Customer segmentation with purchase channels and media touchpoints using single source panel data

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Recent Environmental Changes

Multichannel and multimedia environment

■ Purchase channels

- Online purchase rates are increasing.
- The rates of low involvement, more frequently purchased categories are also increasing in Japanese market.

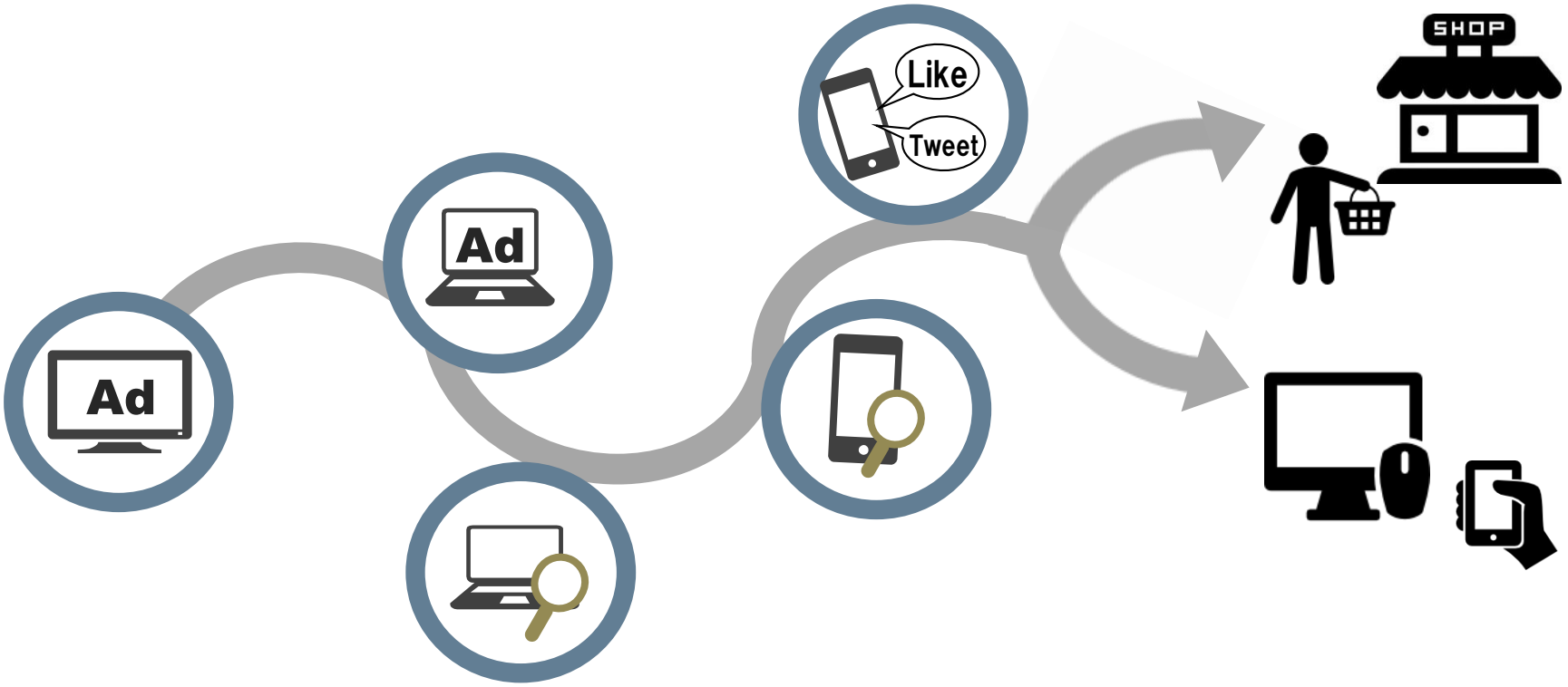
■ Media touchpoints

- Mobile and social media have become popular in all ages.
- It is important for firms to deliver appropriate information to customers via both devices and media.

