IOSR Journal of Business and Management (IOSR-JBM)
e-ISSN: 2278-487X, p-ISSN: 2319-7668. Volume 21, Issue 5. Ser. IX (May. 2019), PP 43-56
www.iosrjournals.org

Bayesian Network Analysis with Odds Ratio for the Questionnaire Investigation on Tourists' Behavior under the View Point of Service Marketing

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Abstract: *Tourists from abroad are increasing rapidly in Japan. Kawazu town in Izu Peninsula is famous for its cherry trees. In the cherry blossom season, many tourists visit this town. The Kawazu Cherry Blossom Festival was carried out in February 2015. Our research investigation was performed during that period. In this paper, a questionnaire investigation is executed in order to clarify tourists' behavior, and to seek the possibility of developing regional collaboration among local government, tourism related industry and visitors. In this research, we construct the model utilizing Bayesian Network and causal relationship is sequentially chained by the characteristics of travelers, an objective to visit Izu Peninsula in Japan and the main occasion to visit them. We analyzed them by sensitivity analysis and odds ratio is calculated to the results of sensitivity analysis in order to obtain much clearer results. These are utilized for constructing a much more effective and useful tourism service. This analysis is well utilized in designing the strategy of service marketing for this. To confirm the findings by utilizing the new consecutive visiting records would be the future works to be investigated.*

Key Words*: Tourism, Izu Peninsula, Kawazu Cherry Tree, Bayesian Network, Service Marketing, odds ratio*

Date of Submission: 16-05-2019 Date of acceptance: 01-06-2019

I. Introduction

In recent years in Japan, the national and local governments have been trying to attract foreign tourists by using strategic approaches and developing tourist facilities, with the aim of promoting regional exchange and generating economic benefits. Particular aims of local government are to overcome the common problems of an aging population and declining birthrate through tourism-generated income and to stimulate the local society through regional exchange and migration.

However, in order to take measures that will increase tourism, it is necessary to understand the attraction of particular regions in Japan, as well as the resources they offer to tourists. Moreover, it is necessary to have a picture of the tourists that might want to such regions.

Although it is useful to have an understanding of an issue at a given time and under specific social conditions, it is difficult to analyze chronological changes or cross-regional trends statistically. It is standard practice to design a survey such that it permits examination of the statistics for a given region over time, but in order to investigate solutions to problems shared across regions it is necessary to carefully examine the critical basic data as well as appropriate methods of data collection.

To try to obtain such data, preceding studies on tourist destinations that have statistically analyzed trends in tourist behavior will now be reviewed.

Yoshida et al. designed and conducted a visitor survey on the spot, which used a questionnaire to investigate the activities of visitors to the Ueno district in Taito ward, Tokyo. Doi et al. analyzed the image of the Izu Peninsula as a tourist destination in their 2003 study "Questionnaire Survey on the Izu Peninsula." Kano conducted tourist behavior studies in Atami city in 2008, 2009, 2014 and in other years.

In this paper, a questionnaire investigation was executed in Kawazu town in February 2015, which was conducted to coincide with events on the Izu Peninsula featuring flowers; the Kawazu Sakura Festival (Feb-Mar), and ways that regions can collaborate to carry out surveys of tourist behavior was also performed.

This survey of tourist behavior was carried out in February 2015, during the Kawazu Cherry Blossom Festival. Given the geographical peculiarities of Kawazu town and its relative lack of accommodation facilities, some of the survey personnel were located also at Izukyu-Inatori Station and Izukyu-Shimoda Station. On the first day of the survey, the weather was good, while on the second it was raining.

The 25th Kawazu Cherry Blossom Festival was held from February 10 to March 10, 2015. It was attended by 801,330 people, which was an increase of 9% over the previous year.

On the first day of the survey, 30-50% of the flowers were in bloom, and the nighttime illuminations lit up on the evening of the 21st. According to the figures of the Kawazu town Tourist Association, there were 30,590 visitors on the 21st and 20,913 visitors on the 22nd.

During the Kawazu Cherry Blossom Festival, around 150 stores were offering food & drink or souvenirs on the road with the row of cherry trees linked to Kawazu Station. A number of events were held during the festival, including the "Semi Gourmet" and "Izu no Odoriko Photography Event."

In recent years, the Bayesian network is highlighted because it has the following good characteristics (Neapolitan, 2004).

- Structural Equation Modeling requires normal distribution to the data in the analysis. Therefore, it has a limitation in making analysis, but the Bayesian network does not require a specific distribution type to the data. It can handle any distribution type.
- It can handle the data which include partial data.
- Expert's know-how can be reflected in building a Bayesian Network model.
- Sensitivity analysis can be easily performed by settling evidence. We can estimate and predict the prospective purchaser by that analysis.
- It is a probability model having a network structure. Related items are connected with directional link. Therefore, understanding becomes easy by its visual chart.

The field of service marketing generally handles the shapeless products.
Therefore it is often the case that it is hard to catch the influence to consumers.
Bayesian Network analysis enables to visualize the relationship and/or influence of shapeless products to consumers which is the field of service marketing.
These are also applied to service engineering.

In this paper, a questionnaire investigation is executed in order to clarify tourists' behavior, and to seek the possibility of developing regional collaboration among local government, tourism related industry and visitors. These are analyzed by using Bayesian Network. We analyzed them by sensitivity analysis and odds ratio is calculated to the results of sensitivity analysis in order to obtain much clearer results. The analysis utilizing Bayesian Network enabled us to visualize the causal relationship among items. Furthermore, sensitivity analysis brought us estimating and predicting the prospective visitors.

These are utilized for constructing a much more effective and useful tourism service. This analysis is well utilized in designing the strategy of service marketing for this.

The rest of the paper is organized as follows. Outline of questionnaire investigation is stated in section 2. In section 3, Bayesian Network analysis is executed which is followed by the sensitivity analysis in section 4. Conclusion is stated in section 5.

II. Outline And The Basic Statistical Results Of The Questionnaire Research

2.1 Outline of the Questionnaire Research

We make a questionnaire investigation on tourists' behavior who has visited Izu Peninsula and is studied mainly at Kawazu town in Shizuoka Prefecture. Kawazu town is famous for its cherry trees. The outline of questionnaire research is as follows. Questionnaire sheet is attached in Appendix 1.

(1)	Scope of investigation	:	Tourists who have visited Kawazu town in Shizuoka Prefecture, Japan
(2)	Period	:	February 21,22/ 2015
(3)	Method	:	Local site, Dispatch sheet, Self writing
(4)	Collection	:	Number of distribution 500 Number of collection 478(collection rate 95.6%) Valid answer 478

- **Basic Statistical Results**
  Now, we show the main summary results by single variable.

