

# The impact of e-retail usage on relative retail patronage formation

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## Abstract

**Purpose** – Despite retail digitisation and research efforts focussed on online and omnichannel shopping, there is insufficient knowledge regarding retail patronage formation in the grocery category, where in-store sales dominate. This study analyses the retail patronage formation in grocery in-store fill-in shopping.

**Design/methodology/approach** – The authors designed a questionnaire to measure retail patronage behaviour, consumer satisfaction (CS), store attributes evaluation and e-retail usage. Then, the authors analysed the path structure for retail patronage behaviour formation using structural equation modelling. Additionally, they performed a mediation analysis using the bootstrap method and a moderation analysis based on a chi-square difference test.

**Findings** – This study provides three main findings. First, the authors' model has two ways to increase Share-of-Wallet (SOW). One is to increase Share-of-Visits (SOV) and another is to increase CS amongst non-users of e-retailing. Second, the results of the moderation analysis suggest the influence of customers' use or non-use of e-retailing on SOW formation. Third, service evaluation plays an interesting role in the overall model: the lower the assessment of service, the higher the SOV; the higher the evaluation of service, the greater the CS; the greater the CS, the higher the SOV.

**Originality/value** – The authors proposed the framework for the relative retail patronage formation in grocery fill-in shopping to examine the relationship between two relative patronage indicators (SOW and SOV) in the path structure and the mediating effect of CS and the moderating effect of e-retailing usage on retail patronage formation.

**Keywords** Retail patronage, Grocery fill-in shopping, Retail digitalisation, e-retailing usage, Customer satisfaction

**Paper type** Research paper

## 1. Introduction

Digitalisation is changing consumer shopping behaviour and retail structures, thus accelerating the hybridisation and co-existence of physical and online shopping (Roggeveen and Sethuraman, 2020). It has resulted in an increasingly diverse range of options for consumers when purchasing goods. Physical outlets have declined worldwide (Dolega and Lord, 2020) and the coronavirus disease 2019 (COVID-19) pandemic has accelerated this trend (Beckers *et al.*, 2021). In the UK, for example, the market share of e-commerce rose from 19% in November 2019 to nearly 33% in May 2020, whilst grocery e-tailing took a quarter of a century



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to capture 8% of the market. The lockdown of cities during the COVID-19 pandemic forced consumers to change their grocery shopping behaviours drastically, resulting in a skyrocketing increase of e-commerce share in grocery retailing to 15% within eight weeks (Pilkington, 2021).

Retail patronage is increasingly essential for retailers as consumers have more choices in obtaining goods. Online shoppers' motivations vary in a competitive environment where customers choose or patronise multiple stores (Rohm and Swaminathan, 2004). Generally, online-only retailers can benefit from lower costs and focus on specific retail mixes such as convenience and lower prices. Meanwhile, store-based retailers are at a cost disadvantage but can emphasise actual product displays, immediate sales, the convenience offered by good locations and in-store service. Therefore, customers use various types of stores (or increasing share of the customer from a retail perspective). Stores that function as both major and fill-in shopping destinations, such as hard discounters in Europe and mini-supermarkets in large urban areas, are fast emerging and complicating retail competition (Hunneman *et al.*, 2021; Yokoyama *et al.*, 2022). Competition between retail formats is more intense than competition within retail formats in Italy (Cardinali and Bellini, 2014). The emergence of new retail formats and the growth of existing formats have partly blurred the boundaries between competing formats in Japan (Yokoyama *et al.*, 2022).

Whilst online shopping and omnichannel studies continue to increase as the frontier of retail diversification (e.g. Verhoef *et al.*, 2015; Wang *et al.*, 2015), in-store sales still hold some weight in grocery purchasing (Hand *et al.*, 2009; Morganosky and Cude, 2000; Mortimer *et al.*, 2016). Fresh produce, such as agricultural, marine and livestock products, whose quality is difficult to standardise and maintain, is one of the most challenging areas to move online and to omnichannel because of customers who consider touching important (Need for Touch) in the purchase of produce prefer physical stores (Kühn *et al.*, 2020). In China, the online shift in grocery sales has adversely affected sales of perishable categories (van Ewijk *et al.*, 2020). Retail literature also found that customers' well-being derived from grocery outlets and the desire to maintain attachment to a place drive the future behavioural intentions of customers (Rosenbaum *et al.*, 2020).