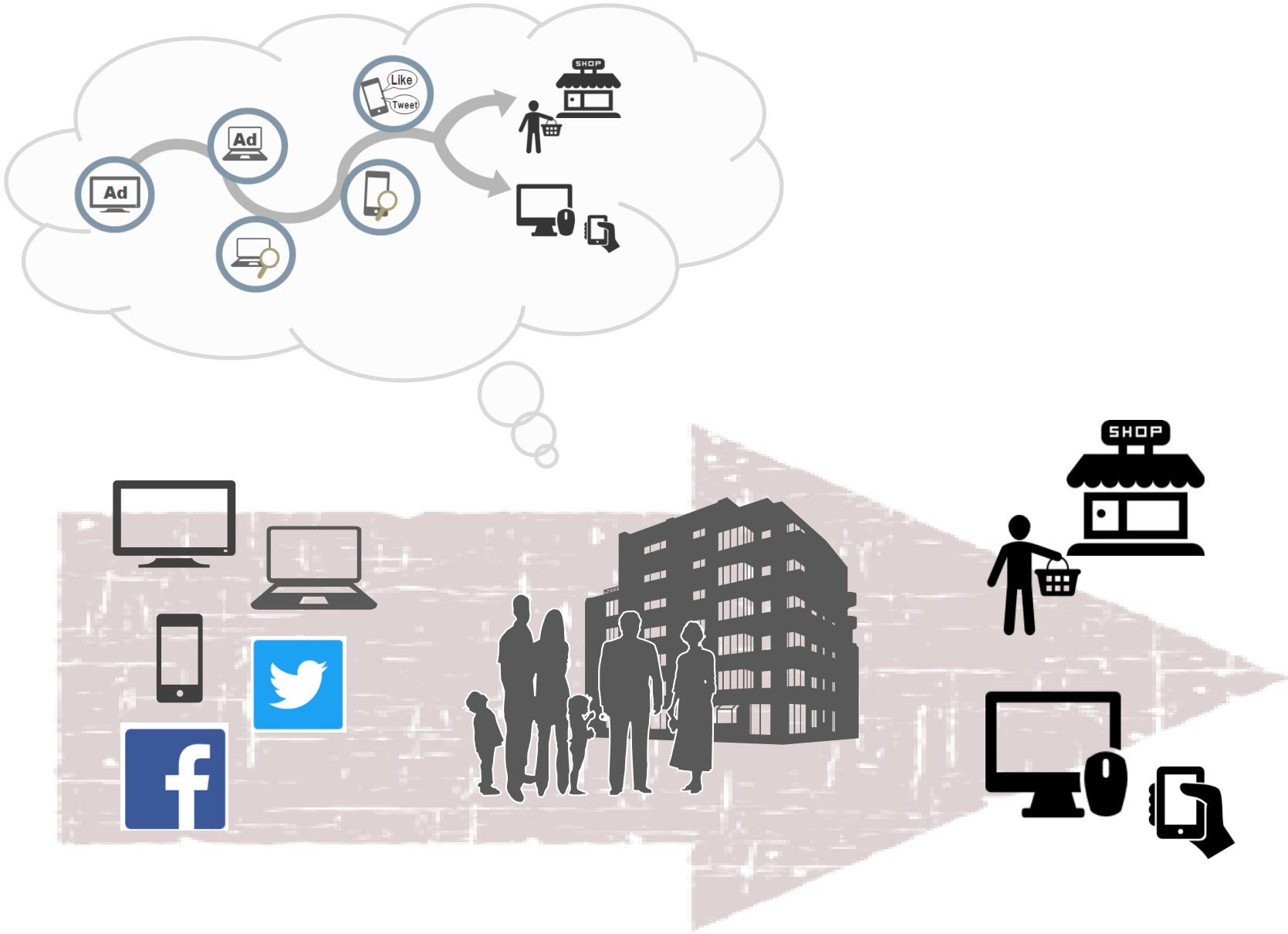
✓ **How can we integrate and manage the customer touchpoints to develop synergies and complementarity ?**

From Media Touchpoints to Purchase

For a chain retailer



Media Touchpoints and Purchase



Research Questions

This study conducted customer segmentation which focuses on purchase channels and media touchpoints using single source panel data (actual behavioral data & survey).