- **Characteristics of answers (Q4)**
- Sex (Q2)

Male 37.24%, Female 59.83%, (Not filled in 2.93%)

- Age (Q3)

10^{th} 2.51%, 20^{th} 14.23%, 30^{th} 12.76%, 40^{th} 13.18%, 50^{th} 18.41%, 60^{th} 17.78%, More than 70 8.37%, (Not filled in 12.76%)

- Occupation (Q4)

Independents 3.77%, Office worker 48.74%, Student 4.81%, Housewife 16.53%, No job 12.13% Miscellaneous 1.26%, (Not filled in 12.76%)

- Residence (Q1)

Tokyou 28.16%, Kanagawa 22.15%, Shizuoka 10.35%, Saitama 10.14%, Chiba 6.63%, Aichi 2.48%, Tochigi 2.48%, Ibaraki 1.86%, Gunma 1.24%, Yamanashi 1.24%, Osaka 0.83%, Nagano 0.83%, Gifu 0.62%, Fukushima 0.62%, Miyagi0.62%, Else

- Fellow travelers (Q5)

Solo trip 3.35%, Couple 34.31%, Family 28.45%, Male's small group 3.77%, Female's small group 12.76%, Male and female's small group 7.95%, Group（More than 7） 7.53%, Miscellaneous 0.42%, (Not filled in 1.46%)

Figure 1. Fellow travelers

(6) Visiting frequency to Izu Peninsula and Kawazu Cherry Tree：

Izu Peninsula＝①First time 18.62% ②Second times 11.09% ③Third times 9.83% ④Fourth times 5.86% ⑤Fifth～Nine times 15.90% ⑥More than ten times 37.66%, (Not filled in 1.05%)

Kawazu Cherry Tree ＝①First time 48.95% ②Second times 16.53% ③Third times 10.46% ④Fourth times 4.60% ⑤Fifth～Nine times 6.07% ⑥More than ten times 7.74% ⑦Has not been there 3.97%, (Not filled in 3.97%)

Figure 2. Main occasion to visit to Izu Peninsula

Figure 3. An objective to Izu peninsula

III. Bayesian Network Analysis

In constructing Bayesian Network, it is required to check the causal relationship among groups of items. Based on this, a model is built as is shown in Figure 1.

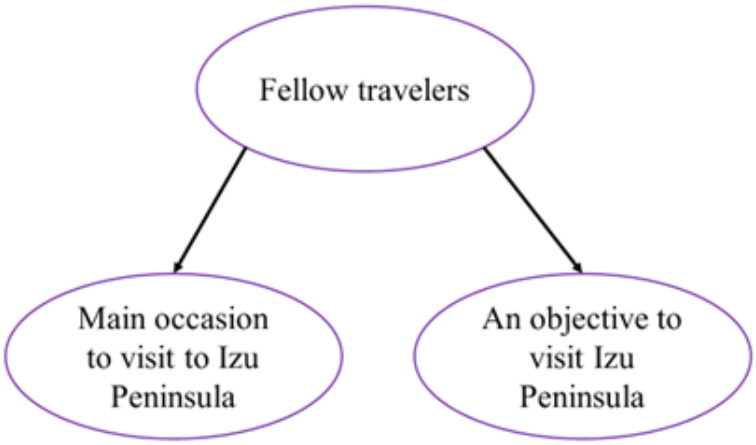

Figure 4. A Built Model

We used BAYONET software (http://www.msi.co.jp/BAYONET/). When plural nodes exist in the same group, it occurs that causal relationship is hard to set a priori. In that case, BAYONET system set the sequence automatically utilizing AIC standard.

IV. Sensitivity Analysis

Now, posterior probability is calculated by setting evidence as, for example, 1.0. Comparing Prior probability and Posterior probability, we can seek the change and confirm the preference for tourism. We set evidence to all parameters. Therefore the analysis volume becomes too large. In this paper, we pick up half of the total cases and make analysis. Nodes we analyze here are "Fellow travelers", "Main occasion to visit Izu Peninsula" and "An objective to visit Izu Peninsula". We prepare another paper for the latter half.

As stated above, we set evidence for each parameter, and the calculated posterior probability is exhibited in Appendix 2 which includes the calculation results of odds ratio.

Here, we classify each item by the strength of the odds ratio.

・Very Strong (+++): Select major parameter of which the odds ratio is more than 10.0
・Strong (++): Select major parameter of which the odds ratio is more than 6.0
・Medium (+): Select major parameter of which the odds ratio is more than 4.0
・Weak: Else
Now we examine each for Very Strong, Strong and Medium case.

4.1 Sensitivity Analysis for "Fellow travelers"
(1) Setting evidence to "Solo trip"
After setting evidence to "Solo trip", the result is exhibited in Table 1.

Table 1 Setting evidence to "Solo trip" case

Newspaper ad	+++
Magazine	+
Online lodging reservation site	++
Internet	+++
Budget	+++
Historic landmark, Literature monument, Construction	+++
Sightseeing facilities	++
Gallery, Museum	+++
Experience-based tourism	+++
Park	+++

We can observe that those who make Solo trip had come by the occasion of "**Newspaper ad**", "Magazine", "Online lodging reservation site" or "**Internet**" with an objective of visiting "**(suitable) Budget**", "**Historic landmark, Literature monument, Construction",** "Sightseeing facilities", **"Gallery, Museum"**, "**Experience-based tourism**" or "**Park**".
(Very Strong part is indicated by bold character and Strong is indicated by italic.)
(2) Setting evidence to "Couple"
After setting evidence to "Couple", the result is exhibited in Table 2.

Table 2 Setting evidence to "Couple" case

Newspaper ad	+

We can observe that those who are Couple had come by the occasion of "Newspaper ad".
(3) Setting evidence to "Family"
There were only weak items.
(4) Setting evidence to "Male's small group"
After setting evidence to "Male's small group", the result is exhibited in Table 3.

Table 3 Setting evidence to "Male's small group" case

Newspaper ad	+++
Online lodging reservation site	+
Stroll around town, Eating tour	++
Budget	+++
Convenience of traffic	++
Historic landmark, Literature monument, Construction	+++
Sightseeing facilities	++
Gallery, Museum	+++
Experience-based tourism	+++
Park	+++

We can observe that those who are Male's small group had come by the occasion of "**Newspaper ad**" or "Online lodging reservation site" with an objective of visiting "**Stroll around town, Eating tour", "(suitable)Budget",** "Convenience of traffic", **"Historic landmark, Literature monument, Construction",** "Sightseeing facilities", **"Gallery, Museum", "Experience-based tourism"** or **"Park**".

