shigaku.go.jp/files/tebiki1-29_4.pdf

provides a method to check the financial health of Japanese private universities. The index is based on one of the check points from the report.

Our data was drawn from the following sources:

・Finance Data for Japanese Private Universities[14]: We use this dataset for the 2020 fiscal year. This data is based on the official fiscal statements provided by Japanese universities. We use this data in indexes A, B, C, and G.)

・Income and expenditure account statement for business activity in Japanese private universities: To complement the information from the Finance Data for Japanese Private Universities, we use information from the income and expenditure account statement for business activity provided by Japanese private universities. We use this data in index D.)

・Shikiho for Japanese Universities [15]: We use this dataset for 2020 fiscal year. It includes information on the characteristics of Japanese universities such as the number of students, workers, and professors. We use this data in index E.

・Japan University Rankings 2020 by Times Higher Education [16]: We use this dataset for the "Engagement" and "Outcomes" in this ranking. We use this data in index F.)

It is important to mention the limitations of our data. We connect the datasets used in this analysis based on the university's name. Both "Finance Data for Japanese Private Universities" and "Income and expenditure account statement for business activity in Japanese private universities" are based on the information from incorporated educational institutions. In Japan, private universities are operated by incorporated educational institutions. Some incorporated institutions include entities other than universities, such as high schools and junior colleges and their income and expenditure account statement for business activity would include data from all entities and not just their universities.

Further, in the Japan University Rankings 2020 by Times Higher Education, some of the field include the sign "-", which we set as missing values. There are also interval data representing a range with, for example, "20.3-29.0". When we use the interval data, we use the value in the middle of the range. These factors are the limitations in this analysis. In index (G), there is an explanation about how to calculate both the amount of managed assets and the amount of external debt in the report by

(Accessed on September 2, 2022.)
[14] https://biz.toyokeizai.net/data/service/detail/id=342 (in Japanese)
(Accessed on September 5, 2022.)
[15] https://biz.toyokeizai.net/data/service/detail/id=341 (in Japanese)
(Accessed on September 5, 2022.)
[16] https://www.timeshighereducation.com/rankings/japan-university/2022
(Accessed on September 5, 2022.)

the Promotion and Mutual Aid Corporation for Private Schools of Japan[17]. However, not all the items needed for the calculation are available. Therefore, we use items from the "Finance Data for Japanese Private Universities" to in place of the missing items. Further, there are some missing values in these items as well[18]. We set these values to zero. The managed assets include stocks, cash, and bonds and external debts include one part of fixed and current liabilities. We analyze only universities whose information is available for all indexes and operating expenses are more than five billion yen. In addition, we divide them into two groups for the purpose of this analysis.

・23 major universities in the Tokyo metropolitan area (Group 1.)
・All universities whose information is available for all indexes and operating expenses are more than five billion yen (Group 2)

The 23 universities are grouped together because we can observe interesting characteristics of differentiation strategies among these universities. Major universities in metropolitan area near Tokyo are important options for many high school students in Japan. Therefore, the Group 1 universities may be important competitors with each other.

We use these indexes for visualizing the differences in strategies by the Japanese private universities. We use factor analysis, cluster analysis, and principal component analysis to visualize the differences in the strategies by the Japanese private universities. Before we present the results, we present the summary statistics , correlation coefficients, and T-score for all indexes.

Figure 1 and Figure 2 represent two versions of the correlation coefficients among the indexes. Figure 1 shows the correlation coefficients among the Group 1 universities and Figure 2, among universities in group 2. In the figures, we simplify the names of the indexes as follows.

・The total educational activity expenditure/The total educational activity revenue　→　Edu act exp/Edu act rev
・The total tuition payment by students/The total educational activity revenue →　Tui pay by stu/Edu act rev
・The total subsidy to educational activity expenditure/The total educational activity revenue　→ Sub to edu act exp/Edu act rev
・Advertisement cost/The total educational activity revenue　→　Adv cost/Edu act rev
・The number of students/The number of teachers　→　Students/Teachers
・The score of "Outcomes"/ The score of "Engagement"　→　"Outcomes"/"Engagement"

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[17] https://www.shigaku.go.jp/files/tebiki1-29_4.pdf, p.9
(Accessed on September 5, 2022.)
[18] We cannot check the exact reason that these values are missing.

・Managed assets/External debts → Man assets/Ext debts

Tables 1 and 2 provide the summary statistics for both groups. The following characteristics are observed:

・With respect to "Edu act exp/Edu act rev," "Tui pay by stu/Edu act rev," "Students/Teachers," and ""Outcomes"/"Engagement," the standard deviations of these indexes among Group 1 universities are larger than that among universities in group 2. This result implies that the degree of differentiation in strategies among the Group 1 universities largely accounts for the degree of differentiation in strategies among all universities analyzed.

・With respect to "Man assets/Ext debts," the variation of "Man assets/Ext debts" is larger for all universities analyzed than the Group 1 universities. This implies that the degree of differentiation in strategies among the Group 1 universities is large with respect to the indexes described above ("Edu act exp/Edu act rev," "Tui pay by stu/Edu act rev," "Students/Teachers," and ""Outcomes"/"Engagement,") in the comparatively small range of "Man assets/Ext debts".

Table 1: Summary statistics (Group 1)

	Edu act exp/Edu act rev	Tui pay by stu/Edu act rev	Sub to edu act exp/Edu act rev	Adv cost/Edu act rev	Students/Teachers	"Outcomes"/"Engagement"	Man assets/Ext debts
count	23	23	23	23	23	23	23
mean	0.96011	0.72442	0.11329	0.00661	30.59449	0.62391	6.11311
std	0.06158	0.13524	0.02397	0.00465	7.06765	0.20528	3.4731
min	0.86583	0.33452	0.06214	0.00019	15.45816	0.40988	2.62519
25%	0.92592	0.72967	0.10051	0.00315	26.38401	0.52402	3.76625
50%	0.95338	0.77969	0.10862	0.00564	30.71104	0.58065	4.97472
75%	0.97662	0.79409	0.12698	0.00889	35.496	0.63315	7.22608
max	1.18802	0.83763	0.15778	0.01749	42.94611	1.21932	15.57906

-This is the summary statistics of the following 23 universities.: Nihon University, Keio University, Tokai University, Waseda University, Meiji University, Hosei University, Chuo University, Toyo University, Aoyama Gakuin University, Tokyo University of Science, Rikkyo University, Sophia University, Senshu University, Gakushuin University, Komazawa University, Shibaura Institute of Technology, Tokyo City University, Tokyo Denki University, Daito Bunka University, Chiba Institute of Technology, Kogakuin University, International Christian University, Asia University

Table 2: Summary statistics (group 2)

	Edu act exp/Edu act rev	Tui pay by stu/Edu act rev	Sub to edu act exp/Edu act rev	Adv cost/Edu act rev	Students/Teachers	"Outcomes"/"Engagement"	Man assets/Ext debts
count	68	68	68	68	68	68	68
mean	0.96564	0.74676	0.12251	0.00928	30.36031	0.54767	7.76136
std	0.06013	0.12626	0.02692	0.00628	7.0237	0.15894	7.16615
min	0.85652	0.18283	0.06214	0.00019	5.18465	0.29516	0.55273
25%	0.92881	0.75602	0.10672	0.0046	26.51574	0.43791	3.62002
50%	0.96294	0.78483	0.12244	0.00831	31.32651	0.53988	5.69851
75%	0.98637	0.80155	0.13495	0.01152	35.32779	0.61636	9.84817
max	1.19392	0.87078	0.2011	0.02742	42.94611	1.21932	49.20307

-This is the summary statistics of the following 68 universities.: Nihon University, Keio University, Tokai University, Kitasato University, Waseda University, Ritsumeikan Asia Pacific University, Ritsumeikan University, Fukuoka University, Doshisha University, Doshisha Women's College of Liberal Arts, Meiji University, Kansai University, Hosei University, Chuo University, Toyo University, Kwansei Gakuin University, Osaka Institute of Technology, Aoyama Gakuin University, Tokyo University of Science, Rikkyo University, Ryukoku University, Kanagawa University, Sophia University, Tokyo University of Agriculture, Meijo University, Senshu University, Chubu University, Gakushuin University, Kyoto Sangyo University, Kanto Gakuin University, Josai International University, Mukogawa Women's University , Nanzan University, Soka University, Komazawa University, Shibaura Institute of Technology, Meiji Gakuin University, J. F. Oberlin University, Tokyo City University, Tokyo Denki University, Kobe Gakuin University, Daito Bunka University, Tohoku Gakuin University, Chiba Institute of Technology, Konan University, Kyushu Sangyo University, Seikei University, Takushoku University, Kogakuin University, Japan Women's University, Showa Women's University, Seinan Gakuin University, Seijo University, Kyoto Women's University, Hiroshima Shudo University, Hiroshima Institute of Technology, Tokyo International University, Kanda University of International Studies, International Christian University, Asia University, Kanagawa Institute of Technology, Kyoto University of Foreign Studies, Tama Art University, Nakamura Gakuen University, Kyoto University of Advanced Science, Hokusei Gakuen University, Tohoku Institute of Technology, Kobe College

Next, we point out the following characteristics in Figure 1 and 2.

・the absolute value of the correlation coefficients between "Man assets/Ext debts" and "Adv cost/Edu act rev" among the Group 1 universities is larger than that among group 2 (-0.088). Although we have to be careful about implying a causal relationship, it is possible that the Group 1

universities tend to use their financial affordability to focus more on advertisement activity than group 2. Further, the absolute value of the correlation coefficients between "Man assets/Ext debts" and "Edu act exp/Edu act rev" among the Group 1 universities (-0.058) is less than that among group 2 (0.37). Once again, although the causal implications must be read with caution, it is possible that the group 2 universities tend to use their financial affordability to focus more on educational activity than the Group 1 universities. Their focus may thus differ from that of universities in the metropolitan area and other universities outside the metropolitan area.

・The correlation coefficients between "Adv cost/Edu act rev" and ""Outcomes"/"Engagement"" are negative for both groups of universities (-0.46, -0.34). This may imply that the advertisement by private universities influences the increase in "Engagement" (evaluation by non-professionals) rather than "Outcomes" (evaluation by professionals).

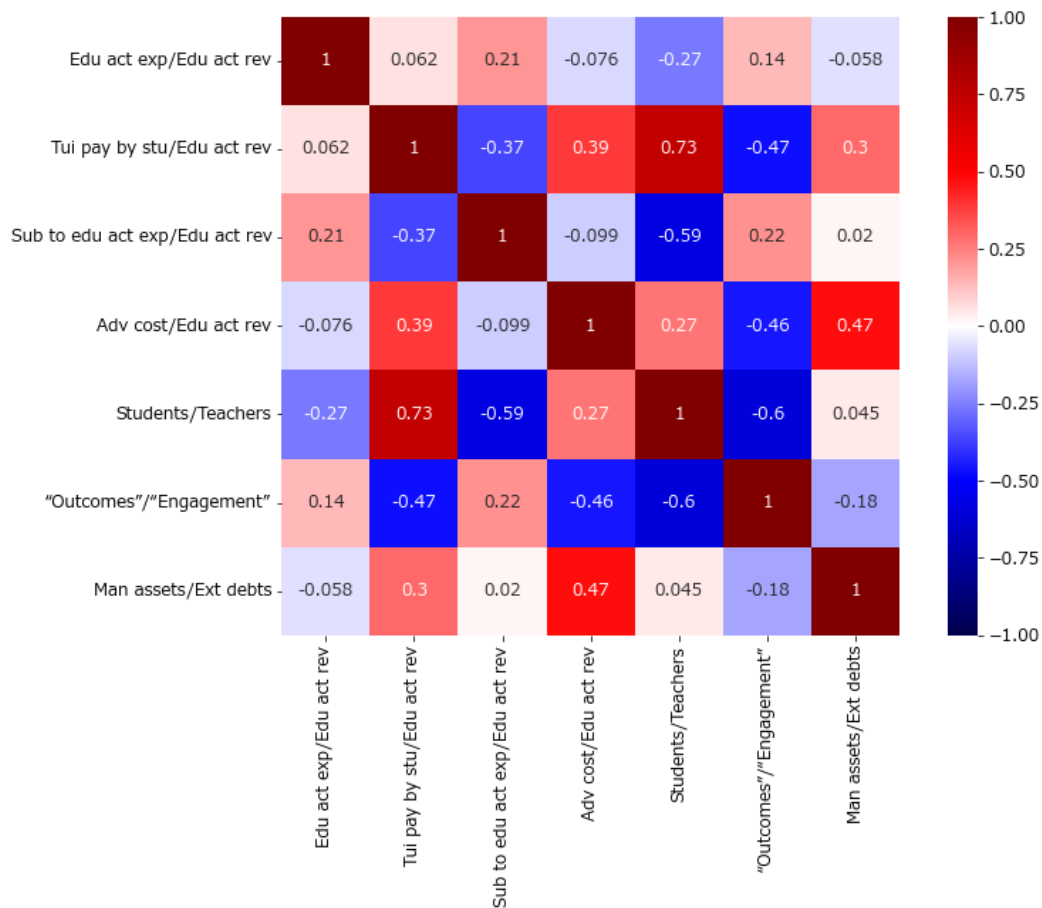Figure 1: Correlation coefficients (Group 1)
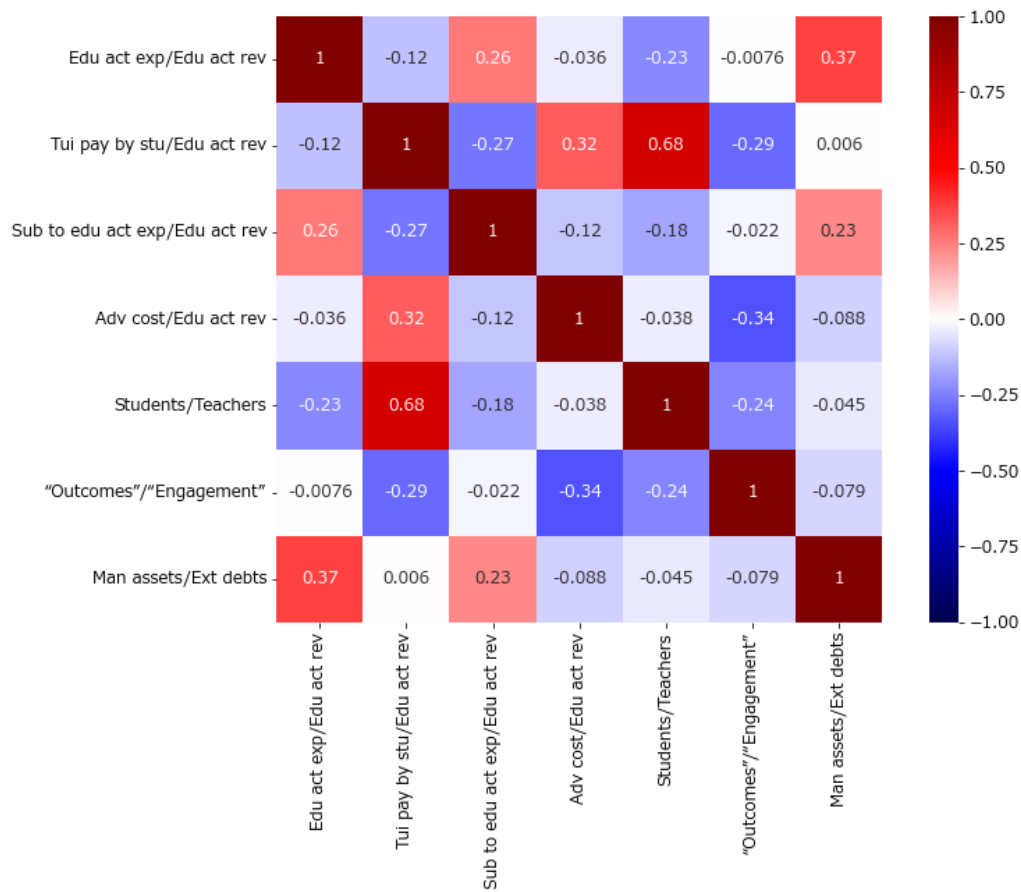
Figure 2: Correlation coefficients (Group 2)

Table 3 lists the T-scores on all indexes. In the table, when the seven indexes of the T-score average of a university becomes higher, the position of the university also becomes higher. We check how they behave in the market by considering their relative position in all indexes. When we calculate the T-score on all indexes, we convert them as follows: With respect to the certain indexes, when the value of the indexes become higher, the T-scores become higher. That is, we consider a higher T-score to be better. These indexes are:

-The total educational activity expenditure/The total educational activity revenue

-The total subsidy to educational activity expenditure/The total educational activity revenue

-The score of "Outcomes"/ The score of "Engagement"

-The managed assets/The external debts

With respect to the following indexes, when the value of the indexes become higher, the T-scores become lower.