1 How can customers be classified on the basis of usage level of purchase channels and media touchpoints?

2 What is the relationship between customer's psychographic/demographic and behavioral segment membership?

Literature Review

How to understand and integrate channel / media touchpoints between firms and consumers (Dholakia et al., 2010).
It is important to create synergies and complementarity between online and physical stores.(Avery et al., 2007).

- Customer segmentation as an effective approach (Neslin et al., 2006)
- Segmentation research on purchase channels
  - Offline: Gupta & Chintagunta (1994)
  - Online: Bhatnagar & Ghose (2004)
  - Multichannel: Thomas & Sullivan (2005)

- To integrate online and physical store channels, it is important to consider purchase processes such as information search and purchase.
  (Kumar & Venkatesan, 2005; Kim & Park, 2005)

⇒ Customer behavior using different channels depending on the purchase process
(Verhoef et al., 2007)

"Research Shopper Phenomenon":
Search online, purchase at physical stores.

Customer Segmentation Research Considering the Purchasing Process

■ **Segmentation with information search and purchase process**（Konus et al., 2008）

- The framework of Latent Class Cluster Analysis
- Customer segments based on channel attitudes (psychical store / Internet / catalog)
- Evaluate demographic and psychological attributes that contribute to segments
- Three segments were proposed.

① Multichannel enthusiasts
who have a high likelihood to use all channels and high level of **innovativeness and shopping enjoyment**.

② Store-focused customers
who have a high likelihood to use stores and have a high level of **brand and channel loyalty**.

③ Uninvolved shoppers
who have a low likelihood to use any channel and low purchasing involvement.

The concepts by Konus et al. (2008) evoked a number of studies.

1. Exploring the possibility of perceived values being different between the information search stage and the purchase stage (Wang et al., 2014).
2. Identification of research shoppers (Sands et al., 2016, Keyser et al., 2015)
3. Taking media characteristic differences into account including Mobile, Social Media. (Sands et al., 2016)

The subject of this research

The past multichannel & media customer segmentation studies are based on channel attitudes.

- Konus et al. (2008): channel "appropriateness"
- Sands et al. (2016): channel "importance", which better reflects actual purchase (Gensler et al.,2012).

To generalize the findings by validating with actual behavioral data.

① Attitude is the antecedent factor of actual behavior (e.g., Barry, 1987)