- Setting evidence to "Female's small group"

After setting evidence to "Male's small group", the result is exhibited in Table 4.

Table 4 Setting evidence to "Female's small group" case

Newspaper ad	＋
Budget	＋＋
Gallery, Museum	＋＋
Experience-based tourism	＋
Park	＋

We can observe that those who are Female's small group had come by the occasion of "Newspaper ad" with an objective of visiting "(suitable)Budget", "Gallery, Museum", "Experience-based tourism" or "Park".

(6) Setting evidence to "Male and female's small group"

After setting evidence to "Male's small group", the result is exhibited in Table 5.

Table 5 Setting evidence to "Male and female's small group" case

Newspaper ad	＋
Budget	＋＋＋
Gallery, Museum	＋＋＋
Experience-based tourism	＋
Park	＋

We can observe that those who are Male and female's small group had come by the occasion of "Newspaper ad" with an objective of visiting "**(suitable)Budget**", "**Gallery, Museum**", "Experience-based tourism" or "Park".

(7) Setting evidence to "Group（More than 7）"

After setting evidence to "Group（More than 7）", the result is exhibited in Table 6.

Table 6 Setting evidence to "Group（More than 7）" case

Newspaper ad	＋＋
Magazine	＋
Budget	＋＋＋
Gallery, Museum	＋＋＋
Experience-based tourism	＋＋
Park	＋＋

We can observe that those who are Group（More than 7） had come by the occasion of "Newspaper ad" or "Magazine" with an objective of visiting "**(suitable)Budget**", "**Gallery, Museum**", "Experience-based tourism" or "Park".

4.2 Sensitivity Analysis for "Main occasion to visit to Izu Peninsula"

(1) Setting Evidence to "Poster"

After setting evidence to "Poster", the result is exhibited in Table 7.

Table 7 Setting evidence to "Poster" case

Newspaper ad	＋
Budget	＋＋
Gallery, Museum	＋＋
Experience-based tourism	＋
Park	＋

We can observe that those who put main occasion to visit to Izu Peninsula as Poster had come by the occasion of "Newspaper ad" with an objective of visiting "(suitable)Budget", "Gallery, Museum", "Experience-based tourism" or "Park".

(2) Setting Evidence to "Brochure by tour company"

After setting evidence to "Brochure by tour company", the result is exhibited in Table 8.

Table 8 Setting evidence to "Brochure by tour company" case

Newspaper ad	＋
Budget	＋＋＋
Gallery, Museum	＋＋＋
Experience-based tourism	＋
Park	＋

We can observe that those who put main occasion to visit to Izu Peninsula as Brochure by tour company had come by the occasion of "Newspaper ad" with an objective of visiting "**(suitable)Budget**", "**Gallery, Museum**", "Experience-based tourism" or "Park".

(3) Setting evidence to "TV program"
After setting evidence to "TV program", the result is exhibited in Table 9.

Table 9 Setting evidence to "Male's small group" case

Newspaper ad	+
Budget	++
Gallery, Museum	++
Experience-based tourism	+
Park	+

We can observe that those who put main occasion to visit to Izu Peninsula as TV program had come by the occasion of "Newspaper ad" with an objective of visiting "(suitable)Budget", "Gallery, Museum", "Experience-based tourism" or "Park".

(4) Setting Evidence to "Newspaper ad"
After setting evidence to "Newspaper ad", the result is exhibited in Table 10.

Table 10 Setting evidence to "Newspaper ad" case

Solo trip	+
Online lodging reservation site	+
Budget	+++
Historic landmark, Literature monument, Construction	+
Gallery, Museum	+++
Experience-based tourism	++
Park	++

We can observe that "Those who put main occasion to visit to Izu Peninsula as Newspaper ad had come by "Solo trip" under the occasion of "Online lodging reservation site" with an objective of visiting "**(suitable)Budget**", "Historic landmark, Literature monument, Construction", "**Gallery, Museum**", "Experience-based tourism" or "Park".

(5) Setting Evidence to "Magazine"
After setting evidence to "Magazine", the result is exhibited in Table 11.

Table 11 Setting evidence to "Magazine" case

Newspaper ad	++
Budget	+++
Gallery, Museum	+++
Experience-based tourism	++
Park	++

We can observe that those who put main occasion to visit to Izu Peninsula as Tour package for Kawazu Cherry Tree by tour company had come by the occasion of "Newspaper ad" with an objective of visiting "**(suitable)Budget**", "**Gallery, Museum**", "Experience-based tourism" or "Park".

(6) Setting Evidence to "Tour package for Kawazu Cherry Tree"
After setting evidence to "Tour package for Kawazu Cherry Tree", the result is exhibited in Table 12.

Table 12 Setting evidence to "Tour package for Kawazu Cherry Tree" case

Newspaper ad	+
Budget	+++
Gallery, Museum	+++
Experience-based tourism	+
Park	+

We can observe that those who put main occasion to visit to Izu Peninsula as Tour package for Kawazu Cherry Tree by tour company had come by the occasion of "Newspaper ad" with an objective of visiting "**(suitable)Budget**", "**Gallery, Museum**", "Experience-based tourism" or "Park".

(7) Setting Evidence to "Online lodging reservation site"
After setting evidence to "Online lodging reservation site", the result is exhibited in Table 13.

Table 13 Setting evidence to "Online lodging reservation site" case

Newspaper ad	++
Budget	+++
Gallery, Museum	+++
Experience-based tourism	++
Park	++

We can observe that "Those who put main occasion to visit to Izu Peninsula as Online lodging reservation site had come by the occasion of "Newspaper ad" with an objective of visiting **"(suitable)Budget**", "**Gallery, Museum**", "Experience-based tourism" or "Park".

(8) Setting Evidence to "Internet"
After setting evidence to "Internet", the result is exhibited in Table 14.

Table 14 Setting evidence to "Internet" case

Solo trip	+
Newspaper ad	++
Budget	+++
Gallery, Museum	+++
Experience-based tourism	+
Park	+

We can observe that those who put main occasion to visit to Izu Peninsula as Internet had come by Solo trip by the occasion of "Newspaper ad" with an objective of visiting "**(suitable)Budget**", "**Gallery, Museum**", "Experience-based tourism" or "Park".

