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Revitalization of an Old Shopping Street Based on Analysis of Citizen's Behavior

市民の行動分析に基づく商店街活性化

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Revitalization of an Old Shopping Street Based on Analysis of Citizen's Behavior

市民の行動分析に基づく商店街活性化

by

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Abstract

These days the downtowns in most local cities in Japan have lost their bustle. This social phenomenon has impaired the regional economy and becomes a problem for sustainable society. In this study, I picked up a shopping street of a local city, and suggested measures for this problem based on data analysis and an experiment on a Word-Of-Mouth (WOM) network.

First, citizen's attitude and behavior are clarified by analyzing the data obtained from two large-scale questionnaires on them. In addition, effectiveness of WOM as a way to transmit information, which is one of the measures to revitalize the old shopping street are verified. In this experiment, the spreading of specific shop information is evaluated by analyzing the structure of the WOM network from the viewpoint of graph theory. The analysis of WOM, an example of social networks, is the feature of this study, although there are many researches about the social network constructed on the Internet such as SNS. The research described here is conducted as part of a project named “Construction of the Town of Kiryu for the Future with Anti-Global-Warming through Regional Power” supported by the Japan Science and Technology Agency.

In Chapter 1, I organize the factors related to the revitalization of the old shopping street and the city as a background of this study, and describe the objective of this study.

In Chapter 2, the problems are analyzed from the perspective of the storekeepers of shops in the old shopping street based on a questionnaire survey on them. The questions are not only about basic attributes of shops, storekeepers, target customers, and the old shopping street but also what the storekeeper thought about the current condition, such as the problem of shopping street etc. Analyzing the results of the questionnaire survey, I

comprehend the current business condition of shops in the old shopping streets, such as the aging of the storekeepers and deterioration in the financial condition, and the problem thought by storekeepers, such as the inconvenience of parking and insufficient goods' variation.

In Chapter 3, the problems are analyzed from the citizen's attitude and behavior based on a large-scale questionnaire survey of 10000 citizens in Kiryu city as consumers. Basic characteristics of respondents, where and how to do shopping, points to choose or not to choose a store etc. were asked in the survey. Citizen's behavior of shopping and their evaluation on the old shopping streets are clarified in each region of the city by comparing with competitive Supermarket and Mall neighboring. Two problems: there is inconvenience of moving among the shops in the old shopping street, and the charm of the old shopping street is not known by those who seldom visit it, are grasped by analyzing the data obtained. Moreover, two measures, taking advantage of using EV bus to tour the shopping street and using WOM to transmit the charm of the shopping street, are suggested to deal with the two problems above in consideration of the current condition of the shopping street that is mentioned in Chapter 2.

In Chapter 4, an experiment about information transmission on a WOM network is described. It is found from the questionnaire survey that the charm of the old shopping street is not known by those who seldom visit it. Therefore, it is necessary to find an effective way to make the charm of the old shopping street be known by those who seldom visit it. To verify that WOM is an effective way in this case, members' conversational relations on the topic of eating-out destinations is investigated for two times on two communities of students in a university. To understand the structure of WOM networks, some indexes, such as *n*-density, effective edge rate of word-of-mouth, etc. is proposed. In addition, the spreading of specific shop information during the questionnaire surveys of

two times is evaluated to check the information transmission by WOM and its effectiveness is verified.

In Chapter 5, the conclusion of this research is described.

As described above, I suggested two measures to deal with the two problems that are grasped by data analyzing in consideration of the current condition of the shopping street. Moreover, WOM network, which is one of the measures mentioned above, is verified as an effective way to transmit information by the experiment. As future works, further analysis, such as taking into the citizens individual attributes on the data obtained, should be done to grasp more problems and find more measures are left.

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Chapter 1. Introduction

1.1. Background of This Study

This study is conducted as part of project named “Construction of the Town of Kiryu for the Future with Anti-Global-Warming through Regional Power” supported by the Japan Science and Technology Agency (the JST Project, for short). So at the beginning, the JST Project will be introduced here. Then the objectives of this study will be described.

1.1.1. The JST Project

Among the various problems of modern society, global warming has become one of the most important issues. Analysis, observation, new energy etc. the development of leading-edge technology has been stressed to deal with it. However, how to make use of technology in our lives, include reconsidering of society system, has not been carried out. In such a situation, as shown in Figure 1-1, the JST Project taking advantage of the characteristics of Kiryu City, Gunma Prefecture of Japan, proposed future city models that developing harmony with nature and reducing CO_2 emissions significantly by the cooperation of enterprise, university, government and citizens. There are five Working Groups (WG, for short), that is to say, Bicycle Rental + Eco-point Introduction WG, Regional Resource Utilization WG, Green Tourism WG, Revitalization of Shopping Street WG and Public Transport using Promote WG, in this project team. A Low-carbon City that is compact and less-energy consumption due to introduction of green transportation system, that is to say, the transportation system of low CO_2 emission type linked public transportation (such as rail and bus), walk and bicycle effectively, is aimed as a goal by the cooperation of the five WGs.

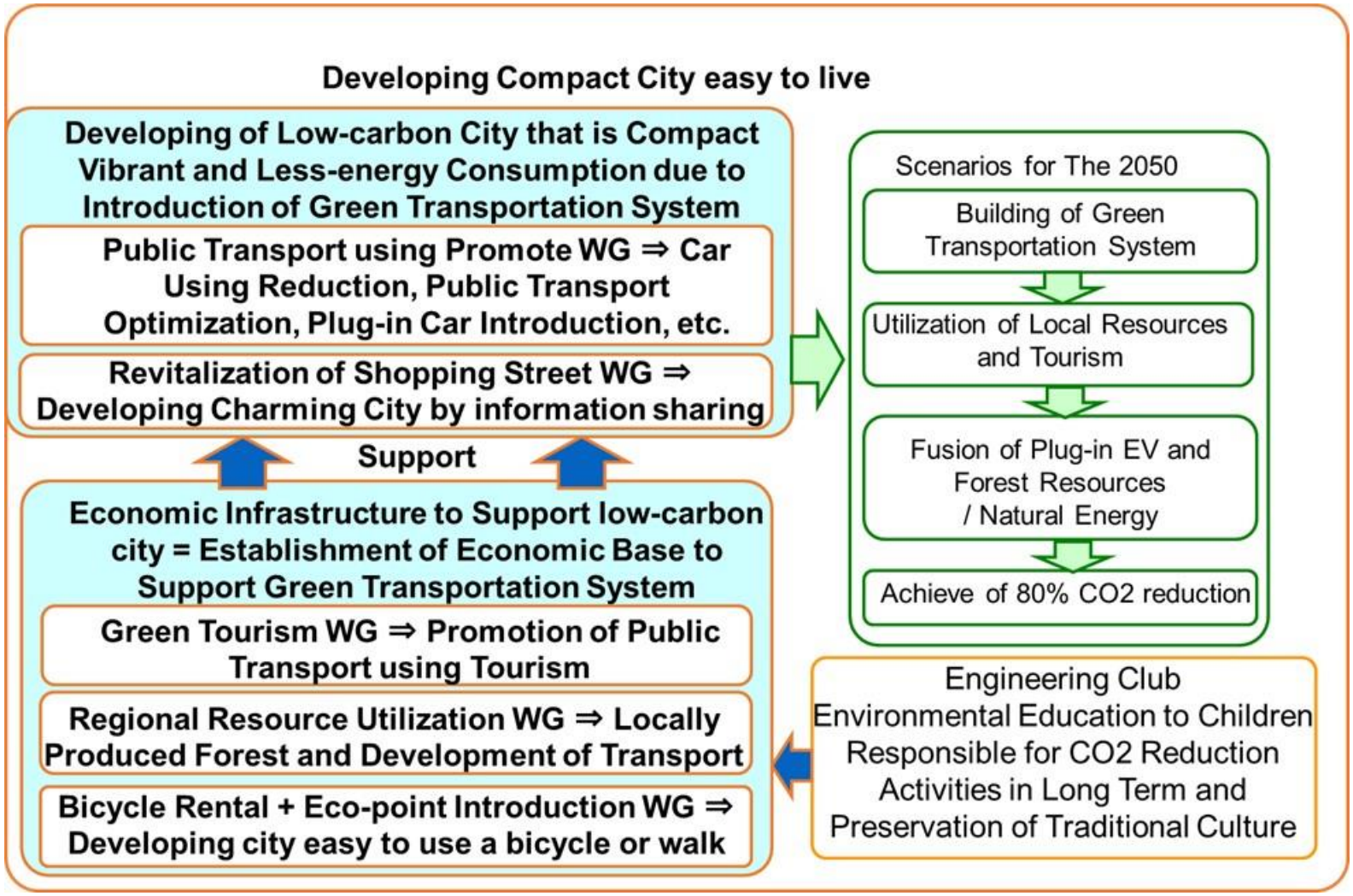


Figure 1-1. Concept of the JST Project [1]

1.1.2. Objectives of This Study

As shown in Figure 1-2, there are many factors relevant to developing compact city Kiryu. One of them, revitalization of the old shopping street, which impaired the regional economy greatly, is thought to be a necessary way. In addition, a functional shopping street in downtown can lead the local resident to shop easily by bicycle or on foot and make the dependence rate to the suburbs shopping mall decrease. That is to say, revitalization of shopping street contributes to not only developing a compact city easy to live, but also reducing CO_2 emissions significantly.

In order to revitalize the old shopping streets, I am trying to get to know the current condition of it and find effective methods to deal with the problems. Therefore, I conducted two big scale questionnaire surveys of citizens of Kiryu city as consumers and the storekeepers in the old shopping street as sellers and verified two hypotheses, which are problems need to deal with of the old shopping street (Figure 1-3).

Moreover, an experiment about information transmission was done to verify WOM as a way to deal with one of the problems above.

I would be very much delighted if this study could be helpful to develop Low-Carbon compact city Kiryu.

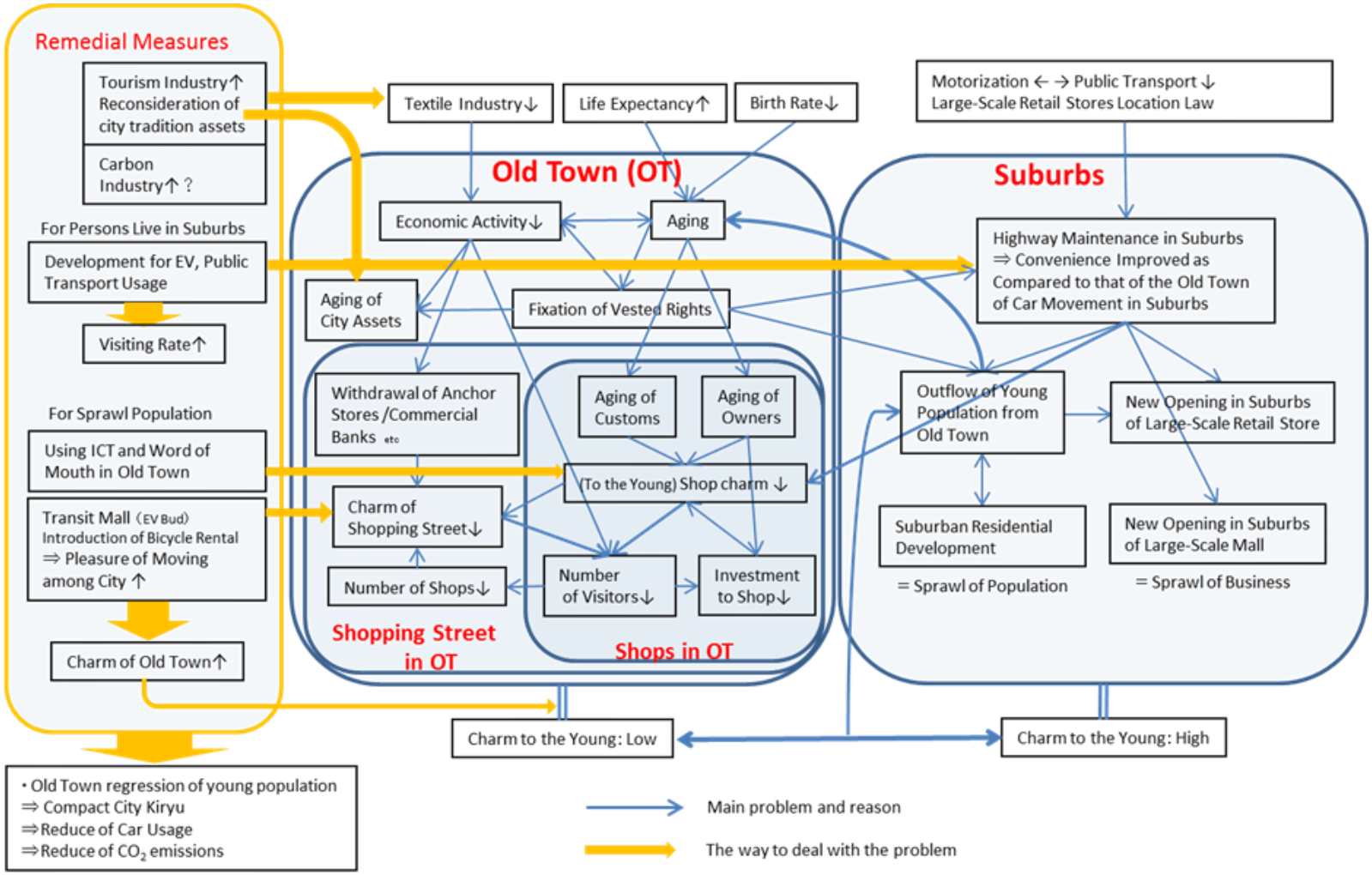


Figure 1-2. Relevant Factors for Compact City Kiryu [1]

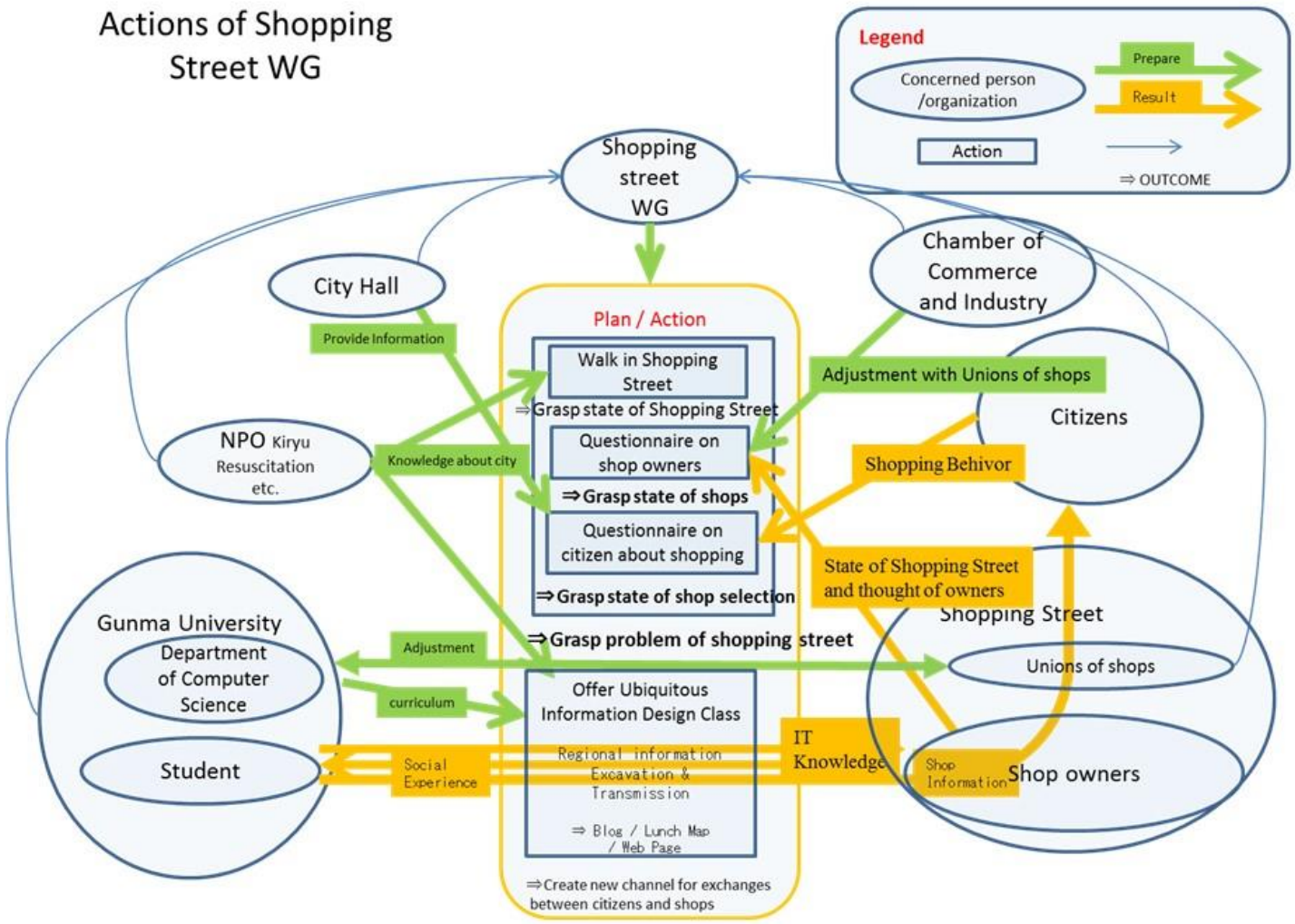


Figure 1-3. Action of Shopping Street WG [1]

1.2. Related Research

Factors, such as increasing spending capacity of consumers, growing car ownership, combined with modern shopping habits as buying in large amounts, made the customers changed their shopping place. Cees etc. [2] conducted a survey questionnaire on 150 visitors and buyers to a mall to identify the motives of them for large-scale shopping malls. Further analysis was done based on 130 suitable returned forms and it was found that about half of them visited the shopping mall for pleasure. Also about half of them responded that they would have bought their goods in the central city had the peripheral mall not existed. Moreover, the shopping mall is more attractive for consumers living a longer distance from the mall.

Cilin etc. [3] investigated the shopping linkages between a closely integrated new shopping precinct, incorporating an edge-of-center superstore, in the small town center of Llanelli in South Wales. The questionnaire survey was taken at seven places in the center during the trading peak hours and 642 copies about the respondent's specific information and the distance to the stores were obtained. Whether going to go other six places was asked and the customers' movement was paid attention to. It is evident that the principal shopping attractions ‘anchor’ the nodes of shopping activity and largely determine the major patterns of pedestrian flows throughout a center.

1.3. Comparison of the Conventional Researches and This Study

Cees investigated the visitors of a large-scale mall only and evaluated the absorption of the shop and the distance, but the quantity and the character of the target are restricted. Colin paid attention on the relation among the shops and examined the visitors’ shopping pattern, but the object was restricted to the visitors in the fixed time zone. Both the objects are in their shopping time so the accuracy of the answer is doubted for the time

convenience. In addition, since both investigations were in the limited time, the representation of the visitors would be under the influence of the weather or the events, etc. on the day.

On the other hand, in order to understand purchasing behavior of citizens, I conducted large-scale investigation to the whole resident of Kiryu city, and since the investigation period is not one day but one month, the data reflects a usual shopping situation was obtained. Next, there are questions not only about buyer activity but also about the evaluation point to various kinds of shops. That is to say, not only the action step, the last step of AIDA (Attention, Interest, Desire, Action) [4], but also other steps, which show the reason of the action, can also been grasped. Then, since this questionnaire survey was answered in the time of a respondent's sufficient convenience, the data from many viewpoints were obtained. Lastly, since questionnaire survey for both the storekeeper in the old shopping street and citizens of Kiryu city were conducted, comparison from many viewpoints can be done and the present condition of the old shopping street has been grasped more correctly.

1.4. Definition used in This Study

Present Kiryu city is based on old Yamada Gun and consists of several mergers. In this paper, I divided Kiryu city into four areas by geographical location, represented as Old Town, New town, Across river and Detached area as shown in Figure 1-4.

By the way, ● is the person received the questionnaire survey form and ▲ is the person answered it. The detail of the questionnaire survey will be described in Chapter 3.