However, research on the impact of retail digitisation on offline grocery purchasing is limited. A Scopus search of the latest research trends on the factors shaping patronage of bricks-and-mortar grocery retailing under the context of widespread online shopping revealed that several empirical studies had been published in leading journals (See Appendix for details of the systematic review we conducted). Of the eight studies discussing the impact of the diffusion of digital technologies on grocery retail brick-and-mortar patronage, three studies discuss how using mobile apps affects brick-and-mortar shopping behaviour and retail patronage (Bies *et al.*, 2021; Lim *et al.*, 2022; Klabjan and Pei, 2011), two studies discuss how the introduction of online shopping affects retail patronage in online and offline shopping (Bauerová, 2019; Melis *et al.*, 2016); two studies examine the impact of in-store digital signage on retail patronage (Garaus *et al.*, 2017; Garaus and Wagner, 2019) and one study discusses the formation of retail patronage in a click-and-collect (Vyt *et al.*, 2022). Whilst existing studies have initiated new horizons in the retail literature, online grocery shopping has only been around for a short time, leaving many areas unexplored.

As the advantages of in-store retailing (the ability to make on-the-spot and in-person decisions) are increasingly highlighted, a gap has emerged in the knowledge of retail patronage formation for in-store food retailing in a retail digitisation environment. To fill this gap, we set the research question: "How does retail digitisation affect retail patronage formation in fresh food in-store fill-in shopping?" Specifically, we constructed a model in which store attributes reflecting the retail mix in the fill-in shopping context shaped retail patronage; we then examined the mediating effect of consumer satisfaction (CS) in this relationship and the moderating effect of customers' online shopping experience on the formation of retail patronage

behaviour. By limiting the survey to in-store grocery fill-in shopping, where efficiency is more vital (Nilsson *et al.*, 2017), we can observe the unique structure of relative retail patronage behaviours (Share-of-Wallet: SOW and Share-of-Visits: SOV) and the impact of the online shopping experience on forming relative patronage behaviours.

The remainder of the paper is organised as follows: we review the theoretical underpinnings of this study and develop a conceptual framework for retail patronage formation in the fill-in shopping context in Section 2; we derive hypotheses in Section 3; the methodology used is elaborated on in Section 4; the confirmation of empirical validity of the hypotheses, using data, is in Section 5 and Section 6 discusses the theoretical and practical implications of the findings, identifies possible limitations and concludes the paper.

## 2. Conceptual framework

### 2.1 Theoretical underpinning

Similar to a major shopping trip, the theoretical underpinning of retail patronage formation in a fill-in shopping trip is a multi-attribute utility model based on the stimulus-organism-response theory (S-O-R theory). This model assumes the weighted sum of various utilities, including costs and benefits from external stimuli, influences preferences and patronage behaviour (Wallenius *et al.*, 2008). Customers are stimulated by multiple offers from retailers, evaluating store attributes and acting accordingly. In the case of daily grocery shopping, customers evaluate store attributes through their shopping experience, mainly in stores, because they directly observe whether fresh food is attractive. Related literature uses the S-O-R theory for offline (Kumar and Kim, 2014), online (Rose *et al.*, 2012), multi-channel (Pantano and Viassone, 2015) and omnichannel (Le and Nguyen-Le, 2021) retail patronage formation studies.

### 2.2 Conceptual framework

Based on the S-O-R theory, we assume a basic conceptual framework in which store attribute evaluation generates CS, which drives retail patronage behaviour. In this framework, various store attributes are “stimulus”, the customer’s attitude towards the store formed by them is “organism” and the behaviour based on that attitude is “response”. Retail patronage literature mainly uses retail marketing mix instruments such as “stimulus” (Blut *et al.*, 2018). It often uses store image (Hsu *et al.*, 2010) and store satisfaction (Hunneman *et al.*, 2015) as “organisms”. Regarding “response”, the number of store visits (Bell *et al.*, 1998), store choice (Reutterer and Teller, 2009), SOW (Hunneman *et al.*, 2015, 2021; Mägi, 2003) and so on are used.