(9) Setting Evidence to "Advice by family, acquaintance"
After setting evidence to "Advice by family, acquaintance", the result is exhibited in Table 15.

Table 15 Setting evidence to "Advice by family, acquaintance" case

Newspaper ad	+
Magazine	+
Budget	+++
Gallery, Museum	+++
Experience-based tourism	+
Park	+

We can observe that those who put main occasion to visit to Izu Peninsula as Advice by family, acquaintance had come by the occasion of "Newspaper ad" or "Magazine" with an objective of visiting "**(suitable)Budget**", "**Gallery, Museum**", "Experience-based tourism" or "Park".

(10) Setting Evidence to "Felt good at the previous visit"
After setting evidence to "Felt good at the previous visit", the result is exhibited in Table 16.

Table 16 Setting evidence to "Felt good at the previous visit" case

Newspaper ad	+
Budget	++
Gallery, Museum	++
Park	+

We can observe that those who put main occasion to visit to Izu Peninsula as Felt good at the previous visit had come by the occasion of "Newspaper ad" with an objective of visiting "(suitable)Budget", "Gallery, Museum", or "Park".

V. Conclusion

In this paper, a questionnaire investigation is executed in order to clarify tourists' behavior, and to seek the possibility of developing regional collaboration among local government, tourism related industry and visitors. This survey of tourist behavior was carried out in February 2015, during the Kawazu Cherry Blossom Festival). The 25th Kawazu Cherry Blossom Festival was held from February 10 to March 10, 2015. It was attended by 801,330 people, which was an increase of 9% over the previous year. On the first day of the survey, 30-50% of the flowers were in bloom, and the nighttime illuminations lit up on the evening of the 21st. According to the figures of the Kawazu town Tourist Association, there were 30,590 visitors on the 21st and 20,913 visitors on the 22nd.

During the Kawazu Cherry Blossom Festival, around 150 stores were offering food & drink or souvenirs on the road with the row of cherry trees linked to Kawazu Station. A number of events were held during the festival, including the "Semi Gourmet" and "Izu no Odoriko Photography Event."

At around the same time (January 20 to March 31), the 18th "Hina no Tsurushikazari Festival" (Hanging Doll Festival) was held at Higashiizu town Inatori.

In order to look for policies for effective use of questionnaire surveys in tourist destinations, the present study reviewed preceding studies in the field. Moreover, an attempt was made to find possibilities for inter-regional cooperation based on the data.

In the Bayesian Network Analysis, model was built under the examination of the causal relationship among items. We analyzed them by sensitivity analysis and odds ratio was calculated to the results of sensitivity analysis in order to obtain much clearer results. The main result of sensitivity analysis is as follows.

We can observe that those who make Solo trip had come by the occasion of "**Newspaper ad**", "Magazine", "Online lodging reservation site" or "**Internet**" with an objective of visiting "**(suitable) Budget**", "**Historic landmark, Literature monument, Construction",** "Sightseeing facilities", **"Gallery, Museum"**, "**Experience-based tourism**" or "**Park**".

We can observe that those who are Male's small group had come by the occasion of "**Newspaper ad**" or "Online lodging reservation site" with an objective of visiting "**Stroll around town, Eating tour", "(suitable)Budget",** "Convenience of traffic", **"Historic landmark, Literature monument, Construction",** "Sightseeing facilities", **"Gallery, Museum", "Experience-based tourism"** or **"Park**".

We can observe that "Those who put main occasion to visit to Izu Peninsula as Newspaper ad had come by "Solo trip" under the occasion of "Online lodging reservation site" with an objective of visiting "**(suitable)Budget**", "Historic landmark, Literature monument, Construction", "**Gallery, Museum**", "Experience-based tourism" or "Park".

We can observe that "Those who put main occasion to visit to Izu Peninsula as Online lodging reservation site had come by the occasion of "Newspaper ad" with an objective of visiting **"(suitable)Budget**", "**Gallery, Museum**", "Experience-based tourism" or "Park".

We can observe that those who put main occasion to visit to Izu Peninsula as Internet had come by Solo trip by the occasion of "Newspaper ad" with an objective of visiting "**(suitable)Budget**", "**Gallery, Museum**", "Experience-based tourism" or "Park".

Thus, we could obtain much more clearer results than those of the one obtained so far. This analysis is well utilized in designing the strategy of service marketing for this.

Although it has a limitation that it is restricted in the number of research, we could obtain the fruitful results.

In the future, it will be necessary to continue such surveys at various locations on the Izu Peninsula using a standardized set of questionnaire items and methods, and the efficacy of the study will have to be confirmed.

Acknowledgements

The authors are grateful to all those who supported us for answering the questionnaire investigation.

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APPENDIX 1

Questionnaire about the Tourism in Izu Peninsula

Please select the appropriate item in each column. Please write down the details in (　　).