-The number of students/The number of teachers:

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-The total tuition paid by students/The total educational activity revenue:

-Advertisement cost/The total educational activity revenue:

・Although some universities have high T-score averages in the seven indexes, few have high scores (more than 60) on all indexes. Most private universities have T-scores of less than 60 in at least one index.

・There are large differences across universities in the T-scores on "Edu act exp/Edu act rev," "Adv cost/Edu act rev," and "Students/Teachers," indexes. This implies that there are differences in what they spend on, which leads to their varied strategies. In addition, the T-scores for "Tui pay by stu/Edu act rev," "Sub to edu act exp/Edu act rev," and "Man assets/Ext debts," indicate large differences in these indexes. This implies that there are differences among universities in their source of funding and financial conditions.

Indexes such as "Edu act exp/Edu act rev," "Adv cost/Edu act rev," and "Students/Teachers," in Table 3 show that some universities focus relatively more on advertisement activities or on educational activities. Based on this, we can hypothesize that some Japanese private universities behave in the following ways.

Type 1: Some universities spend the tuition revenue from one batch of students on advertisement activity to lure students in the next batch.

Type 2: Some universities spend the tuition revenue from a batch of students on educational activities for the same batch.

For reference, we raise the examples of both types. For example, if we define some universities as Type 1 university as one where indexes such as "Edu act exp/Edu act rev," "Adv cost/Edu act rev," and "Students/Teachers" are less than 50, we can raise it can include Kyoto University of Foreign Studies, Chiba Institute of Technology, Takushoku University, Kyoto Sangyo University, Seijo University, and Kanto Gakuin University. If we define some universities as Type 2 university as one where the indexes such as "Edu act exp/Edu act rev,", "Adv cost/Edu act rev," and "Students/Teachers" are more than 50, it can include Nanzan University, Mukogawa Women's University, Sophia University, Ritsumeikan University, Kitasato University, Soka University, International Christian University, and Keio University.

The following universities are included in Group 1. They are classified according to the Japanese method of grouping.

・SOKEIJORI (yellow in Table 3): Waseda University ("So" is the Chinese reading of the Kanji character "Wa."), Keio University, Sophia University (Jochi Daigaku in Japanese), Tokyo University

of Science (Tokyo Ri̲ka Daigaku in Japanese) . This group ranked highest among private universities in the metropolitan area in the T-score-based university rankings announced by Japanese private cramming schools.

・GMARCH (blue in Table 3): G̲akushuin University, M̲eiji University, A̲oyama Gakuin University, R̲ikkyo University, Chuo University, H̲osei University. This groups is at the top of the middle rankings among metropolitan private universities in the cramming schools' ranking.

・NITOKOMASEN (red in Table 3): Ni̲hon University, To̲yo University, Koma̲zawa University, Sen̲shu University. This groups ranks at the second middle position among metropolitan private universities in the cramming schools' ranking.

・GOKODAI (five private colleges of technology, gray in Table 3): Shibaura Institute of Technology, Tokyo Denki University, Tokyo City University, Kogakuin University, Chiba Institute of Technology. In the university rankings of Japanese private cramming schools, they are in the various position among Japanese private universities in the metropolitan area. This is based on grouping five private institutes of technology in the Tokyo metropolitan area.

Although the relative position of each university in Table 3—which is decided by the T-score average of our seven indexes—is largely similar to that of the cramming schools' rankings, certain differences can be observed in each index among the members of a single group such as SOKEIJORI, GMARCH, and NITOKOMASEN. For instance, the GOKODAI group comprises only private colleges of technology in the Tokyo metropolitan area. However, as seen in Table 3, they differ from each other in each index although they are the same college type. For example, Chiba Institute of Technology and Tokyo City University focus on advertisement activity (higher "Adv cost/Edu act rev"), whereas some universities such as Kogakuin University and Tokyo City university score lower on the "Adv cost/Edu act rev" index.

Table 3: T-scores on all indexes

University Name	7 indexes T-score average	Edu act exp/Edu act rev (T-score)	Tui pay by stu/Edu act rev (T-score)	Sub to edu act exp/Edu act rev (T-score)	Adv cost/Edu act rev (T-score)	Students/Teachers (T-score)	"Outcomes"/"Engagement" (T-score)	Man assets/Ext debts (T-score)
Soka University	71.23	88.247	65.352	67.686	51.747	63.34	53.977	108.26
Keio University	64.389	50.283	82.531	44.8	64.58	71.375	92.572	44.582
Kitasato University	63.077	50.235	94.995	51.258	60.292	86.11	52.166	46.483
International Christian University	59.092	87.258	51.196	58.036	55.842	61.992	54.58	44.741
Waseda University	59.011	49.409	55.655	52.007	62.694	56.593	91.477	45.245
Fukuoka University	58.657	51.476	81.917	53.513	59.304	69.802	47.081	47.505
Tokai University	58.288	42.843	82.892	61.728	60.276	68.25	48.225	43.803

University							
Mukogawa Women's University	56.067	66.61	45.04	51.913	54.388	56.438	38.16	79.918
Ritsumeikan University	55.437	61.266	49.208	55.571	60.227	57.002	59.679	45.104
Nanzan University	54.862	65.764	53.497	74.41	50.912	54.635	42.01	42.808
Sophia University	54.506	50.377	52.193	61.368	59.868	56.731	56.822	44.185
Kyoto Women's University	53.876	49.658	46.846	62.825	51.377	50.502	55.372	60.551
Hiroshima Shudo University	53.022	50.109	47.859	62.098	51.309	47.619	49.568	62.591
Gakushuin University	52.941	57.794	48.08	47.079	56.547	49.497	57.107	54.485
Tokyo University of Science	52.878	46.462	51.531	44.081	61.332	58.275	65.684	42.779
Tohoku Institute of Technology	52.381	42.162	47.151	62.581	46.717	50.039	58.447	59.573
Ritsumeikan Asia Pacific University	52.376	61.266	49.208	55.571	60.227	44.831	50.426	45.104
Kogakuin University	52.076	49.301	47.74	51.335	44.867	54.814	55.487	60.99
Japan Women's University	51.451	44.497	47.995	52.341	57.609	53.262	60.296	44.156
Tokyo City University	51	47.947	51.124	63.202	38.148	54.629	54.5	47.45
Hokusei Gakuen University	50.976	54.461	50.814	79.415	42.618	47.863	37.134	44.531
Kyushu Sangyo University	50.858	62.078	44.142	50.224	51.418	48.344	36.363	63.435
Kanto Gakuin University	50.853	49.976	47.779	61.03	47.108	43.902	53.884	52.296
Osaka Institute of Technology	50.46	53.925	46.422	50.563	49.881	54.769	54.007	43.652
Daito Bunka University	50.452	57.952	45.395	50.554	47.689	48.742	49.938	52.896
Kyoto University of Advanced Science	50.359	59.094	60.336	52.776	30.842	67.289	40.874	41.305
Kansai University	50.271	49.44	49.564	52.213	56.73	39.914	54.082	49.956
Aoyama Gakuin University	50.148	52.294	47.082	43.089	62.402	47.062	52.09	47.018
Nakamura Gakuen University	50.106	38.711	50.881	69.956	54.487	43.345	38.08	55.284
Seikei University	49.797	52.193	46.93	47.406	45.367	49.88	46.443	60.365
Nihon University	49.786	42.633	65.592	43.442	51.872	50.231	48.145	46.585
Tokyo Denki University	49.707	47.057	46.593	45.262	48.938	51.555	50.547	57.998
Chubu University	49.488	53.324	48.933	54.497	48.08	60.871	38.899	41.811
Konan University	49.422	59.182	46.382	49.725	50.476	48.174	37.17	54.843
Meiji University	48.95	52.202	47.066	36.794	59.022	46.352	55.134	46.082
Shibaura Institute of Technology	48.881	33.278	49.42	52.525	51.429	51.763	55.349	48.402
Seinan Gakuin University	48.825	42.455	48.299	59.438	58.218	37.86	41.578	53.925
Meiji Gakuin University	48.809	51.954	45.638	47.383	51.984	33.244	52.701	58.757
Tokyo University of Agriculture	48.781	37.052	45.919	51.484	52.551	48.487	52.029	53.948
Meijo University	48.75	51.386	49.172	49.713	49.323	49.368	48.01	44.279
Kwansei Gakuin University	48.469	42.295	46.996	46.744	59.039	45.611	50.28	48.319

Tohoku Gakuin University	48.266	35.722	46.046	55.13	57.419	40.634	51.282	51.629
Doshisha University	48.051	44.087	44.955	43.244	57.473	40.087	54.304	52.207
Doshisha Women's College of Liberal Arts	47.724	44.087	44.955	43.244	57.473	47.07	45.029	52.207
Kobe College	47.646	57.684	44.205	44.364	46.904	49.433	37.884	53.047
Hiroshima Institute of Technology	47.217	44.395	45.29	60.278	28.066	57.464	47.841	47.182
Kyoto Sangyo University	46.992	43.773	47.96	52.959	42.474	47.725	46.052	47.998
Chuo University	46.949	45.962	46.084	40.437	59.817	42.151	49.385	44.804
Hosei University	46.855	43.85	46.275	44.09	58.959	37.64	49.961	47.213
Kanagawa Institute of Technology	46.836	45.004	46.567	45.107	24.638	61.432	60.05	45.056
Kanagawa University	46.634	62.849	46.513	50.63	39.288	41.406	42.219	43.529
Asia University	46.53	51.478	46.173	36.244	50.856	43.116	54.87	42.969
Seijo University	46.518	49.248	44.738	43.338	49.794	38.732	57.09	42.689
Ryukoku University	46.317	48.379	46.754	48.16	52.336	38.139	42.57	47.883
Kobe Gakuin University	46.199	51.208	44.014	49.381	42.822	44.225	48.088	43.657
Rikkyo University	46.099	41.678	47.373	39.765	55.73	48.035	44.148	45.967
J. F. Oberlin University	45.559	55.983	44.623	43.301	45.473	40.799	48.87	39.866
Josai International University	45.54	50.866	40.58	35.055	33.878	57.923	40.874	59.602
Tama Art University	45.47	42.161	40.105	29.457	56.081	45.953	52.281	52.249
Toyo University	44.995	36.662	46.118	46.97	57.883	35.356	41.88	50.093
Showa Women's University	44.929	31.718	47.383	53.612	51.687	51.391	33.995	44.718
Komazawa University	44.832	45.483	46.893	44.486	52.654	31.948	48.776	43.58
Takushoku University	44.48	42.293	45.984	48.466	40.332	39.108	49.444	45.729
Senshu University	44.218	55.235	45.25	35.925	50.402	36.014	43.2	43.497
Kyoto University of Foreign Studies	42.03	46.124	45.6	48.649	20.907	41.706	48.949	42.274
Kanda University of International Studies	41.36	35.338	42.109	28.374	30.163	66.79	45.159	41.588
Tokyo International University	40.844	51.572	43.334	34.292	21.922	55.206	38.16	41.424
Chiba Institute of Technology	40.143	41.258	42.75	27.403	36.835	40.152	41.266	51.339

4. Results

In this section, we present the analysis results based on all indexes used with respect to Group 1 and Group 2 universities.

In addition, we separate the Group 2 universities into three based on their "Man assets/Ext debts" index values. This index indicates the university's level of financially affordability. Universities in

the same group have similar financial conditions. We analyze this aspect to better understand the differences their behavior in similar financial conditions. We cannot clearly interpret what each factor and principal component means in all analyses while we show factor loadings and check the relationship between each variable and each factor instead, we only visualize the differences in indexes among the universities. We standardized all indexes for this analysis[19].

・Factor Analysis Results
= Group 1=
Table 4 and Figures 3A and 3B present the results of the factor analysis. In each column of Table 4, the highest and the second highest values are marked in yellow. From now on, we focus on the size of absolute value and "highest" is the largest absolute value and "the second highest" is the second largest absolute value. We use the promax rotation.

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[19] With respect to each index, we use the following standardization, (A_(University i) – A_min)/(A_max – A_min).