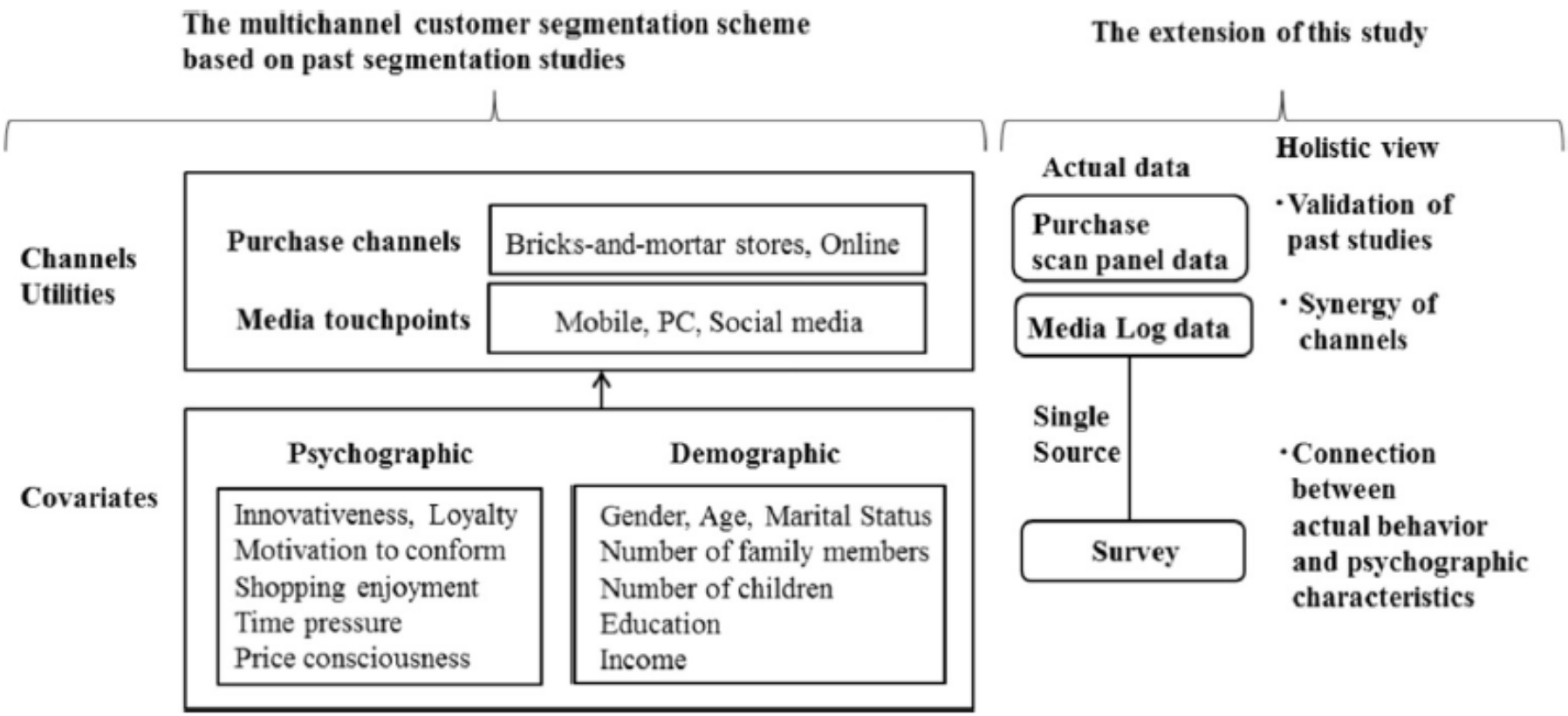
② Even if the behavior is asked in the survey, there is a discrepancy between the survey response and the actual behavioral data. (e.g., Abeele et al., 2013, Nakano & Zanma, 2017)

③ Marketing actions in the digital marketing environment are increasingly performed based on the results of actual behavioral data.

- This study aims to give a basis for a holistic integration of customers' actual information search and purchase behavior and their psychological differences.
- In response to the growing importance of channel purchasing and device discussions (Verhoef et al., 2015), we will explicitly identify "devices" for media use.

Our Conceptual Framework

- Low-involvement, more frequent purchased category
- Japanese market



Data Collection

◆We used the single source panel data (i-SSP) obtained from Intage Inc.
◆The i-SSP consists of a purchase scan panel data and log data of mobile/PC, which are linked with the same individual panelist ID as the key.
◆A total of 2,595 Japanese individuals between the ages of 15 and 69 were surveyed.

・purchase scan panel data (called *SCI*)
・collected by barcode scanners
・all products data
groceries, beverages, sundries, cosmetics and drugs
・April 1 ~ September 30,2016 (183 days)

・Mobile App/WEB log, PC WEB log
・automatically collected via an application in the installed panelists' terminals
・April 1 ~ September 30,2016 (183 days)

・Online survey for i-SSP panelists
・using the same questionnaire as the one by Konus et al. (2008).
・October 3 ~ October 16, 2016

Definition and Measurement

Purchase Channels

- Purchase frequency (the number of purchase days) in bricks-and-mortar stores and online stores.