Following Hunneman *et al.* (2015), store attribute evaluations were adopted as the explanatory variable, CS as the mediating variable and the relative retail patronage behaviour variable as the objective variable. Although previous research tested a model in which store attributes directly influenced patronage intentions and indirectly through the mediation of satisfaction simultaneously (Nair, 2018), the outcome variable continued to be patronage intention, essentially positioned as an organism in the S-O-R theory. As attitudinal indicators are insufficient for the outcome (Keiningham *et al.*, 2011), SOW and SOV, well-known measures of relative retail patronage behaviour variables (Mägi, 2003; Kim and Lee, 2010), were introduced instead of patronage intention.

Regarding relative retail patronage behaviour variables, we assume that SOV appears before the SOW in the fill-in shopping context. Although previous studies have used SOV as one of the measures of behavioural loyalty (De Wulf *et al.*, 2001) or as a proxy indicator for SOW to check the robustness of the estimation (Ailawadi *et al.*, 2008), SOW and SOV are not necessarily interchangeable despite their high correlation (Mägi, 2003). The SOW is the ultimate goal from a practical perspective, but increasing the SOV is also important in fill-in shopping. For customers, stores that are the target of fill-in shopping trips are not their

primary shopping destination. Therefore, they need to be visited first and there are almost no ways to increase the SOW without increasing the SOV.

The relationships between variables in the path structure mentioned above may vary depending on the Internet shopping usage of the customer (Sopramanian and Robertson, 2007). In the digitised retail world, customers increasingly experience purchasing groceries through online shopping. Even if most customers purchase fresh food in physical outlets, the relationship between factors and retail patronage behaviour may differ between customers who also use Internet shopping and those who only use offline stores (Melis et al., 2016). Specifically, the influence of attitude on behaviour may be more significant for non-e-retailing usage customers than for e-retailing users because the latter have fewer means of obtaining products easily. Having no convenient means of obtaining in-store products may lead to a stronger relationship between store attribute evaluations or CS and retail store usage behaviour.

The above discussion derives the conceptual framework in Figure 1. The originality of this study lies in the following two aspects. First, we propose a framework for the path structure of factors that influence the formation of relative retail patronage in the fill-in shopping context by relying on the S-O-R theory. Specifically, we examine the relationship between two relative patronage indicators (SOW and SOV) in the path structure of causes and effects that form retail patronage. Second, we examine the mediating effect of CS and the moderating effect of e-retailing usage on retail patronage formation in grocery fill-in shopping. As institutional changes in retailing (e.g. retail digitisation, cross-industry competition) change the basis of consumer retail patronage formation, the framework and empirical results of this study are likely to differ from pre-changing findings, thus contributing to retail literature and practitioners.

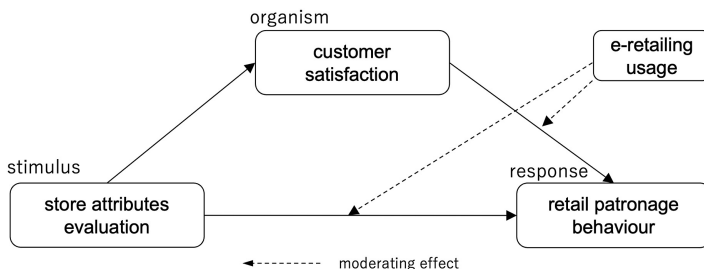
### 3. Hypothesis development

#### 3.1 Direct effect

The store attributes that influence retail patronage formation revealed by existing studies are cost and benefit factors. Cost factors include price and store convenience, whereas benefit factors include assortment, quality and customer service. Following previous studies, we focussed on price, service and convenience as store attributes (Hunneman et al., 2021). As fill-in shopping trips for groceries are often utilitarian rather than hedonic, customer evaluations of store attributes may influence retail patronage behaviour. In short, if shopping is task-oriented, the stimulus may respond without going through the organism. We, therefore, formulate the following hypothesis.

*H1.* Customer's evaluation of price (a), service (b) and convenience (c) positively influence SOV.