Table 4: Factor loadings of factor analysis in Group 1

	factor1	factor2	factor3
Edu act exp/Edu act rev	-0.033	-0.043	0.456
Tui pay by stu/Edu act rev	0.956	0.139	0.515
Sub to edu act exp/Edu act rev	-0.542	0.152	0.168
Adv cost/Edu act rev	-0.037	0.905	-0.16
Students/Teachers	0.97	-0.105	-0.19
"Outcomes"/"Engagement"	-0.416	-0.306	0.138
Man assets/Ext debts	-0.055	0.562	0.047

Figure 3A: Factor analysis result with Factor 1 and Factor 3 (Group 1)
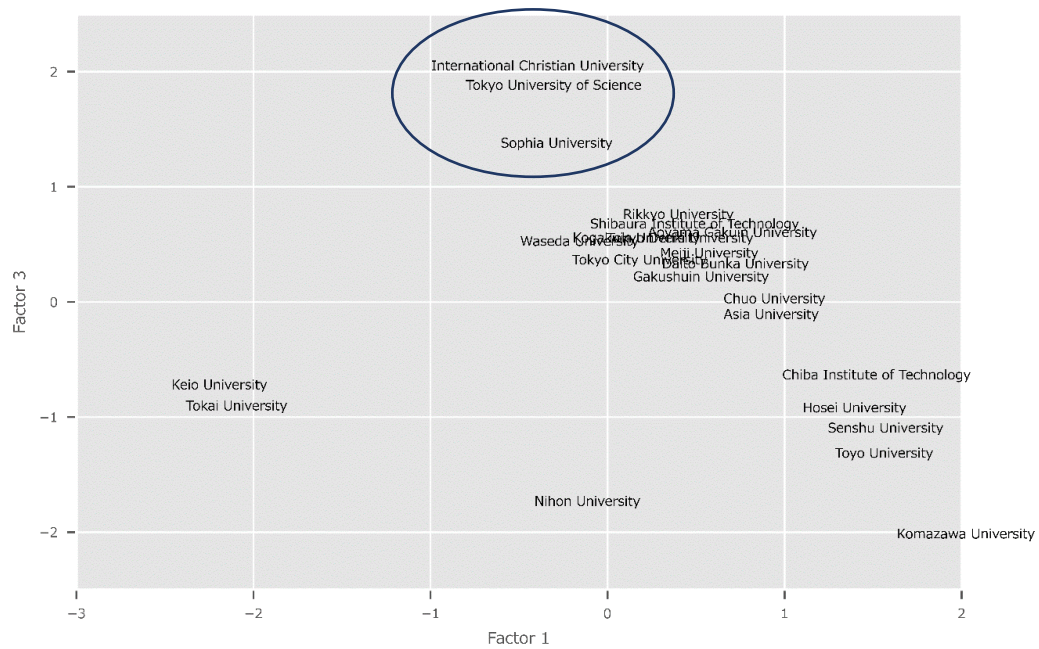
Figure 3B: Factor analysis result with Factor 1 and Factor 2 (Group 1)
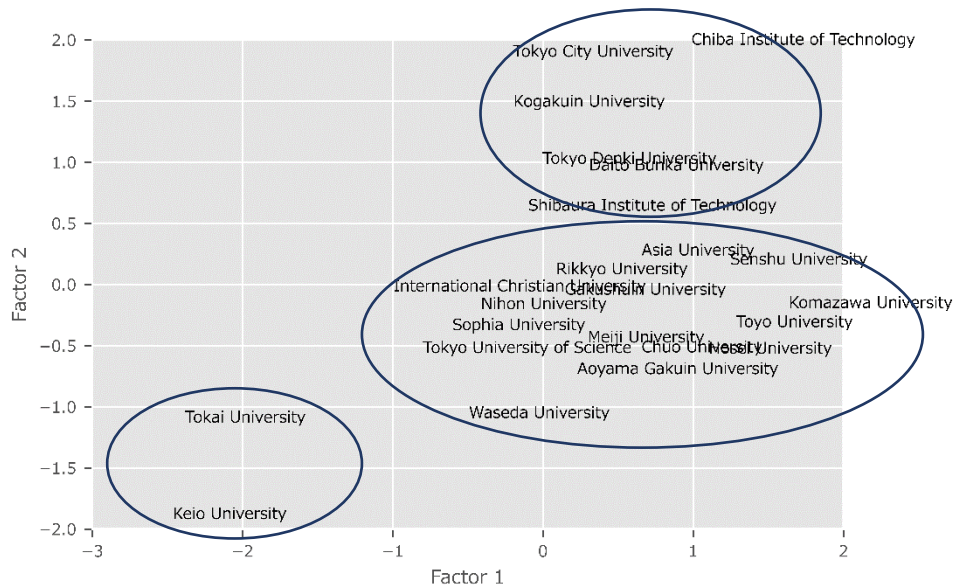
In Table 4, "Students/Teachers" has the highest value with a positive sign in factor 1 and "Tui pay by stu/Edu act rev," has the second highest. Universities that have higher positive values in these indexes are in the far right. In Figure 3B, Keio University and Tokai University are in the left position of Factor 1. There are many universities in the right position of Figure 3B. Universities that have lower values in both indexes seem to indicate that they focus on improving the student–teacher ratio and on decreasing their dependence on tuition.

In Table 4, "Adv cost/Edu act rev" has the highest value with a positive sign in factor 2 and "Man assets/Ext debts" has the second highest. When universities have higher values in both indexes, they seem to indicate that they focus on advertisement activities compared to other universities and have more affordable financial conditions. They are in the upper position in Figure 3B. One of the examples is Chiba Institute of Technology. The university in the lowest position is Keio University.

In Figure 3B, there seems to be three groups within Group 1: one in the lower left, such as Keio University; one in the middle right, such as GMARCH; and the third in the top right, such as Chiba Institute of Technology. The figure indicates that in factor 3, the loading values of "Edu act exp/Edu act rev" and "Tui pay by stu/Edu act rev" are high in positive sign. This factor is difficult to interpret as when the loading value of "Edu act exp/Edu act rev" is high and that of "Tui pay by stu/Edu act rev" is low—which are preferable characteristics of a "good" university—the value of factor 3 is not high. When both "Edu act exp/Edu act rev" and "Tui pay by stu/Edu act rev" are high, the university becomes highest, such as International Christian University in Figure 3A. Keio University does not have a high value of "Tui pay by stu/Edu act rev," which is in the middle position of factor 3.

= Group 2 =

Next, we turn to the results for the Group 2 universities in Table 5 and Figures 4A and 4B. With respect to factor 1 in Table 5, the highest and the second highest indexes are the same as Table 4: "Adv cost/Edu act rev" and "Outcomes"/"Engagement" in factor 1 and "Edu act exp/Edu act rev" and "Man assets/Ext debts" in factor 3.

In factor 2, the second highest loading value is "Outcomes"/"Engagement." The difference between the second highest loading and highest loading is large, which means that the highest loading "Adv cost/Edu act rev" largely influences the position in factor 2. In addition, when a university has higher reputation among professionals than non-professionals (higher "Outcomes"/"Engagement"), the university is at a lower position in Figure 4B. There seems three sub-groups among Group 2 in Figure 4B, depending on the loading values in factor 1 and factor 2. The group in lower left of Figure 4B has low values for "Tui pay by stu/Edu act rev," "Adv cost/Edu act rev," and "Students/Teachers," which indicates a greater focus on educational rather than advertisement activity (e.g., Keio University). There are many universities in the group in the lower right of Figure 4B. They have high values for "Tui pay by stu/Edu act rev," and "Students/Teachers," and they have low values for "Adv cost/Edu act rev," which indicates they don't focus on both educational and advertisement activity. The group in the upper right has the opposite characteristics of the lower left group. (e.g., Kyoto University of Foreign Studies). When universities have both high "Edu act exp/Edu act rev" and high "Man assets/Ext debts" in factor 3, they are in higher position in Figure 4A (e.g., Soka University).

Table 5: Factor loadings of factor analysis for Group 2 universities

	factor1	factor2	factor3
Edu act exp/Edu act rev	-0.085	0.044	0.596
Tui pay by stu/Edu act rev	0.783	0.135	-0.039
Sub to edu act exp/Edu act rev	-0.14	-0.05	0.386
Adv cost/Edu act rev	-0.219	1.064	-0.16
Students/Teachers	0.931	-0.265	-0.078
"Outcomes"/"Engagement"	-0.246	-0.285	-0.116
Man assets/Ext debts	0.152	-0.058	0.647

Figure 4A: Factor analysis results with Factor 1 and Factor 3 (Group 2)
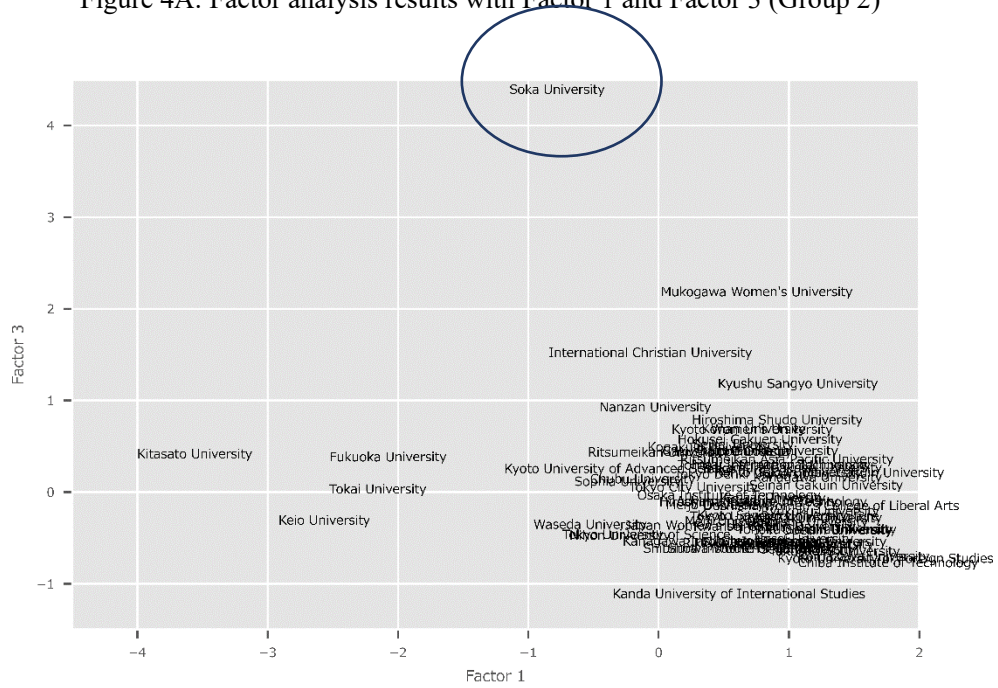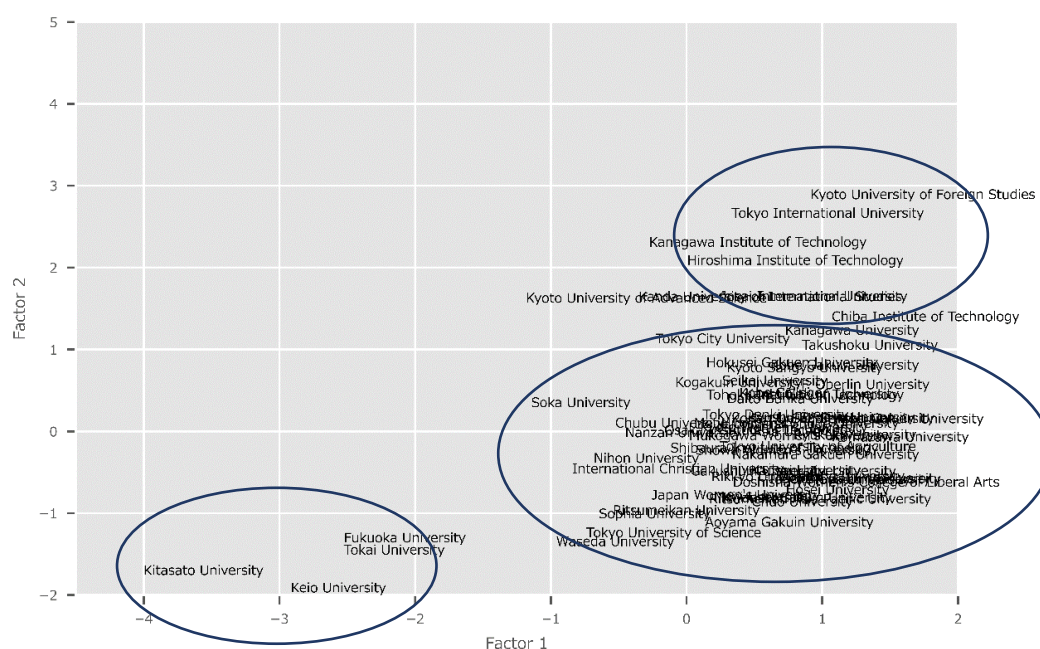
Figure 4B: Factor analysis results with Factor 1 and Factor 2 (Group 2)

・Factor Analysis by separating the universities into three groups based on the index of "Man assets/Ext debts"

=Low "Man assets/Ext debts" Group=

Table 6 and Figures 5A and 5B present the results of factor analysis in the group with low "Man assets/Ext debts." With respect to factors 1 and 2, the highest and the second highest loading values are the same as in Table 5. With respect to factor 3, the index "Sub to edu act exp/Edu act rev" has the highest loading value and the index "Edu act exp/Edu act rev" has the second highest loading value. In Table 5B, Keio University is in the bottom left, implying that Keio University focuses on educational activity (low "Students/Teachers" and high "Adv cost/Edu act rev") and has better reputation among professionals (High "Outcomes/Engagement"). Nanzan University and Hokusei Gakuen University are in a higher position in Figure 5A.

Table 6: Factor loadings of factor analysis in the group with low "Man assets/Ext debts"

	factor1	factor2	factor3
Edu act exp/Edu act rev	0.102	0.018	0.319
Tui pay by stu/Edu act rev	0.52	0.418	-0.148
Sub to edu act exp/Edu act rev	-0.226	-0.025	0.983
Adv cost/Edu act rev	-0.109	0.787	-0.143