Media Touchpoints

- The average daily usage (minutes) of mobile(smart phone), PC and social media.
- Social media includes Facebook, Twitter, Instagram and mixi.

Demographics

- Gender, Age, Marital status, Number of family members, Number of children, Education, and Household income.

Psychographics

- Innovativeness, Loyalty, Shopping enjoyment, Motivation to conform, Time Pressure, Price consciousness

Psychographics : Results of PCA

- We used the same questionnaire as the one by Konus et al. (2008)
- Principal component analysis (PCA) carried out in confirmatory.
- Cronbach's alpha for multi-item scales were all greater than 0.7 except for motivation to conform.

Although the value for "motivation to conform" was 0.63, it was adopted for this study, in the same way as the adoption by Konus et al. (2008) with the value of 0.64 for "motivation to conform."

	Innova-tiveness	Loyalty	Motivation to conform	Shopping enjoyment	Time Pressure	Price con-sciousness	Reliability (C. Alpha)
I am one of those people who try a new product firstly just after launch.	0.81						
I like to try new and different products.	0.80						
I always have the newest gadgets.	0.75						0.77
I find it boring to use the same product (for brand) repetiively.	0.67						
I regularly purchase different variants of a product just for change.	0.58						
I have favorite brands that I keep buying frequently.		0.77					
The brand of the product is important for me in my purchase dicisions.		0.73					
I generally purchase the same brands.		0.70					0.74
The place where I do my shopping is very important to me.		0.69					
I generally do my shopping in the same way.		0.61					
I find it very boring when other people criticize my behavior.			0.79				
Being accepted by other people is very important to me.			0.73				0.63
I like to have some problems that I can solve without much thinking.			0.70				
I like shopping.				0.87			
I like shopping for groceries and commodity goods.				0.86			0.81
I take my time when I shop.				0.83			
I am always busy.					0.92		0.81
I usually find myself pressed for time.					0.92		
I compare the prices of various products before I make choice.						0.86	0.76
It is important for me to have the best price for the product.						0.84	

Latent-Class Cluster Analysis

Latent-Class Model with the probability of segment memberships

$$f(U_{ic}|\, z_i) = \sum_{m=1}^{K} \left[\prod_{c=1}^{5} g_c(U_{ic}|\, z_i, s_i) \right] p(s_i = m|z_i)$$

$$\sum_{m=1}^{K} p(s_i = m|z_i) = 1$$

U_{ic}	Customer *i*'s perceived utility of purchase channel and media touch points *c*. c={1:stores purchase, 2:online purchase, 3:mobile usage, 4:PC usage, 5:social media usage}
s_i	Indicator of customer *i*'s segment, equal to 1,2,…,K, where K is the number of segments.
z_i	Customer *i*'s covariate vector of psychographic and demographic.
$f(U_{ic}\|\, z_i)$	Probability distribution for customer *i*'s perceived utility of purchase channel and media touch points *c*, given the customer's antecedent variables.
$g(U_{ic}\|\, z_i, s_i)$	Probability distribution for customer *i*'s perceived utility of purchase channel and media touch points *c*, given the customer's antecedent variables and given that the customer is in segment s_i.
$p(s_i = m\|z_i)$	Probability that customer *i* is in segment *m*, given the customer's antecedent variables.

Latent-Class Cluster Analysis

Latent-Class Model with the probability of segment memberships

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◆Distribution setting

- Purchase days: 1. bricks-and-mortar stores /2. online stores

$$g_1, g_2 \sim Poisson\ Dist$$

- Media usage duration: 3. Mobile /4. PC /5. Social Media

$$g_3, g_4, g_5 \sim Normal\ Dist$$

◆Multinomial logit model

to indicate the probability of segment memberships

$$p(s_i = m|z_i) = \frac{\exp(z_i'\gamma_m)}{\sum_{l=1}^{K} \exp(z_i'\gamma_l)}$$

Results

Determining the Number of Segments

- BIC is considered to be more effective than other information criteria (such as AIC) for Latent-Class Cluster Analysis

(Vermunt and Magidson, 2002; Collins and Lanza, 2009).