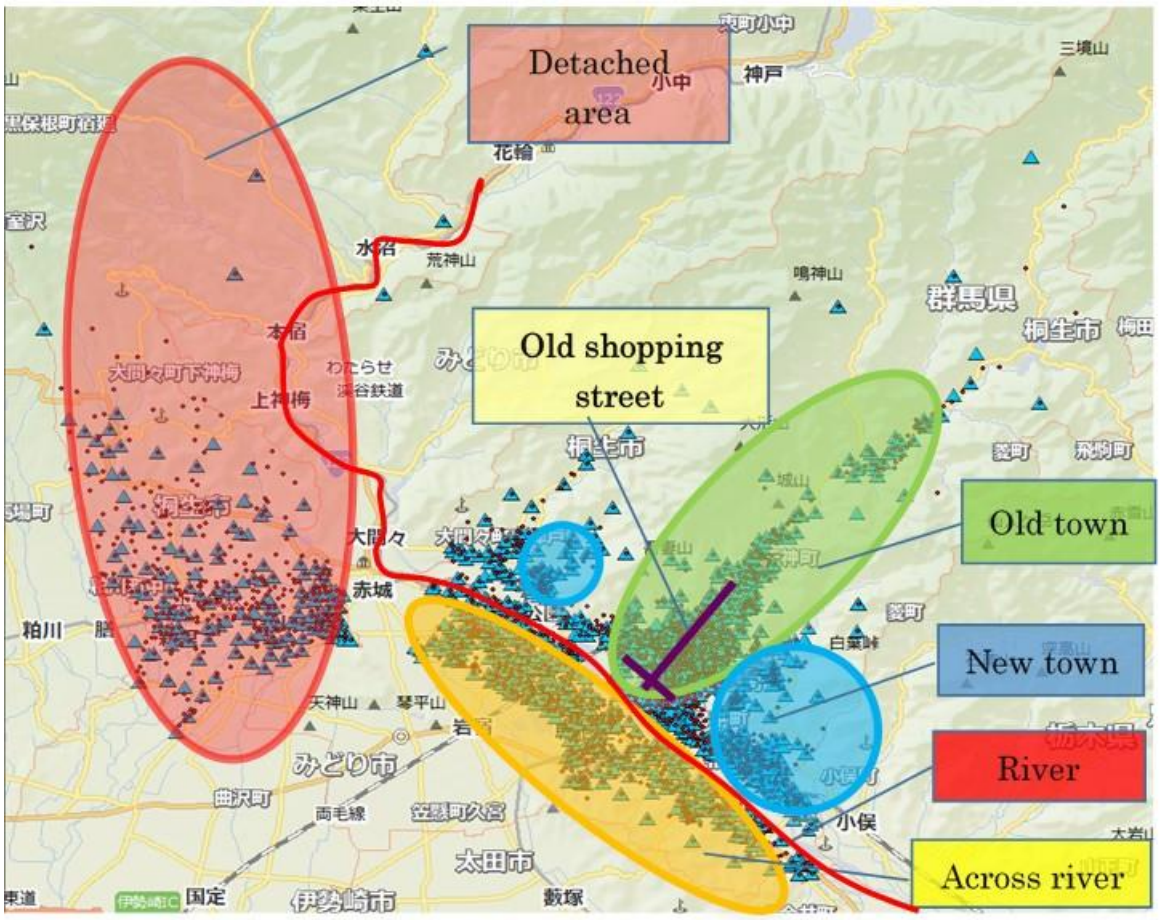


Figure 1-4. Area Divided in Kiryu City [5]

There are 63,576 females and 59,217 male, total 122,793 people living in Kiryu city. As shown in Figure 1-5, the aging of citizens is very serious in Kiryu city. In this paper, the young, Middle age and the old means the people aged 0 to 39, 40 to 59, 60 or older, respectively.

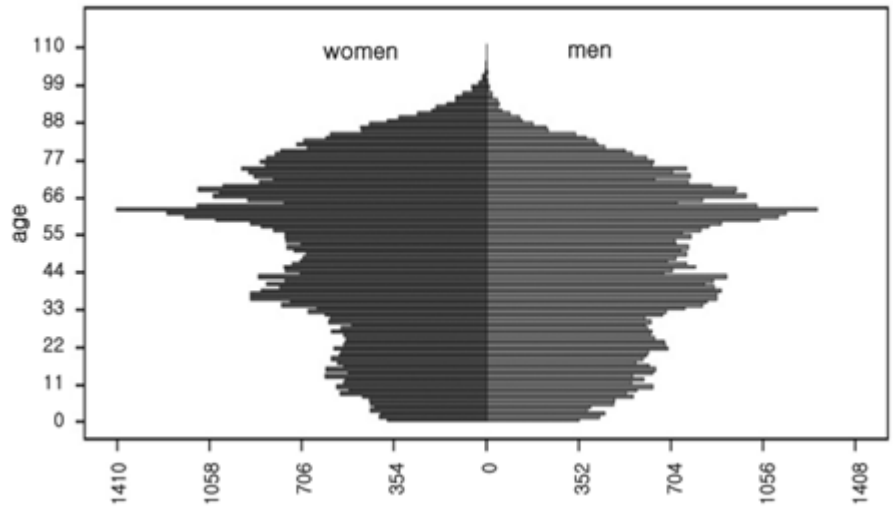


Figure 1-5. Population Pyramid of Kiryu City [5]

Moreover, the store in Kiryu city is classified into following three types. First, the shops located in the Old town, which serves as a problem and a candidate to be improved, and being the target of storekeepers' survey, named as "Shops in old shopping street". Second, 41 representative large-scale retailer stores been selected located in Kiryu city named as "Supermarket". Finally, the five large-scaled shopping malls, which located in a suburb near Kiryu city, named as "Mall".

1.5. Outline of This Study

Chapter 2 describes a questionnaire survey of the storekeepers in the old shopping street and clarifies the current business condition of shops in the old shopping streets and the problem thought by storekeepers.

Chapter 3 describes a big scale questionnaire survey of citizens of Kiryu city as consumers and clarifies citizen's behavior of shopping and their evaluation on the old shopping streets.

Chapter 4 reports an experiment about information transmission on a WOM network and proves that WOM is an effective way to make the charm of the old shopping street to be known.

Chapter 5 describes the conclusion of this dissertation and direction for future works.

Chapter 2. Questionnaire Survey of Storekeepers in Old Shopping Street

2.1. Introduction

Grasping the condition and the problem needed to deal with of the old shopping street is very important for developing the compact city Kiryu. Therefore, several questionnaire surveys include the one on storekeepers in the old shopping street were administered as a part of the JST Project in order to grasp the condition of the shopping streets correctly.

2.2. Method

As shown in Table 2-1, the questionnaire survey of storekeepers in the old shopping street was conducted from February 16 to 28, 2009 with the cooperation of Kiryu city hall, Kiryu Chamber of Commerce and Industry and the storekeepers in the shopping street. The questionnaire sheet was given to 504 storekeepers in 11 shop unions and resulted in 208 valid responses with a 41% recovery percentage. It gathered data about basic condition of each shop, its customers, the shopping street, the management situation, and other conditions. The sheet is attached in Appendixes at the end of this paper.

Table 2-1. Distribution and recovery status

	Distribution destination	February 16 to 28, 2009			
		Distribution number	The number of recovery	Recovery rate	Recovery process
1	Hon-cho 1	30	6	20%	Mailing
2	Hon-cho 2	33	16	48%	Mailing and Collect by person
3	Hon-cho 3	55	26	47%	Mailing and Collect by person
4	Hon-cho 4	34	15	44%	Mailing
5	Tyuou	33	12	36%	Mailing
6	Suehiro-cho	78	15	19%	Collect by person
7	Hon-cho 6	77	43	56%	Collect by person
8	Nishik-cho	61	31	51%	Collect by person
9	Aioi	30	12	40%	Mailing
10	Itoya	30	1	3%	Mailing
11	Nagasakiya	43	31	72%	Collect by person
	Total	504	208	41%	

2.3. Results

2.3.1. Summary of Shops Condition

There are 94 (45%) private-manage-shop, 110 (53%) corporate-manage-shop and 4

(2%) unknown shops in the total 208 shops that responded to the questionnaire survey. Moreover, about half of them use a part of home as the shop and all the employees are families.

For the handling items, as shown in Table 2-2, handling items of shops in old shopping street is diverse. Grocery is most numerous and Clothing and Service are the next most.

Table 2-2. Handling items of shops in the old shopping street

Handling items	Number of answer	%
Clothing	32	15%
Personal belongings	24	12%
Cultural products	30	14%
Household goods	6	3%
Grocery	44	21%
Durable Goods (home appliances and furniture)	5	2%
Eating and drinking cafe	28	13%
Service	32	15%
Unknown	7	3%
Total	208	100%

Table 2-3. Business years of shops in the old shopping street

Years (Y)	Unknown	Y< 3	3≤Y < 5	5≤Y <10	10≤Y <20	20≤Y <30	30≤Y <40	40≤Y <50	Y≧ 50
Number of answer	4	6	8	8	18	27	19	17	101
%	1.9	2.9	3.8	3.8	8.7	13.0	9.1	8.2	48.6

For the area of each shop, as shown in Table 2-4, 76% shops are smaller than 98 m^2. In addition, 51% shops are using the building together with home.

Table 2-4. Area of shops in the old shopping street

Shop area	Number of answer	%
32 m^2	50	24%
33～65 m^2	73	35%
66～98 m^2	35	17%
99～131 m^2	6	3%
132～164 m^2	8	4%
165～329 m^2	13	6%
More than 329 m^2	11	5%
Others	3	1%
Unknown	9	4%

For the number of employees of each shop, as shown in Table 2-5, about half of the shops have run by family only.

Table 2-5. Number of employees of shops in the old shopping street

Number of employees	Number of answer	%
Family only	93	45%
less than 2	44	21%
3 to 5	35	17%
6 to 10	23	11%
More than 10	11	5%
Unknown	2	1%

For the age of storekeepers, as shown in Table 2-6, about half of the shop storekeepers are more than 60 year old, the normal age of retirement in Japan.

Table 2-6. Age of shop storekeepers in the old shopping street

Age of storekeepers	Number of answer	%
20's	2	1%
30's	23	11%
40's	19	9%
50's	58	28%
60’s	59	28%
70's or above	44	21%
Unknown	3	1%

For successor, only 16% give a positive answer as shown in Table 2-7.

Table 2-7. Whether have successor as storekeeper

Whether have successor?	Number of answer	%
Yes	34	16%
Yes, but do not know whether to be successor	59	28%
No	74	36%
Unknown	41	20%

2.3.2. The Financial Condition of Shops

First, in order to investigate business conditions of the shops, I set a question about the number of purchase customers per day for the last week at the investigation time. As

shown in Table 2-8, about 40% shops had less than 20 customers.

Table 2-8. Number of Purchase Customers per Day for the Last Week

number of customers (C)	Un-known	C<20	20≤C<40	40≤C< 60	60≤C< 80	80≤C < 100	C≧100
Number of answer	46	80	38	15	7	3	19
%	22.1%	38.5%	18.3%	7.2%	3.4%	1.4%	9.1%

About income, number of customers and profit, as shown in Table 3, compare with 3 years ago, less than 10% shops grow and more than 70% shops reduced. That is to say, the business condition is becoming worse.

Table 2-9. Income, number of customers and profit compare with 3 years ago

	Growth by or more than 10%	Growth less than 10%	No Change	Reduce less than 10%	Reduce by or more than 10%	Unknown
Income	10	8	24	38	119	9
	5%	4%	12%	18%	57%	4%
number of customers	9	9	32	45	100	13
	4%	4%	15%	22%	48%	6%
Profits	5	10	28	39	114	12
	2%	5%	13%	19%	55%	6%

2.3.3. Problems of Old Shopping Street

About the problem of the old shopping street, I list up all the problems conceivable in the questionnaire and ask the storekeeper to multiple select all the problems they thought. As shown in Figure 2-1, many problems, such as too many empty shops, no suction institution, no parking, etc. exist.

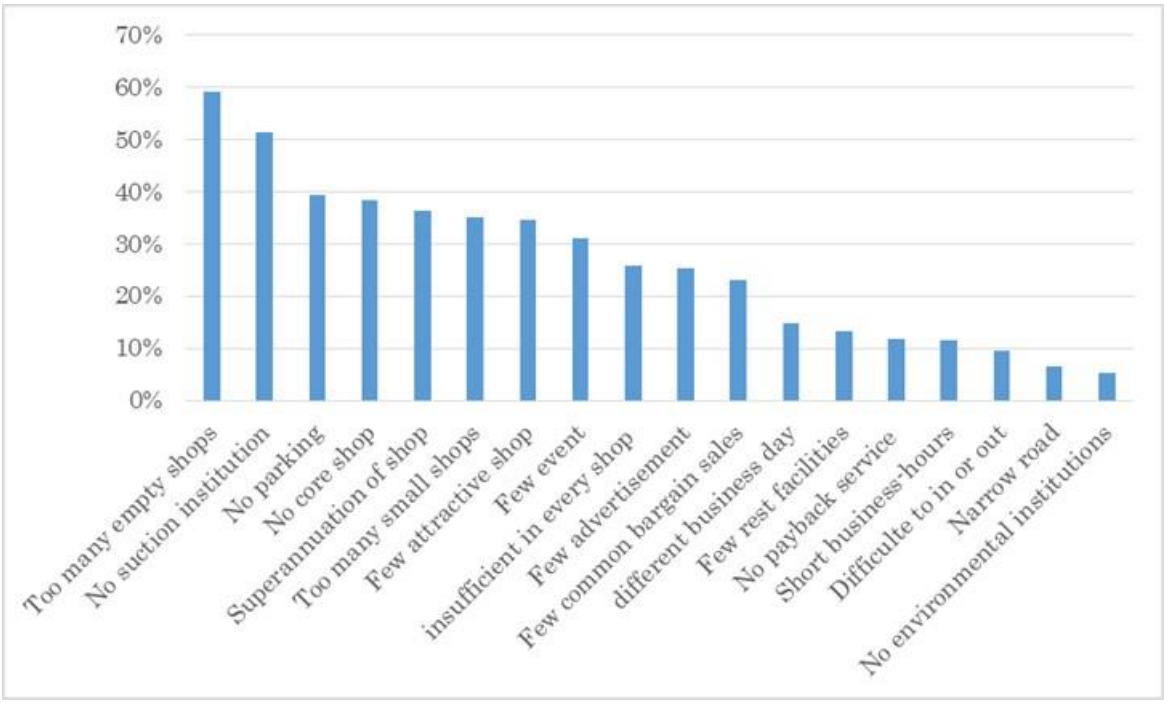


Figure 2-1. Problems Selected by Storekeepers

2.4. Discussion

From the result above, it was found that many shops have long histories and run by the family only. Many shops are small-scale and using the building together with home. In addition, the decrease in income and number of customers, the aging of storekeepers and absence of successor become serious problems for the storekeepers.

As the problems of the old shopping street, too many empty shops, no suction institution and no parking etc. are given.

Chapter 3. Questionnaire Survey on Citizens of Kiryu City

3.1. Introduction

Getting to know the shopping behavior of the customs and how the old shopping street is evaluated by them are also very important for grasp the condition of it and further for developing the compact city Kiryu. Therefore, the questionnaire surveys on citizens of Kiryu city was administered as part of the JST Project.

In this study, I conducted big-scale-questionnaire surveys of citizens of Kiryu city as consumers and analyzed the data, using R [6]: a free software programming language and software environment for statistical computing and graphics. Then the evaluation to the Shops in the old shopping street, Supermarket and Mall from viewpoint of goods, traffic, and pleasure and so on by the customs were achieved. In addition, I compared the thought on the old shopping street by both the citizens and the storekeepers and grasped some problems of the old shopping street.

3.2. Method

Another big-scale-questionnaire surveys I conducted is on the citizens of Kiryu city in November 2012 to get to known the shopping activity of them. This questionnaire were sent to 10,000 householders whom are random sampled from a total 49,411 householders of Kiryu and returned 2,963 ones; it means about 6% of the total or the 29.63% of the sample. The survey's content is as follows:

Q1: The name of the stations of bus or train to be used (not included in this study)

Q2: The personality of the answer, such as the sex, age, address, traffic means (bicycle, car, train, on foot, etc.) and whether own license.

Q3: Where and how many times to do the shopping during one month, activities done in

the store, such as foods, clothes, daily goods, window-shopping, etc. and the traffic means used.

Q4: The points to choose or not to choose the store.

Q5: Awareness of the activities of our project (not included in this study).

Q6: Frequency of going to the city center street in one month.

Q7: The opinion regard to city and public transport (not included in this study).

3.3. Results

There are seven questions in this questionnaire survey. Questions 2 to 4 and 6 will be discussed here for the relation to the problems to deal with. Other questions were analyzed by Seki [5].

3.3.1. Statistics on Characteristics of Respondents

Question 2 related to age, gender, licensing presence of their families and the respondents themselves and the result is shown below. As shown in Table 3-1, 1,665 male and 1,043 female answered the questionnaire survey. There is the possibility that the wife answered using the name of the householder, so the analysis according to sex will not be conducted in this study for the lack of reliability.

About the age, it is 1,421 the old, 1,056 middle aged and 253 the young. Most persons own license regardless of sex and age, especially for the middle age. There are less young persons in Kiryu city and the questionnaire survey is conducted every householder unit, so less young person in respondent is reasonable.

Table 3-1. Age, sex, licensing presence of the respondent

		The young			Middle-age		The old			Unknown	Total
		Teens	Twenties	Thirties	Forties	Fifties	Sixties	Seventies	Eighties		
Sex	Male	3	17	119	220	375	524	376	8	23	1665
	Female	6	23	76	211	237	305	172	3	10	1043
	Unknown	0	2	6	5	8	15	19	0	201	256
Car License	own	3	36	196	421	597	767	428	8	38	2494
	Not own	6	6	4	7	13	52	111	3	3	205
	Unknown	0	0	2	8	10	27	25	0	193	265
	%	33.3%	85.7%	97.0%	96.6%	96.3%	90.7%	75.9%	72.7%	16.2%	84.1%
Total		9	42	202	436	620	846	564	11	234	2964

As shown in Table 3-2, 993 persons living in Across river, 841 persons living in Old Town, 676 persons living in New Town and 453 persons living in Detached area answered the questionnaire survey.

Table 3-2. Living area of the respondent

	Old town	New town	Across river	Detached area	Total
Answers	841	676	993	453	2963
%	28.4%	22.8%	33.5%	15.3%	100.0%

About 6% family answered the questionnaire survey and there is no clear deviation in age or region as mentioned above, so it is thought that Kiryu citizens' general shopping situation can be grasped almost correctly with this survey data.

3.3.2. Statistics about Shopping Behavior

In this survey, I asked about shopping to the main person who usually goes to shopping in his/her home. Question 3 is the main part of the question in which about where respondents were shopping during the month before the questionnaire survey. At the first, respondents were asked to write the frequency of shopping in every individual shop, next, to check all propose to visit the shop. In the answer sheet, I illustrate vertically stores' name of shops, and illustrate horizontally shopping activities done in the store, such as foods, clothes, daily goods, window-shopping, etc. Respondents check the corresponding cells. It is difficult to ask all of the stores located in Kiryu city, so I limited alternatives in the questionnaire to the representative shopping places in Kiryu city, and they classified in three kinds: Shops in The old shopping street, Supermarket and Mall. In addition, means to go to the shopping, such as bicycle, car, walk were investigated for each shop. Number of total times of visiting every shop and Experience of visiting every shop are shown

separately by visiting purpose in Figure 3-1 and 3-2 respect as a bar graph. The horizontal axis of bar graph shows propose and total times of all respondent who visiting that shop. The vertical axis of bar graph shows the ratio of visiting an individual shop to all shops. As shown in Figure 3-1 and 3-2, for propose of visiting shops, food and daily commodities is obviously greater in number for Supermarket. Different to Supermarket, Shops in the old shopping street are used for multiple purposes.