Students/Teachers	1.074	-0.192	0.081
"Outcomes"/"Engagement"	0.037	-0.814	-0.284

Figure 5A: Factor analysis result with Factor 1 and Factor 3 (the group with low "Man assets/Ext debts")
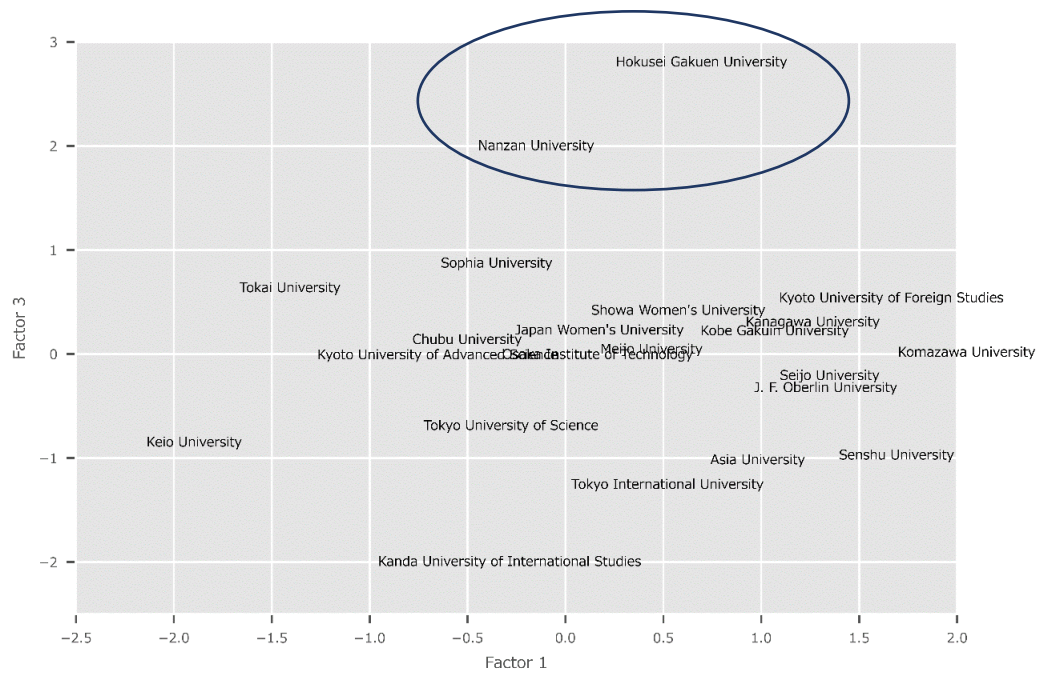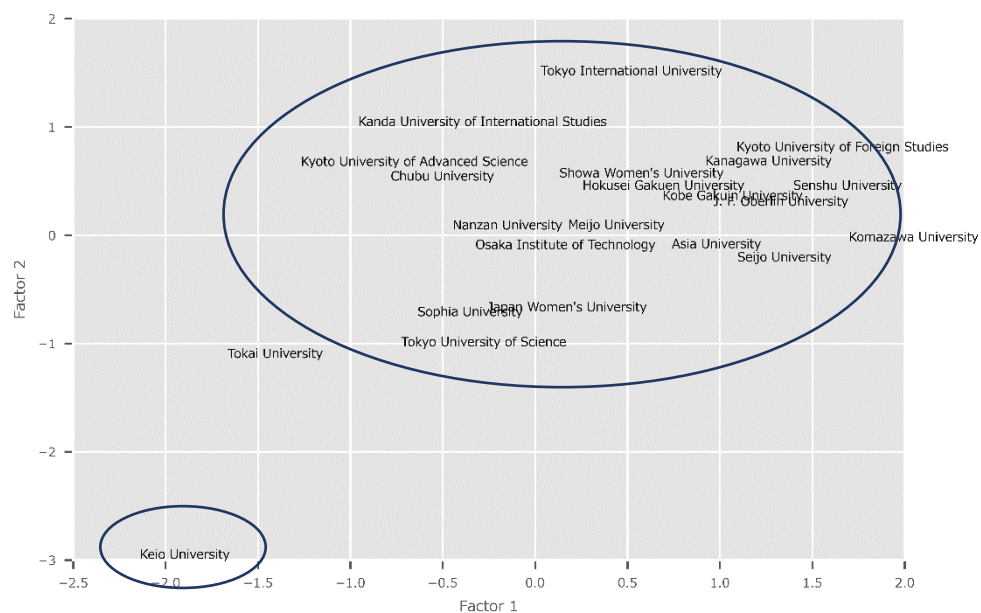
Figure 5B: Factor analysis result with Factor 1 and Factor 2 (the group with low "Man assets/Ext debts")

=Middle "Man assets/Ext debts" Group=

Table 7 shows that factor 1 has the same highest and the second highest loadings as in Table 6. With respect to factor 2, "Adv cost/Edu act rev" has the highest loading and "Tui pay by stu/Edu act rev" has the second highest loading. The difference between "Adv cost/Edu act rev" (highest) and "Tui pay by stu/Edu act rev" (the second highest) is greater than that between other factors. "Adv cost/Edu act rev" is more influential than "Tui pay by stu/Edu act rev." Factor 3 has the same highest and the second highest loadings with Table 6.

In Figure 6B, there seems to be three groups. One is the group in the lower right (Kitazato University and Fukuoka University), which have lower "Tui pay by stu/Edu act rev" and lower "Students/Teachers," which means that they focus on educational activity with lower dependence on tuition. The second group is in the upper right (e.g., Kanagawa Institute of Technology) and have higher "Adv cost/Edu act rev," which means that they focus on advertisement activity. The final group is in the lower right. With respect to factor 3, both "Edu act exp/Edu act rev" and "Sub to edu act exp/Edu act rev" have higher loadings than other indexes. According to Figure 6A, International Christian University and Ritsumeikan University are in the upper position.

Table 7: Factor loadings of factor analysis in the group with middle "Man assets/Ext debts"

	factor1	factor2	factor3
Edu act exp/Edu act rev	0.068	-0.146	0.624
Tui pay by stu/Edu act rev	1.061	0.19	0.202
Sub to edu act exp/Edu act rev	-0.042	0.175	0.599
Adv cost/Edu act rev	0.095	0.986	-0.099
Students/Teachers	0.74	-0.159	-0.328
"Outcomes"/"Engagement"	0.011	-0.068	0.425

Figure 6A: Factor analysis result with Factor 1 and Factor 3 (the group with middle "Man assets/Ext debts")
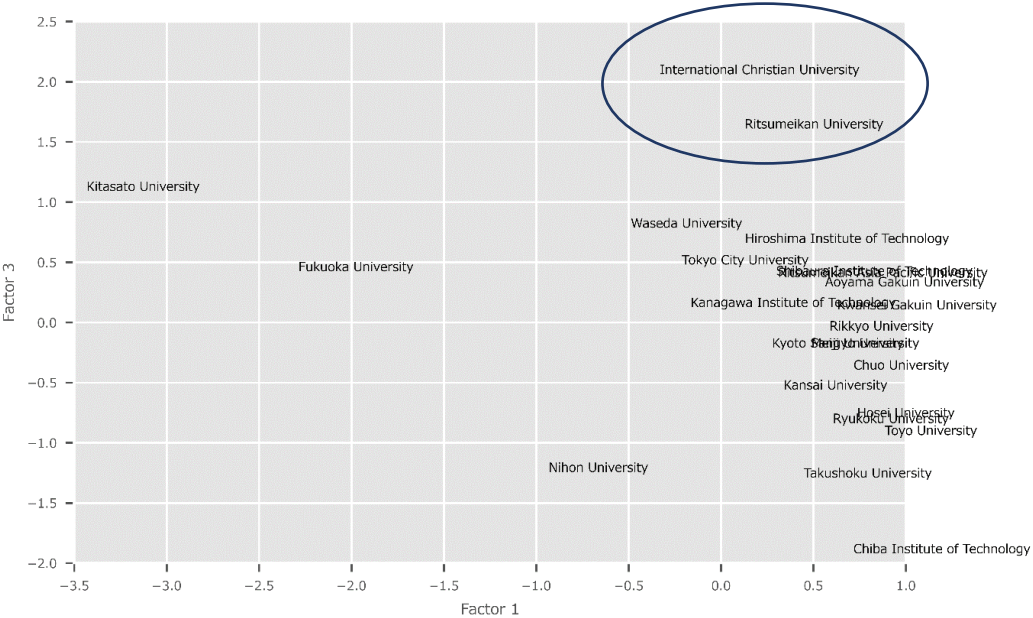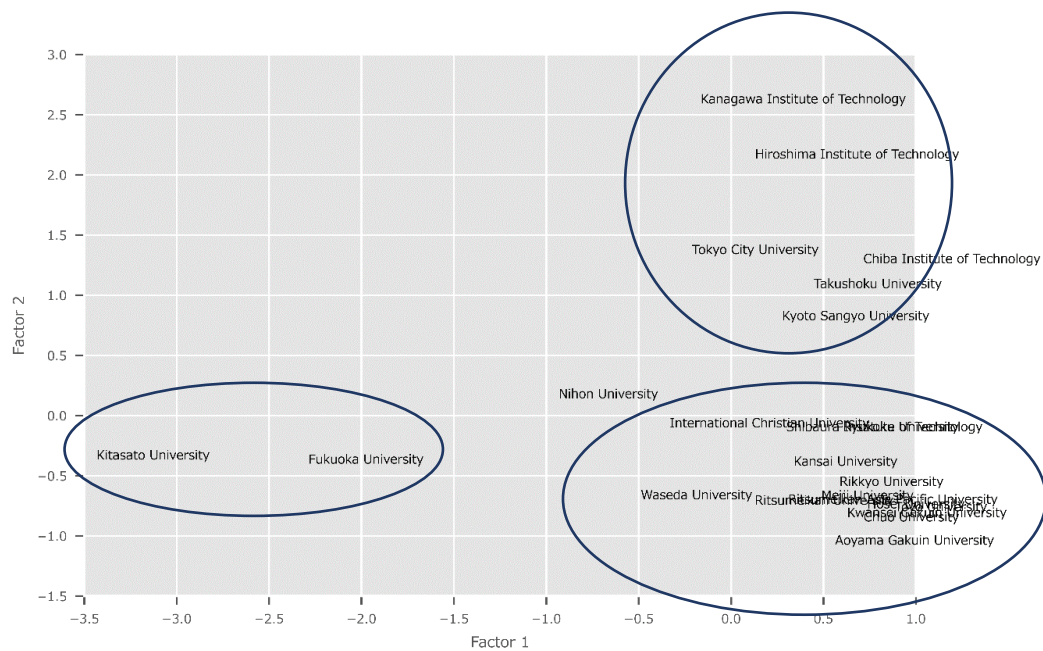
Figure 6B: Factor analysis result with Factor 1 and Factor 2 (the group with middle "Man assets/Ext debts")

=High "Man assets/Ext debts" Group=

In Table 8, with respect to factor 1, "Tui pay by stu/Edu act rev" has the highest value and "Sub to edu act exp/Edu act rev" has the second highest absolute value in the negative sign. With respect to factor 2, "Students/Teachers" has the highest value and "Adv cost/Edu act rev" has the second highest absolute value in the negative sign. In factor 3, "Edu act exp/Edu act rev" has the highest value and "Tui pay by stu/Edu act rev" has the second highest absolute value in the negative sign.

In Figure 7B, the universities having higher "Tui pay by stu/Edu act rev" and lower "Sub to edu act exp/Edu act rev" are in the right position (factor 1; e.g., Mukogawa Women's University and Josai International University). Soka University, which is in the left, has the opposite characteristics. The universities with higher "Adv cost/Edu act rev" and lower "Students/Teachers" are in the lower portion of the figure (e.g., Soka University, Mukogawa Women's University, and Josai International University). They are in the lower position in Table 3 for a different reason: Soka University and Mukogawa Women's University have lower "Students/Teachers" and Josai International University has higher "Adv cost/Edu act rev". In Table 7A, Soka University is in a higher position, which means that it has higher "Edu act exp/Edu act rev."

Table 8: Factor loadings of factor analysis in the group with high "Man assets/Ext debts"

	factor1	factor2	factor3
Edu act exp/Edu act rev	-0.158	-0.099	0.946
Tui pay by stu/Edu act rev	0.939	0.014	-0.356
Sub to edu act exp/Edu act rev	-0.683	0.092	0.066
Adv cost/Edu act rev	0.159	-0.546	-0.033
Students/Teachers	0.193	0.909	-0.193
"Outcomes"/"Engagement"	-0.268	-0.038	-0.199

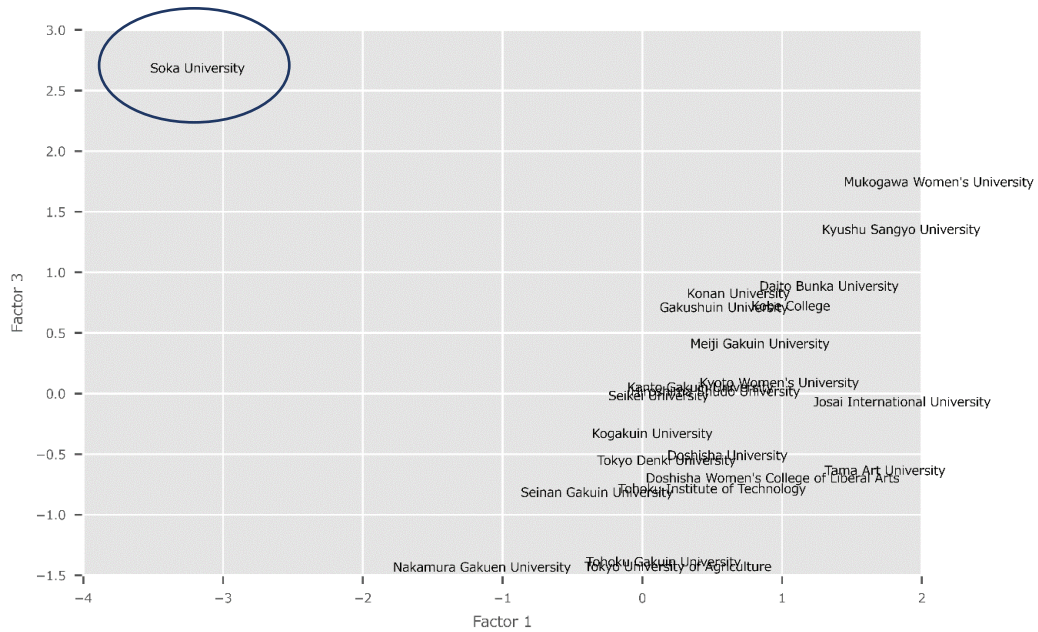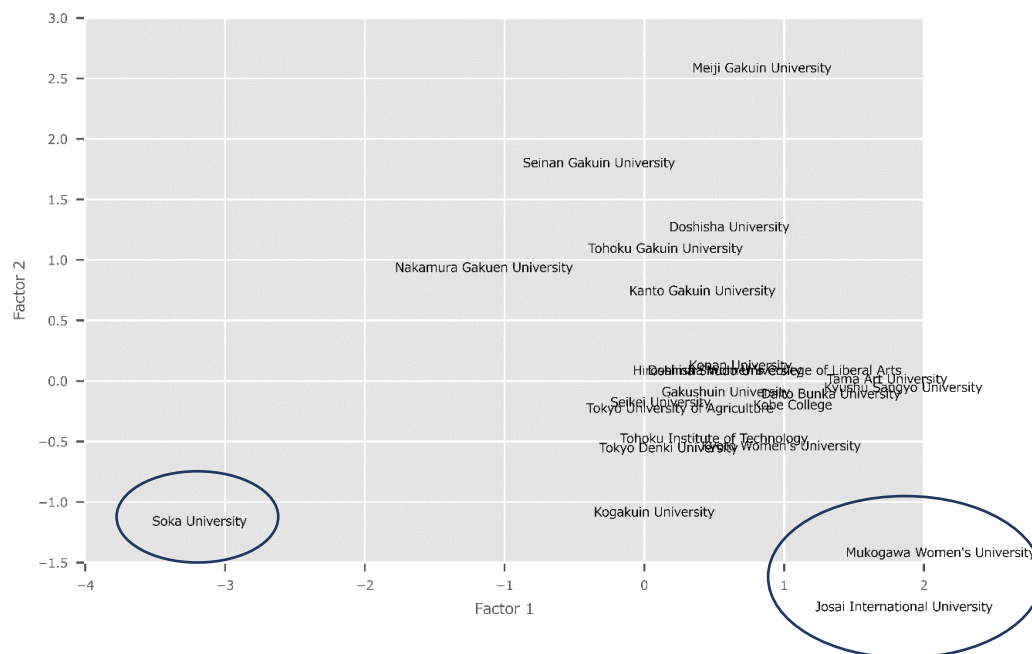Figure 7A: Factor analysis result with Factor 1 and Factor 3 (the group with high "Man assets/Ext debts")

Figure 7B: Factor analysis result with Factor 1 and Factor 2 (the group with high "Man assets/Ext debts")

・Hierarchical Cluster Analysis Results

= Group 1 universities=

Figure 8 and Tables 9 and 10 present the results of the hierarchical cluster analysis. Figure 8 shows the dendrogram, Table 9 shows the averages of all indexes in each cluster, and Table 10 shows the universities in each cluster[20]. In Table 9, the lowest value in each index is indicated in blue and the highest value, in yellow. In Cluster 1, this group has the lowest values in "Edu act exp/Edu act rev," which is not largely different from Cluster 3 and Cluster 4, "Tui pay by stu/Edu act rev," "Adv cost/Edu act rev," "Students/Teachers," and "Man assets/Ext debts." This group has the highest value in "Outcomes/Engagement". Cluster 2 has the highest values in both "Edu act exp/Edu act rev" and "Sub to edu act exp/Edu act rev." Cluster 3 has the highest values in "Tui pay by stu/Edu act rev" and "Students/Teachers" and the lowest values in "Sub to edu act exp/Edu act rev" and "Outcomes/Engagement." Cluster 4 has the highest values in "Adv cost/Edu act rev" and "Man assets/Ext debts."