Q1. Address：Prefecture（　　）
⇒If the prefecture is Tokyo, Kanagawa, Shizuoka, then City（　　）
Q2. Sex：　①Male　②Female
Q3. Age：　①10th　②20th　③30th　④40th　⑤50th　⑥60th　⑦70～
Q4. Occupation：①Independents　②Office worker　③Student　④Housewife　⑤No job　⑥Miscellaneous（　　）
Q5. Fellow travelers：
①Solo trip　②Couple　③Family　④Male's small group　⑤Female's small group
⑥Male and female's small group　⑦Group（More than 7）　⑧Miscellaneous（　　）
Q6. Visiting frequency to Izu Peninsula and Kawazu Cherry Tree：
Izu Peninsula＝①First time　②Second times　③Third times　④Fourth times　⑤Fifth～Nine times　⑥More than ten times
Kawazu Cherry Tree ＝①First time　②Second times　③Third times　④Fourth times　⑤Fifth～Nine times　⑥More than ten times
Q7. Means of transportation to IZU Peninsula：
①JR, Izu-kyuko train　②Sightseeing bus　③Private automobile　④Rent-a car　⑤Highway bus　⑥Shuttle bus service by the hotel　⑦ Miscellaneous（　　）
Q8. Means of movement in Izu Peninsula：（Plural answers allowed）
①Walking　②Fixed-route bus　③Sightseeing bus　④Private automobile　⑤Rent-a car　⑥Taxi　⑦Miscellaneous（　　）
→To whom who has selected ⑤: Starting point（　　）End point（　　）
Q9. Main occasion to visit to Izu Peninsula（Plural answers allowed）
①Poster　②Brochure by tour company　③TV program　④Newspaper ad　⑤Magazine　⑥Tour package for Kawazu Cherry Tree　⑦Online lodging reservation site　⑧Internet　⑨Advice by family, acquaintance　⑩Felt good at the previous visit　⑪Miscellaneous（　　）
Q10. What is an objective to visit Izu Peninsula?（Plural answers allowed）
①Hot spring　②Scenery, Nature　③Dish, sense of taste　④Flower of the season　⑤Stroll around town, Eating tour　⑥Budget　⑦Convenience of traffic　⑧Historic landmark, Literature monument, Construction　⑨Sightseeing facilities　⑩Gallery, Museum　⑪Experience-based tourism　⑫Park　⑬Miscellaneous（　　）
Q11. Staying time in Izu Peninsula：
①One- day trip（　　）hour　②2 days stay　③3 days stay　④More than 4 days
⇒If you have selected ②～④, please answer the following question.
(1)Staying type：①Inn, Hotel　②Resort house　③Second house　④Relative's house　⑤Miscellaneous（　）
(2)Use type of staying facilities：①Per night with dinner and breakfast　②Per night with dinner　③Per night with breakfast　④With no meals　⑤Miscellaneous（　　）
Q12. Where are you going to go in Izu Peninsula?　※Place at which staying time is more than 30 minutes
★ Customer type（　　）：A：One- day trip, Depart from Kawazu Cherry Tree　B：One- day trip, Depart from elsewhere except for Kawazu Cherry Tree　C：Stay more than one night, Depart from Kawazu Cherry Tree　D：Stay more than one night, Depart from elsewhere except for Kawazu Cherry Tree
①Facilities to call at
(　　)→(　　)→(　　)→(　　)→(　　)→(　　)
②Place of stay：First night【　　】　Second night【　　】
Q13. Do you want to come to Izu Peninsula again?
Q13-A: ①Want to come again　②Slightly want to come again　③Slightly do not want to come again　④Do not want to come again
⇒To whom who has selected ①and ②: What was good in Izu Peninsula?

（ ）

To whom who has selected ③and ④: What was not good in Izu Peninsula?

（ ）

Q13-B: What season do you want to come to Izu Peninsula? ①Spring Month（ ）②Summer Month（ ）③Autumn Month（ ）④Winter Month（ ）

Q14. Select items in each theme concerning the attractiveness of southern part of Izu Peninsula.（Plural answers allowed）

Theme 1"sea": ①Sea bathing ②Activities such as diving and fishing ③Pleasure cruiser ④Sunset ⑤Driving along the coastline ⑥Open- air bath where the visitor can see the sea ⑦Fresh products of the sea

Theme 2"Hot spring": ①Feelings of the hot spring district ②Japanese-style hotel ③Open- air bath ④Dinner in the hotel ⑤Hospitality

Theme 3"Nature"：①Flower of the season ②Hiking, stroll ③Geopark ④Experience-oriented program ⑤Mount Fuji ⑥ Warm climate

Theme 4"Culture"：①Temples and shrines ②Letter bearing the shogun's scarlet seal (Voucher seals of visit) ③Stroll around town ④Folk craft goods ⑤Local dishes

Miscellaneous：【 】【 】【 】

Q15. What do you want to be enhanced while travelling southern part of Izu Peninsula?（Plural answers allowed）

①Area map of southern part of Izu Peninsula ②Total WEB site ③Model tourism plan of southern part of Izu Peninsula ④Tourism information for driving ⑤Information for the landing-type tourism such as experience-based plan ⑥Information about restaurant and shop ⑦Enhancement of alternative traffic and their information ⑧Miscellaneous（ ）

Q16. How about the expenditure or budget of the following items in Izu Peninsula?

(1) Lodging expense：①~10,000(Yen) ②10,001～15,000 ③15,001～20,000 ④20,001～30,000 ⑤30,001～

(2) Food and drink expense：①~1,000 ②1,001～2,000 ③2,001～3,000 ④3,001～5,000 ⑤5,001～

(3) Souvenir, Shopping：①~1,000 ②1,001～2,000 ③2,001～3,000 ④3,001～5,000 ⑤5,001～

(4) Miscellaneous：①~1,000 ②1,001～2,000 ③2,001～3,000 ④3,001～5,000 ⑤5,001～

APPENDIX 2
Calculated posterior probability

name			Fellow travelers									
	state	Prior	Solo trip	Solo trip_odds	Couple	Couple_odds	Family	Family_odds	Male's small group	Male's small group_odds	Female's small group	Female's small group_odds
Fellow travelers	Solo trip	0.024	1	–	0	–	0	–	0	–	0	–
	Couple	0.337	0	–	1	–	0	–	0	–	0	–
	Family	0.353	0	–	0	–	1	–	0	–	0	–
	Male's small group	0.04	0	–	0	–	0	–	1	–	0	–
	Female's small group	0.099	0	–	0	–	0	–	0	–	1	–
	Male and female's small group	0.083	0	–	0	–	0	–	0	–	0	–
	Group (More than 7)	0.056	0	–	0	–	0	–	0	–	0	–
Main occasion to visit to Izu Peninsula	Poster	0.087	0.25	3.498	0.126	1.513	0.11	1.297	0.083	0.950	0.111	1.310
	Brochure by tour company	0.11	0.125	1.156	0.115	1.051	0.121	1.114	0.167	1.622	0.111	1.010
	TV program	0.087	0.094	1.089	0.094	1.089	0.094	1.089	0.094	1.089	0.094	1.089
	Newspaper ad	0.008	0.125	17.714	0.034	4.364	0.011	1.379	0.083	11.224	0.037	4.764
	Magazine	0.028	0.125	4.959	0.046	1.674	0.033	1.185	0.083	3.142	0.074	2.774
	Tour package for Kawazu	0.059	0.125	2.278	0.08	1.387	0.077	1.331	0.083	1.444	0.037	0.613
	Online lodging reservation	0.02	0.125	7.000	0.057	2.962	0.011	0.545	0.083	4.435	0.074	3.916
	Internet	0.079	0.375	6.995	0.126	1.681	0.077	0.973	0.083	1.055	0.074	0.932
	Advice by family, acquaintanc	0.181	0.25	1.508	0.115	0.588	0.187	1.041	0.25	1.508	0.259	1.582
	Felt good at the previous visit	0.244	0.25	1.033	0.253	1.049	0.275	1.175	0.25	1.033	0.222	0.884
An objective to visit Izu Peninsula	Hot spring	0.445	0.625	2.079	0.552	1.537	0.352	0.677	0.5	1.247	0.407	0.856
	Scenery, Nature	0.24	0.5	3.167	0.244	1.022	0.264	1.136	0.25	1.056	0.296	1.331
	Dish, sense of taste	0.295	0.125	0.341	0.287	0.962	0.264	0.857	0.5	2.390	0.407	1.640
	Flower of the season	0.669	0.375	0.297	0.701	1.160	0.703	1.171	0.417	0.354	0.667	0.991
	Stroll around town, Eating	0.059	0.125	2.278	0.103	1.831	0.033	0.544	0.333	7.963	0.111	1.991
	Budget	0.004	0.125	35.571	0.011	2.769	0.011	2.769	0.167	49.920	0.037	9.567
	Convenience of traffic	0.059	0.125	2.278	0.08	1.387	0.044	0.734	0.333	7.963	0.074	1.275
	Historic landmark, Literature	0.02	0.25	16.333	0.034	1.725	0.011	0.545	0.25	16.333	0.037	1.883
	Sightseeing facilities	0.051	0.25	6.203	0.023	0.438	0.066	1.315	0.333	9.290	0.074	1.487
	Gallery, Museum	0.004	0.125	35.571	0.011	2.769	0.011	2.769	0.167	49.920	0.037	9.567
	Experience-based tourism	0.008	0.125	17.714	0.011	1.379	0.011	1.379	0.167	24.860	0.037	4.764
	Park	0.008	0.125	17.714	0.023	2.919	0.011	1.379	0.167	24.860	0.037	4.764