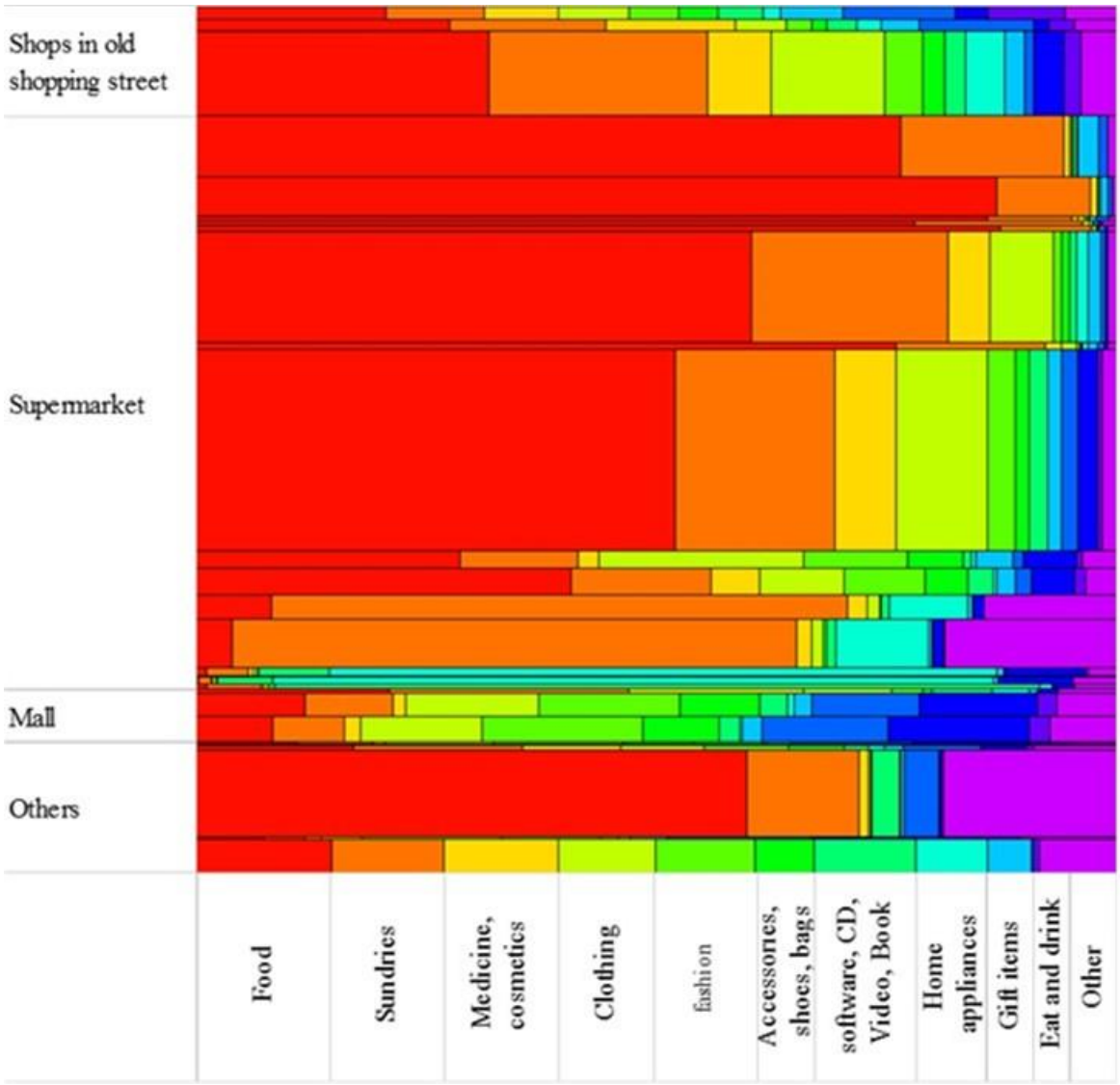


Figure 3-1. Number of Total Times of Visiting Every Shop by Visiting Purpose

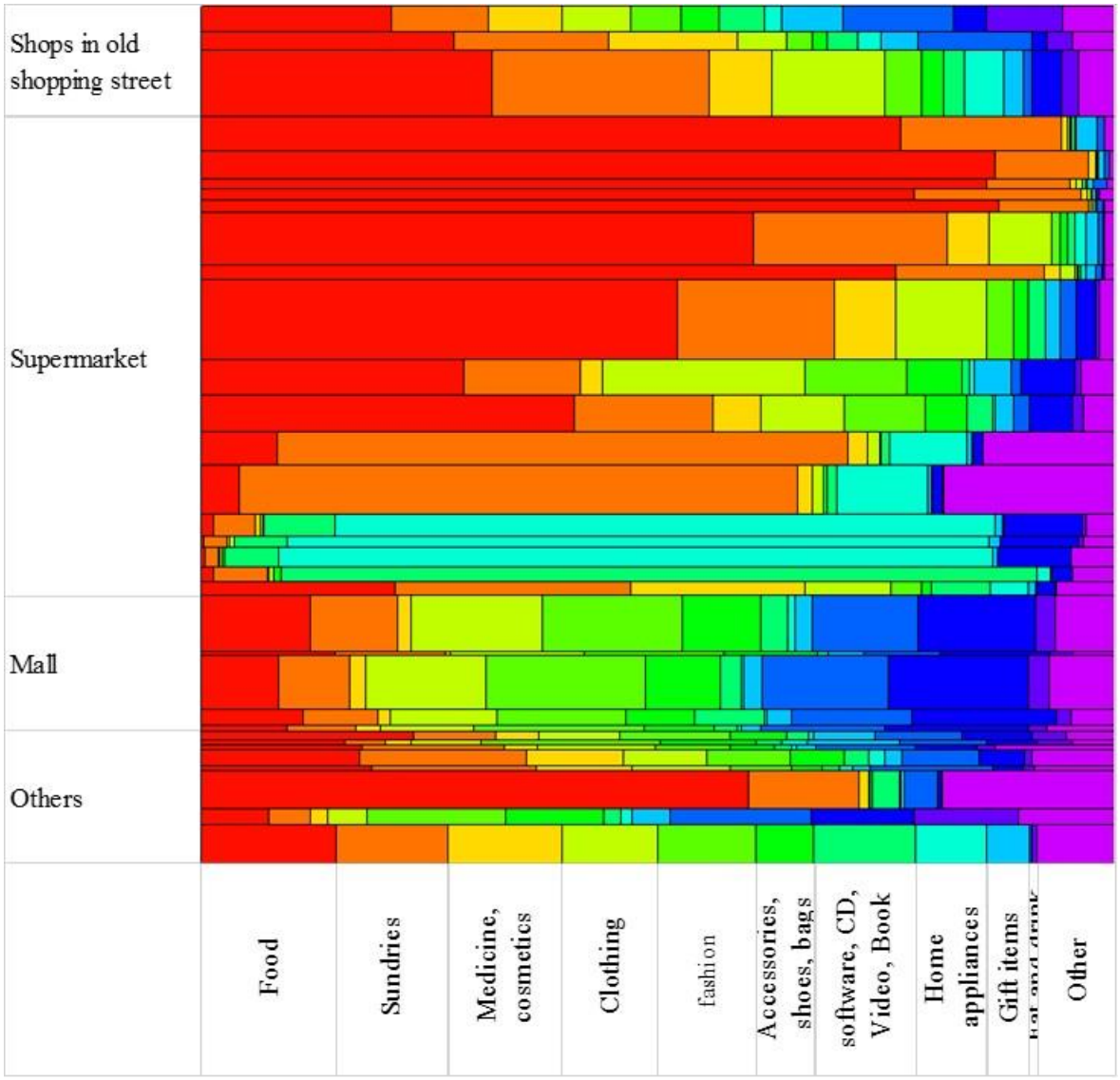


Figure 3-2. Experience of Visiting Every Shop by Visiting Purpose

For visiting means, as shown in Table 3-3, private cars were used basically. More specifically, 2/3 visitors used private cars and of about 1/3 used bicycle or on foot for Shops in the old shopping street, nearly 90% visitors used private cars for Supermarket and almost all of the visitors used private cars for Mall.

Table 3-3. Visiting means to stores

	On foot	Bicycle	Auto-bicycle	Car	Bus	Train	Total
Shops in old shopping street	982	1067	106	4673	124	88	7040
	13.9%	15.2%	1.5%	66.4%	1.8%	1.3%	100.0%
Supermarket	2400	2325	650	36395	82	14	41866
	5.7%	5.6%	1.6%	86.9%	0.2%	0.0%	100.0%
Mall	4	27	2	3058	4	16	3111
	0.1%	0.9%	0.1%	98.3%	0.1%	0.5%	100.0%

Figure 3-3 shown visiting rate between shopping places separated by the different ages. It can be seen that the old using shops in shopping street more and Mall less than the other ages. For Mall, usage is very different and decreased in the order of the young, Middle-age and The Old.

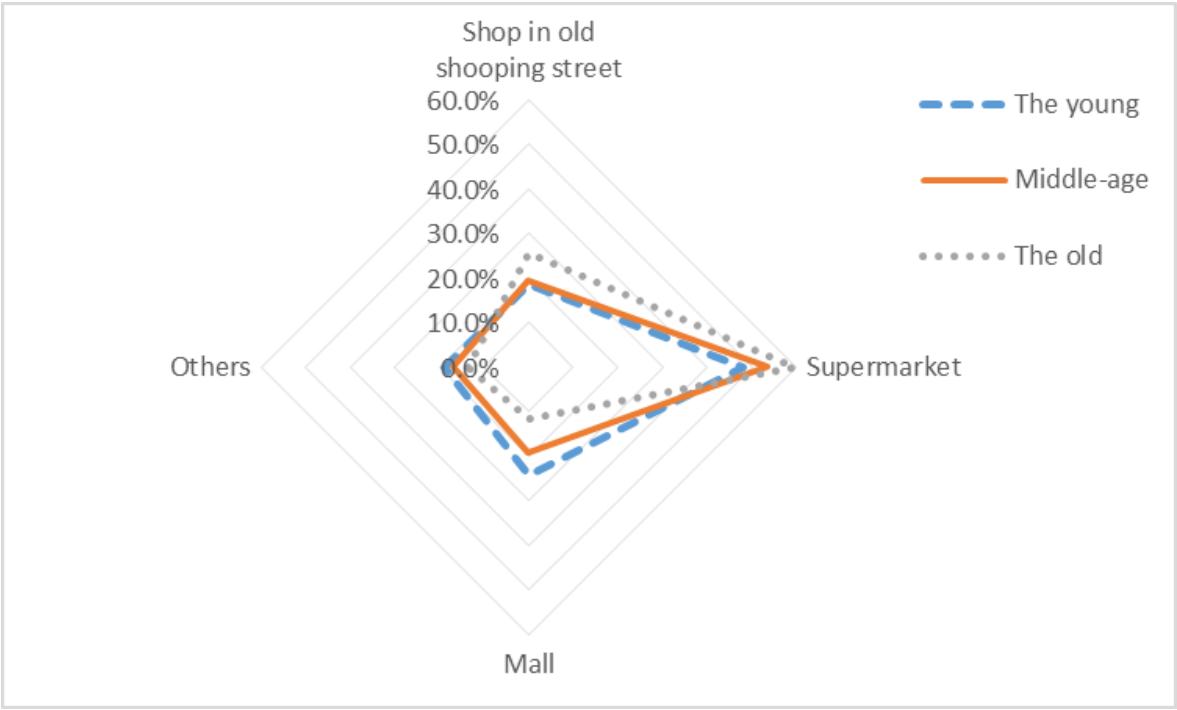


Figure 3-3. Visiting Rate between Shopping Places by Different ages

Figure 3-4 shows visiting rate between shopping places separated by the four areas. It can be seen that for Supermarket, Mall and others, there are little difference among the four areas. However, for Shops in shopping street, usage is very different and decreased in the order of Old town, New town, Across river and detached area.

Figure 3-4. Visiting Rate between Shopping Places by Different Areas

3.3.3. Statistics about Shop Evaluation

In Question 4, respondent was asked to write ○ or ×for the three types of stores, which are Shops in old shopping street, Supermarket and Mall, about 25 points shown in Table 3-4. The ○ means that the point is a good point makes the respondent choose the shop and the × means the point is a bad point makes the respondent do not choose the shop.

First, total number of both ○and × was counted and calculated as point rate to find which point is considered for decide the shopping place. As shown in table 7, “variety of goods”, “parking” and “all can bought in one place” are the most important points for decision. “Cheap”, “easy to find goods”, “near”, “having place for rest and meal” and “Good atmosphere” are the points followed.

Then, average number of point in each evaluate object [(the number of ○) - (the

number of ×)] for those three stores are shown at the right side of Table 7. Average number of point in “parking”, “all can bought in one place” and “variety of goods” for Shops in the old shopping street are low. “Cheap”, “long business-hour”, “having place for children”, “having place for rest and meal” and “attractive advertising” are low also. On the other hand, “parking”, “cheap”, “variety of goods” and “all can be bought in one place” of Supermarket are high. It is similar of Mall to Supermarket and “Having favorite goods”, “good atmosphere”, “having place for rest and meal” are also evaluated highly but “Near” and “intimacy” are not good.

Table 3-4. Point rate and average number of points of all that selected by respondent

Evaluate objects		Point rate	Average number of point		
			shops in Old Shopping Street	Super-market	Mall
Goods	Variety of goods	0.350	-0.181	0.384	0.389
	Easy to find goods	0.217	-0.006	0.096	0.114
	All can be bought in one place	0.338	-0.203	0.347	0.380
	Having favorite goods	0.202	-0.040	0.039	0.257
	Fresh and good sense	0.177	-0.016	0.077	0.167
	Cheap	0.258	-0.109	0.462	0.063
Shop	Good atmosphere	0.212	-0.024	0.057	0.332
	Intimacy	0.113	0.098	0.014	-0.040
	Famous	0.108	-0.010	0.039	0.092
	Individuality	0.101	0.038	0.001	0.036
	Good service attitude	0.118	0.028	0.045	0.080
	Product knowledge of clerk	0.089	0.023	0.004	0.036
	After-sales service	0.079	0.023	0.001	0.001
	Delivery	0.068	-0.013	0.001	-0.010
	Long-opening Hours	0.185	-0.088	0.239	0.151
Traffic	Near	0.218	0.050	0.323	-0.077
	Parking	0.352	-0.218	0.407	0.317
	Convenient of bus	0.080	-0.030	-0.012	-0.036
Pleasure	Having place for children	0.107	-0.076	0.014	0.125
	Convenient of public facility	0.070	-0.025	-0.004	-0.011
	Convenient of ATM	0.130	-0.019	0.106	0.104
	Having place for rest and meal	0.214	-0.059	0.061	0.380
Adv.	Attractive advertising	0.130	-0.055	0.132	0.086
	Attractive event	0.086	-0.033	-0.007	0.069
	Payback	0.106	-0.029	0.063	-0.010

In addition, regional differences of the evaluation are shown in Table 3-5. Distance to store is regard importantly by the respondents living in New town and Old town but reverse by those living in Across river and Detached area. The reason of it can be thought as the difference in means of transportation. In addition, “long-business-hour” is not regarded so important by those living in detached area. Those living in all the area except old town regard pleasure important.

In addition, as shown in table 3-5, it can be seen that the Shops in the old shopping street is evaluated highly by those living in old town but reverse by those living in detached area. In addition, the mall is evaluated highly by those living in across river but reverse by those living in old town.

Age differences of the evaluation are shown in table 3-6. First, for the young, it can be seen that they give more points than the other ages, especially on goods, having place for children, Long-opening hours and having place for rest and meal. The young give more negative to the old shopping street, although Individuality, Good service attitude and Product knowledge of clerk were evaluated positively. In addition, the young give positive evaluation about Price, Long-opening hours and Near to Supermarket and about Goods, Good atmosphere, having place for children, having place for rest or meal and Long-opening hours to Mall. On the other hand, middle age and the old gave an evaluation of the inverse of the young generally.

Table 3-5. Average number of points separated by different area

Living area		Old town				New town				Across river				Detached area			
Evaluate objects		Point rate	shops in OSS	Super-market	Mall	Point rate	shops in OSS	Super-market	Mall	Point rate	shops in OSS	Super-market	Mall	Point rate	shops in OSS	Super-market	Mall
Goods	Variety of goods	0.002	0.016	0.076	-0.050	0.014	-0.026	0.023	-0.012	0.015	-0.021	-0.035	0.046	-0.019	-0.022	-0.031	-0.029
	Easy to find goods	-0.003	0.059	-0.036	-0.033	0.009	0.008	-0.001	-0.008	0.009	-0.023	0.002	0.021	0.000	-0.046	0.060	0.003
	All can be bought in one place	-0.006	0.023	0.090	-0.085	0.009	-0.012	0.015	-0.010	0.016	-0.025	-0.038	0.057	-0.012	-0.009	-0.063	0.017
	Having favorate goods	-0.015	0.059	-0.017	-0.041	0.003	0.019	-0.011	0.009	0.014	-0.015	0.006	0.026	0.002	-0.048	0.002	0.034
	Fresh and good sense	-0.002	0.053	-0.043	-0.025	0.004	0.002	-0.040	-0.010	0.007	-0.021	0.000	0.010	-0.006	-0.048	0.020	0.007
	Cheap	0.011	0.016	0.073	-0.043	0.018	-0.030	0.020	-0.012	0.010	-0.034	-0.024	0.031	-0.016	0.000	-0.052	-0.008
Shop	Good atmospher	-0.014	0.020	-0.020	-0.057	-0.005	-0.007	-0.013	-0.019	0.008	-0.015	0.009	0.025	0.000	-0.018	-0.002	0.022
	Intimacy	0.026	0.078	0.003	0.001	0.023	0.027	-0.017	-0.006	0.000	-0.014	-0.009	-0.002	-0.014	-0.076	-0.012	-0.006
	Famous	0.004	0.005	0.002	-0.004	0.016	0.002	0.001	0.013	0.005	0.004	0.003	0.012	0.006	-0.016	-0.010	0.000
	Individuality	0.008	0.023	-0.028	-0.003	0.009	0.014	-0.005	-0.002	0.003	0.006	0.010	0.004	-0.007	-0.033	0.023	-0.006
	Good service attitude	0.001	0.021	-0.004	-0.018	0.003	0.014	-0.009	-0.009	0.009	0.006	-0.008	0.017	-0.016	-0.030	0.013	-0.018
	Product knowledge of clerk	0.005	0.029	0.002	-0.005	0.003	0.008	-0.010	-0.023	0.000	-0.009	-0.006	-0.001	-0.005	-0.021	-0.006	-0.023
	After-sales service	0.005	0.020	-0.009	-0.006	0.011	0.011	0.001	-0.009	0.008	0.003	0.007	0.005	-0.009	-0.027	0.003	-0.012
	Delivery	0.009	0.004	0.020	-0.010	0.013	-0.001	0.010	0.000	0.003	-0.001	-0.003	0.010	-0.003	-0.007	-0.015	-0.005
	Long-opening Hours	0.010	0.005	0.055	-0.032	0.007	-0.017	-0.006	-0.009	0.006	-0.012	-0.018	0.029	-0.021	-0.009	-0.071	-0.016
Traffic	Near	0.050	0.138	0.103	-0.022	0.035	0.024	0.013	-0.004	-0.010	-0.051	-0.038	0.003	-0.019	-0.108	-0.087	0.030
	Parking	-0.023	0.034	0.023	-0.074	-0.007	-0.015	-0.024	-0.019	0.020	-0.037	-0.006	0.043	-0.012	-0.005	-0.065	0.014
	Convenient of bus	-0.001	0.021	0.003	-0.005	0.014	0.000	-0.011	-0.002	0.005	-0.010	0.004	0.005	0.010	-0.019	-0.030	-0.006
Pleasure	Having place for children	-0.009	0.000	-0.001	-0.031	0.016	-0.020	-0.001	0.014	0.008	-0.003	-0.001	0.020	0.022	-0.023	0.002	0.034
	Convenient of public facility	0.001	0.006	0.000	-0.014	0.015	0.001	-0.007	-0.010	0.008	0.005	-0.003	0.003	0.004	-0.021	-0.004	0.003
	Convenient of ATM	-0.012	0.028	-0.015	-0.036	0.006	-0.008	0.004	-0.013	0.012	-0.009	0.026	0.011	0.004	-0.045	-0.022	0.026
	Having place for rest and meal	-0.021	0.000	-0.021	-0.065	0.008	-0.017	-0.001	-0.009	0.021	-0.012	0.010	0.036	0.006	-0.001	0.016	0.028
Adv.	Attractive advertising	-0.007	0.011	-0.009	-0.035	0.001	0.000	-0.022	-0.016	0.005	-0.010	-0.009	0.020	0.005	0.002	0.005	-0.004
	Attractive event	0.000	0.002	-0.004	-0.011	0.004	-0.013	-0.013	-0.007	0.003	-0.004	-0.003	0.010	0.002	-0.015	-0.004	-0.011
	Payback	0.008	0.019	0.025	-0.012	0.007	0.004	0.004	-0.016	0.003	-0.008	0.003	0.005	-0.012	-0.013	-0.047	-0.012