		LL	AIC	BIC	CAIC
Model 1	1-Cluster	-5588.7	11205.4	11287.5	11301.5
Model 2	2-Cluster	-5056.1	10184.2	10395.3	10431.3
Model 3	3-Cluster	-4676.6	9469.1	9809.1	9867.1
Model 4	4-Cluster	-4393.8	8947.5	9416.4	9496.4
Model 5	5-Cluster	-4185.4	8574.9	9172.8	9274.8
Model 6	6-Cluster	-4061.6	8371.1	9097.9	9221.9
Model 7	**7-Cluster**	**-3957.7**	8207.5	**9063.2**	**9209.2**
Model 8	8-Cluster	-3894.3	8124.5	9109.2	9277.2
Model 9	9-Cluster	-3858.2	**8096.5**	9210.1	9400.1

We obtained a minimum value of BIC & CAIC

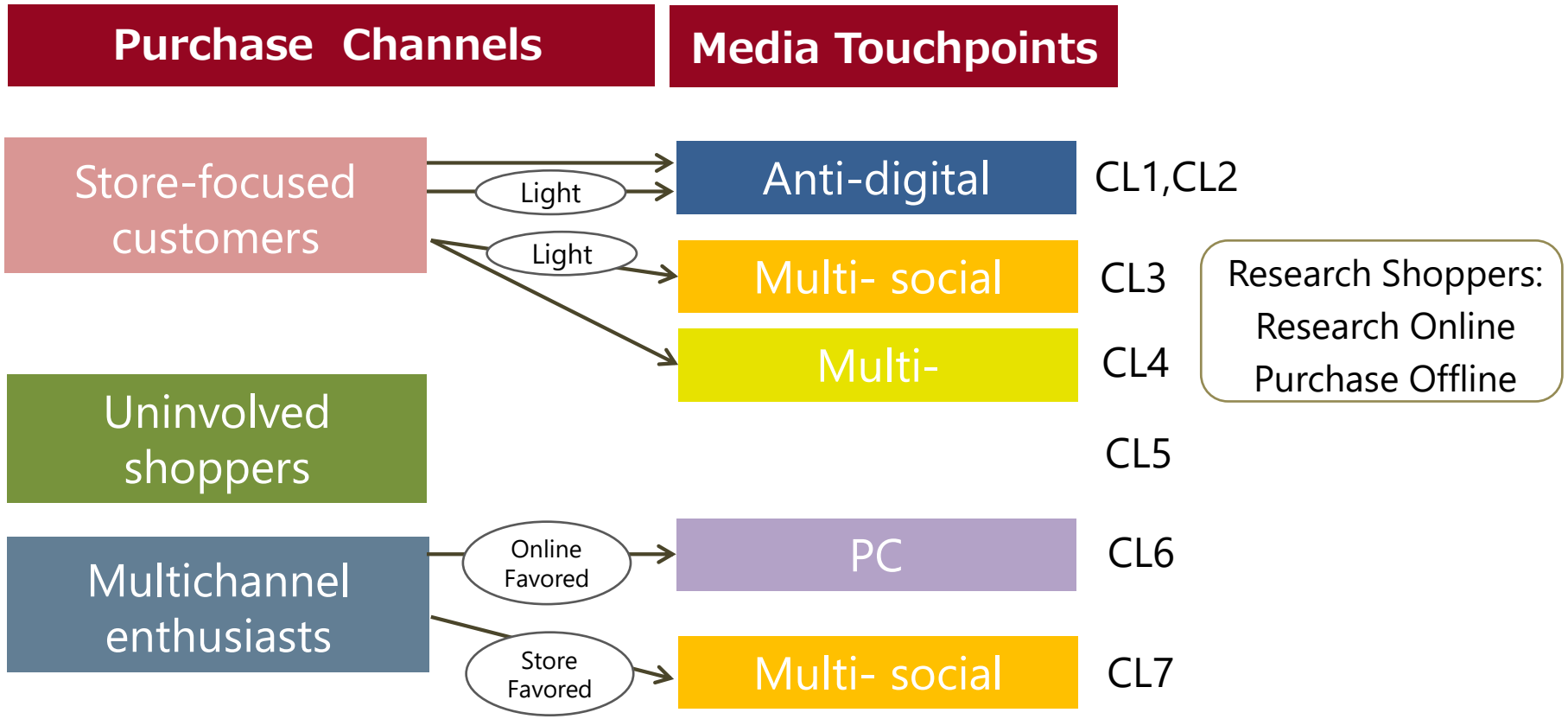
for the 7-cluster model,

which was selected as the best model.

Cluster Profiles

■ purchase days and media usage duration for each cluster (n=2595)

		Cluster1 21.3%	Cluster2 19.0%	Cluster3 15.7%	Cluster4 15.7%	Cluster5 15.4%	Cluster6 6.5%	Cluster7 6.4%	the Overall Mean
Purchase channels	Store	**101.3**	58.2	71.1	**143.2**	27.9	58.7	**123.8**	82.3
	Online	1.1	0.9	0.7	0.4	0.8	**16.5**	**11.8**	2.5
Media touchpoints	Mobile	137.8	139.2	**223.8**	**176.5**	164.1	148.0	**176.2**	164.8
	PC	55.5	46.7	**130.5**	**102.0**	80.3	**90.2**	**99.5**	81.8
	Social Media	2.9	2.4	**58.3**	**19.1**	18.4	12.1	**27.3**	18.6



Cluster Profiles

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		Cluster1	Cluster2	Cluster3	Cluster4	Cluster5	Cluster6	Cluster7	the Overall
		21.3%	19.0%	15.7%	15.7%	15.4%	6.5%	6.4%	Mean
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■ **Cannibalization and synergies in multichannel customers**

– CL6 has the highest online purchase frequency but low total purchase frequency.

⇒ It leads to be **cannibalism** in offline and online.

– CL7 has the second highest total purchase frequency.

⇒It leads to be **synergies** in offline and online.

Estimates of Parameters