				Main occasion to visit to Izu Peninsula									
Male and female's small group	Male and female's small group_odds	**Group (More than 7)**	Group(More than 7)_odds	**Poster**	Poster_odds	**Brochure by tour company**	Brochure by tour company_odds	**TV program**	TV program_odds	**Newspaper ad**	Newspaper ad_odds	**Magazine**	Magazine_odds
0	–	**0**	–	**0.06**	2.596	**0.026**	1.086	**0.027**	1.128	**0.094**	4.219	**0.062**	2.688
0	–	**0**	–	**0.375**	1.180	**0.295**	0.823	**0.331**	0.973	**0.317**	0.913	**0.278**	0.758
0	–	**0**	–	**0.341**	0.948	**0.324**	0.878	**0.346**	0.970	**0.106**	0.217	**0.209**	0.484
0	–	**0**	–	**0.032**	0.793	**0.055**	1.397	**0.042**	1.052	**0.098**	2.608	**0.064**	1.641
0	–	**0**	–	**0.1**	1.011	**0.086**	0.856	**0.1**	1.011	**0.103**	1.045	**0.135**	1.420
1	–	**0**	–	**0.033**	0.377	**0.086**	1.040	**0.085**	1.026	**0.102**	1.255	**0.067**	0.793
0	–	1	–	**0.032**	0.557	**0.084**	1.546	**0.058**	1.038	**0.100**	1.873	**0.132**	2.564
0.043	0.472	**0.063**	0.706	1	–	**0.114**	1.350	**0.111**	1.310	**0.125**	1.499	**0.118**	1.404
0.13	1.209	**0.188**	1.873	**0.132**	1.230	1	–	**0.129**	1.198	**0.161**	1.553	**0.151**	1.439
0.094	1.089	**0.094**	1.089	**0.094**	1.089	**0.094**	1.089	1	–	**0.094**	1.089	**0.094**	1.089
0.043	5.572	**0.063**	8.337	**0.041**	5.301	**0.045**	5.843	**0.036**	4.631	1.000	–	**0.054**	7.078
0.043	1.560	**0.125**	4.959	**0.058**	2.137	**0.064**	2.374	**0.055**	2.020	**0.083**	3.142	1.000	–
0.087	1.520	**0.188**	3.693	**0.086**	1.501	**0.094**	1.655	**0.085**	1.482	**0.105**	1.871	**0.100**	1.772
0.043	2.202	**0.063**	3.295	**0.053**	2.742	**0.055**	2.852	**0.047**	2.417	**0.078**	4.145	**0.066**	3.463
0.043	0.524	**0.125**	1.665	**0.118**	1.560	**0.108**	1.412	**0.103**	1.339	**0.136**	1.835	**0.122**	1.620
0.304	1.976	**0.375**	2.715	**0.191**	1.068	**0.217**	1.254	**0.199**	1.124	**0.240**	1.429	**0.234**	1.382
0.304	1.353	**0.063**	0.208	**0.252**	1.044	**0.245**	1.005	**0.251**	1.038	**0.237**	0.962	**0.231**	0.931
0.391	0.801	**0.438**	0.972	**0.455**	1.041	**0.437**	0.968	**0.444**	0.996	**0.465**	1.084	**0.450**	1.020
0.261	1.118	**0.188**	0.733	**0.271**	1.177	**0.259**	1.107	**0.262**	1.124	**0.273**	1.189	**0.265**	1.142
0.391	1.534	**0.25**	0.797	**0.296**	1.005	**0.313**	1.089	**0.305**	1.049	**0.327**	1.161	**0.316**	1.104
0.696	1.133	**0.563**	0.637	**0.653**	0.931	**0.643**	0.891	**0.664**	0.978	**0.589**	0.709	**0.616**	0.794
0.043	0.717	**0.063**	1.072	**0.089**	1.558	**0.092**	1.616	**0.084**	1.463	**0.123**	2.237	**0.104**	1.851
0.043	11.188	**0.063**	16.742	**0.035**	9.031	**0.043**	11.188	**0.032**	8.231	**0.067**	17.881	**0.053**	13.936
0.043	0.717	**0.125**	2.278	**0.083**	1.444	**0.091**	1.597	**0.08**	1.387	**0.119**	2.154	**0.103**	1.831
0.043	2.202	**0.063**	3.295	**0.053**	2.742	**0.057**	2.962	**0.046**	2.363	**0.095**	5.144	**0.073**	3.859
0.043	0.836	**0.125**	2.658	**0.076**	1.531	**0.085**	1.729	**0.072**	1.444	**0.115**	2.418	**0.100**	2.068
0.043	11.188	**0.063**	16.742	**0.035**	9.031	**0.043**	11.188	**0.032**	8.231	**0.067**	17.881	**0.053**	13.936
0.043	5.572	**0.063**	8.337	**0.035**	4.497	**0.043**	5.572	**0.032**	4.099	**0.067**	8.905	**0.053**	6.940
0.043	5.572	**0.063**	8.337	**0.039**	5.032	**0.046**	5.979	**0.036**	4.631	**0.071**	9.477	**0.056**	7.356