(*shops in OSS means Shops in old shopping street in the table above)

Table 3-6. Average points separated by different ages

Living area		The Young (<40)				Middle-age (40 to 59)				The Old (>59)			
Evaluate objects		Point rate	shops in OSS	Super-market	Mall	Point rate	shops in OSS	Super-market	Mall	Point rate	shops in OSS	Super-market	Mall
Goods	Variety of goods	0.128	−0.148	0.033	0.210	−0.077	0.105	0.012	−0.156	−0.063	0.084	0.009	−0.126
	Easy to find goods	0.117	−0.097	0.011	0.116	−0.052	0.042	0.000	−0.044	−0.049	0.042	−0.003	−0.047
	All can be bought in one place	0.142	−0.154	0.026	0.235	−0.076	0.099	0.021	−0.148	−0.064	0.086	0.022	−0.124
	Having favorate goods	0.145	−0.091	−0.016	0.239	−0.071	0.033	0.001	−0.121	−0.068	0.041	0.006	−0.113
	Fresh and good sense	0.080	−0.032	−0.053	0.095	−0.034	0.048	0.020	−0.076	−0.031	0.038	0.032	−0.060
	Cheap	0.088	−0.066	0.145	−0.004	−0.061	0.056	−0.091	−0.012	−0.049	0.045	−0.071	−0.007
Shop	Good atmospher	0.111	−0.060	−0.077	0.168	−0.037	0.037	0.064	−0.117	−0.038	0.035	0.056	−0.098
	Intimacy	0.075	0.029	−0.042	−0.043	−0.005	0.005	0.016	0.006	−0.011	0.002	0.020	0.011
	Famous	0.085	0.002	−0.011	0.054	−0.017	0.007	0.010	−0.030	−0.024	0.003	0.011	−0.028
	Individuality	0.081	0.065	−0.001	0.007	−0.015	0.001	0.013	−0.022	−0.021	−0.010	0.011	−0.013
	Good service attitude	0.055	0.040	−0.025	0.028	−0.003	0.021	0.045	−0.010	−0.009	0.011	0.033	−0.009
	Product knowledge of clerk	0.055	0.040	−0.059	−0.016	−0.007	0.000	0.027	−0.001	−0.012	−0.009	0.031	0.007
	After-sales service	0.062	0.005	−0.053	−0.013	−0.010	−0.012	0.010	0.004	−0.014	−0.007	0.017	0.007
	Delivery	0.052	−0.007	−0.045	−0.009	−0.004	0.001	0.006	0.000	−0.009	0.004	0.009	0.001
	Long-opening Hours	0.131	−0.110	0.074	0.150	−0.059	0.030	−0.077	−0.072	−0.057	0.037	−0.056	−0.070
Traffic	Near	0.088	−0.050	0.089	0.017	−0.025	0.006	−0.014	0.033	−0.030	0.009	−0.025	0.018
	Parking	0.075	−0.092	−0.022	0.104	−0.063	0.105	0.006	−0.091	−0.040	0.080	0.025	−0.065
	Convenient of bus	0.050	−0.014	−0.047	−0.027	−0.009	0.009	0.006	−0.014	−0.014	0.011	0.012	−0.004
Pleasure	Having place for children	0.169	−0.107	0.006	0.264	−0.013	0.017	0.007	−0.031	−0.035	0.025	0.007	−0.059
	Convenient of public facility	0.057	−0.022	−0.035	−0.012	−0.005	0.002	0.001	−0.004	−0.012	0.008	0.006	−0.001
	Convenient of ATM	0.094	−0.041	−0.015	0.138	−0.015	0.025	0.007	−0.034	−0.024	0.020	0.005	−0.040
	Having place for rest and meal	0.126	−0.060	−0.034	0.239	−0.052	0.033	0.011	−0.145	−0.052	0.029	0.017	−0.126
Adv.	Attractive advertising	0.059	−0.032	0.027	0.037	−0.012	0.022	0.003	−0.021	−0.016	0.018	0.003	−0.016
	Attractive event	0.062	−0.030	−0.017	0.050	−0.015	0.018	0.006	−0.030	−0.020	0.017	0.010	−0.027
	Payback	0.040	−0.034	−0.063	−0.002	−0.012	0.007	−0.001	−0.009	−0.011	0.012	0.015	−0.007

Evaluation on each item, which is goods, shop, traffic, pleasure and advertisement, to Shops in the old shopping street by different categories are summarized in Figure 3-5 and Figure 3-6. They are calculated by using the following formula to balance the different number of question in every item.

Evaluation on each item = Total evaluation of all questions in the item / number of question in the item

As shown in Figure 3-5, evaluations to Shops in the old shopping street by those who have visiting or no visiting experience in this one month are very different. However, it is difficult to clarify the relevance between the evaluations and the visiting only by this data for which one is the reason and which one is the result are unknown.

Figure 3-5. Evaluation to Shops in The Old Shopping Street by Different Areas

As shown in Figure 3-6, evaluations to Shops in the old shopping street by different residential areas are very different and they decreased in the order of Old town, New town,

Across river and Detached area.

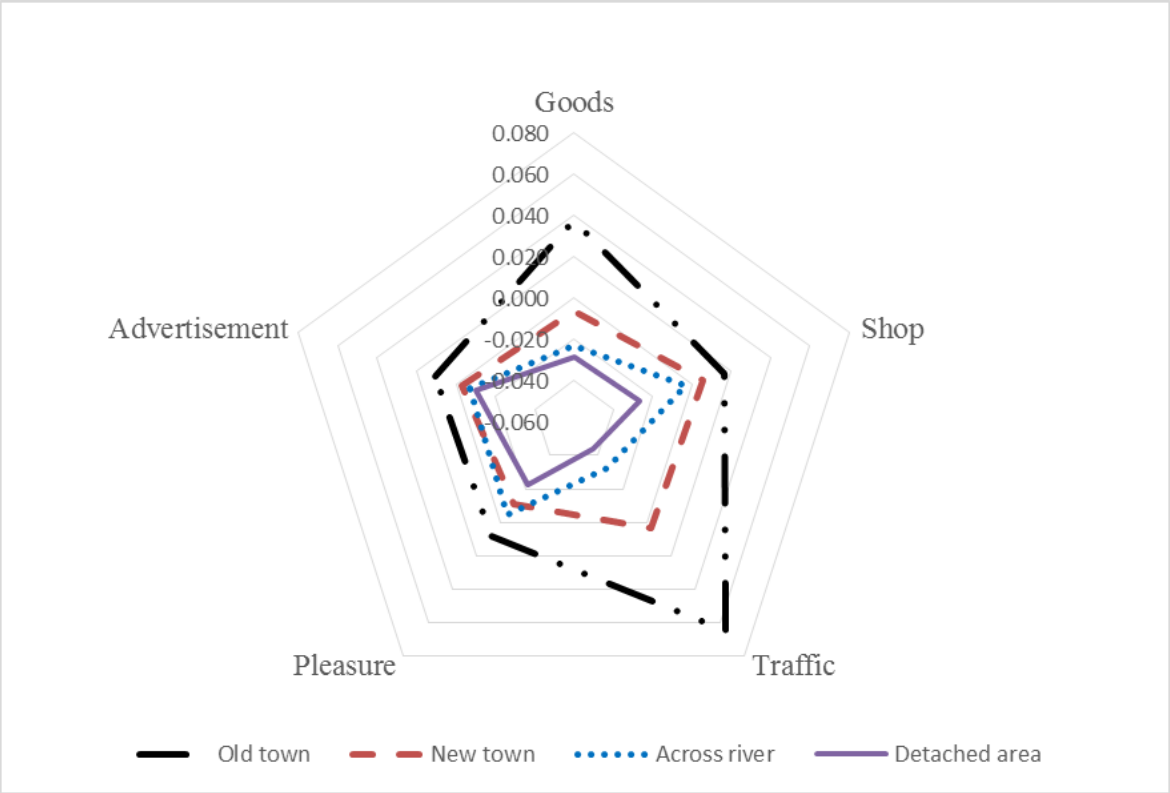


Figure 3-6. Evaluation to Shops in The Old Shopping Street by Different Areas

For the frequency of going to the city center street in one month, I analyzed it by different area and different ages. As shown in table 3-7, the farther people live, the less visiting was found. Especially for the Detached area, 36% people have no experience of visiting the old shopping street in this one month. In addition, as shown in Table 3-8, there is no significant difference for the visiting to the old shopping street among the different ages

Table 3-7. Frequency of going to the city center street in one month by different areas

	Whole city	Old town	New town	Across river	Detached area	Whole city	Old town	New town	Across river	Detached area
Nearly Everyday	177	87	38	44	7	6.0%	10.3%	5.6%	4.4%	1.5%
4 or 5 times per week	197	83	54	49	11	6.6%	9.9%	8.0%	4.9%	2.4%
2 or 3 times per week	358	115	102	115	26	12.1%	13.7%	15.1%	11.6%	5.7%
Several Times	905	208	240	352	104	30.5%	24.7%	35.5%	35.4%	23.0%
About 1 time	515	94	110	205	106	17.4%	11.2%	16.3%	20.6%	23.4%
None	487	60	92	170	165	16.4%	7.1%	13.6%	17.1%	36.4%
Living there	137	131	2	3	1	4.6%	15.6%	0.3%	0.3%	0.2%
No Answer	189	63	38	55	33	6.4%	7.5%	5.6%	5.5%	7.3%
Total	2965	841	676	993	453	100%	100%	100%	100%	100%

Table 3-8. Frequency of going to the city center street in one month by different ages

	The Young	Middle-age	The Old	The Young	Middle-age	The Old
Nearly Everyday	22	81	65	8.7%	7.7%	4.6%
4 or 5 times per week	18	72	98	7.1%	6.8%	6.9%
2 or 3 times per week	19	100	206	7.5%	9.5%	14.5%
Several Times	85	361	399	33.7%	34.2%	28.0%
About 1 time	47	180	251	18.7%	17.0%	17.6%
None	38	187	228	15.1%	17.7%	16.0%
Living there	10	44	62	4.0%	4.2%	4.4%
No Answer	13	31	114	5.2%	2.9%	8.0%
Total	252	1056	1423	100.0%	100.0%	100.0%

3.4. Discussion

In my study, I investigated not only Action step, the final step in the AIDA steps [4], but also the previous steps that show the processes to the action. As a result, I grasp the condition of the old shopping street and found some of the problems of it based on the results of the two questionnaire surveys mentioned above. Consequently, I suggest below for improving two problems of them.

First, as indicated by the result above, shortage of goods verities and cannot buy all in

one shop are mentioned as problems by both the customers and the storekeepers in the old shopping street. Therefore, potential customers think to have to move among the shops in the old shopping street to get all goods they needs. So frequent parking include in and out is necessary since car is used most widely as a means to stores. On the other hand, they assess parking to be very difficult. Storekeepers mention too parking difficulty and narrow road as problems of the old shopping street. It can be thought that moving among shops in the old shopping street is inconvenience for customers. That is to say, moving among the shops is necessary in the old shopping street, this inconvenience prevent the visiting.

In order to improve the problem above, direct measures are making a block on which existing every individual shop and stores lacking the street are concentrated, and making parking easier to in and out. However, as mentioned above in the survey of storekeepers, the business condition is not so good so it can be thought that these direct measures are difficult to realize. Therefore, it is necessary to deal with the problems in other view.

Therefore, I propose to create a move means among the shops in the old shopping street to deal with the inconvenience to increase the visiting rate. Transit mall is a one of the solution; however, it was difficult because it needed large investment. Accordingly, EV bus (FIG. 3-7) developed by the present project was considered. It is easy to get on and off for its low floor and full of spaciousness for without door and window glass. It can be thought that it can be used easier for the old, children and customers with heavy shopping-goods and can improve the charm of Old town. Now, examination service of the EV bus began, and the service is being evaluated.

Figure 3-7. EV bus

Second, as indicated by the result above, evaluation on the old shopping street is very different by the four areas and decreased in the order of Old town, New town, Across river and Detached area. For some items, such as traffic, evaluated different by residents in different living area is reasonable. As to other items, such as goods, shop and pleasure, it is not reasonable. I found that the usage of the old shopping street also decreased in the order of Old town, New town, Across river and Detached area. That is to say, the more usage of the old shopping street, the higher evaluation it receives. Then, it can be say that the charm of the old shopping street is not known by those who seldom using it.

In order to improve the problem above, it is necessary to find a good way to make the charm of the old shopping street to be known by those seldom using it. Therefore, an experiment about information transmission conducted by us will be described in the next Chapter.

Chapter 4. Experiment on a WOM Network

4.1. Introduction

As mentioned in Chapter 3, the old shopping street has lost its bustle and there are a lot of problem in it. In order to activate the shopping streets, I am trying to find an effective method of disseminating information to citizens to make them recognize the charm of the shopping streets. Also as mentioned in Chapter 2, most storekeepers and their customers are aging. On the other hand, I also found that there are about 7000 high school students and about 3000 university students in Kiryu City. It means that many teenagers who are free in the daytime are in Kiryu City. Therefore, effective information dissemination for both elders and teenagers should be found. Though the internet is popular in the society of today, I believe that face-to-face WOM, the traditional way of disseminating information, will be more effective in this case, in which elders and teenagers are the key persons in the community. Therefore, in this research, I examine the capability of the WOM network.

The purpose of my research is to evaluate the effect of WOM in relation to the graph structure of a WOM network. First, I evaluate the relationship between the behavioral tendency of the members of the network and the WOM graph structure. Next, I evaluate the spread of new information based on the WOM graph structure. WOM about meal in a student community will be examined in this research. The reason of choosing student as the subject of this experiment is that the student has clear affiliation and easy to examine and control. In addition, the reason of choosing meal as the topic of WOM is that it is concerned by most students and the talking about it is existing actually so it is easier to grasp. The result of this experiment will be used as preliminary data for the activation of the shopping streets of Kiryu City.

4.1.1. Related Research

Problems concerning interpersonal relationship networks are addressed in many fields such as informatics, sociology, psychology, business administration, and economics from different viewpoints. I introduce related studies in the following two areas: interpersonal relationship networks and WOM marketing, which is an effect of those networks.

4.1.1.1. Interpersonal Relationship Network in Informatics

Research that analyzes social networks has been conducted for a long time, for example, the famous Small World study by Milgram [7]. Adamic, L. A. et al. [8] devised techniques and tools to mine internet information in two data sets and extracted social networks and the exogenous factors underlying the networks' structure. This study found that some factors are better indicators of social connections than others are, and that these indicators vary between user populations. Recently, Wu [9] studied several longstanding questions in media communications research, in the context of the microblogging service Twitter, regarding the production, flow, and consumption of information. Matsuo et al. [10] researched the extract method of the relationship between researchers by using a search engine based on the web information. Yasuda et al. [11] researched constructing, changing process and structure of a research's network that was obtained by web mining within a period of four years. Yuda et al. [12] analyzed network structure at the time of 2005 of mixi, the biggest Social Network Service in Japan.

Instead of the real relationship of people, the web data that was automatically left the log was used by most of those researches. In addition, most of those researches focus on the network itself but put the relation to the people's activity away. In this study, we focus on the people's activity and WOM network.

4.1.1.2. WOM Marketing

In the field of marketing, WOM is examined chiefly in comparison with the mass

media influence on an individual's decision-making. Rogers [13] compares advertisement to WOM, and shows that the former has a great influence on an individual at the information-gathering stage but the latter has a big influence at the decision-making stage. Herr et al. [14] investigated the effects of WOM communications and specific attribute information on product evaluations and found that a face-to-face WOM communication was more persuasive than a printed format but the effect was reduced or eliminated when a prior impression of the target brand was available from memory or when extremely negative attribute information was presented.

4.1.2. The Meaning of WOM Network in This study

WOM was defined by Arndt [15] as oral person-to-person communication between a receiver and a communicator whom the receiver perceives as noncommercial, concerning a brand, product, or service. Brown et al.[16] added that "the communicator and the receiver have a social tie."

In this study, I use the definition of WOM mentioned above. It can be expected that the networks differ depending on the topic of the WOM. Therefore, as the social tie of the communicator and the receiver, I use the existence of conversation concerning meals in daily life as a WOM network. I investigate how information about the shopping streets spreads on this network. In this study, I check just two points. The first point is whether communicators and receivers are interested in the topic. The second point is whether each constituent of the community has a chance to have conversations exchanging information concerning the topic. Meals are a topic of concern for all students, so the network satisfies both these points. Furthermore, the network about meals can be expected to function as a WOM network concerning the shopping streets.

4.1.3. The Hypothesis to be Examined

In this study, I survey the network of interpersonal relationships that exists in the real

community, analyze its structure, and investigate its relation to the behavioral tendency of the constituent members. As a result, I examine the utility of WOM as an information dissemination method to activate the shopping streets. Concretely, a questionnaire survey was designed to examine the following hypothesis: First, there is a strong relationship between the structure of a WOM network and similarity of the members' behavior concerning the topic of the network. Second, when new information is acquired by some members of the network, it will spread in the network. The usability of WOM as an information dissemination method for shopping streets activation is evaluated by assessing the degree of information spreading in a WOM network of a student community.

4.2. Method

4.2.1. The Questionnaire Survey

Questionnaire surveys with the same content were administered to 189 junior students at the Department of Computer Science (henceforth C_1) and the Department of Mechanical System Engineering (henceforth C_2) of Gunma University two times, in April and July. I selected junior students as the investigation object because the groups of students are clear and easy to study. Moreover, steady interpersonal relationship networks are expected for these communities because the students have been in the same department for two years. The analysis was based on the students whose answers were effective in both investigations, and the sample size is 53 for C_1 and 58 for C_2. The data of $C_1$from the first and second investigations are abbreviated as C_{11} and C_{12}, respectively. The data of $C_2$from the first and second investigations are abbreviated as C_{21} and $C_{22,}$ respectively.

The survey carried a signature, and its content is as follows:

1) Eating style at the university in the daytime.

2) The names of other students that the student talked with or emailed about which

restaurant to go to for meals, excluding drinking parties, in the preceding week.

3) The name of the restaurant that became the topic.

4) Living conditions, such as where the student's home is and whether he or she has a car.

5) Whether does he or she recognize the restaurant Basho (Basho is a European-food restaurant with a long history. It is an unobtrusive presence for the locals because it is in an alley in the city centre. But it became a topic nationwide when a wall painting by Shiko Munakata, a famous painter in Japan, was foundhidden in the wall several years ago. Yet, local young people are not aware of the restaurant although customers come from far away. Also, it is not a good choice for lunch for university students because its distance from the university is more than 1 kilometer.).

After the first investigation, information about the restaurant Basho was given in a lecture to some of the investigated students of C_1. Then, the appearance of the spread of the information was observed in the second investigation (Figure 4-1).