	Cluster1	Cluster2	Cluster3	Cluster4	Cluster5	Cluster6	Cluster7	Wald	p-value
Intercept	0.427	0.837	-0.075	-0.818	-1.442	0.358	0.714	15.36	**0.02**
Inovativeness	0.008	-0.082	-0.076	**0.106**	**-0.189**	0.013	**0.220**	22.44	**0.00**
Loyalty	0.020	-0.067	**-0.120**	-0.025	-0.098	**0.126**	**0.164**	11.37	**0.08**
Motivation to conform	0.014	-0.005	**0.101**	0.027	0.035	-0.009	**-0.163**	5.17	0.52
Shopping enjoyment	0.059	-0.061	-0.024	0.031	-0.095	-0.077	**0.167**	6.68	0.35
Time pressure	0.034	0.041	**-0.117**	**0.137**	0.085	-0.078	**-0.103**	13.52	**0.04**
Price consciousness	0.018	-0.016	0.019	**-0.141**	-0.022	**0.101**	0.041	6.15	0.41
Gender(male)	**-0.171**	**0.164**	**-0.105**	**0.826**	**0.754**	**-0.998**	**-0.469**	110.94	**0.00**
Age									
15-24 years	-0.131	-0.003	**1.163**	-0.648	**1.390**	-0.110	-1.662	163.00	**0.00**
25-34 years	-0.158	0.094	**0.192**	**0.138**	**0.369**	-0.538	-0.098		
35-44 years	-0.163	0.068	-0.130	0.094	-0.221	-0.018	**0.370**		
45-54 years	0.067	-0.142	-0.400	**0.482**	-0.809	**0.152**	**0.650**		
55-69 years	**0.386**	-0.018	-0.825	-0.066	-0.730	**0.514**	**0.739**		
married	0.079	**0.295**	0.017	**-0.277**	**0.111**	**-0.155**	-0.070	9.59	0.14
household	0.025	-0.008	-0.001	**0.175**	**0.269**	**-0.271**	**-0.188**	33.81	**0.00**
child	**0.198**	0.011	**0.103**	**-0.103**	**-0.154**	**0.130**	**-0.185**	13.46	**0.04**
education	0.003	-0.042	0.036	0.010	0.046	0.016	-0.069	6.98	0.32
Income (million yen)									
less than 3.99	-0.013	0.039	**0.221**	**0.161**	0.014	-0.490	0.069	51.52	**0.00**
4.00-5.49	-0.016	**0.118**	-0.249	**0.337**	**0.155**	**0.205**	-0.550		
5.50-6.99	**0.115**	0.060	0.007	-0.050	-0.018	0.081	-0.195		
7.00-8.99	0.026	-0.097	**0.105**	-0.054	-0.112	-0.121	**0.253**		
more than 9.00	-0.112	-0.119	-0.084	-0.394	-0.039	**0.324**	**0.423**		