CS is an important nexus of antecedents and behavioural outcomes in retail patronage formation (Blut et al., 2018). The literature has identified the relationship between store



**Figure 1.**  
Conceptual framework

attributes and CS (Huddleston *et al.*, 2009), CS and retail patronage (Mägi, 2003; Filipe *et al.*, 2017), or the overall structure that includes them (Hunneman *et al.*, 2015; Sarantidou, 2017). These findings are also likely to be valid for grocery fill-in shopping. Unlike store attribute evaluation variables, CS is an attitudinal variable that may directly affect SOV and SOW (e.g. Hunneman *et al.*, 2017; Leppäniemi *et al.*, 2017; Shaikh *et al.*, 2018).

*H2.* Customer's evaluation of price (a), service (b) and convenience (c) positively influence CS.

*H3.* CS positively influences SOV (a) and SOW (b).

As previously mentioned, the potential for the in-store environment to evoke customer needs and increase SOW would not be common in a utilitarian fill-in shopping context. In the fill-in shopping trip context, the SOV precedes SOW in time. In other words, the variation in the former explains the variation in the latter.

*H4.* SOV positively influences SOW.

### *3.2 Mediating effect of customer satisfaction*

The fill-in shopping of groceries is a shopping behaviour that is more like a task than a pleasurable purchase, but the stimulus may guide the response through the organism. Studies that point to hedonic aspects of shopping value (Babin *et al.*, 1994) and empirical results of Hunneman *et al.* (2015) support this assumption. Relevant literature examines CS mediating the relationship between store attributes and retail patronage attitudinal variables (Nair, 2018; Nessel *et al.*, 2021). In short, store attribute evaluation may lead to relative retail patronage behaviour via CS.

*H5.* CS mediates the relationship between price (a), service (b), convenience (c) and SOV.

### *3.3 Moderating effect of Customer's E-retail usage*

Customer e-retail usage influences the relationship between retail patronage behaviour and its antecedents (Melis *et al.*, 2016). E-retail usage here includes e-commerce, which is comprehensive from order to delivery and home delivery using various ordering methods. The reason is that e-commerce and home delivery are on the same level in achieving convenience and efficiency in retailing that are not available in physical stores. Customers who routinely purchase groceries through e-retail have many options to obtain groceries compared with e-retail non-users. Therefore, even if they have high evaluations of store attributes and CS, these are unlikely to lead to retail patronage behaviour. Conversely, those who only purchase groceries in physical stores are more likely to reflect a higher evaluation of antecedents in their retail patronage behaviour because they have comparatively limited access to products than those who use e-retail and offline shopping.

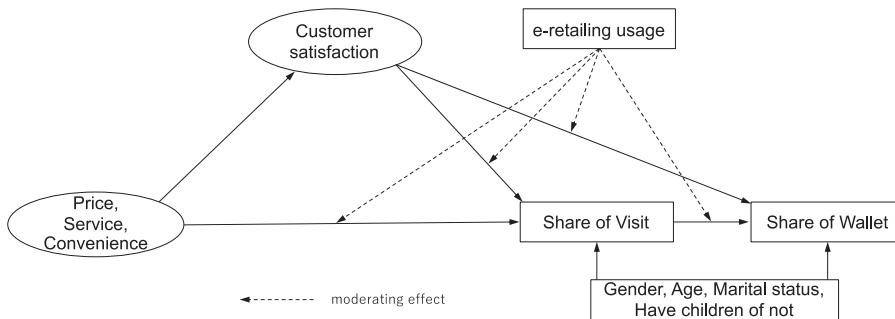
*H6.* Customer e-retail usage weakens the positive relationship between price (a), service (b), convenience (c) and SOV.

*H7.* Customer e-retail usage weakens the positive relationship between CS and SOV (a) and SOW (b).

*H8.* Customer e-retail usage weakens the positive relationship between SOV and SOW.

### *3.4 Analytical model*

As demographic variables affect food e-tailing usage (Hood *et al.*, 2020; van Droogenbroeck and van Hove, 2017) and may also influence other variables and inter-variable relationships, we controlled for gender, age, marital status and presence of children. This resulted in the analytical model in Figure 2.