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[20] We checked various methods to decide the optimal number of clusters, such as Gap statistics (Tibshirani et al. (2001)), X-means (Pelleg and Moore (2000)), Silhouette coefficient (Rousseeuw (1986)), Calinski–Harabasz Index (Calinski and Harabasz (1974)), and Davies–Bouldin Index (Davies and Bouldin (1979)). We could not find the optimal number of clusters using any of these methods. With respect to Gap statistics, the value of the statistics was not stable, and X-means did not indicate a stable optimal number of clusters. The Silhouette coefficient, Calinski–Harabasz Index, and Davies–Bouldin Index indicated that we should make the number of clusters as large as possible. For each analysis, we decided the number of clusters in advance.

Both Cluster 1 and Cluster 2 in Table 9 seem to be characterized by a greater focus on educational activity (comparatively lower "Students/Teachers" or comparatively higher "Edu act exp/Edu act rev"), not spending on advertisement (comparatively lower "Adv cost/Edu act rev"), and having a lower financial resources for their operation (comparatively lower "Man assets/Ext debts"). Table 10 shows the universities in each cluster (e.g., Cluster 1: Keio University; Cluster 2: Sophia University). Most universities in Cluster 1 and Cluster 2 have higher positions in the cramming school rankings. Neither Cluster 3 nor Cluster 4 focus on educational activity (comparatively higher "Students/Teachers" or comparatively lower "Edu act exp/Edu act rev"), spend on advertisement (comparatively higher "Adv cost/Edu act rev"), or have strong financial conditions to operate (comparatively higher "Man assets/Ext debts").
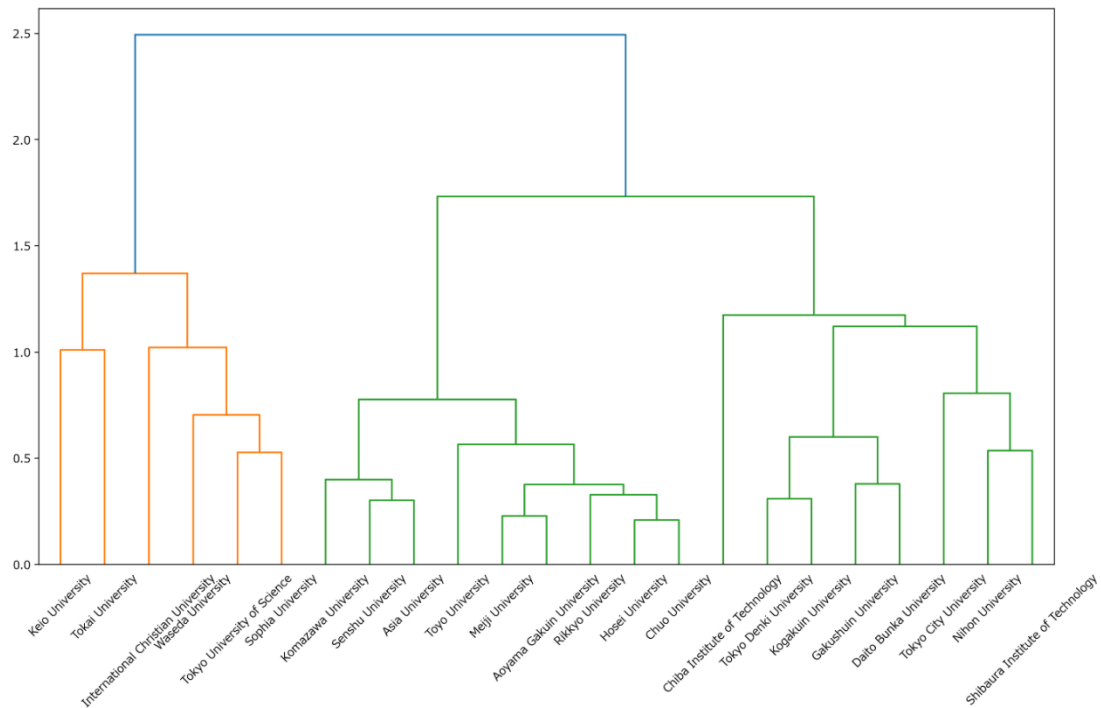
Figure 8: Hierarchical cluster analysis (Group 1)

Table 9: Hierarchical cluster analysis averages of all indexes (Group 1)

	Cluster1 Averages of All Indexes	Cluster2 Averages of All Indexes	Cluster3 Averages of All Indexes	Cluster4 Averages of All Indexes
Edu act exp/Edu act rev	0.246	0.465	0.258	0.257
Tui pay by stu/Edu act rev	0.005	0.754	0.907	0.83
Sub to edu act exp/Edu act rev	0.722	0.739	0.376	0.564
Adv cost/Edu act rev	0.078	0.167	0.294	0.632
Students/Teachers	0.04	0.329	0.774	0.538
"Outcomes"/"Engagement"	0.568	0.504	0.147	0.2
Man assets/Ext debts	0.078	0.08	0.16	0.535
The Number of Cluster	1	2	3	4

Table 10: Hierarchical cluster analysis university list (Group 1)

Cluster1	Cluster2	Cluster3	Cluster4
Keio University	Sophia University	Komazawa University	Gakushuin University
Tokai University	Waseda University	Senshu University	Shibaura Institute of Technology
	International Christian University	Rikkyo University	Tokyo City University
	Tokyo University of Science	Asia University	Tokyo Denki University
		Toyo University	Daito Bunka University

		Chuo University	Chiba Institute of Technology
		Hosei University	Kogakuin University
		Meiji University	Nihon University
		Aoyama Gakuin University	

= Group 2 =

Figure 9 and Tables 11 and 12 show the results of hierarchical cluster analysis. In Table 11, blue and yellow are used in the same way as Table 9. In Table 11, Cluster 1 (e.g., Tokai University) has the lowest values for "Students/Teachers" and "Tui pay by stu/Edu act rev." These universities maintain a low "Students/Teachers" index score while they reduce dependence on tuition, which means that these universities are beneficial for students because they focus on educational activity and reduce the burden to students. Cluster 2 (e.g., Keio University) has the highest values for "Outcomes/Engagement" and the lowest for "Adv cost/Edu act rev." Universities in Cluster 2, which have the highest reputation from professionals, do not focus on advertisement activity. Cluster 3 (e.g., Tokyo International University) has the highest "Tui pay by stu/Edu act rev" and "Adv cost/Edu act rev" and has the lowest "Sub to edu act exp/Edu act rev." Cluster 3 has higher dependence on tuition and advertisement activity and do not get significant support from subsidy, which means that these universities are not well suited for students. Universities in Cluster 5 (e.g., Seijo University), which have the lowest "Edu act exp/Edu act rev" and the highest "Students/Teachers," focus less on educational activity than other universities. It seems that Clusters 1, 3, and 5 have different policies on students because Cluster 1 universities reinforce appropriate education and reduce students' burden, but the other two do not. Cluster 6 has the highest "Sub to edu act exp/Edu act rev" and the lowest "Outcomes/Engagement" and "Man assets/Ext debts." Cluster 6 (e.g., International Christian University) has the second highest "Edu act exp/Edu act rev". The universities in Cluster 6 carry out educational activity and have a lower reputation; meanwhile, they receive much greater subsidies but have operate on worse financial conditions. Only Soka University is included in Cluster 8: it has the highest "Edu act exp/Edu act rev" and "Man assets/Ext debts," which implies that Soka University focuses on educational activity based on its high "Man assets/Ext debts".

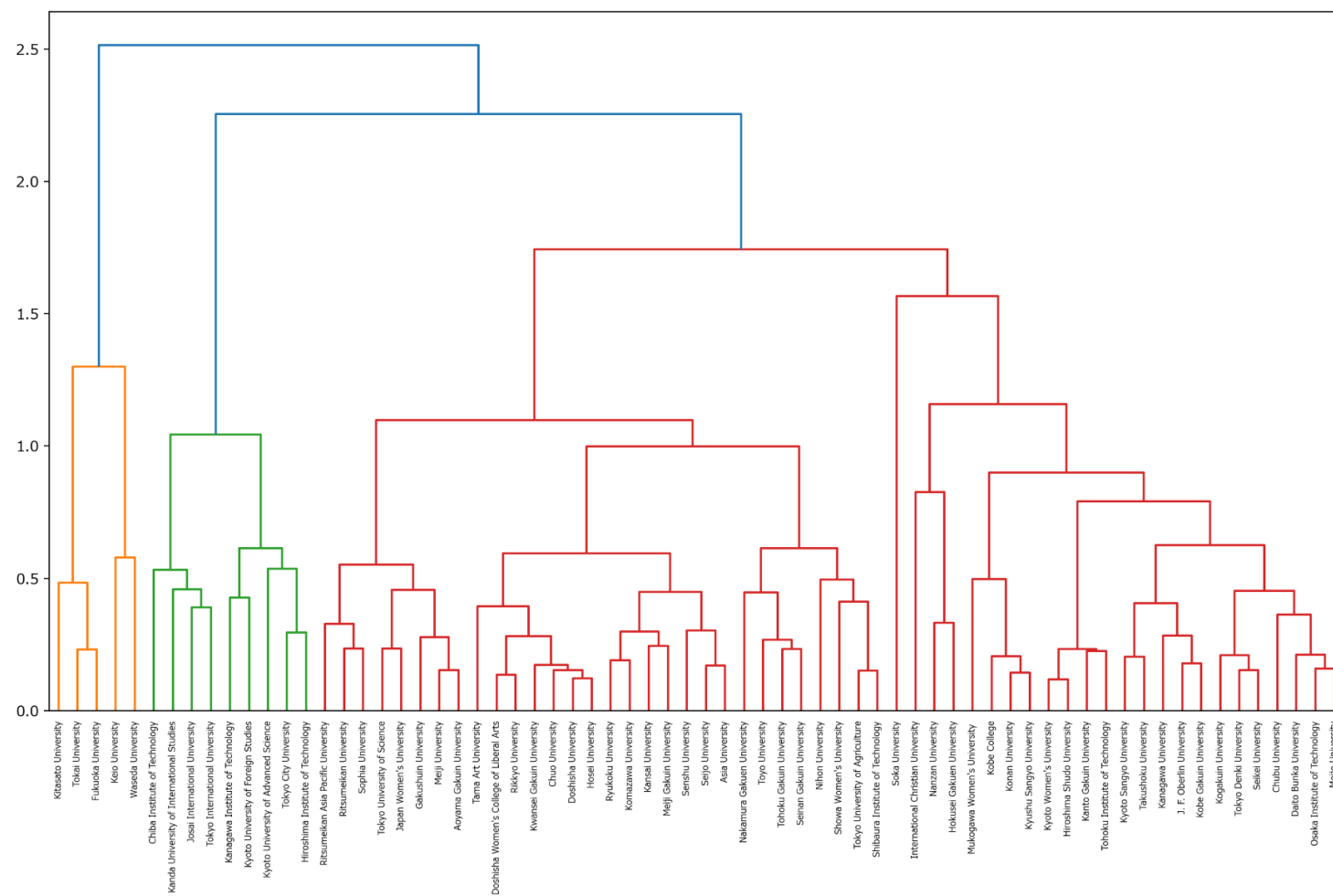Figure 9: Hierarchical cluster analysis (Group 2)

Table 11: Hierarchical cluster analysis averages of all indexes (Group 2)

	Cluster1 Averages of All Indexes	Cluster2 Averages of All Indexes	Cluster3 Averages of All Indexes	Cluster4 Averages of All Indexes	Cluster5 Averages of All Indexes	Cluster6 Averages of All Indexes	Cluster7 Averages of All Indexes	Cluster8 Averages of All Indexes
Edu act exp/Edu act rev	0.291	0.321	0.268	0.381	0.206	0.662	0.375	1
Tui pay by stu/Edu act rev	0.153	0.472	0.885	0.837	0.868	0.786	0.884	0.54
Sub to edu act exp/Edu act rev	0.54	0.404	0.317	0.425	0.371	0.831	0.472	0.775
Adv cost/Edu act rev	0.106	0.022	0.804	0.113	0.225	0.339	0.398	0.294
Students/Teachers	0.21	0.409	0.559	0.637	0.812	0.578	0.687	0.42
"Outcomes"/"Engagement"	0.259	0.991	0.212	0.395	0.243	0.181	0.226	0.341
Man assets/Ext debts	0.089	0.074	0.095	0.091	0.133	0.061	0.199	1
The Number of Cluster	1	2	3	4	5	6	7	8

Table 12: Hierarchical cluster analysis university list (Group 2)

Cluster1	Cluster2	Cluster3	Cluster4	Cluster5	Cluster6	Cluster7	Cluster8
Tokai University	Keio University	Tokyo International University	Gakushuin University	Seijo University	International Christian University	Hiroshima Shudo University	Soka University
Kitasato University	Waseda University	Kanagawa Institute of Technology	Meiji University	Meiji Gakuin University	Nanzan University	Kyoto Women's University	
Fukuoka University		Josai International University	Aoyama Gakuin University	Shibaura Institute of Technology	Hokusei Gakuen University	Kobe College	
		Kyoto University of Advanced Science	Tokyo University of Science	Seinan Gakuin University		Takushoku University	
		Kanda University of International Studies	Sophia University	Komazawa University		Osaka Institute of Technology	
		Tokyo City University	Ritsumeikan University	Asia University		Kanagawa University	

		Hiroshima Institute of Technology	Ritsumeikan Asia Pacific University	Tohoku Gakuin University		Meijo University	
		Kyoto University of Foreign Studies	Japan Women's University	Nihon University		Chubu University	
		Chiba Institute of Technology		Senshu University		Kyoto Sangyo University	
				Doshisha University		Kanto Gakuin University	
				Doshisha Women's College of Liberal Arts		Mukogawa Women's University	
				Kansai University		Tohoku Institute of Technology	
				Hosei University		J. F. Oberlin University	
				Chuo University		Tokyo Denki University	
				Tama Art University		Kobe Gakuin University	
				Kwansei Gakuin University		Daito Bunka University	
				Toyo University		Konan University	
				Rikkyo University		Kyushu Sangyo University	
				Ryukoku University		Seikei University	
				Tokyo University of Agriculture		Kogakuin University	
				Showa Women's University			
				Nakamura Gakuen University			

5. Discussion

The Appendix contains results for the following:

・Principal component analysis by separating the universities into three groups based on the "Man assets/Ext debts" index
・Hierarchical cluster analysis by separating the universities into three groups based on the "Man assets/Ext debts" index

Here, we discuss the following hypotheses based on our results in section 4 and in the Appendix.