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		Channel & Media	Psychographic	Demographic
2types of Research shoppers	opinion-seeking type (CL3)	Store focused -Light Multi- **social**	**+ motivation to conform** - loyalty - time pressure	female, young, few children low or relatively high income
	time-constrained type (CL4)	Store focused Multi-	**+ time pressure** + Innovativeness - price consciousness	Male, middle- aged, large family size, low income
2types of Multichannel enthusiasts	price-conscious type (CL6)	Multichannel -online favored **PC**	**+ price consciousness** + loyalty	female, elderly, few children low or relatively high income
	innovator type (CL7)	Multichannel -store favored Multi- **social**	**+ Innovativeness** **+ shopping enjoyment** + loyalty - motivation to conform - time pressure	female, middle-aged to elderly, high income, small family size, few children

Discussion

Who are the multichannel shoppers in the Japanese FMCG market?

⇒ We found two types of multichannel shoppers.

(1) Store-favored multichannel shoppers

- Both online and offline channels are mutually used to suit the purchase setting using multidevice and social media.
- These shoppers have high innovativeness and shopping enjoyment, brand/channel loyalty and low time pressure.

- The tendency of innovativeness and shopping enjoyment is consistent with the multichannel enthusiast suggested by Konus et al. (2008).

- In addition, this study suggests that these shoppers tend to seek hedonic benefits of "Exploration" (Ailawadi et al., 2001) while actively using multimedia including mobile.

Discussion

Who are the multichannel shoppers in the Japanese FMCG market?

⇒ We found two types of multichannel shoppers.

(2) Online-favored multichannel shoppers

- There is the possibility of cannibalism, as the usage of offline channels decreases as the amount of online channel usage increases.
- These tendencies are called the "channel lock-in" (Verhoef et al., 2007).

- In addition to past research, this study suggests that the price sensitiveness characteristics and PC device usage of multichannel customers are involved in the online purchasing channel.

- These shoppers tend to seek utilitarian benefits related to informativeness (Strom et al., 2014) and price comparison via PCs.

Limitation & Future Research

This study aims to give a basis for a holistic integration of customers' actual channel & media use behavior and their psychological differences.

□This study does not capture attitudes for channel & media use.

It will be necessary to capture the attitudes used in previous research (Konus et al., 2008; Sands et al., 2016) and discuss the connection between attitudes and actual behavior.

□ Refinement of explanatory variables

・Brand/Store loyalty

In this study, both types of multichannel shoppers tended to have higher brand/store loyalty than previous studies (Konus et al., 2008).

This is because, the accumulated frequency of purchase channel use is treated as variables of segmentation, which shows the degree of channel experience.

More generally, it is necessary to differentiate between brand and store loyalty.

・Other factors

Especially, spatial constraints (eg., distance to nearby stores) and risk avoidance

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