										An objective to visit Izu Peninsula			
Tour package for Kawazu Cherry Tree	Tour package for Kawazu Cherry Tree_odds	**Online lodging reservation site**	Online lodging reservation site_odds	**Internet**	Internet_odds	**Advice by family, acquaintanc**	Advice by family, acquaintance_odds	**Felt good at the previous visit**	Felt good at the previous visit_odds	**Hot spring**	Hot spring_odds	**Scenery, Nature**	Scenery, Nature_odds
0.04	1.694	**0.071**	3.108	**0.098**	4.418	**0.034**	1.431	**0.027**	1.128	**0.038**	1.606	**0.051**	2.185
0.313	0.896	**0.402**	1.323	**0.405**	1.339	**0.191**	0.464	**0.334**	0.987	**0.411**	1.373	**0.309**	0.880
0.314	0.839	**0.08**	0.159	**0.258**	0.637	**0.325**	0.882	**0.38**	1.123	**0.274**	0.692	**0.349**	0.983
0.042	1.052	**0.075**	1.946	**0.034**	0.845	**0.053**	1.343	**0.042**	1.052	**0.048**	1.210	**0.04**	1.000
0.044	0.419	**0.157**	1.695	**0.072**	0.706	**0.13**	1.360	**0.089**	0.889	**0.092**	0.922	**0.113**	1.159
0.087	1.053	**0.078**	0.935	**0.036**	0.413	**0.129**	1.636	**0.103**	1.269	**0.075**	0.896	**0.084**	1.013
0.127	2.452	**0.076**	1.387	**0.07**	1.269	**0.109**	2.062	**0.014**	0.239	**0.057**	1.019	**0.041**	0.721
0.113	1.337	**0.124**	1.485	**0.128**	1.540	**0.107**	1.257	**0.112**	1.324	**0.114**	1.350	**0.115**	1.364
0.143	1.350	**0.15**	1.428	**0.135**	1.263	**0.141**	1.328	**0.126**	1.166	**0.127**	1.177	**0.128**	1.188
0.094	1.089	**0.094**	1.089	**0.094**	1.089	**0.094**	1.089	**0.094**	1.089	**0.094**	1.089	**0.094**	1.089
0.045	5.843	**0.059**	7.775	**0.047**	6.115	**0.043**	5.572	**0.034**	4.364	**0.038**	4.898	**0.038**	4.898
0.065	2.413	**0.076**	2.855	**0.065**	2.413	**0.064**	2.374	**0.05**	1.827	**0.055**	2.020	**0.056**	2.059
1	–	**0.096**	1.694	**0.093**	1.635	**0.093**	1.635	**0.081**	1.406	**0.085**	1.482	**0.084**	1.463
0.053	2.742	1	–	**0.059**	3.072	**0.053**	2.742	**0.045**	2.309	**0.051**	2.633	**0.049**	2.525
0.114	1.500	**0.13**	1.742	1	–	**0.102**	1.324	**0.101**	1.310	**0.11**	1.441	**0.109**	1.426
0.217	1.254	**0.221**	1.284	**0.197**	1.110	1	–	**0.192**	1.075	**0.191**	1.068	**0.2**	1.131
0.238	0.968	**0.239**	0.973	**0.244**	1.000	**0.242**	0.989	1	–	**0.249**	1.027	**0.253**	1.049
0.445	1.000	**0.475**	1.128	**0.473**	1.119	**0.426**	0.926	**0.441**	0.984	1	–	**0.446**	1.004
0.257	1.095	**0.27**	1.171	**0.275**	1.201	**0.262**	1.124	**0.264**	1.136	**0.262**	1.124	1	–
0.299	1.019	**0.327**	1.161	**0.288**	0.967	**0.317**	1.109	**0.306**	1.054	**0.303**	1.039	**0.303**	1.039
0.642	0.887	**0.613**	0.784	**0.635**	0.861	**0.642**	0.887	**0.67**	1.005	**0.661**	0.965	**0.659**	0.956
0.087	1.520	**0.119**	2.154	**0.095**	1.674	**0.087**	1.520	**0.083**	1.444	**0.091**	1.597	**0.085**	1.482
0.041	10.645	**0.056**	14.771	**0.041**	10.645	**0.043**	11.188	**0.03**	7.701	**0.032**	8.231	**0.034**	8.764
0.089	1.558	**0.109**	1.951	**0.09**	1.577	**0.088**	1.539	**0.077**	1.331	**0.084**	1.463	**0.08**	1.387
0.056	2.907	**0.08**	4.261	**0.065**	3.406	**0.056**	2.907	**0.044**	2.255	**0.05**	2.579	**0.051**	2.633
0.083	1.684	**0.097**	1.999	**0.085**	1.729	**0.088**	1.795	**0.069**	1.379	**0.072**	1.444	**0.076**	1.531
0.041	10.645	**0.056**	14.771	**0.041**	10.645	**0.043**	11.188	**0.03**	7.701	**0.032**	8.231	**0.034**	8.764
0.041	5.301	**0.056**	7.356	**0.041**	5.301	**0.043**	5.572	**0.03**	3.835	**0.032**	4.099	**0.034**	4.364
0.044	5.707	**0.061**	8.055	**0.046**	5.979	**0.046**	5.979	**0.034**	4.364	**0.037**	4.764	**0.037**	4.764