・Hypothesis 1: The Japanese private universities in the top position of the T-score rankings announced by cramming schools do not adopt strategies for differentiation from other top universities because the number of top universities in Japan is small and they already have a higher position than many other universities.

Japanese cramming schools have announced Keio University and Waseda University as the top two private universities. Therefore, we focus on these universities here. Figures 3A, 3B, 4A, 4B, and 8 and Table 10 indicate that these two universities take differentiation strategies. In particular, Keio University focuses more on educational activity than Waseda University. However, Figure 9 and Table 12 show that they are in the same cluster. In this analysis, Keio University seems to differentiate from Waseda University with respect to the reinforcement of educational activity.

・Hypothesis 2: Universities other than the top universities in the T-score rankings adopt differentiation strategies against other universities in a similar position such as reinforcement of advertisement to consumers or strengthening the quality of education.

In our factor analysis, hierarchical cluster analysis and principal component analysis, certain universities that are not top-ranked seem to differentiate from each other. The analysis of the value of the index "Man assets/Ext debts" in Figure 5A, 5B, 6A, 6B, 7A, 7B and the analysis results in Appendix, indicate that some universities in this group focus on educational activity whereas others focus on advertisement activity. For example, universities such as Chiba Institute of Technology seem to focus on advertisement activity rather than on educational activity while they have a strong financial condition. In contrast, Keio University focuses on educational activity although they do not seem to have a strong financial condition. Soka University also focuses on educational activity but also have an extremely strong financial position. Taken together, these results indicate some differentiations in positioning against each other among some universities.

Finally, we discuss the policy implications of the results of our analysis here. For the question of why a university may focus heavily on advertisement activity rather than increasing the quality of the educational service, we have the following explanation. In Japan, official institutions that evaluate university education, such as National Institution for Academic Degrees and Quality Enhancement of Higher Education [21], provide their results based on their research. However, consumers may not be able to judge whether they can reliably choose universities based on the information such institutions provide. Furthermore, even though they provide information, it is possible that some consumers do not understand the meaning of information or are not interested in it. As a result, these consumers may naturally depend on TV or magazine advertisement for the universities or on the T-score rankings of private Japanese cramming schools, whereas these information sources may not precisely evaluate or represent the quality of education many universities provide.

A university that has a strong understand of the Japanese higher education market may focus more on advertisement activity rather than educational activity because this would help bring in new consumers from among a particular class of consumers in the market who are attracted by advertisements.

Private universities set their own policies and provide various educational services to various consumers. However, if student tuitions are used as a major resource for advertisement activity, this resource would not be used for increasing human capital, and the consumers who choose the university do not notice this aspect. In this case, the Japanese public sector needs to intervene in increasing consumers' understanding of the educational activities that universities provide. The sector also needs to improve their understanding the quality of the ratings of official evaluators such as National Institution for Academic Degrees and Quality Enhancement of Higher Education and how to interpret their results.

6. Conclusion

In this paper, we have analyzed the following hypotheses.

・Hypothesis 1: The Japanese private universities in the top position of the T-score rankings announced by cramming schools do not adopt strategies for differentiation from other top universities because the number of top universities in Japan is small and they already have a higher position than many other universities.

・Hypothesis 2: Universities other than the top universities in the T-score rankings adopt

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differentiation strategies against other universities in a similar position such as reinforcement of advertisement to consumers or strengthening the quality of education.

The analysis results support Hypothesis 2, although the evidence was insufficient to support Hypothesis 1. Our analysis indicated that some Japanese private universities adopt differentiation strategies with respect to educational and advertisement activities, with some universities focusing on educational activity and others, on advertisement activity.

Finally, we provide policy implications with respect to the higher education market in Japan. In Japan, some institutions such as National Institution for Academic Degrees and Quality Enhancement of Higher Education do not work well in that they do not provide information about private universities in a way that is easy for consumers to understand. In addition, many consumers may not sufficiently understand the activities of private universities and some are attracted by advertisements. If a university focuses too much on advertisement activity rather than focusing on education to students and students do not recognize this, the public sector must intervene in this situation. In this case, the public sector should improve the functioning of the institutions providing information about private universities and should also educate Japanese consumers so that they could clearly understand what services the universities provide. This analysis would also be useful as a reference for other countries where similar problems may exist.

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Appendix:

・Hierarchical cluster analysis by separating the universities into three groups based on the index of "Man assets/Ext debts"

In this appendix, we present the results of hierarchical cluster analysis by separating the universities into three groups based on the index of "Man assets/Ext debts."

- Low "Man assets/Ext debts" Group - Figure 10, Table 13 and 14

Figure 10 and Tables 13 and 14 present the results in the same way as section 4. We discuss only Cluster 1 and 4. Cluster 1 has the lowest "Tui pay by stu/Edu act rev," "Adv cost/Edu act rev," and "Students/Teachers." It has the highest "Outcomes/Engagement." Cluster 1 (e.g., Keio University) focuses on educational activity (lower "Adv cost/Edu act rev" and "Students/Teachers") and has a good reputation among professionals (higher "Outcomes/Engagement"). Cluster 4 has the lowest "Edu act exp/Edu act rev," "Sub to edu act exp/Edu act rev," and "Outcomes/Engagement" and the highest "Tui pay by stu/Edu act rev" and "Adv cost/Edu act rev." Cluster 4 focuses on advertisement activity (higher "Adv cost/Edu act rev") and does not so much focus on educational activity (lower "Edu act exp/Edu act rev").

- Middle "Man assets/Ext debts" Group - Figure 11 and Tables 15 and 16

Here, we discuss only Cluster 1 and 3. Cluster 1 has the lowest "Tui pay by stu/Edu act rev," "Adv cost/Edu act rev," and "Students/Teachers," which is like Cluster 1 above. Cluster 3 has the lowest "Edu act exp/Edu act rev," "Sub to edu act exp/Edu act rev," and "Outcomes/Engagement" and the highest "Students/Teachers," which is like Cluster 4 above.

- High "Man assets/Ext debts" Group - Figure 12, Table 17 and 18

Here, we discuss only Cluster 1 and 4. Cluster 1 (e.g., Nakamura Gakuen University) has the lowest "Edu act exp/Edu act rev," "Sub to edu act exp/Edu act rev," and "Adv cost/Edu act rev" and the highest "Students/Teachers," which is interesting because this indicates that these universities do not focus on both educational activity and advertisement activity although they have a strong financial position. Cluster 4, which includes only Soka University, has the lowest "Tui pay by stu/Edu act rev" and "Students/Teachers." and the highest "Edu act exp/Edu act rev," "Sub to edu act exp/Edu act rev," and

"Outcomes/Engagement", which means that they focus on educational activity.

=Low "Man assets/Ext debts" Group=

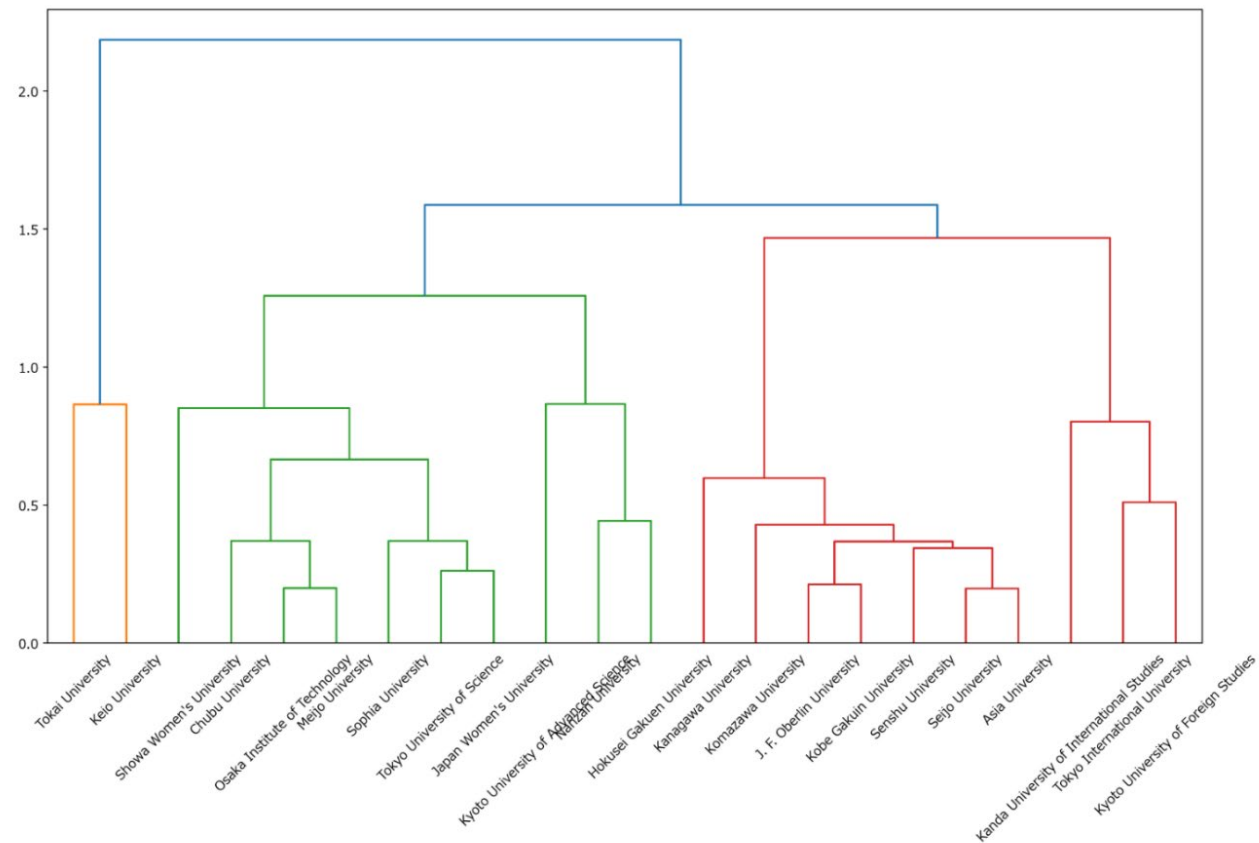Figure 10: Hierarchical cluster analysis (the group with low "Man assets/Ext debts")

Table 13: Hierarchical cluster analysis averages of all indexes (the group with low "Man assets/Ext debts")

	Cluster1 Averages of All Indexes	Cluster2 Averages of All Indexes	Cluster3 Averages of All Indexes	Cluster4 Averages of All Indexes
Edu act exp/Edu act rev	0.436	0.569	0.627	0.371
Tui pay by stu/Edu act rev	0.004	0.786	0.918	0.961
Sub to edu act exp/Edu act rev	0.488	0.566	0.293	0.171
Adv cost/Edu act rev	0.049	0.329	0.395	0.922
Students/Teachers	0.04	0.404	0.809	0.426
"Outcomes"/"Engagement"	0.621	0.235	0.256	0.172
The Number of Cluster	1	2	3	4

Table 14: Hierarchical cluster analysis university list (the group with low "Man assets/Ext debts")

Cluster1	Cluster2	Cluster3	Cluster4
Tokai University	Showa Women's University	Kobe Gakuin University	Kyoto University of Foreign Studies
Keio University	Kyoto University of Advanced Science	J. F. Oberlin University	Kanda University of International Studies
	Hokusei Gakuen University	Kanagawa University	Tokyo International University
	Meijo University	Asia University	
	Chubu University	Seijo University	
	Sophia University	Komazawa University	
	Japan Women's University	Senshu University	
	Tokyo University of Science		
	Nanzan University		
	Osaka Institute of Technology		

=Middle "Man assets/Ext debts" Group=

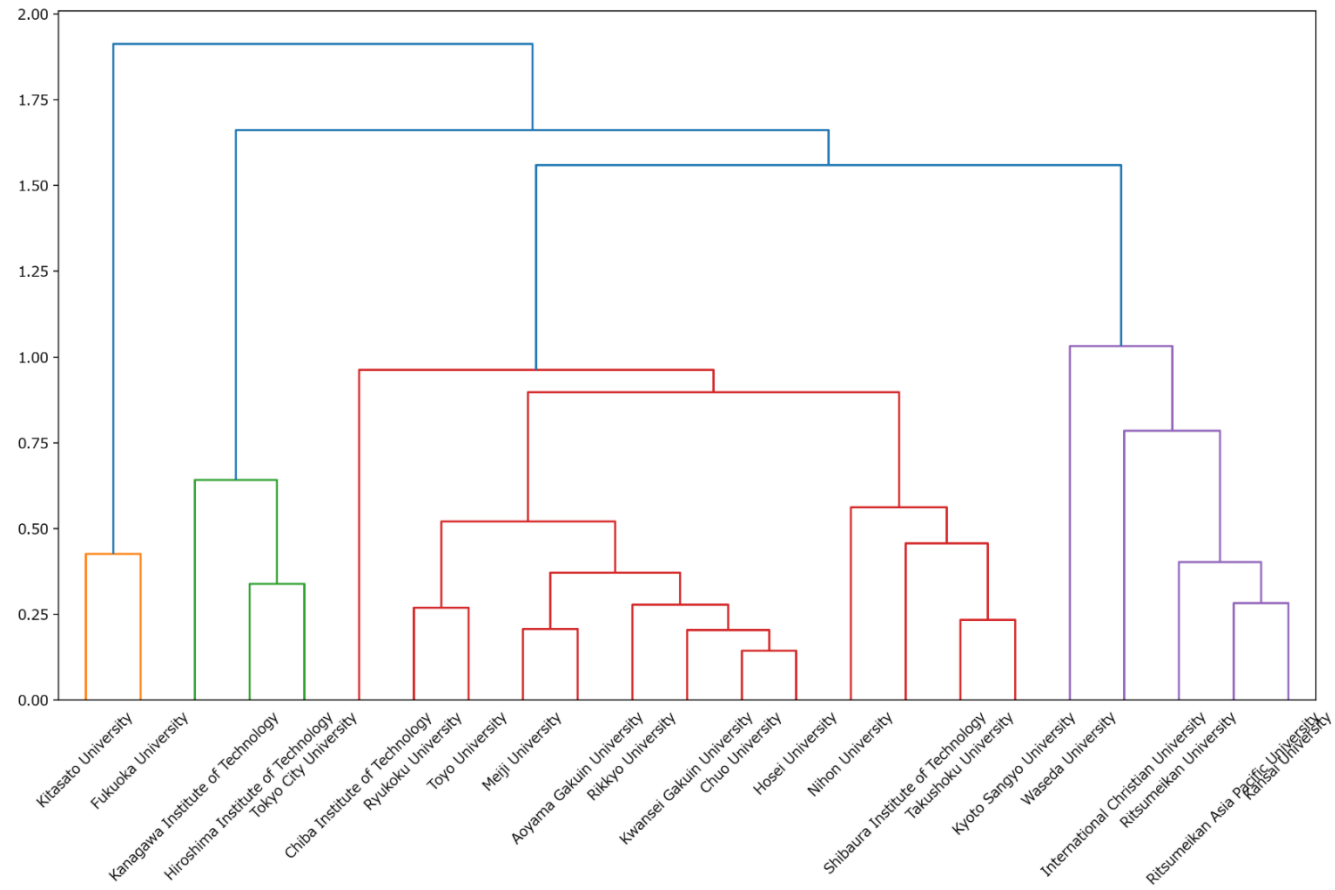Figure 11: Hierarchical cluster analysis (the group with middle "Man assets/Ext debts")