**Figure 2.**  
Analytical model

## 4. Methodology

### 4.1 Sample and data collection

We chose regular customers of *My Basket* as our sample, the largest mini-supermarket chain in Japan. As the percentage of consumers who purchase groceries at three or more stores in a month is 57.4% in Japan (National Supermarket Association of Japan, 2020), customer overlap constantly; this helps reveal fill-in shopping behaviour. As in-store navigation fluency is not related to familiarity with the store for regular customers (Otterbring *et al.*, 2016) and they do not rely on as little information as novice customers (Evanschitzky and Wunderlich, 2006), we can easily observe the relationship between store attributes (price, service and convenience), evaluations and outcomes (CS and behavioural loyalty). In addition, as experiencing losses and gains over time reduces the sensitivity of store attribute evaluations to CS (Mittal *et al.*, 1998), a relatively new retail format is well suited to observe attitudes and behaviours formed from store attribute evaluations.

The chain considers the fill-in shopping trip customer as its primary target rather than the major shopping trip customer. This chain store has approximately 1,000 long-hour operation stores with 2,800–3,600 stock-keeping units on 200–265 square metres of floor space, mainly in urban residential areas. The trade area is the same as that of a convenience store: residents within a 500-m radius. The assortment is almost identical to a typical supermarket, except for the low share of miscellaneous goods. These features indicate that this chain is more suitable for fill-in-shopping trip customers.

We conducted an online survey with a leading research firm in 2019 (before the COVID-19 pandemic). After excluding respondents who had never shopped at the chain ( $n = 188$ ) and who spent more than 50% of their grocery purchases at that shop ( $n = 146$ ), we obtained 696 responses. That is, we defined fill-in shoppers as regular customers who shopped less than 50% of their total grocery purchases at the chain and used them in our analysis. The sample attributes were 49.0% women and 51% men, the mean age was 46.63 (Standard Deviation [SD] = 13.078), marital status was 36.9% single and 63.1% married, 51.3% had children and 48.7% did not have children.

### 4.2 Measurement

The constructs and measurement scales used in this study are reported in Table 1. For store attributes, we developed 17 questionnaire items, referring to the retail mix framework of Levy and Weitz (2012) and the scale of Hunneman *et al.* (2015). Repeated exploratory factor analysis (maximum likelihood estimation with Promax rotation) whilst deleting items with low commonality and factor loadings extracted stable factors. Factor analysis with the remaining ten items identified three factors (rotations converged after five iterations): price, service and convenience. These factors explained 75.832% of the variance. For CS, we used the Japanese Customer Satisfaction Index (JCSI), a Japanese equivalent of the American Customer

Construct	Measurement scales (11-point Likert scale)	Mean	Standardised deviation
Customer satisfaction	X <sub>1</sub> Based on my shopping experiences in the past year, I am satisfied with <i>My Basket</i> stores	7.379	1.969
	X <sub>2</sub> Based on my experiences in the past year, <i>My Basket</i> has been a good choice as my shopping destination	7.382	1.973
Price	X <sub>3</sub> <i>My Basket</i> helps enrich my everyday life	6.981	2.002
	X <sub>4</sub> Prices of the products at <i>My Basket</i> stores are low for the quality I get	7.098	1.826
	X <sub>5</sub> Items with special promotions at <i>My Basket</i> stores are low-priced	6.864	1.983
Service	X <sub>6</sub> Overall pricing at <i>My Basket</i> stores is low	7.261	1.877
	X <sub>7</sub> Sales personnel at <i>My Basket</i> stores provide me with prompt responses	6.927	1.905
	X <sub>8</sub> Sales personnel at <i>My Basket</i> stores provide me with services that I ask for	6.941	1.915
Convenience	X <sub>9</sub> Sales personnel at <i>My Basket</i> stores provide me services in a comfortable manner	6.864	1.922
	X <sub>10</sub> <i>My Basket</i> stores are conveniently located, and I find it easy to access	8.053	2.155
	X <sub>11</sub> I have a handy means of transportation to <i>My Basket</i> store(s)	7.739	2.120
	X <sub>12</sub> <i>My Basket</i> stores are located in good sites for the customers	7.888	2.074
	X <sub>13</sub> <i>My Basket</i> stores are located in good locations for me	8.098	2.088

**Table 1.**  
Constructs and  
measurement scales

Satisfaction Index (ACSI) in the USA and the European Customer Satisfaction Index (ECSI) in Europe, which has established scale reliability and is suitable for surveys in Japan (Ono, 2010). We measured these using three items. All items were measured on an 11-point Likert scale (the higher the score, the stronger the agreement).