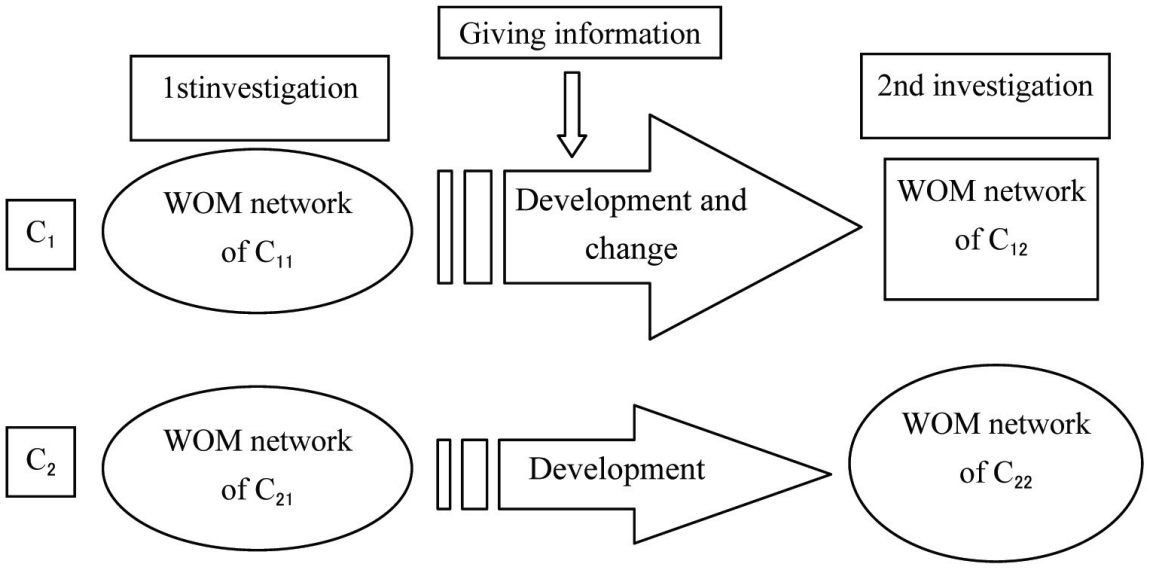
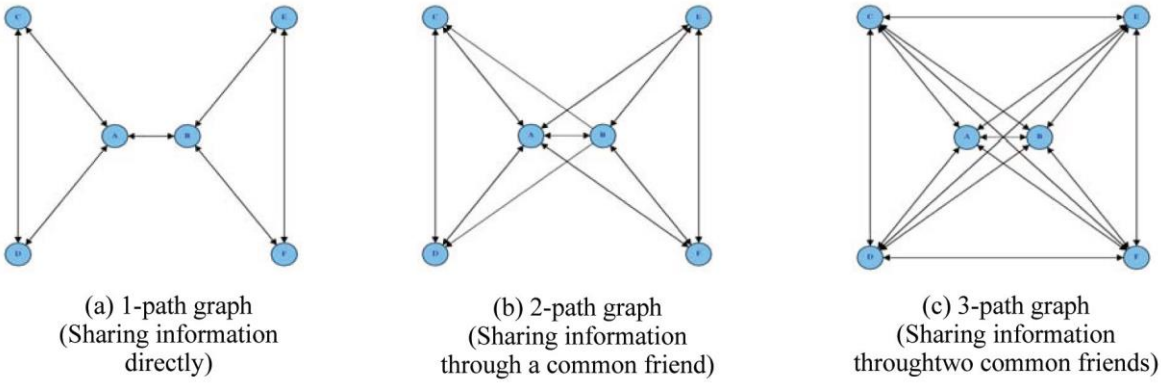


Figure 4-1. Method of Research

4.2.2. The Definition of the Graph Structure of a WOM Network

In this study, I represent a WOM network, using graph theory (for example, Jonathan Gross et al.[17]), as a directed graph whose vertices are persons, and a directed edge from vertex A to vertex B means that person A talked to person B. I define *adjacent* level for a pair of vertices in order to indicate the level of information sharing between a pair in the WOM network. Adjacent level of vertices A and B is defined as the minimum length of paths from A to B or reverse. If there are no such paths, the adjacent level is defined as ∞. An *n-path graph* is defined as a graph in which all vertices pairs of adjacent level *n* or less are connected (Figure 4-2). An *n*-path graph of a mutually connected graph becomes a complete graph for a large enough *n*. If a subset of vertices and their edges becomes a clique—a subgraph that becomes a complete graph—these persons possibly share all the information in *n* conversations or less. As an index of the information sharing ease of a WOM network, I define the *n-density* of a network as the ratio of the number of edges in an *n*-path graph to the number of edges in a complete graph that has the same vertices as the original graph. The *n*-path graph of a graph G is sometimes referred to as *n*-th power of G. Furthermore, I define *transitivity* and *reciprocality* as the auxiliary indexes of a directed network. The former is defined as the ratio of the number of shortcut edges to the number of pairs of vertices that have a path of length 2. It means the ratio of the relations “a friend of a friend is a friend.” The latter is defined as the ratio of the number of reciprocal pairs of vertices to the number of connected pairs. It means the ratio of relations “a friend thinks of me as a friend.” That is to say, the allowable conversation frequency means the quality of the information sharing relation.



(a) 1-path graph (Sharing information directly)

(b) 2-path graph (Sharing information through a common friend)

(c) 3-path graph (Sharing information throughtwo common friends)

Figure 4-2. *n*-path graph

4.3. Results

4.3.1. The Result of WOM Network

4.3.1.1. Characteristics of the WOM Network Graph

WOM networks concerning meals in each department were identified by the two investigations (Figures 4-3 to 4-6), and the characteristics of them are summarized in Table 4-1 and Table 4-2. I found that all of the 1-densities of the four networks are about 0.06 when I consider the graphs as directed graphs. There are more large cliques (size of 7) and more isolated students in C_1 than C_2. Moreover, C_1 has high transitivity and high reciprocality. The students in C_1 divide into several groups that are highly independent of each other and are intimate in the group. Thus, C_1 has a higher transitivity than C_2, considered as an undirected graph. The reason for the difference between the two departments can be thought as a result of the different types of study. The students of C_1 have more one-person jobs, such as programming, and discussion, if it exists, is limited to the one-to-one type. However, the students of $C_2$are assigned more experiment practice, and they need to collaborate with different students. Therefore, various interpersonal relationships are composed and a uniform network is established.

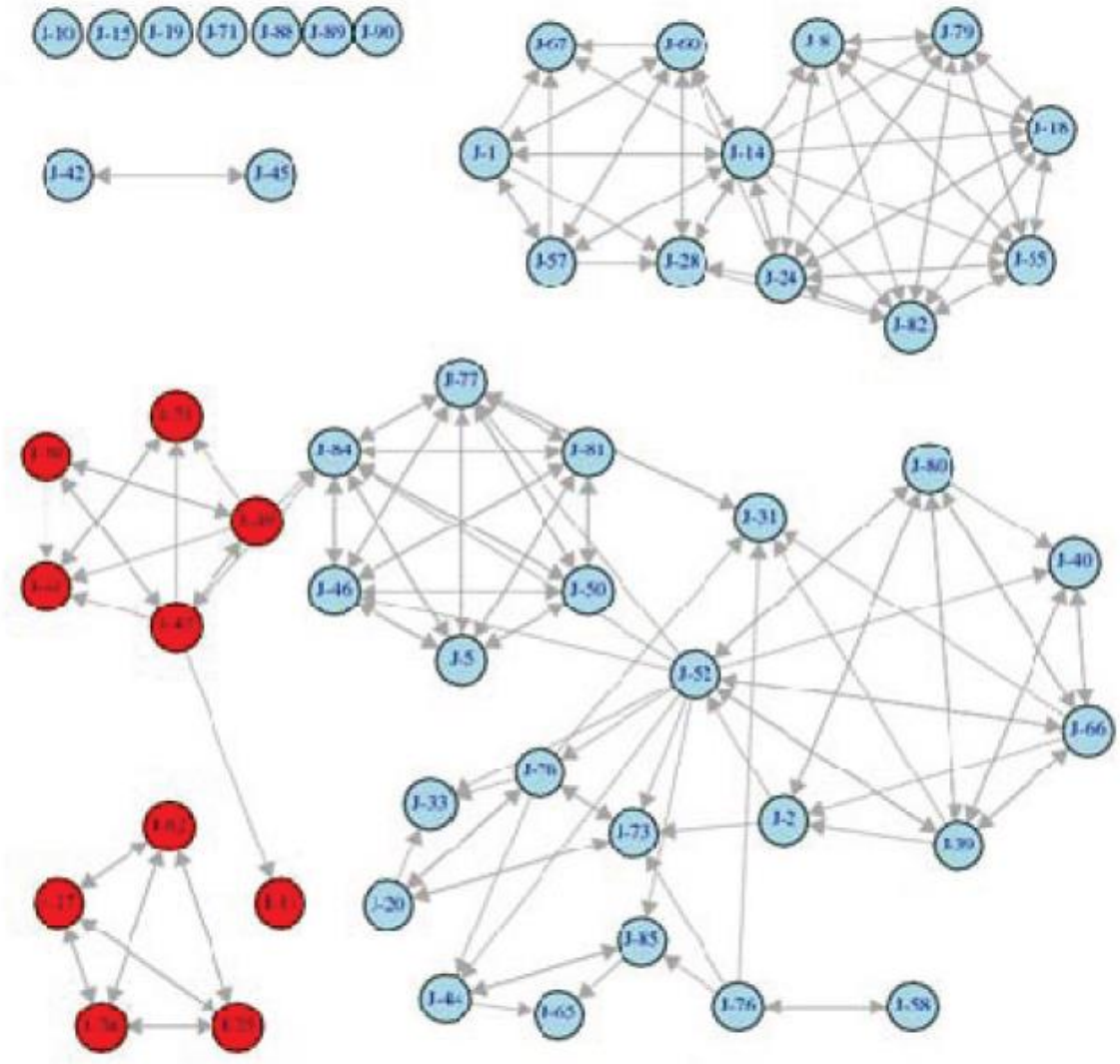


Figure 4-3. Network of C_{11}

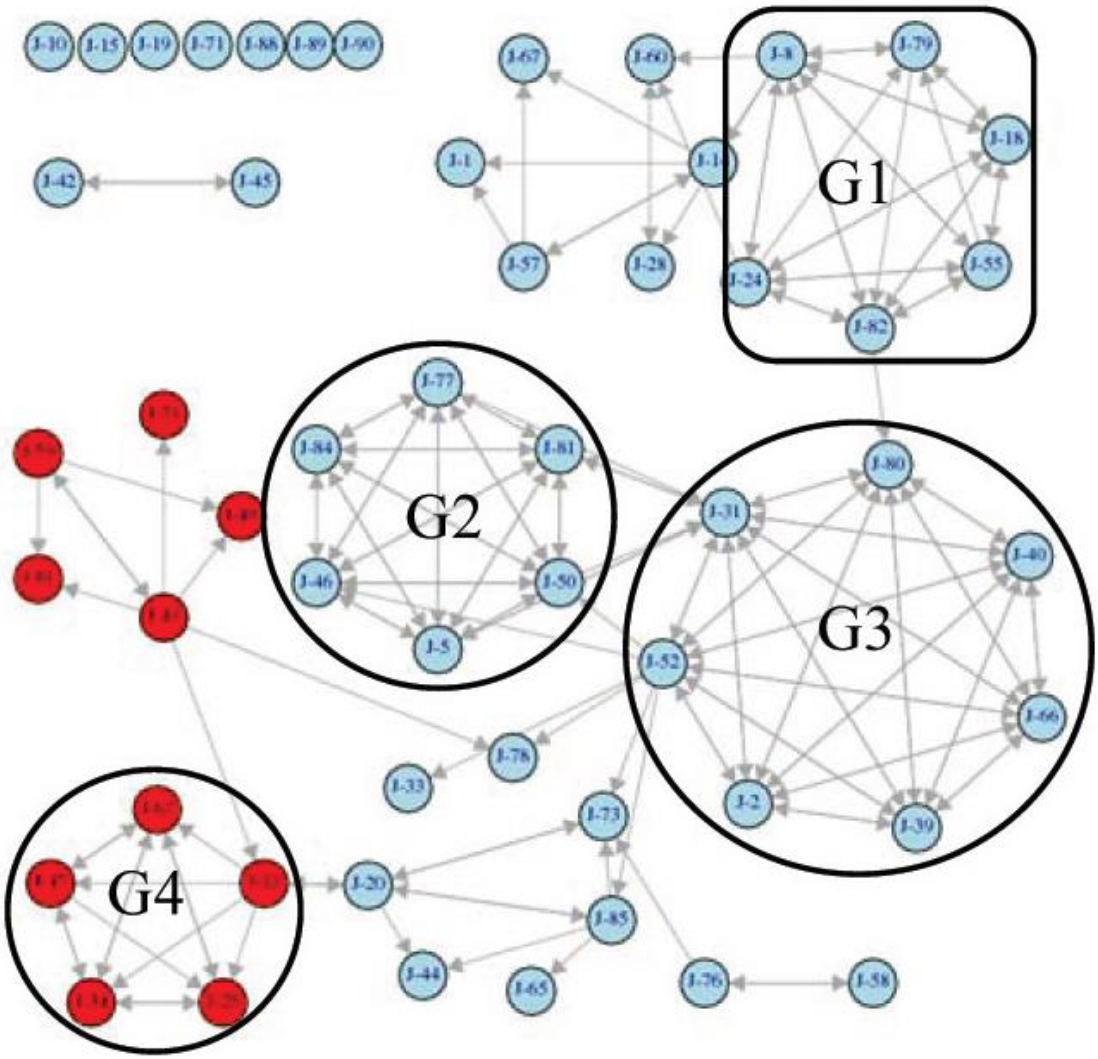


Figure 4-4. Network of C_{12} (G_1–G_4 are $_4$ cliques)

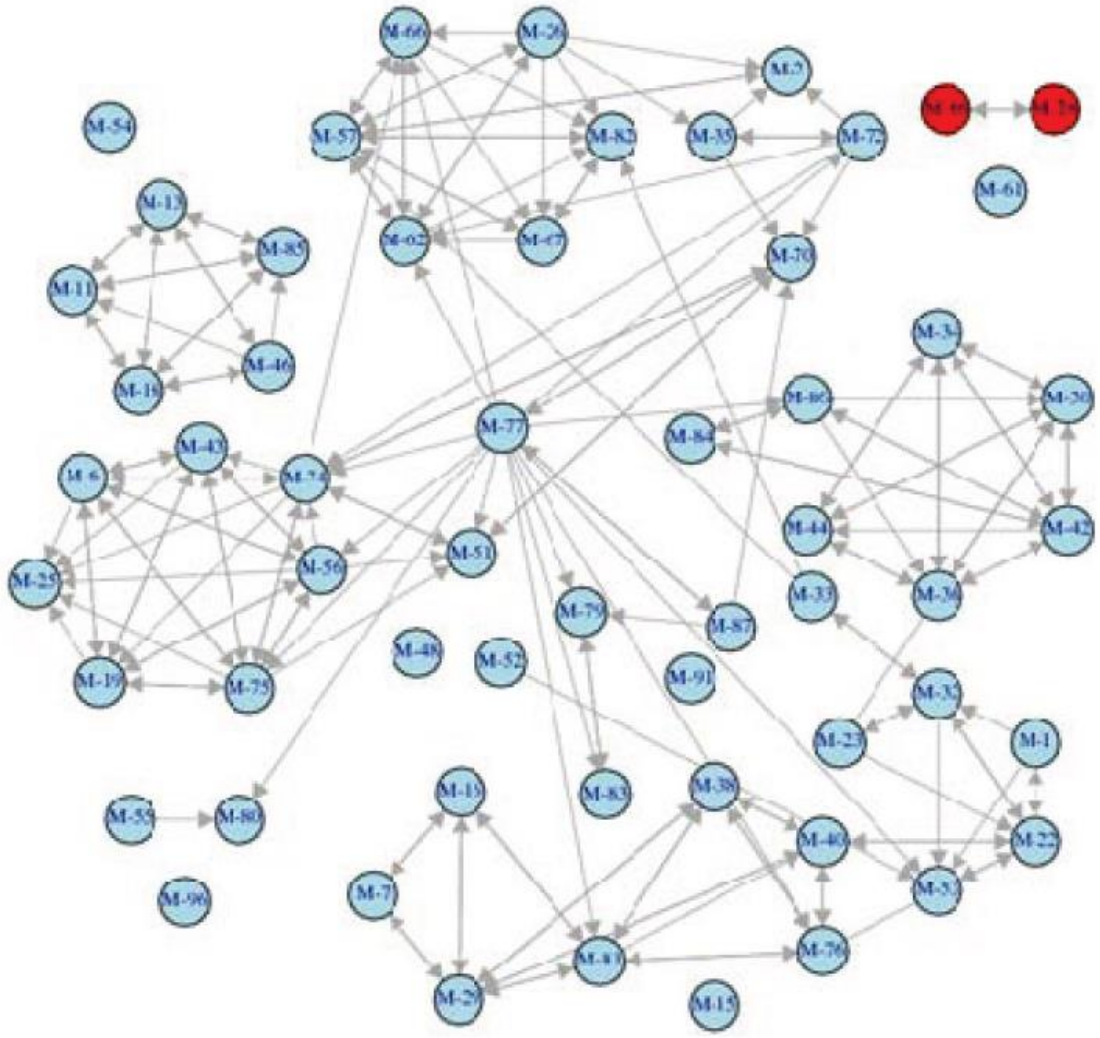


Figure 4-5. Network of C_{21}

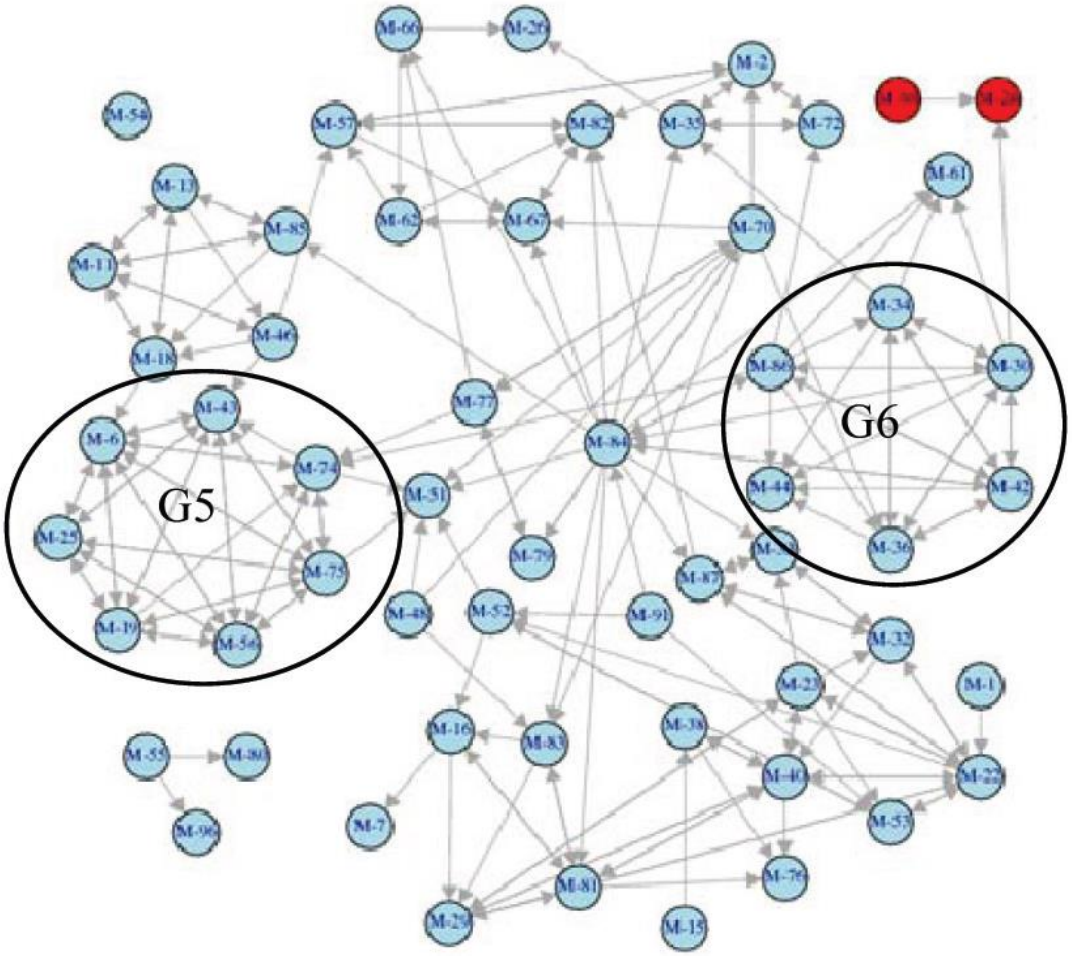


Figure 4-6. Network of C_{22}

Table 4-1. Basic character of networks

	Vertices	Indexes as directed graph				Indexes as undirected graph		
		Edges	Density	Transitivity	Reciprocality	Edges	Density	Transitivity
C_{11}	53	177	0.064	0.713	0.566	113	0.082	0.627
C_{12}	53	163	0.059	0.746	0.630	100	0.073	0.651
C_{21}	58	192	0.058	0.617	0.524	126	0.076	0.557
C_{22}	58	200	0.06	0.529	0.449	138	0.083	0.423

Table 4-2. Large cliques and unconnected vertices

	Exclusive large cliques*						Unconnected sub-graph from the maximum connected sub-graph									
	Clique size				Included vertices	%	Sub-graph size						Fewer than 3 vertices		Medium size	
	7	6	5	4			12	5	4	3	2	1	Included vertices	%	Included vertices	%
C_{11}	1	1	1	2	26	49.1%	1		1		1	7	9	17.0%	18	34.0%
C_{12}	1	2	1		24	45.3%					1	7	9	17.0%	20	37.7%
C_{21}	1	1	2	2	31	53.4%		1			1	6	8	13.8%	19	32.8%
C_{22}		2		4	28	48.3%				1		1	4	6.9%	26	44.8%

* Cliques are enumerated exclusively from the larger one to the small one.