Table 15: Hierarchical cluster analysis averages of all indexes (the group with middle "Man assets/Ext debts")

	Cluster1 Averages of All Indexes	Cluster2 Averages of All Indexes	Cluster3 Averages of All Indexes	Cluster4 Averages of All Indexes
Edu act exp/Edu act rev	0.326	0.232	0.191	0.527
Tui pay by stu/Edu act rev	0.125	0.906	0.897	0.843
Sub to edu act exp/Edu act rev	0.698	0.804	0.461	0.762
Adv cost/Edu act rev	0.076	0.852	0.256	0.093
Students/Teachers	0.161	0.557	0.834	0.671
"Outcomes"/"Engagement"	0.166	0.256	0.137	0.414
The Number of Cluster	1	2	3	4

Table 16: Hierarchical cluster analysis university list (the group with middle "Man assets/Ext debts")

Cluster1	Cluster2	Cluster3	Cluster4
Fukuoka University	Kanagawa Institute of Technology	Aoyama Gakuin University	Waseda University
Kitasato University	Tokyo City University	Shibaura Institute of Technology	Ritsumeikan University
	Hiroshima Institute of Technology	Kwansei Gakuin University	Ritsumeikan Asia Pacific University
		Kyoto Sangyo University	Kansai University
		Ryukoku University	International Christian University
		Hosei University	
		Chiba Institute of Technology	
		Nihon University	
		Meiji University	
		Rikkyo University	
		Takushoku University	
		Chuo University	
		Toyo University	

=High "Man assets/Ext debts" Group=

Figure 12: Hierarchical cluster analysis (the group with high "Man assets/Ext debts")
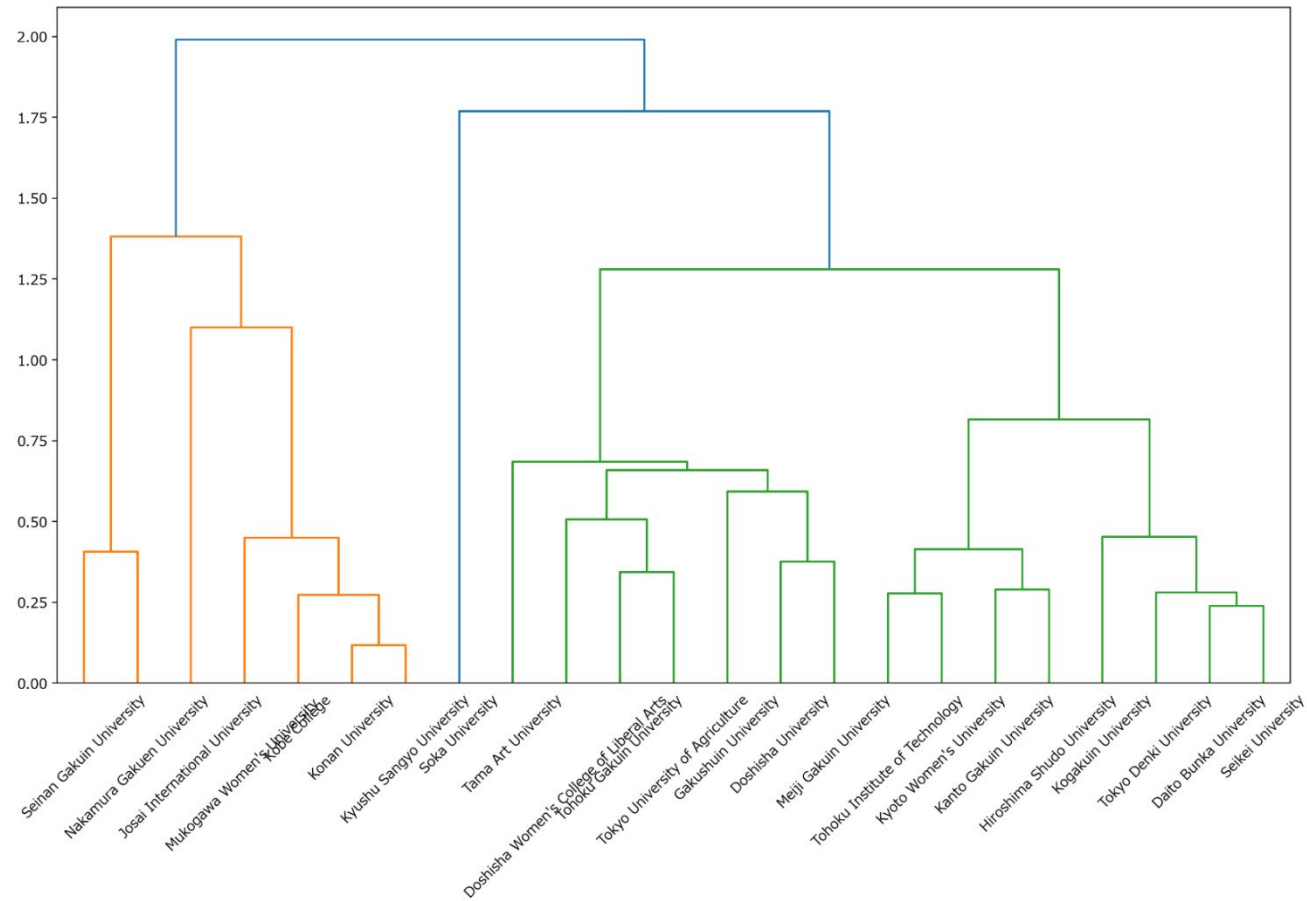
Table 17: Hierarchical cluster analysis averages of all indexes (the group with high "Man assets/Ext debts")

	Cluster1 Averages of All Indexes	Cluster2 Averages of All Indexes	Cluster3 Averages of All Indexes	Cluster4 Averages of All Indexes
Edu act exp/Edu act rev	0.093	0.449	0.223	1
Tui pay by stu/Edu act rev	0.624	0.843	0.761	0
Sub to edu act exp/Edu act rev	0.87	0.415	0.524	0.944
Adv cost/Edu act rev	0.077	0.444	0.275	0.266
Students/Teachers	0.756	0.375	0.55	0
"Outcomes"/"Engagement"	0.157	0.078	0.721	0.798
The Number of Cluster	1	2	3	4

Table 18: Hierarchical cluster analysis university list (the group with high "Man assets/Ext debts")

Cluster1	Cluster2	Cluster3	Cluster4
Nakamura Gakuen University	Kyushu Sangyo University	Hiroshima Shudo University	Soka University
Seinan Gakuin University	Kobe College	Kogakuin University	
	Josai International University	Kyoto Women's University	
	Konan University	Seikei University	
	Mukogawa Women's University	Tohoku Institute of Technology	
		Meiji Gakuin University	
		Tohoku Gakuin University	
		Gakushuin University	
		Tokyo University of Agriculture	

		Daito Bunka University	
		Kanto Gakuin University	
		Tama Art University	
		Doshisha Women's College of Liberal Arts	
		Doshisha University	
		Tokyo Denki University	

・Principal component analysis by separating the universities into three groups based on the index of "Man assets/Ext debts"

-Low "Man assets/Ext debts" Group – Table 19 and Figures 13A and 13B

The universities at the edge of the table have similar results to those in both the factor analysis and hierarchical cluster analysis. Tokai University and Keio University are in the far-right position in Table 13A and 13B, which means that they do not focus on advertisement activity and have a low "Students/Teachers" index.

-Middle "Man assets/Ext debts" Group - Table 20, Figure 14A and 14B

The universities at the edge of the table have results similar to those of both the factor and hierarchical cluster analyses. In particular, the results for Kitasato University, Fukuoka University, and Chiba Institute of Technology are similar. Kitasato University and Fukuoka University focus on educational activity. Chiba Institute of Technology focuses on advertisement activity and have a higher "Students/Teachers" index.

-High "Man assets/Ext debts" Group - Table 21 and Figures 15A and 15B

The universities at the edge of the table have results similar to those of both the factor and hierarchical cluster analyses. In particular, Soka University focuses on educational activity.

=Low "Man assets/Ext debts" Group=

Table 19: Factor loadings of principal component analysis in the group with low "Man assets/Ext debts"

	PC1	PC2	PC3
Edu act exp/Edu act rev	-0.062	-0.612	0.106
Tui pay by stu/Edu act rev	-0.61	0.052	-0.153
Sub to edu act exp/Edu act rev	0.186	-0.684	0.209
Adv cost/Edu act rev	-0.466	0.191	0.66
Students/Teachers	-0.512	-0.277	-0.593
"Outcomes"/"Engagement"	0.333	0.203	-0.365

Figure 13A: Principal component analysis results with Factor 1 and Factor 3 (the group with low "Man assets/Ext debts")
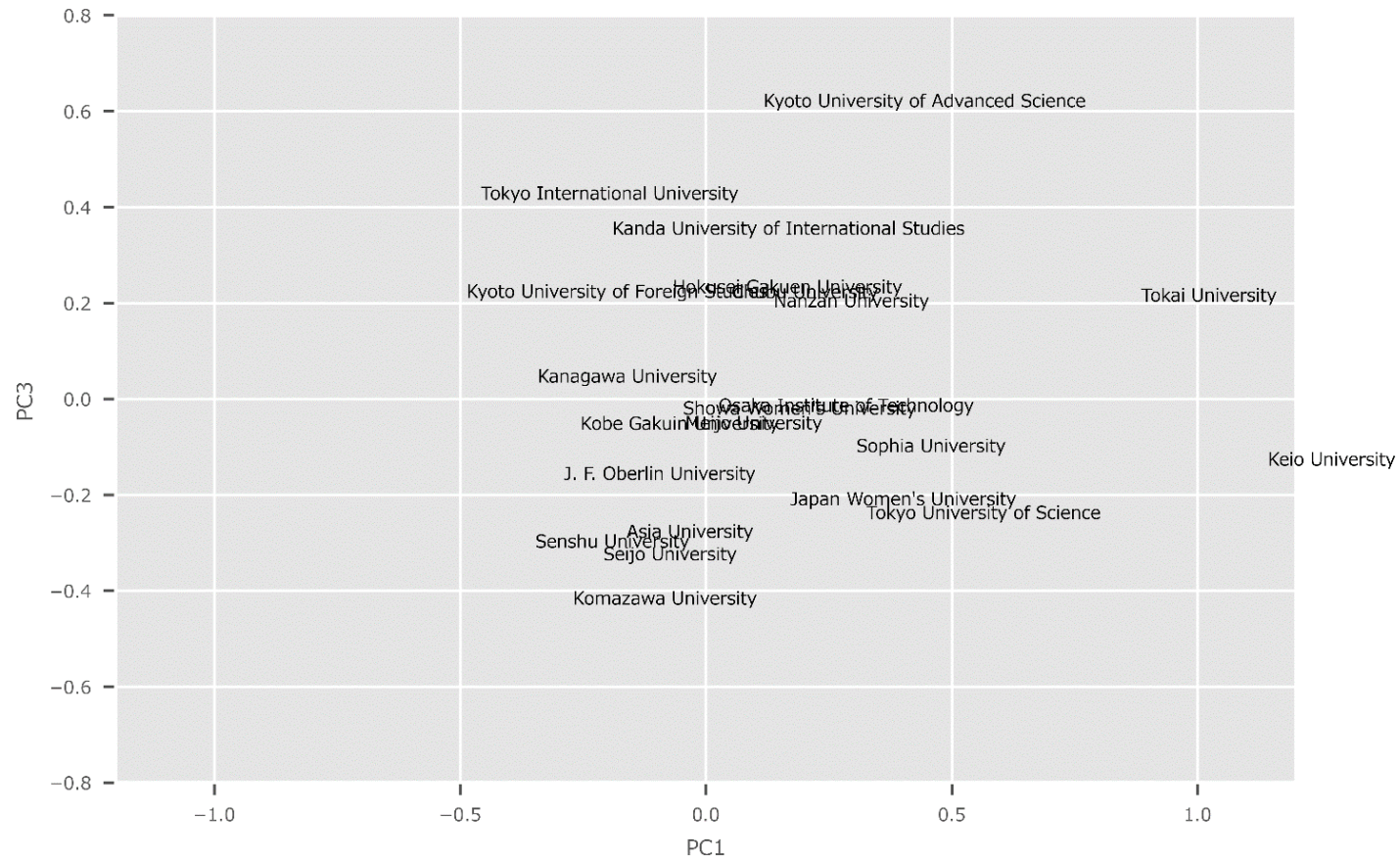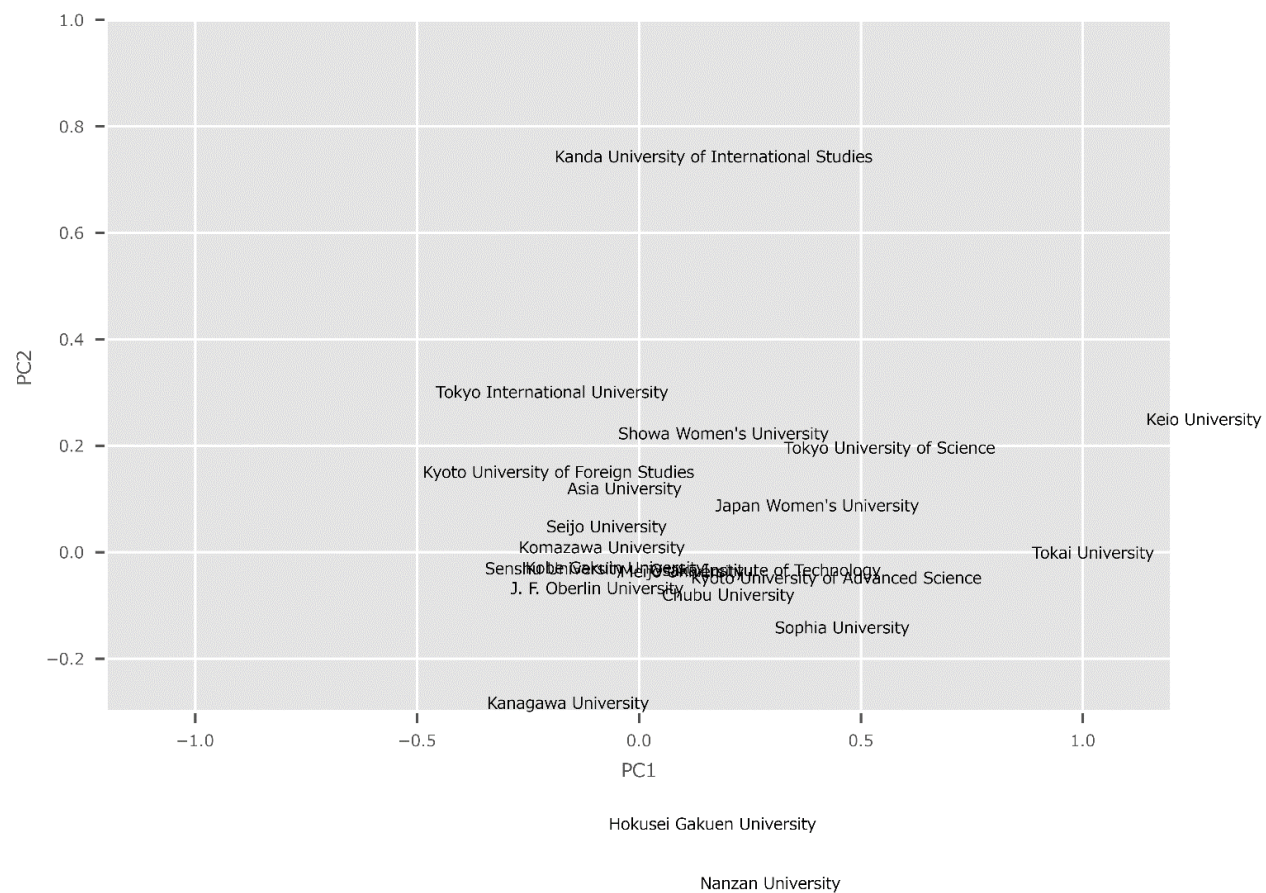
Figure 13B: Principal component analysis results with Factor 1 and Factor 2 (the group with low "Man assets/Ext debts")