For relative retail patronage behaviour, we employed SOW, which many studies have used, and SOV as suggested by Mägi (2003) and Blut *et al.* (2018). Referring to Ailawadi *et al.* (2014), we asked what percentage of total spending and visits in grocery purchases were accounted for by spending and visits at the target mini-supermarkets. The response of SOW was distributed between 1 and 45%, with a mean value of 14.40% (SD = 10.992). The SOV was distributed between 1 and 90%, with a mean value of 18.28% (SD = 15.496). Following previous studies (Hunneman *et al.*, 2015), we logit transformed these relative retail patronage scales. Following this, the SOW scores were distributed between -4.60 and -0.20, with a mean of -2.1029 (SD = 1.00219). SOV scores were distributed between -4.60 and 2.20 with a mean of -1.8215 (SD = 1.10117).

For e-retail usage, we asked respondents directly about their use of Internet shopping and home delivery. Whilst the relevant literature often uses "Internet usage" as a moderator, focussing on the customer's experience of obtaining groceries is essential for this study. We measured how respondents used Internet shopping and home delivery on an 11-point Likert scale and defined customers who responded to both with "1 = not at all" as those who do not use e-retail and the rest as those who use it. One hundred eighty-two respondents did not use Internet shopping, 304 did not use home delivery and 134 (19.3%) did not use both.

We used the following demographic variables as control variables: gender, age, marital status and the presence of children. We used dummy variables: assigning a score of one for men and zero for women based on gender; one for single and zero for married for marital status and one for those with no children and zero for those with children. For age, the actual scores obtained from the survey were used directly in the analysis.

#### 4.3 Common method variance

We took the explanatory variables and outcomes from the same sample, which may introduce common method bias, but found no concerns. We performed Harman's single-factor and common latent factor tests (Podsakoff *et al.*, 2003). Harman's single-factor test found five factors, with the first factor contributing 42.45%, which was not a majority. In the common latent factor test, we estimated models connected to all observed variables and common latent factors as well as models without common latent factors, respectively. Then, we compared the results. The difference in standardised coefficients between the two models was within 0.2 (distributed between 0.081 and 0.136) and all paths were positive and significant ( $t = 3.997, p < 0.01$ ).

### 5. Analyses and results

#### 5.1 Reliability and validity

We confirmed the validity and reliability of the constructs using confirmatory factor analysis and found no concerns. The fit index of the whole model showed a good fit: chi-square and degrees of freedom ( $\chi^2 = 102.792, df = 59, p < 0.000$  and adjusted  $\chi^2 = 1.742$ ), comparative fit index (CFI = 0.994), standardised root mean squared residual (SRMR = 0.021) and root mean square error of approximation (RMSEA = 0.033). Cronbach's alpha and composite reliability were above the cut-off of 0.6 (Nunnally, 1978; Bagozzi and Yi, 1988), and the average variance extracted was above the cut-off of 0.5 and above the square of the correlation coefficient between constructs and above the maximum shared squared variance scores (Fornell and Larcker, 1981). Detailed figures are reported in Table 2.

#### 5.2 Hypotheses testing

**5.2.1 Structural model assessment.** We tested the hypotheses via covariance-based structural equation modelling (CBSEM) using the Maximum Likelihood Estimation for three reasons. First, the constructs included in our model are seen as common factors explaining the covariance between the relevant indicators (Sarstedt *et al.*, 2016); second, the sample size is above the threshold; thus, the accuracy of the parameters can be expected (Reinartz *et al.*, 2009; Sarstedt *et al.*, 2016) and third, as this study was conducted in a different context (Japan), emphasis needs to be placed on the consistency of the parameters (Reinartz *et al.*, 2009). Furthermore, recent CBSEM packages that have implemented methods for managing small samples and non-normality also influenced our decision.

The results of the path analysis with structural equation modelling using four constructs, two retail patronage behaviour variables and four control variables showed a good fit: Chi-square and degrees of freedom ( $\chi^2 = 201.236, df = 120, p < 0.000$  and adjusted  $\chi^2 = 1.677$ ), CFI = 0.991, SRMR = 0.020 and RMSEA = 0.031. These values are appropriate when the observed items are 12–30 and the sample size is above 250 (Hair *et al.*, 2013). A sufficiently low SRMR value of 0.020 ( $< 0.080$ ; Hu and Bentler, 1998) suggests that the nature of the data follows a common factor model (Sarstedt *et al.*, 2016), justifying the CBSEM adoption.