On the other hand, the number of isolated students decreases in the second investigation, compared with the first one. It seems the students who were isolated at the beginning of the semester became related to a group as time went by.

4.3.1.2. *n*-density of WOM Networks

The *n*-densities of both WOM networks are shown in Figure 4-7, where the WOM networks are fixed by the second investigation. The horizontal axis of this figure is path length, which means conversation frequency, and the vertical axis is *n*-density. It can be found that the *n*-densities become saturated with 7 path lengths in C_2 and 9 path lengths in C_1, and the *n*-densities are 0.9 and 0.7 respectively. That is to say, the information can be disseminated to 90 percent and 70 percent, respectively, of constituent members. The figures are about 30 percent and 20 percent when I assume these networks are undirected networks.

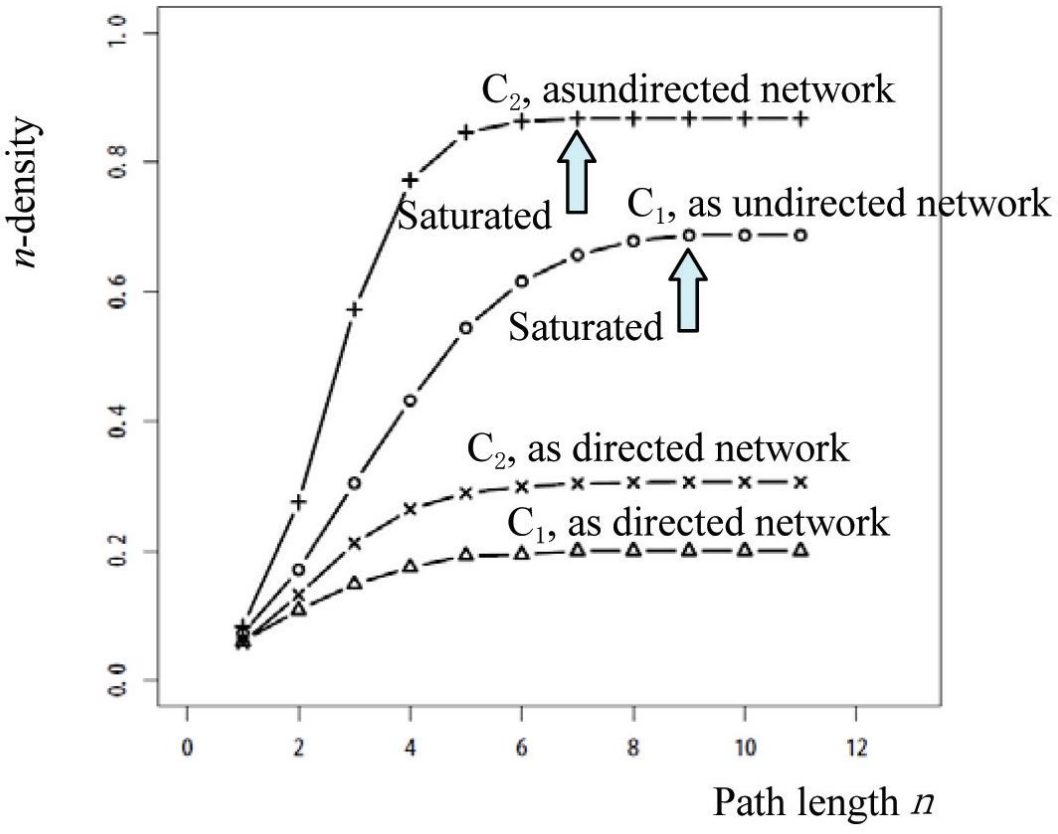


Figure 4-7. Possibility of Information Transmission

I consider conversations symmetric among receivers and communicators, and I assume that a reverse edge could not be investigated if there is an edge. Therefore, in the following discussion, directed graphs will be treated as undirected graphs if there is no specification.

4.3.2. Relationship between WOM Network and Behavioral Tendency

Table 4-3 and Table 4-4 show the results for the method of taking a meal. Main methods for lunch are using the refectory, purchasing a lunch box, and cooking in both C_1 and C_2. However, for dinner, most students of C_1cook by themselves, but there are a variety of methods in C_2, even though cooking is the main method.

Table 4-3. Method for lunch (%)

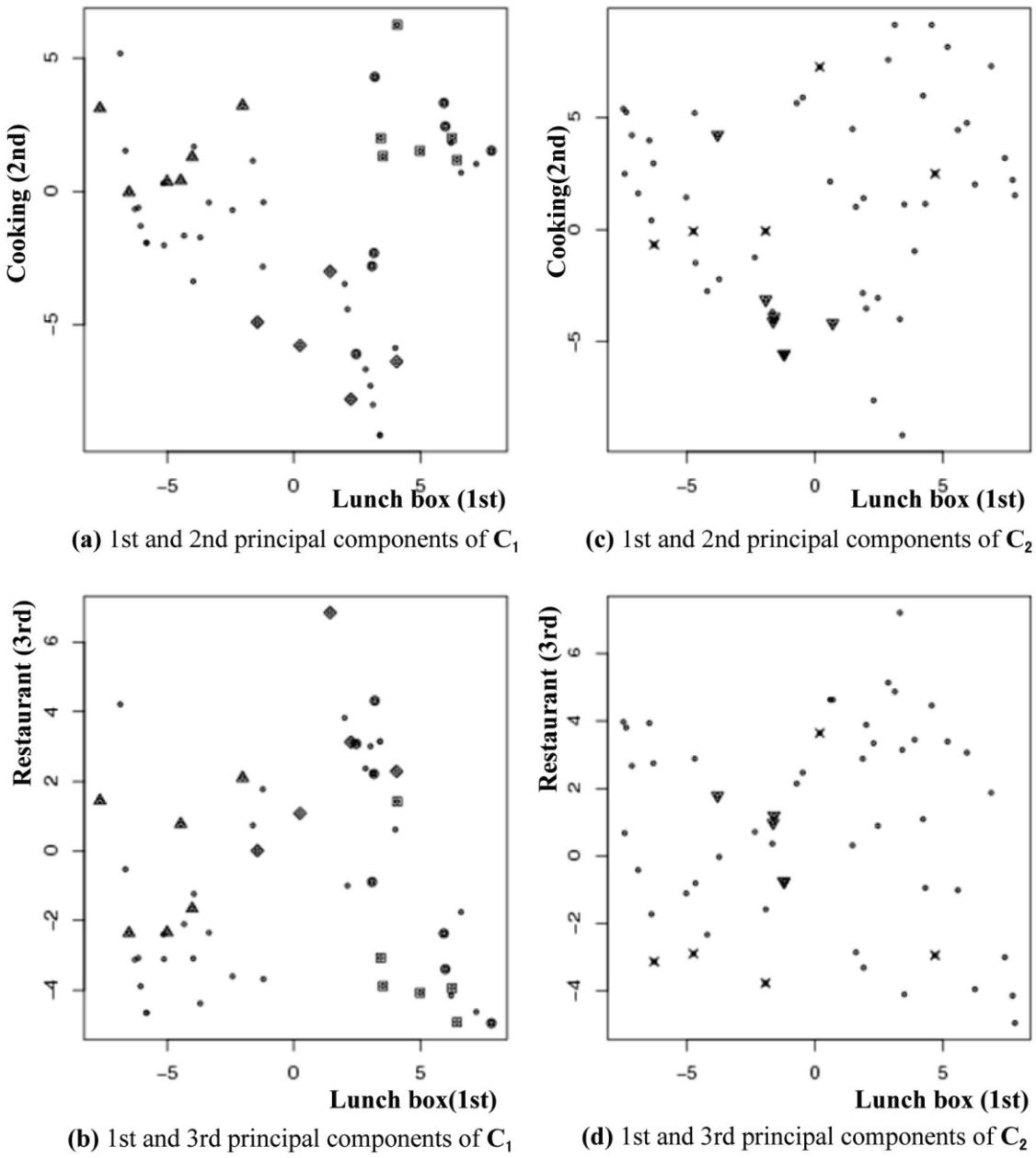
	Cooking	Purchasing lunch box	Using refectory	Eating at a restaurant	Eating nothing	Other
C_1	23.6	26.4	43.4	3.4	1.9	1.3
C_2	18.9	33.5	44.2	0.9	2.5	0.0
Average	21.3	30.0	43.8	2.2	2.2	0.7

Table 4-4. Method for dinner (%)

	Cooking	Purchasing lunch box	Using refectory	Using at a restaurant	Eating nothing	Other
C_1	76.2	3.2	4.7	11.9	2.5	1.5
C_2	53.6	12.2	18.7	12.4	2.2	0.9
Average	64.9	7.7	11.7	12.2	2.4	1.2

4.3.2.1. Relationship between WOM Network and Meal Characteristics

Principal component analysis of the ratio of the methods of taking a meal was conducted based on the second investigation. Figure 4-8 shows an individual factor score scatter plot. Most members of the same clique, indicated by the same mark, have positions in the same quadrant in this figure. That shows a tendency for the persons to have the same eating style. This configuration may indicate that students who have a similar eating style composed the clique on a WOM network, or it may indicate that some intimate members have a high possibility of taking a meal together and so their eating styles became nearly the same. It was clarified that a strong relationship existed between the WOM network concerning meals and similarities in the behavior of taking a meal.



(a) 1st and 2nd principal components of $\mathbf{C_1}$ **(c)** 1st and 2nd principal components of $\mathbf{C_2}$

(b) 1st and 3rd principal components of $\mathbf{C_1}$ **(d)** 1st and 3rd principal components of $\mathbf{C_2}$

Figure 4-8. Factor scores of the two department's students methods of taking a meal

Note: ▲is G1, ■ is G2, ● is G3, ◆ is G4, ▼ is G5, × is G6, and · is the others of Figure 4-5.The 1st, 2nd, and 3rd principal components are lunch box, cooking, and restaurant, respectively.

4.3.2.2. Relationship between Method of Taking a Meal and Adjacent Level

Figure 4-9 shows the average Euclidean distance of lunch behavior and dinner behavior among individuals who are adjacent in the *n*-path graph of a WOM network. The horizontal axis means the effective range of information exchanging of the adjacent relationship in the network, and the vertical axis is the average behavior distance defined by

$$d(i,j) = \sqrt{\sum_{k=1}^{N} (x_{ik} - x_{jk})^2},$$

Where x_{ik} is a *k*-th factor score of eating style of the *i*-th individual in C_1 or C_2. The average is taken for all edges (*i*, *j*) that compose the *n*-path graph.

There is a high correlation among the lunch behavior of constituent members whom the adjacent level is near in a WOM network. It is especially remarkable in C_1. However, the correlation of dinner behavior was not clear. It is understood that the influence of conversation at the university on dinner behavior is restrictive.

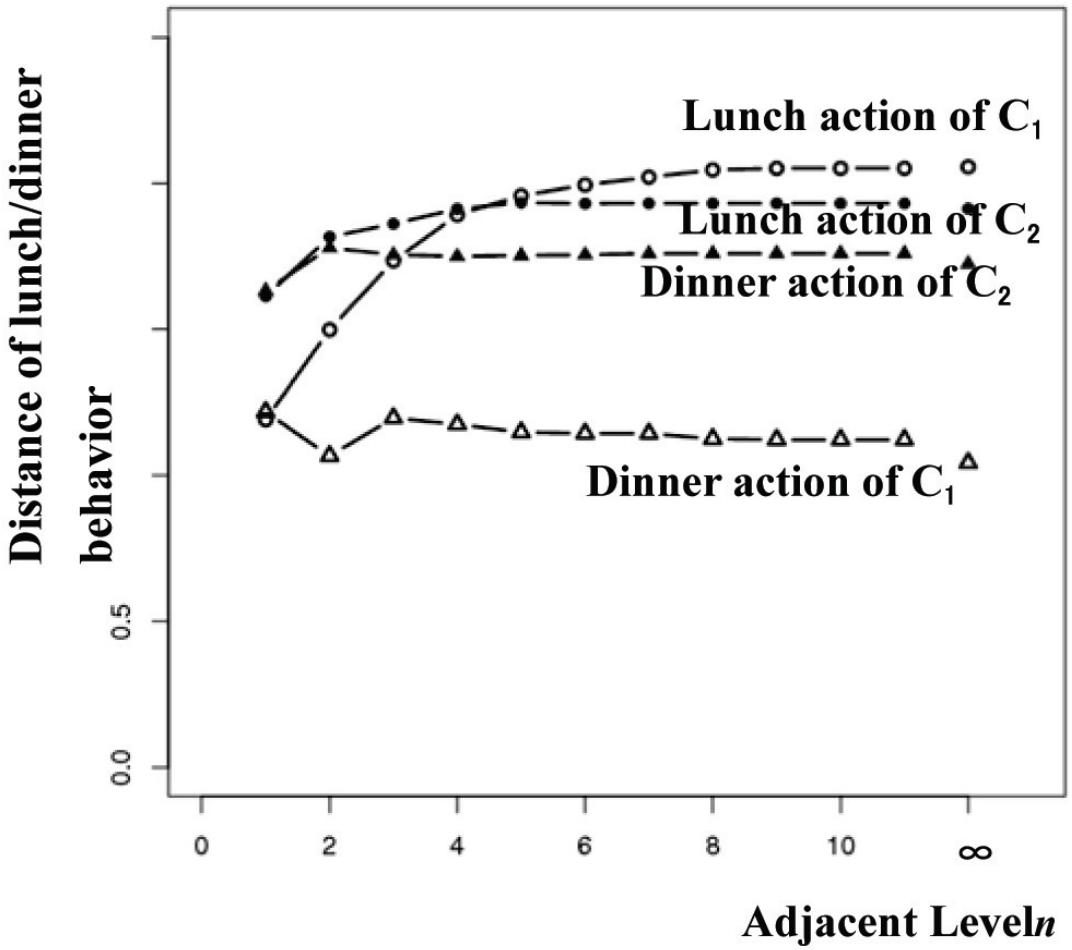


Figure 4-9. Relationship between Adjacent Level and Distance of Lunch/Dinner Behavior

4.3.3. Change in Recognition by Spreading of Specific Information

Seven students of C_1 and no students of C_2 participated in an information design class between the two investigations, and information concerning a restaurant named Basho was given to them in this class, in order to find the change in recognition caused by information spreading. Basho had once been a topic in the local newspaper, so the WOM network of the students is not the only information source. If some students got to know of Basho, the cause of the change is uncertain. However, it can be determined that the difference in the recognition change between the two departments is the effect of our intervention. Table 4-5 summarizes the change in recognition of Basho. When I compare the improvement of

recognition between the two investigations, the improvement in C_2, in which there was no intervention, is only about 7%. On the other hand, in C_1, in which there was positive intervention, the improvement is about 20%. The 13% difference between the two departments is thought to be an effect of the intervention.

Table 4-5. Change of recognition rate between two investigations

	1st investigation		Class participants (who already knew it)	2nd investigation		Difference	
	Number of persons who knew it	%		Number of persons who knew it	%	Number of persons(Class participants)	%
C_2	6	10%	0 (0)	10	17%	4 (0)	+67%
C_1	7	14%	6 (1)	17	34%	10 (5)	+143%

Moreover, five students that is, half the number of students who got to know of Basho between the two investigations of C_1 are not the students who participated in the information design class. It is expected that that is the result of information spreading. The detail of spreading processes is shown in Figures 4-10 and 4-11. All five students who recognized Basho newly in C_1 are connected with adjacency level 1 to students who had already known about Basho in the first investigation or took the information design class.

On the other hand, only four students newly recognized Basho in C_2. Two of them are connected to a student who had already known about Basho in the first investigation. It is highly likely that all of the students who got to know of Basho between the two investigations acquired information about it through the WOM network.

I now define the effective edge rate of WOM that is, the rate at which new information spread to the person of adjacency level 1. The effective edge rate of WOM is defined as *Ee*/*E* in my case. E is the number of edges from the students who already knew about Basho in the first investigation or participated in the information design class to the students who did not know about it, and *Ee* is the number of edges that may disseminate the information effectively. That is to say, *Ee* is the number of edges from the students who already knew about Basho in the first time or participated in the information design class to the students who got to know about it by the time of the second one. In the case of Basho, the index is 23.1% for C_1, and 7.8% for C_2.

It is thought that the effective edge rate of a WOM depends on how much the communicator and the receiver are interested in the information to be disseminated. The difference of probability of 15.3% is considered an effect of the intervention. I think that the intervention from the class had more impact than the local newspaper and other information sources.