=Middle "Man assets/Ext debts" Group=

Table 20: Factor loadings of principal component analysis in the group with middle "Man assets/Ext debts"

	PC1	PC2	PC3
Edu act exp/Edu act rev	0.29	-0.042	-0.459
Tui pay by stu/Edu act rev	-0.551	-0.089	-0.545
Sub to edu act exp/Edu act rev	0.321	0.341	-0.535
Adv cost/Edu act rev	-0.402	0.86	0.044
Students/Teachers	-0.542	-0.366	-0.212
"Outcomes"/"Engagement"	0.233	0.004	-0.398

Figure 14A: Principal component analysis results with Factor 1 and Factor 3 (the group with middle "Man assets/Ext debts")
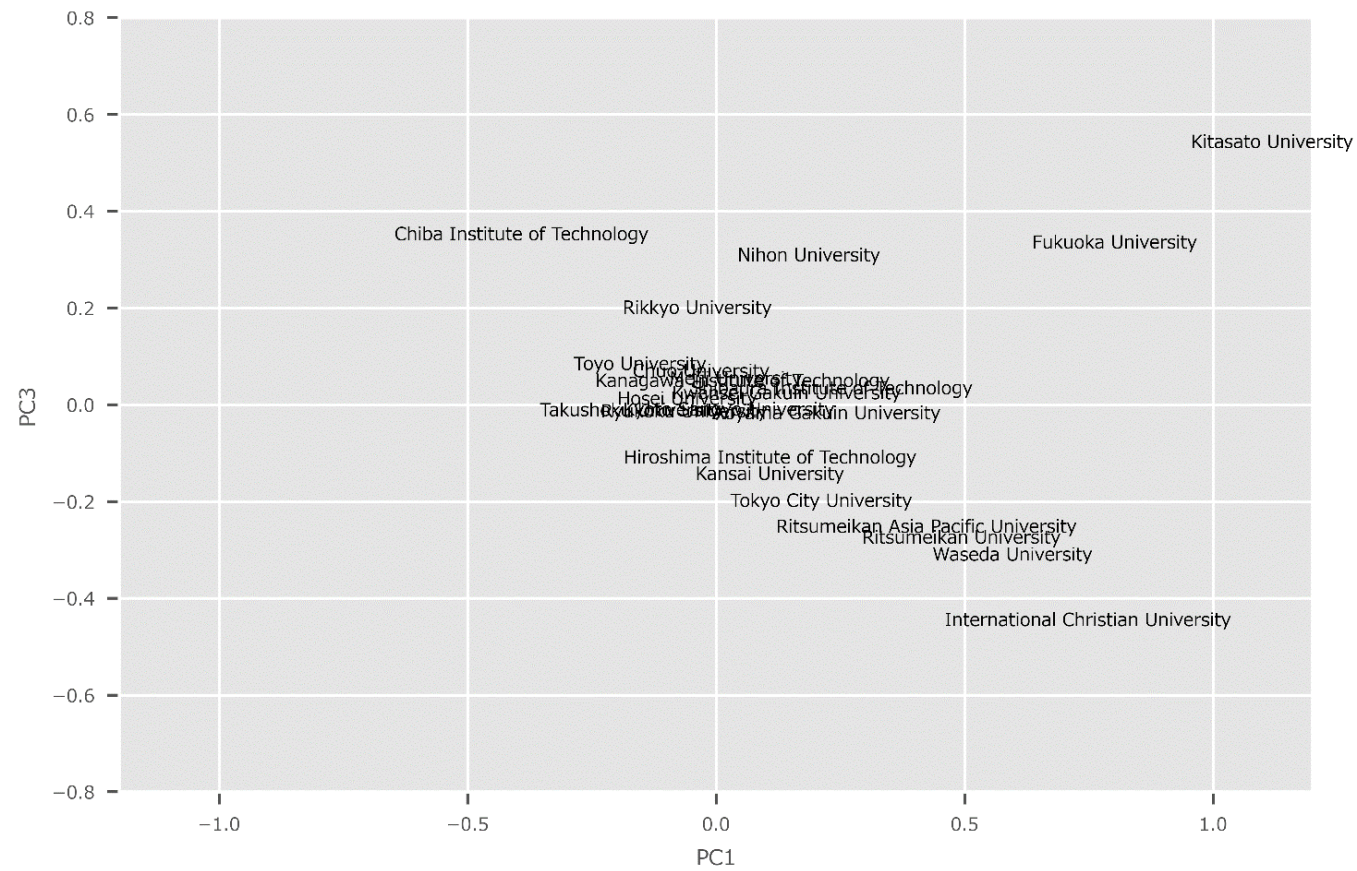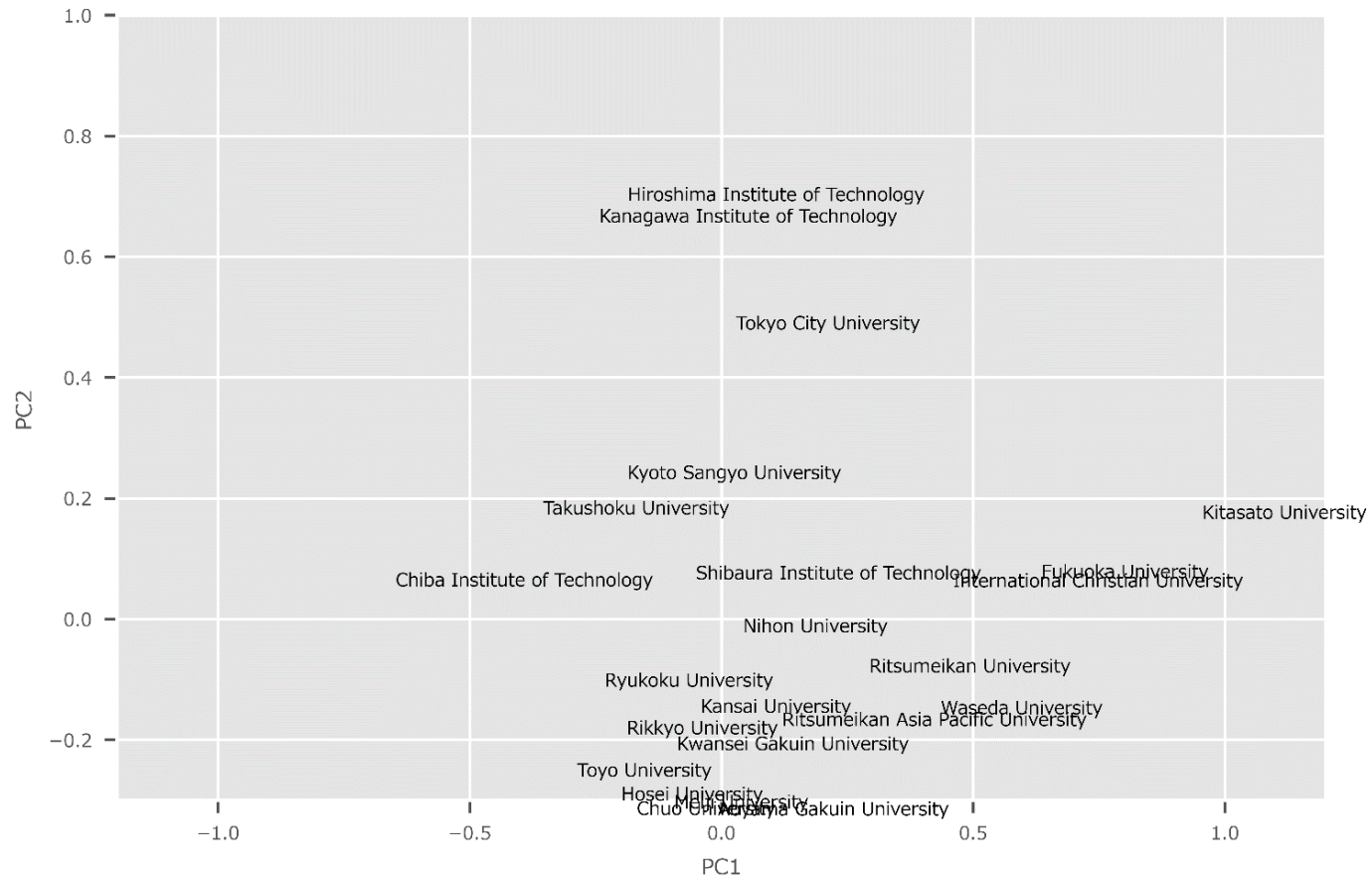
Figure 14B: Principal component analysis results with Factor 1 and Factor 2 (the group with middle "Man assets/Ext debts")

=High "Man assets/Ext debts" Group=

Table 21: Factor loadings of principal component analysis in the group with high "Man assets/Ext debts"

	PC1	PC2	PC3
Edu act exp/Edu act rev	0.08	0.565	0.023
Tui pay by stu/Edu act rev	0.243	-0.423	0.26
Sub to edu act exp/Edu act rev	-0.297	0.364	-0.568
Adv cost/Edu act rev	0.187	0.262	0.565
Students/Teachers	-0.079	-0.543	-0.349
"Outcomes"/"Engagement"	-0.897	-0.082	0.41

Figure 15A: Principal component analysis results with Factor 1 and Factor 3 (the group with high "Man assets/Ext debts")
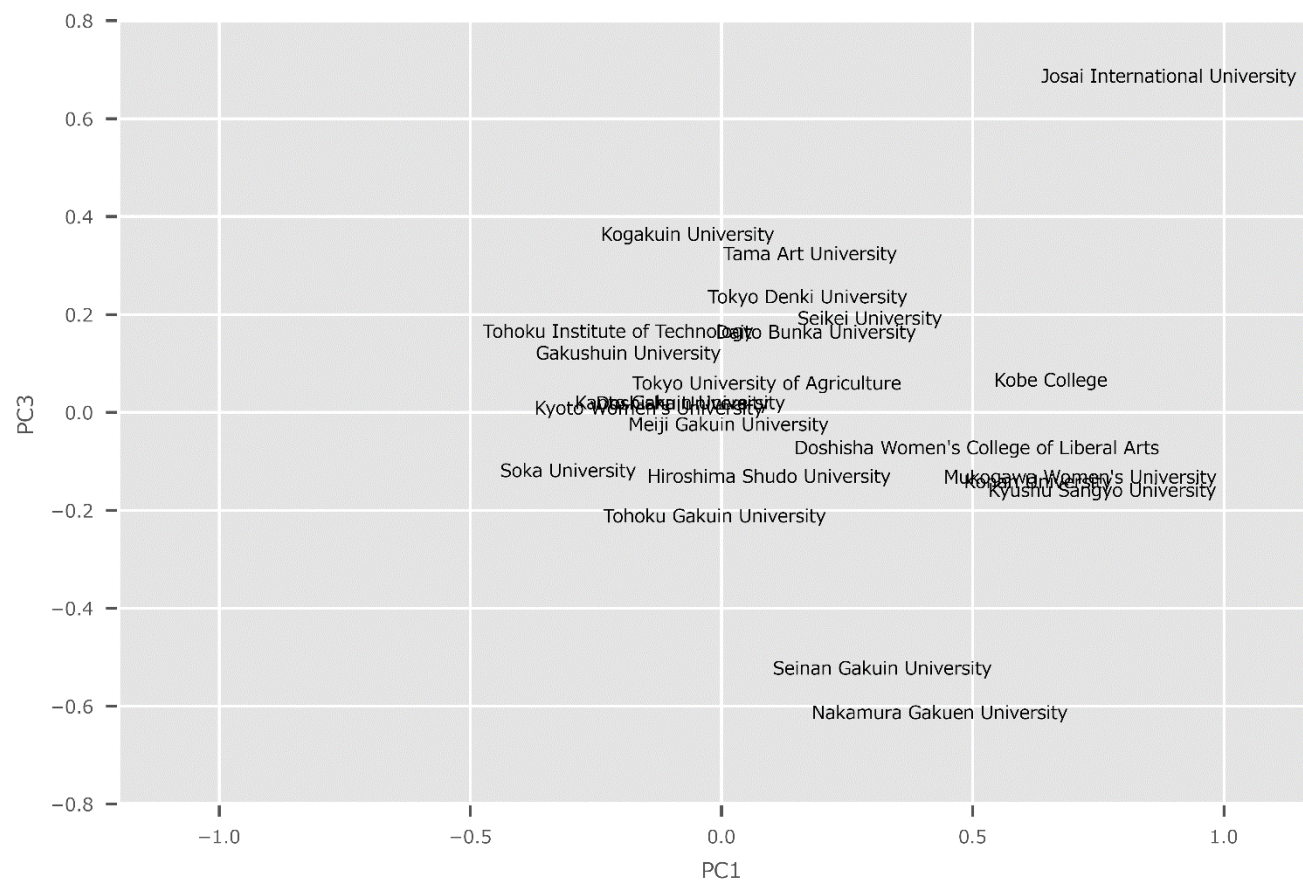
Figure 15B: Principal component analysis results with Factor 1 and Factor 2 (the group with high "Man assets/Ext debts")