Dish, sense of taste	Dish, sense of taste_odds	**Flower of the season**	Flower of the season_odd	**Stroll around town, Eating**	Stroll around town, Eating tour_odds	**Budget**	Budget_odds	**Convenience of traffic**	Convenience of traffic_odds	**Historic landmark, Literature**	Historic landmark, Literature monument, Construction_odds	**Sightseeing facilities**	Sightseeing facilities_odds	**Gallery, Museum**	Gallery, Museum_odds	**Experience-based tourism**	Experience-based tourism_odds	**Park**	Park_odds
0.011	0.452	**0.015**	0.619	**0.04**	1.694	**0.106**	4.822	**0.042**	1.783	**0.145**	6.897	**0.093**	4.170	**0.164**	7.978	**0.106**	4.822	**0.094**	4.219
0.312	0.892	**0.349**	1.055	**0.406**	1.345	**0.119**	0.266	**0.331**	0.973	**0.246**	0.642	**0.105**	0.231	**0.017**	0.034	**0.119**	0.266	**0.213**	0.532
0.299	0.782	**0.367**	1.063	**0.135**	0.286	**0.119**	0.248	**0.189**	0.427	**0.082**	0.164	**0.315**	0.843	**0.049**	0.084	**0.119**	0.248	**0.107**	0.220
0.069	1.779	**0.027**	0.666	**0.167**	4.812	**0.221**	6.809	**0.175**	5.091	**0.228**	7.068	**0.195**	5.814	**0.458**	20.280	**0.221**	6.809	**0.198**	5.925
0.134	1.408	**0.1**	1.011	**0.132**	1.384	**0.116**	1.194	**0.092**	0.922	**0.08**	0.791	**0.102**	1.034	**0.053**	0.509	**0.116**	1.194	**0.104**	1.056
0.109	1.352	**0.089**	1.079	**0.044**	0.508	**0.115**	1.436	**0.046**	0.533	**0.079**	0.948	**0.051**	0.584	**0.031**	0.353	**0.115**	1.436	**0.103**	1.269
0.047	0.831	**0.049**	0.869	**0.043**	0.757	**0.113**	2.148	**0.09**	1.667	**0.078**	1.426	**0.1**	1.873	**0.088**	1.627	**0.113**	2.148	**0.101**	1.894
0.108	1.271	**0.11**	1.297	**0.118**	1.404	**0.121**	1.445	**0.114**	1.350	**0.128**	1.540	**0.117**	1.391	**0.134**	1.624	**0.121**	1.445	**0.121**	1.445
0.132	1.230	**0.125**	1.156	**0.141**	1.328	**0.173**	1.693	**0.146**	1.383	**0.159**	1.530	**0.151**	1.439	**0.201**	2.035	**0.173**	1.693	**0.166**	1.610
0.094	1.089	**0.094**	1.089	**0.094**	1.089	**0.094**	1.089	**0.094**	1.089	**0.094**	1.089	**0.094**	1.089	**0.094**	1.089	**0.094**	1.089	**0.094**	1.089
0.039	5.032	**0.032**	4.099	**0.052**	6.802	**0.076**	10.199	**0.053**	6.940	**0.073**	9.765	**0.057**	7.495	**0.104**	14.393	**0.076**	10.199	**0.072**	9.621
0.057	2.098	**0.051**	1.866	**0.068**	2.533	**0.091**	3.475	**0.07**	2.613	**0.086**	3.266	**0.075**	2.815	**0.112**	4.378	**0.091**	3.475	**0.087**	3.308
0.083	1.444	**0.082**	1.425	**0.087**	1.520	**0.109**	1.951	**0.094**	1.655	**0.103**	1.831	**0.097**	1.713	**0.12**	2.175	**0.109**	1.951	**0.106**	1.891
0.051	2.633	**0.044**	2.255	**0.067**	3.519	**0.083**	4.435	**0.064**	3.350	**0.082**	4.377	**0.063**	3.295	**0.106**	5.810	**0.083**	4.435	**0.08**	4.261
0.098	1.267	**0.099**	1.281	**0.116**	1.530	**0.133**	1.788	**0.116**	1.530	**0.145**	1.977	**0.121**	1.605	**0.157**	2.171	**0.133**	1.788	**0.132**	1.773
0.207	1.181	**0.193**	1.082	**0.204**	1.160	**0.27**	1.674	**0.217**	1.254	**0.242**	1.445	**0.242**	1.445	**0.293**	1.875	**0.27**	1.674	**0.254**	1.541
0.252	1.044	**0.253**	1.049	**0.245**	1.005	**0.235**	0.952	**0.239**	0.973	**0.24**	0.978	**0.239**	0.973	**0.235**	0.952	**0.235**	0.952	**0.237**	0.962
0.441	0.984	**0.442**	0.988	**0.478**	1.142	**0.449**	1.016	**0.466**	1.088	**0.482**	1.161	**0.439**	0.976	**0.465**	1.084	**0.449**	1.016	**0.46**	1.062
0.259	1.107	**0.259**	1.107	**0.263**	1.130	**0.277**	1.213	**0.26**	1.113	**0.286**	1.268	**0.276**	1.207	**0.289**	1.287	**0.277**	1.213	**0.273**	1.189
1	–	**0.302**	1.034	**0.339**	1.226	**0.355**	1.315	**0.333**	1.193	**0.338**	1.220	**0.329**	1.172	**0.393**	1.547	**0.355**	1.315	**0.348**	1.276
0.658	0.952	1	–	**0.615**	0.790	**0.543**	0.588	**0.606**	0.761	**0.547**	0.597	**0.581**	0.686	**0.44**	0.389	**0.543**	0.588	**0.56**	0.630
0.094	1.655	**0.078**	1.349	1	–	**0.151**	2.837	**0.131**	2.404	**0.155**	2.926	**0.127**	2.320	**0.224**	4.604	**0.151**	2.837	**0.146**	2.727
0.037	9.567	**0.026**	6.647	**0.057**	15.051	1	–	**0.06**	15.894	**0.087**	23.727	**0.071**	19.030	**0.141**	40.872	**0.092**	25.229	**0.083**	22.538
0.088	1.539	**0.073**	1.256	**0.125**	2.278	**0.152**	2.859	1	–	**0.152**	2.859	**0.131**	2.404	**0.228**	4.710	**0.152**	2.859	**0.144**	2.683
0.052	2.688	**0.038**	1.936	**0.085**	4.552	**0.126**	7.064	**0.088**	4.728	1	–	**0.101**	5.505	**0.2**	12.250	**0.126**	7.064	**0.116**	6.430
0.078	1.574	**0.063**	1.251	**0.109**	2.276	**0.161**	3.571	**0.118**	2.489	**0.158**	3.492	1	–	**0.063**	1.251	**0.161**	3.571	**0.146**	3.181
0.037	9.567	**0.026**	6.647	**0.057**	15.051	**0.092**	25.229	**0.06**	15.894	**0.087**	23.727	**0.071**	19.030	1	–	**0.092**	25.229	**0.083**	22.538
0.037	4.764	**0.026**	3.310	**0.057**	7.495	**0.092**	12.564	**0.06**	7.915	**0.087**	11.816	**0.071**	9.477	**0.141**	20.354	1	–	**0.083**	11.224
0.041	5.301	**0.03**	3.835	**0.062**	8.196	**0.093**	12.714	**0.064**	8.479	**0.089**	12.114	**0.072**	9.621	**0.142**	20.522	**0.093**	12.714	1	–

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