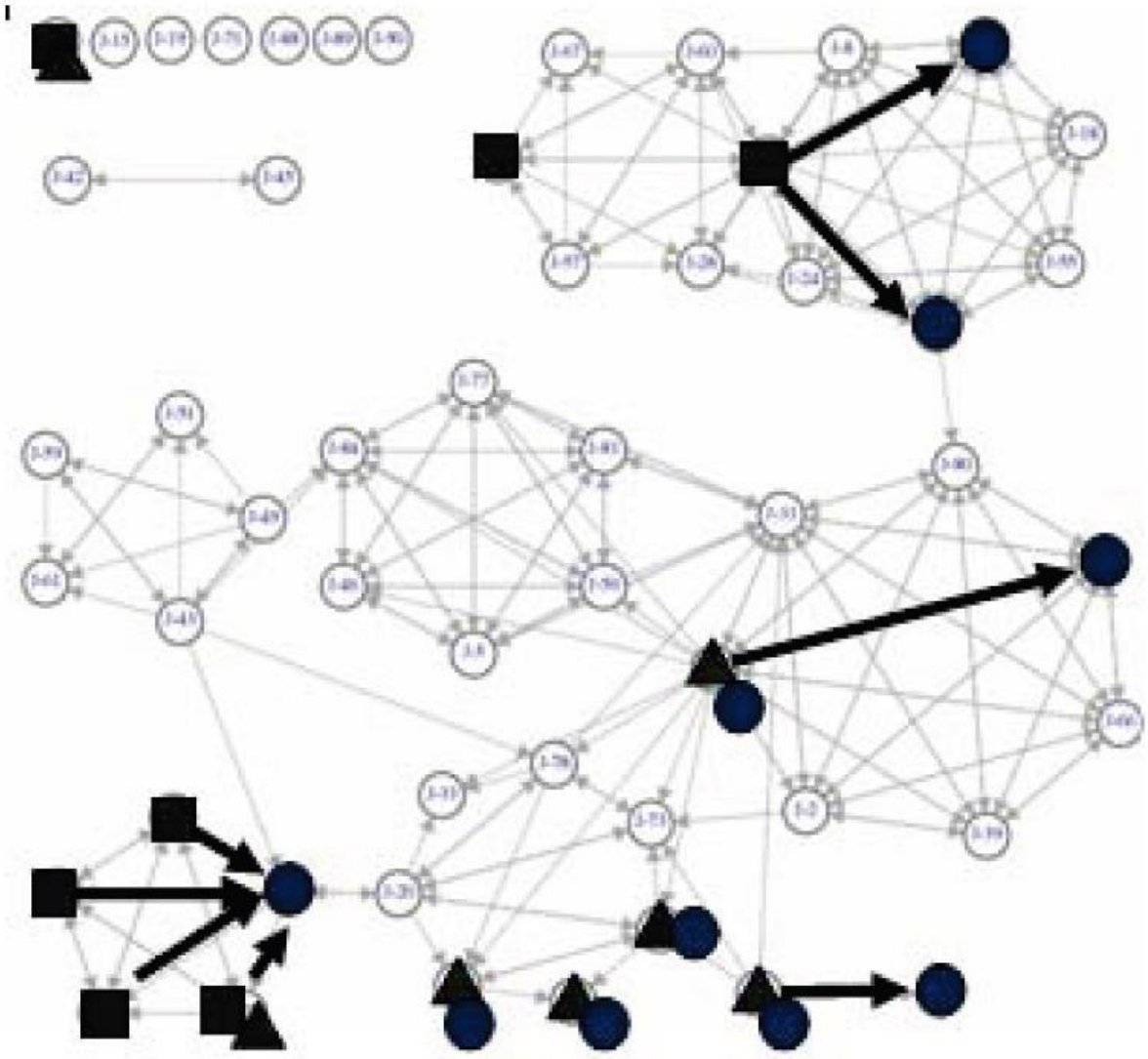


Figure 4-10. Information Spreading Process in C_2

Note: ■represents the students who already knew Basho at the 1st investigation, ▲represents the students who took the class, and ●represents the students came to know of Basho by the 2nd investigation.

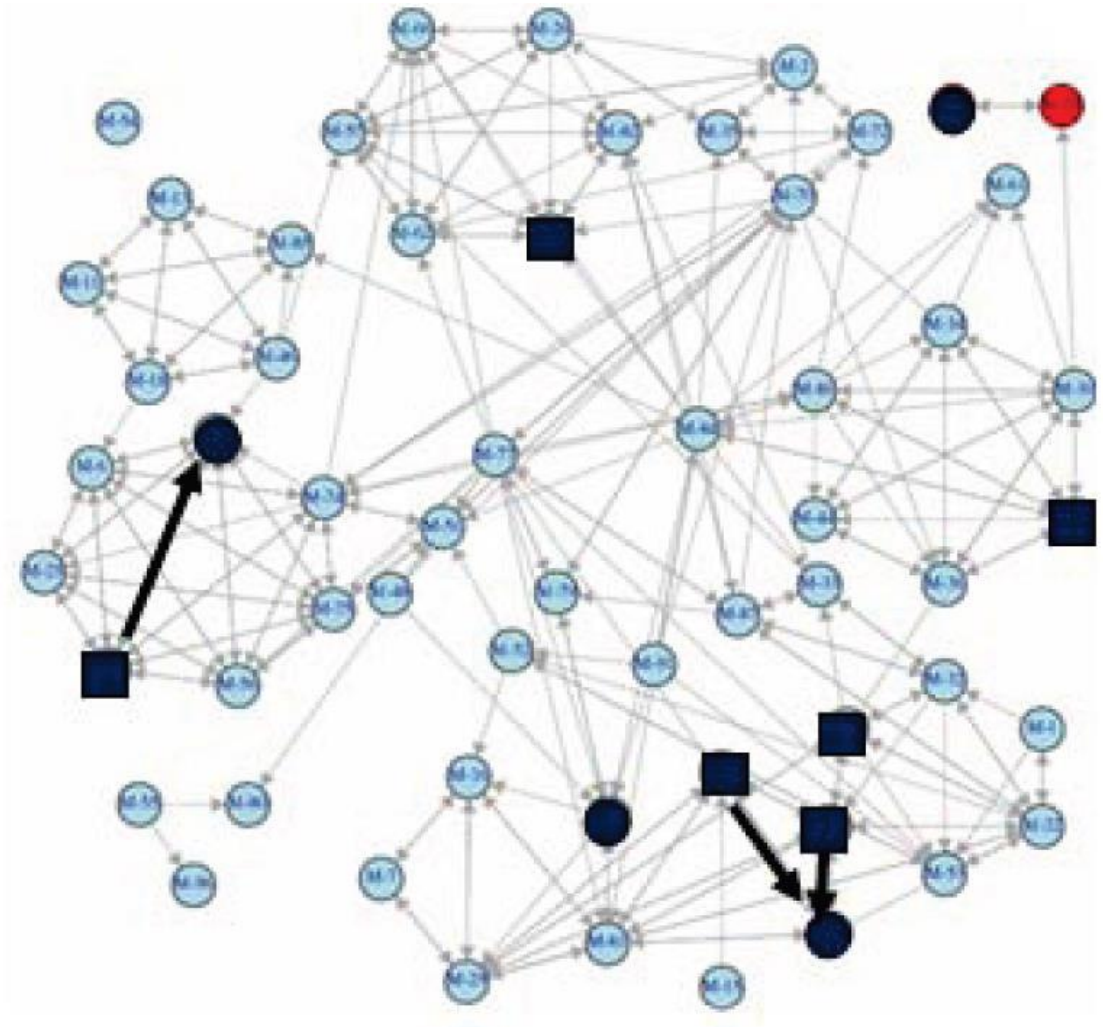


Figure 4-11. Information Spreading Process in C_1

Note: ■ represents the students who already knew Basho at the 1st investigation, ▲represents the students who took the class, and ● represents the students came to know of Basho by the 2nd investigation.

4.4. Discussion

In my study, I verified that there is a strong relationship between the behavioral tendency concerning a topic disseminated on a WOM network and the WOM structure by

investigating the WOM networks of the students. Moreover, it was confirmed that new information is disseminated in the network if some constituent members of the network acquire it. Therefore, a WOM network was proved as an effective way to disseminate information.

The topic disseminated in the WOM network concerned a restaurant in the center city that has no high special fascination for the students. However, new recognition of it was found as a result of the intervention in the WOM network. Therefore, a new way to increase recognition of the shopping streets could be to make known to some students the fascination of the shopping streets by letting them join some event or cooperate with a storekeeper. Then information about the shop should be expected to be disseminated to the students who are adjacent to the ones who already know about it through a WOM network. That is to say, using the WOM network effectively can be expected to affect the consumption behavior of a young person. In addition, the shopping streets will be bustling with visits of young persons, and that will be a way to create downtown activity.

Chapter 5. Conclusions and Future Works

5.1. Conclusions

By conducting a questionnaire survey of the storekeepers in the old shopping street and a big scale questionnaire survey of citizens of Kiryu city as consumers, the problems of the old shopping street, include the two main problems: "moving among the shops is necessary in the old shopping street, this inconvenience prevent the visiting" and " the charm of the old shopping street is not be known well" are grasped.

Moreover, the spreading of new information through WOM network is found and evaluated based on the results of two times questionnaire survey. Therefore, as a way to disseminate information, the effect of WOM is verified by the experiment conducted in this study. Thinking about the aging population composition of Kiryu City, face-to-face WOM, the traditional way of disseminating information, is believed to be more effective than Internet or something like SNS in this case.

I hope I can contribute to build the convenience shops in compact city Kiryu by grasping the condition of the old shopping street correctly and show a clear direction to improve it.

5.2. Future works

Problems of the old shopping street are grasped, and effect of WOM is verified to deal with the problem that the charm of the old shopping street is not known well by those who seldom visit it in this study. However, there are still many problems need to be deal with. For example, further analysis, such as taking into the citizens individual attributes on the data obtained, should be done to grasp more problems and find more measures are left.

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Gaowa

Gunma University, Kiryu, Japan

2014/02/07

List of Publications

[1] Gaowa, Yoichi Seki & Takayuki Takarada. (2013). Relationship between Word-of-Mouth Network and Behavioral Tendency-Preliminary Research for Local Downtown Activation. International Journal of Marketing Studies (Vol.5, No.5, pp.1-11). doi:10.5539/ijms.v5n5p1.

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List of Presentations

[1] 高娃, 小嶋耕作, 関庸一。口コミネットワークと行動習慣の関係、日本経営工学会平成21年度秋季大会、名古屋、2009年11月7日（－8日）。

[2] 高娃, 関庸一。消費者ニーズと商店主意識を考慮した商店街再生、日本経営工学会平成22年度春季大会、東京、2010年5月 15(-16)日。

Appendixes

Ⅰ. Questionnaire Survey Form of Storekeepers in Old Shopping Street

Ⅱ. Questionnaire Survey Form of the Citizens of Kiryu City

Ⅲ. Questionnaire Survey Form of WOM Network among Students

Ⅰ．桐生市商店経営実態調査へのご協力のお願い

このたび、独立行政法人 科学技術振興機構での研究開発プロジェクト「**地域力による脱温暖化と未来の街ー桐生の構築**」の一環として地元の商業活動の実態を調査し、商店街活性化の方策を考える上での基礎資料とさせていただきたいと思います。お忙しいところ、誠にご面倒ですが、趣旨をおくみとりいただき、調査にご協力いただきますようお願い申し上げます。なお、この調査の結果は、**大学を中心として地元商業を発展させるため**の資料としてのみ利用します。戴いた回答はすべて統計数値として扱い、税務とも一切関係ありませんので、できるだけありのままを回答してください。
この調査票は**２月２５日までに**解答し添付の封筒に入れてください。その封筒は、
１、調査票配布時に商店街事務局が回収すると伝えられた場合は、**商店街事務局に提出**ください。
２、配布のとき特に指定がなかった場合は、**２月中の消印となるよう郵便ポストに投函**ください。
お答え戴けない質問があっても構いません。是非、用紙の回収にご協力ください。
また、本調査に関するお問い合わせは、以下までご連絡ください。
群馬大学工学部　地域力による脱温暖化と未来の街ー桐生の構築プロジェクト　事務局
電話：0277-30-1508、　電子メール：co2pj@me.gunma-u.ac.jp

2009 年２月

実施機関：　群馬大学工学部　地域力による脱温暖化と未来の街ー桐生の構築プロジェクト 実施協力機関：　桐生市、桐生商工会議所

この調査用紙の配布されたお店（支店ならその支店）の経営者あるいは店長がそのお店についてご記入ください。該当する番号を○で囲むか、語句を記入してください。番号は**１つを選択**する場合と**複数を選択**する場合とがあります。なお、（　　）の付いた「その他」を選択された時には、お手数ですがその内容について簡潔に記入してください。

＜あなたのお店について伺います。＞

Ｑ１-1 あなたの店は**商店街に加盟**していますか。該当する番号どちらかに○印をつけてください。

１，はい　　２，いいえ

Ｑ１-2　あなたの店は**どの地区の商店街**にありますか、該当する番号に１つだけ○印をつけてください。

１，本町一丁目商進会	２，本町二丁目商盛会	３，本町三丁目商店街(振)
４，本町四丁目商店街(振)	５，桐生中央商店街(振)	６，末広町商店街(振)
７，本町六丁目商店街(振)	８，錦町商店街(振)	９，相生商店連盟サービス会
10，泉町国際通り睦会	11，広一商店会	12，糸ヤ通り友の会
13，長崎屋テナント会	14，その他（　　）	

Ｑ２　あなたの店の**主な取り扱い品目**あるいは業種について、該当する番号に１つだけ○印をつけてください。

１，衣料品	２，身の回り品〔注１〕	３，文化品〔注２〕	４，家庭用品〔注３〕
５，食料品	６，耐久品（家電・家具）	７，飲食・喫茶	８，サービス業〔注４〕
９，その他（　　）			

〔注１〕身の回り品（靴，履物，カバン，袋物，医薬品，化粧品，小間物，手芸材料，アクセサリー等）
〔注２〕文化品（書籍，文房具，玩具，カメラ，楽器，レコード・ＣＤ，時計，メガネ，貴金属，スポーツ用品，生花等）
〔注３〕家庭用品（金物，荒物，陶器等）
〔注４〕サービス業（娯楽，理美容，クリーニング，コピー，リース業，加工修理業等）

Ｑ３　あなたの店の**事業形態**について、該当する番号に１つだけ○印をつけてください。

１，個人　２，法人（会社，学校、医療、ＮＰＯ）　３，その他（　　）

Ｑ４　現在地でのあなたの店の**営業年数**について、該当する番号に１つだけ○印をつけてください。

１，3 年未満	２，3～5 年未満	３，5～10 年未満	４，10～20 年未満
５，20～30 年未満	６，30～40 年未満	７，40～50 年未満	８，50 年以上
９，その他（　　）			

Ｑ５　あなたの店の**営業時間**について記入し，定休日の曜日のすべてに○印をつけてください。

＿＿時 ＿＿分 ～ ＿＿時 ＿＿分	（例： 9 時 00 分～14 時 00 分）
＿＿時 ＿＿分 ～ ＿＿時 ＿＿分	（例：17 時 00 分～19 時 00 分 営業時間が分れている場合のみ）
定休日：　月，火，水，木，金，土，日	（定休日に○印をつけてください）

Ｑ６　あなたの店の**雇用従業員数**(パート・アルバイトを含む)について、該当する番号に１つだけ○印をつけてください。

１，雇用従業員はいない(家族のみ)	２，雇用者は 2 人以下	３，3～5 人以下
４，6～10 人以下	５，11 人以上	

〔注〕パート・アルバイトは実働 8 時間を 1 人として換算してください。(たとえば 4 時間なら 0,5 人など)

Ｑ７-1　あなたの店の**売場面積**について伺います。該当する番号に１つだけ○印をつけてください。

１，10 坪未満（32 ㎡）	２，20 坪未満（33～65 ㎡）	３，30 坪未満（66～98 ㎡）
４，40 坪未満（99～131 ㎡）	５，50 坪未満（132～164 ㎡）	
６，100 坪未満（165～329 ㎡）	７，100 坪以上（330 ㎡～）	８，その他（　　）

Ｑ７-2　あなたの店はあなたの**所有**ですか。該当する番号に１つだけ○印をつけてください。

１，土地も建物も自己所有	２，建物は（区分）自己所有
３，自己所有でない（賃貸やテナントなどの場合）	

Ｑ８　**あなたの年代**について、該当する番号に１つだけ○印をつけてください。

１，20 代	２，30 代	３，40 代	４，50 代	５，60 代	６，70 代以上

Ｑ９，あなたの**自宅**についてお伺いします。該当するものに○印を付けてください。

1，店舗と自宅が併用	2，市内に自宅がある	3，市外に自宅がある

Q10　あなたの店では**インターネットに繋がったパソコン**を使っていますか．該当する番号１つに○をつけてください．

1，使っている　　2，使っていない

Q11-1　あなたはあなたの**店の経営者ですか。**

1，はい　　2，いいえ

Q11-2　前問で「1、はい」とお答えの場合のみお尋ねします。
あなたの、**後継者**はいらっしゃいますか。該当する番号に1つだけ○印をつけてください。

1，後継者がいる　　2，後継者がいるが，後を継ぐかどうかはわからない 3，後継者はいない

＜あなたの店のお客様について伺います。＞

Q12　主たるお客様**（固定客）の居住する範囲**について、該当する番号に1つだけ○印をつけてください。

1，店まで徒歩5分くらいで来られる付近の町内　　2，店まで自転車やバイクで10分位で来られる市内　　3，自転車やバス・電車で30分位　　4，他の市内全域 5，隣接する市町村　　6，他の県内全域　　7，県外　　8，わからない

Q13　先週1週間の1日あたりの**購買客数**についてご記入ください。

1日あたり購買（買い上げ客数）は、約〔　　〕人

Q14　あなたが当店のお客様に対して**特に心掛けている点**は次のどれですか。該当番号すべてに○印をつけてください。

1，価格の安さ	2，商品の品質・鮮度の良さ
3，商品やサービスの品揃えの豊富さ	4，特定の商品やサービスに特化
5，商品知識の新しさ豊富さ	6，店のきれいさ
7，店の雰囲気	8，長い営業時間（早朝、深夜の営業）
9，客の駐車場の確保	10，接客態度の良さ
11，広告やチラシの活用	12，カードやスタンプなどの販促活動
13，固定客に合わせた店づくり	14、商店街との協力
15，その他（　　）	

＜あなたの所属する商店街についてお尋ねします。＞

Q15　あなたの店のある商店街は、買い物客を引きつける**魅力**があると思いますか。1つだけ○印をつけてください。

1，魅力は十分にある　　2，魅力が少しはある 3，魅力は少ない　　4，魅力はほとんどない

Q16　あなたの店のある**商店街の抱える主な問題点**はどれだと思いますか。該当番号すべてに○印をつけてください。

(1)　施設について：

1，駐車場がない	2，道路が狭隘で安全性に欠ける
3，アーケードなどの環境施設がない	4，トイレやベンチなどの休憩施設がない
5，来街吸引施設がない	6，店舗の老朽化
7，その他（　　）	

(2)　店舗構成について：

1，零細店が多い	2，空き店舗が目立つ

3，核となる店舗がない　　4，１か所で買えない（不足業種がある）
5，魅力ある個店が少ない　　6，入りにくい店が多い
7，その他（　　）

(3)　商店街の運営方針について：

1，共同売り出しが少ない　　2，イベントが少ない
3，ポイントなどの還元サービスがない　4，チラシ等の広告・宣伝が少ない
5，営業時間帯が短い　　6，定休日が不揃い
7，その他（　　）

(4)　その他

（　　）

Q17　**商店街の活性化の方針**として最も有望と思うものはどれですか。１つだけ○印をつけてください。

1，若者を対象とした商店街づくり　　2，高齢者を対象とした商店街づくり
3，子育て支援機能の充実した商店街づくり　4，観光客の立ち寄れる商店街づくり
5，環境対策を意識した商店街づくり　6，桐生の食（食材）を生かした商店街づくり
7，繊維を活用した市民参加型の商店街づく 8，地元企業との連携による商店街づくり
9，インターネットを生かした商店街づくり
10，イベント・お祭りによる集客を生かした商店街づくり
11，その他（　　）

Q18　あなたの**商店街を活発にするには**どうしたらよいと思いますか。あなたが参加・協力したいと思う番号すべてに○印をつけてください。

①イベント

1，季節に応じたバーゲンセール　2，産地直送市、朝市　3，フリーマーケット
4，イベントに合わせたセール　5，金曜・土曜夜市　6，各種行事、まつり
7，子供向けイベント　8，お年寄り向けイベント　9，福引き大会
10，合同大売り出し　11，スタンプ（カード）事業　12，情報誌・ミニコミ誌
13，その他（　　）

②施設環境整備

1，展示会などの展示会場　2，駐車場
3，共同トイレ　4，ポケットパーク[注1]，ベンチ・休憩所
5，緑地帯、花壇等　6，託児施設
7，子育て支援施設　8，多目的ホール、多目的広場
9，遊具・娯楽施設　10，高齢者のための施設
11，大型店誘致　12，ホームページ開設（パソコンで買物ができる）
13，経営者研修　14，先進地視察
15，シンポジウム・講演会　16，その他（　　）

［注 1］ポケットほどの小さな公園の意味で、都市生活の中での潤いや休憩のために整備された比較的小規模な空間のこと。

＜あなたの店の経営についてお尋ねします。＞

Q19　**３年前の経営状況に比較して**の変化として、該当するものをそれぞれ１つ選んで○印を付けてください。

売上高

1，10%以上の伸び　2，10%未満の伸び　3，変わらない
4，10%未満の減少　5，10%以上の減少

客　数

1，10%以上の伸び　　2，10%未満の伸び　　3，変わらない 4，10%未満の減少　　5，10%以上の減少

利　益

1，10%以上の伸び　　2，10%未満の伸び　　3，変わらない 4，10%未満の減少　　5，10%以上の減少

Q20　あなたの店の前期の**年間売上高**について伺います。該当する番号に１つだけ○印をつけてください。

1，1 千万円未満　2，1～2 千万円未満　　3，2～3 千万円未満　4，3～5 千万円未満 5，5～7 千万円未満　6，7 千万円～1 億円未満　7，1～3 億円未　　8，3～5 億円未満 9，5～7 億円未満　　10，7～10 億円未満　　11，10 億円以上

Q21　あなたの店には他店に負けない**個性的な商品**がありますか。該当する番号に１つだけ○印をつけてください。

1，ない　　2，開発中　　3，ある（商品名：　　）

Q22　あなたの店は、主に**どの層のお客様**を中心に品揃え等をしていますか。該当番号すべてに○印をつけてください。

1，10 代女性　2，20 代女性　3，30 代女性　　4，中年層(女性)　5，高齢層(女性) 6，10 代男性　7，20 代男性　8，30 代男性　　9，中年層(男性)　10，高齢層(男性) 11，その他（　　）

Q23　あなたの店が当面している**経営上の問題点**について伺います。該当番号**すべて**に○印をつけてください。

（1）外部経営環境について：

1，景気の低迷　　2，郊外型大型ＳＣ店の影響　　3，コンビニエンスストアの普及 4，同業店との競合　　5，インターネット販売等の普及 6，ディスカウントストアなどの普及　　7，高齢化の進展　　8，少子化の進展 9，桐生市の顧客吸引力の低下　10，来街者の減少　　11，その他（　　）

（2）内部経営環境について：

1，店舗の老朽化	2，品揃えの悩み	3，経営者の高齢化
4，後継者難	5，経営へのやる気や気力の低下	6，人手不足
7，客数の減少	8，客単価の減少	9，経費の増大
10，情報化への対応の遅れ	11，広告宣伝の不足	
12，駐車場・駐輪場の不足	13，その他（　　）	

Q24　あなたの店が今後、**取ろうとする経営方針**について、該当番号**すべて**に○印をつけてください。

(1) 営業規模について：

1，拡大	2，現状維持	3，縮小

(2) 店舗について：

1，独自の多店舗化	2，共同店舗化	3，増改築
4，現状維持	5，移転	6，撤退・廃業
7，フランチャイズあるいはボランタリーチェーンに加入する		

(3) 営業方針について：

1，専門店化	2，商品構成の多角化	3，ディスカウント化
4，外販の強化	5，接客の強化	6，仕入れ方法の改善・開拓
7，客層（ターゲット）の転換	8，営業時間の延長	9，インターネットの活用

(4) その他

（

）

Q25　**商店街の活性化**に関して、ご意見や要望等がありましたらご記入ください。

ご協力ありがとうございました。
できれば、次の別紙もお答えください。

桐生市商店経営実態調査　調査用紙 別紙

2009 年２月

この用紙にご記入戴けた場合、この用紙も、**ここまでの回答用紙と一緒に封筒に入れて**返送いただいても結構です。しかし、ここまでの調査の匿名性を確保するため、この回答用紙 別紙だけを別にして、以下の電話番号に**ＦＡＸしてくださっても結構**です。

ＦＡＸ先：
群馬大学工学部　地域力による脱温暖化と未来の街－桐生の構築プロジェクト事務局

ＦＡＸ電話番号：0277-30-1508

問１　本プロジェクトでは、今後、桐生市の商店街活性化のため、来街者と商店の間での情報共有実験を計画しています。このような実験に興味をお持ちでしょうか。

１，実験に参加したい　２，興味はあるので結果を知りたい　３，関心はない

問２　最後に、差支えなければご氏名とご住所をお教えください。本調査の結果など、本プロジェクトに関連した情報を提供させていただきます。

ご氏名　＿＿＿＿＿＿＿＿＿＿＿＿＿＿店名＿＿＿＿＿＿＿＿＿＿＿＿
ご住所　〒＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿
電子メールアドレス：＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

Ⅱ．桐生市民のお買物調査

2012 年 11 月

実 施 機 関：群馬大学工学部　地域力による脱温暖化と未来の街ー桐生の構築プロジェクト
実施協力機関：桐生市

この調査は、**コンパクトシティ桐生の中の 便利で魅力的な商店・商店街づくり**のため、群馬大学工学部の上記プロジェクトが桐生市にお住みの皆様にお買物等についてお尋ねするものです。本調査票は**桐生市役所の協力を得て、桐生市民からの無作為抽出で**送付させていただきました。調査結果は匿名での分析にのみ使わせていただきます。お忙しいところ恐縮ではございますがご協力くださいますようお願い申し上げます。

なお、各ご家庭で**普段の買物をされている方**が、記入していただきますようお願いします。ご記入いただいたこの用紙は、返信用封筒に入れて **11 月末日までに**ポストに投函をお願い致します。

問合せ先　群馬大学工学部　地域力による脱温暖化と未来の街ー桐生の構築プロジェクト 事務局
電話 & FAX：0277-30-1508、　電子メール：co2pj@ml.gunma-u.ac.jp

問１　あなたとご家族についてお尋ねします。あなたが外出の際に**利用することのある最寄り駅やバス路線**があれば、その駅名・バス路線名に〇をつけてください。その他の場合駅名も記入ください。（複数回答可）

JR 両毛線　1, 桐生駅　2, 岩宿駅　3, 小俣駅　4, その他の駅＿＿＿＿

東武鉄道　5, 新桐生駅　6, 相老駅　7, 赤城駅　8, 足利市駅　9, その他の駅＿＿＿＿

上毛電鉄　10, 西桐生駅　11, 新里駅　12, その他の駅＿＿＿＿

わたらせ渓谷鉄道　13, 桐生駅　14, 相老駅　15, 運動公園駅　16, その他の駅＿＿＿＿

バス　1, 梅田線　2, 川内線　3, 広沢線　4, 境野線　5, 新桐生駅～桐生女子高線　6, 菱線
7, 相生線　8, 新里町デマンドタクシー　9, 黒保根町路線バス　10, その他＿＿＿＿

問２　ご家族の**通勤**(パートを含む)や**通学・通院**のようすについて伺います。

① 同居されている**ご家族はあなたを含めて何人**でしょうか？　＿＿＿＿ 人
② あなたとあなたのご家族で所有している**マイカー**は**何台**ですか。　＿＿＿＿ 台
③ あなたを含む家族の内で**高校生以上の方**について伺います。それぞれの方の通勤・通学・通院での交通利用のうち、**最も主なもの**について以下にご記入ください。

	性別 〇をしてください	**年齢** 数字を入れてください	**通う場所** 通勤通学通院している場合、通い先の所在地の市町村名、住所を**わかる範囲で**結構ですのでお答えください	**頻度** **1 週間に**普通、何回ですか？	**利用交通手段** 普通、利用している交通手段のすべてについて、番号に〇をしてください	**普通自動車免許**をお持ちですか？
例	1, 男 ②, 女	35才	桐生 市 天神 町 1 (丁目)・字 5 番地	5 回	① 自転車 2, バイク 3, 車 ④ バス 5, 電車 ⑥, 徒歩	(はい) いいえ
あなた	1, 男 2, 女	＿＿才	＿＿市＿＿町 ＿＿丁目・字＿＿番地	＿＿回	1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩	はい いいえ
2.	1, 男 2, 女	＿＿才	＿＿市＿＿町 ＿＿丁目・字＿＿番地	＿＿回	1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩	はい いいえ
3.	1, 男 2, 女	＿＿才	＿＿市＿＿町 ＿＿丁目・字＿＿番地	＿＿回	1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩	はい いいえ
4.	1, 男 2, 女	＿＿才	＿＿市＿＿町 ＿＿丁目・字＿＿番地	＿＿回	1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩	はい いいえ
5.	1, 男 2, 女	＿＿才	＿＿市＿＿町 ＿＿丁目・字＿＿番地	＿＿回	1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩	はい いいえ

問３　あなたが**この１か月の間に**買い物した場所について、例にならって下の表の質問にお答ください。

		問① 以下のお店のうち、買い物へ行った場所を（丸で）**囲んでください。** （ ）内に複数の店舗がある場合には、**そのうち最も利用する店舗に**（丸を）してください。そのあと、丸で囲んだ行について、右側の問いにお答えください。その他、場所が分かれば（ ）内に記載ください。	**問② そこへは、この1か月の間に何回出かけましたか？ まず、行った回数を書いてください。次にそれらのお買物での目的の全てに○をつけてください。**													**問③** **その場所に行くのに、普段、どんな交通手段を使いますか？** **最も普通の行き方で使う手段のすべてに○を付けてください。**
			行った回数	食品全般	日用雑貨品	くすり・化粧品	実用衣料品・肌着	おしゃれ着	アクセサリー・靴・バッグ類	ビデオソフト・CD・本	家庭用電化品	贈答品	飲食（外食）	ウインドーショッピング	イベント・催し物	その他	
例	A 商店街		5	○	○		○								○		1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
例	●●●●																1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
例	×××（○○店、△△店、□□店）		8	○	○		○	○	○			○			○		1, 自転車 2, バイク（3）車 4, バス 5, 電車 6, 徒歩
市内商店街	本町通りの商店街 や 末広通りの商店街																1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
市内商店街	その他の 商店 ・ 商店街（ ）																1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
近隣大型小売店	MEGAドン・キホーテ桐生店 ［ 旧 長崎屋桐生店 ］																1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
近隣大型小売店	フレッセイ（ 新桐生店・天神店 ・ 桐生南店 ）																1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
近隣大型小売店	アバンセ（ 浜松町店・川内店 ・ 新里店）																1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
近隣大型小売店	フジマート（ 大間々店 ・広沢店 ）																1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
近隣大型小売店	コープ 東久方店																1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
近隣大型小売店	Aコープ（ 広沢店 ・ 笠懸店 ）																1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
近隣大型小売店	ベイシア （ 大間々店 ・桐生境野店 ・ 新里店 ）																1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
近隣大型小売店	とりせん（ 大間々店 ・笠懸店 ）																1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
近隣大型小売店	ヤオコー（ 相生店［桐生マーケットシティ］ ・ 境野店 ）																1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
近隣大型小売店	アピタ笠懸店																1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
近隣大型小売店	さくらもーる 大間々店																1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
近隣大型小売店	カインズホーム（笠懸店・桐生梅田店・桐生広沢店）																1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
近隣大型小売店	セキチュー（ 桐生南店 ・大間々店 ）																1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩

この１か月に、訪れなかった場所の行は、

問３のつづき

	問① 以下のお店のうち、買い物へ行った場所を（丸で）囲んでください。 ( )内に複数の店舗がある場合には、そのうち最も利用する店舗に 丸を してください。 そのあと（丸で）囲んだ行について、右側の問いにお答えください。その他、場所が分かれば( )内に記載ください。	問② そこへは、この1か月の間に何回出かけましたか？ まず、行った回数を書いてください。 次にそれらのお買物での目的の全てに○をつけてください。														問③ その場所に行くのに、普段、どんな交通手段を使いますか？ 最も普通の行き方で使う手段のすべてに○を付けてください。
		行った回数	一般食品	日用雑貨品	くすり・化粧品	実用衣料品・肌着	おしゃれ着	アクセサリー・靴・バッグ類	ビデオソフト・CD・本	家庭用電化品	贈答品	飲食（外食）	ウインドーショッピング	イベント・催し物	その他	
近隣大型小売店	ヤマダ電機 テックランド New みどり店															1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
	コジマ NEW 桐生店															1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
	ケーズデンキ みどり本店															1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
	ファミリーブック(桐生東店・広沢店・ 新里店・ 笠懸店・大間々店)															1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
	その他の近隣大型小売店 ( )															1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
郊外型大型ショッピングセ	太田 イオン															1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
	足利 コムファースト															1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
	スマーク 伊勢崎															1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
	けやきウォーク 前橋															1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
	高崎 イオン															1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
その他	前橋市内 ( )															1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
	高崎市内 ( )															1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
	足利市内 ( )															1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
	( )															1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
	( )															1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
	自宅から最寄りのコンビニエンスストア															1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
その他の県外 (東京・横浜・＿＿＿＿＿＿)																1, 自転車 2, バイク 3, 車 4, バス 5, 電車 6, 徒歩
商品の宅配・通信販売（電話 ・ FAX ・ インターネット）																左の回数は、購入を申し込んだ回数をお答えください

次頁に続く

問４　次のお店(商店街)にお買いものに行くかどうかを考えるとき、**そのお店を選ぶポイント**に○を、**それが問題でそのお店を選ばないポイント**には×をつけてください。主なものだけで結構です。

		お買いものに行くかどうか考えるとき注目するポイント	本町通り・末広町通り商店街	ドン・キホーテなど 近隣大型小売店	太田イオンなど郊外型大型ショッピングセンター
例		△△△△	○		×
1	商品について	商品の品揃えが豊富			
2		商品を探しやすい			
3		1ヶ所ですべてが買物できる			
4		好きな商品・ブランドがある			
5		商品の品質(鮮度)、センスが良い			
6		価格が安い			
7	お店について	店がきれいで雰囲気が良い			
8		古くからの馴染みだから			
9		お店が有名だから			
10		お店の個性が好き			
11		従業員の接客態度が良い			
12		店員の商品知識が豊富			
13		アフターサービスがよい			
14		商品を配達してくれる			
15		夜遅くまで営業している			
16	交通について	近くて便利			
17		駐車場が便利			
18		バスなどの足が便利			
19	快適さ	子供が遊ぶ場所がある			
20		近隣の公共施設を利用しやすい			
21		金融機関(ATM 含む)を利用しやすい			
22		食事や休憩をする場所がある			
23	広告催しなど	広告・チラシが魅力的			
24		催物の開催が魅力的			
25		そこのシールやスタンプを集めている			
26	その他	（　　）			

問５　群馬大学での CO_2 削減プロジェクトで進めている**以下の取り組みをご存知ですか**。ご存じのものに○をつけてください。

1，電動バス(MAYU：右上写真)の運行　2，子供地元探検隊
3，竹垣・もくべえ　4，地元学(梅田地区、商店街)調査
5，レンタサイクルの推奨　6，マイクロＥＶ(右下写真)の実験

問６　あなたは、**この一ヵ月に何回**ぐらい**桐生市中心市街地** (本町、末広町、錦町、市役所周辺、桐生厚生総合病院、JR 桐生駅などを含む) に行きましたか?

1，ほぼ毎日　2，週 4～5 回　3，週 2～3 回　4，数回　5，1 回程度
6，行かなかった　7，中心街に住んでいる

問７　桐生市の**公共交通**と**街**を魅力あるものにするために、ご意見があれば是非ご記入ください。

御協力ありがとうございました。

Ⅲ． 外食に関する口コミのアンケート(2 回目)

（情報工学科
3年生用）
2009 年 7 月

JSTプロジェクト **地域力による脱温暖化と未来の街―桐生の構築**

商店街活性化WG　関、高娃、小嶋

この調査は、コンパクトシティ桐生を目指す表記JSTプロジェクトの一環として、授業担当の先生の協力を得て行うものです。以下では、個人名の入った質問がありますが、回答いただいた内容は、個人を特定できない形にして利用しますので、安心して、回答してください。ご協力のほど、よろしくお願いいたします。

あなたの学籍番号:＿＿＿＿＿＿＿＿＿＿＿＿　男・女

1、 あなたの食事の方法について伺います。大学で授業がある平日には食事をどうしていますか。大体の割合を**整数**でお答え下さい。

	自炊/自宅で（持参する弁当を含む）	購入した弁当	大学生協（食堂や桐園）	学外の飲食店	食べない	その他（　）	その他（　）
昼食	割	割	割	割	割	割	割
夕食	割	割	割	割	割	割	割

2、 **学内外**での食事について学生同士で話(口頭・メール)をした機会について伺います。この一週間の間での会話について、思い出して回答ください。以下に、3年生の名前があげてあります。この中から、この一週間の間に、宴会を除き、学内外の飲食店についてや、食事をするのにどこに行こうかなどを話した/メールしたことのある人を見つけて番号に○をつけてください。

1,＊＊　2,＊＊　3,＊＊　4,＊＊　5,＊＊　6,＊＊　7,＊＊　8,＊＊　9,＊＊　10,＊＊　11,＊＊
12,＊＊　13,＊＊　14,＊＊　15,＊＊　16,＊＊　17,＊＊　18,＊＊　19,＊＊　20,＊＊　21,＊＊
22,＊＊　23,＊＊　24,＊＊　25,＊＊　26,＊＊　27,＊＊　28,＊＊　29,＊＊　30,＊＊　31,＊＊
32,＊＊　33,＊＊　34,＊＊　35,＊＊　36,＊＊　37,＊＊　38,＊＊　39,＊＊　40,＊＊　41,＊＊
42,＊＊　43,＊＊　44,＊＊　45,＊＊　46,＊＊　47,＊＊　48,＊＊　49,＊＊50,＊＊　51,＊＊
52,＊＊　53,＊＊　54,＊＊　55,＊＊　56,＊＊　57,＊＊　58,＊＊　59,＊＊　60,＊＊　61,＊＊
62,＊＊　63,＊＊　64,＊＊　65,＊＊　66,＊＊　67,＊＊　68,＊＊　69,＊＊　70,＊＊　71,＊＊
72,＊＊　73,＊＊　74,＊＊　75,＊＊　76,＊＊　77,＊＊　78,＊＊　79,＊＊　80,＊＊　81,＊＊
82,＊＊　83,＊＊　84,＊＊　85,＊＊　86,＊＊

3、 **裏になります。ご記入お願いします。**

4、 あなたについて伺います。以下についてお答ください。選択肢がある場合は番号に○を付けてください。下線があるときは文字で記入してください。

(1)	現在のお住まいはどちらでしょうか？	＿＿＿＿市　＿＿＿＿(町)＿＿＿＿丁目
	それは、下宿ですか、それとも、自宅ですか。	1,下宿　2,自宅　3,その他
	そこには何年間住んでいますか？	＿＿＿＿年間
(2)	自分の自由に使える車をお持ちですか？	1,はい　2,いいえ
	その車はどのような用途で使っていますか？使っているものすべてに○を付けてください。	1,通学　2,レジャー　3,アルバイト　4,部活 5,買物 6,その他 （　）

(3)	E メールは1日に何通くらい出しますか？	1, 携帯電話で＿＿通　　2,PC環境で＿＿通
	WEB に1日何時間ぐらいアクセスしていますか？	1, 携帯電話で＿＿時間 2,PC環境で＿＿時間
(4)	新しいお店で外食しようと思ったとき、まず、何を調べますか？もっとも頼りにしている方法を一つだけお答えください。	1,WEB 検索　2,友人間の口コミ 3,地図やパンフレット 4,その他（　　）
(5)	本町5丁目の”芭蕉”という店はご存知ですか？	1,知らない　2,知ってはいる 3,行ったことがある
	2，3を選んだ人のみ、その知る方法は	1,友人間の口コミ　2,街中授業　3,その他 （　　）

以上です。ご協力ありがとうございました。

3、 上の会話などで話題になった**学外**の飲食店があれば、その店名を教えてください。前回の調査でよく行かれる店の名前が書いてありますが、当てはまるところの番号に〇をつけてください。下にない場合は、空欄の所にご記入お願いします。ご記入の場合は、場所を裏面の地図に、番号で記入してください。

1. 一生　2. ペーパームーン　3. てんてん　4. アライやきそば　5. せば巣　6. ホットモット
7. もん吉　8. ひょうたん　9. 第一富士　10. 遊民舎　11.藤屋　12.芭蕉　13.ヤプー　14.マック
15.デニーズ　16.吉野家　17.おおとら　18.ガスト 19.サイゼリヤ　20.すきや 21.ジョイフル　22.牛角　23.スタミナ太郎

25、_____　26、_____　27、_____　28、_____

29、_____　30、_____　31、_____　32、_____

以上