	CA	CR	AVE	MSV	P	C	S	CS
Price (P)	0.918	0.860	0.672	0.412	0.820 <sup>a</sup>			
Convenience (C)	0.933	0.905	0.762	0.244	0.494	0.873 <sup>a</sup>		
Service (S)	0.856	0.926	0.806	0.328	0.573	0.439	0.900 <sup>a</sup>	
Customer satisfaction (CS)	0.926	0.920	0.794	0.412	0.642	0.401	0.505	0.891 <sup>a</sup>

**Note(s):** CA = Cronbach's alpha, CR = composite reliability, AVE = average variance extracted, MSV = maximum shared variance and <sup>a</sup> = square root of the AVE value

**Table 2.**  
Reliability, validity and  
correlation of  
constructs



5.2.2 *Direct effects.* The results of the hypothesis testing regarding the direct effect are presented in Table 3. The results supported H1c, H2a, H2b, H3a and H4. Note that H1b (path from service to SOV) was not supported because the sign was negative, although the coefficient was significant ( $\beta = -0.100, p < 0.05$ ). The effects of the control variables on the retail patronage behaviour variables (SOV and SOW) suggested a significant negative effect of age on SOV ( $\beta = -0.085, -0.167/-0.006$  of Lower/Upper limit of 95% confidence intervals,  $p = 0.035$ ). In contrast, the other variables had no effect.

5.2.3 *Mediating effects.* We estimated bias-corrected 95% confidence intervals, the most accurate estimation for mediation analysis (MacKinnon *et al.*, 2004), using the parametric bootstrapping method (Efron and Tibshirani, 1994) based on 5,000 bootstrap samples to confirm the mediating effect (Hayes, 2022). The results are presented in Table 4 and support H5a, H5b and H5c, relying on MacKinnon *et al.* (2002). The path from price to SOV was non-significant ( $p = 0.723$ ), whereas that from price to SOV via CS was significant ( $p = 0.011$ ), suggesting full mediation. The path from service to SOV was negatively significant ( $p = 0.047$ ), that from service to SOV via CS was positively significant ( $p = 0.008$ ). The path from convenience to SOV and convenience to SOV via CS were significant ( $p < 0.001, = 0.041$ ), whereas that from convenience to CS was not significant ( $p = 0.067$ ). These results suggest partial mediation.

5.2.4 *Moderating effects.* Further, we performed a multi-group moderation analysis using the chi-square difference method to reveal the moderating effect of e-retail usage in forming retail patronage behaviour (SOV and SOW). The results in Table 5 support H7b and H8 but not H6a, H6b, H6c and H7a. E-retail usage does not significantly moderate the direct effects of store attribute variables (price, service, convenience) and CS on SOV (differences in  $\chi^2$  values

	Hypothesised paths	$\beta$	Lower bounds	Upper bounds	<i>p</i> -value	Hypotheses testing
H1a	Price (P)→SOV	0.022	-0.101	0.148	0.723	Not supported
H1b	Service (S)→SOV	-0.100	-0.200	-0.002	0.047	Not supported
H1c	Convenience (C)→SOV)	0.192	0.100	0.280	0.000	Supported
H2a	Price(P)→CS	0.500	0.407	0.580	0.000	Supported
H2b	Service (S)→CS	0.187	0.104	0.267	0.000	Supported
H2c	Convenience (C)→CS	0.072	-0.004	0.146	0.067	Not supported
H3a	CS→SOV	0.137	0.029	0.244	0.013	Supported
H3b	CS→SOW	0.007	-0.036	0.051	0.733	Not supported
H4	SOV→SOW	0.833	0.807	0.857	0.000	Supported

**Table 3.**  
Results for structural equation analyses

**Note(s):**  $\beta$  = standardised regression weight, Lower/Upper bounds values are bias-corrected 95% confidence intervals and *p* is the value of the two-tailed significance probability

	Hypothesised paths	Mediator	Total effects	Direct effects	Indirect effects	Standardised regression weight		<i>p</i> -value	Hypotheses testing
						Lower bounds	Upper bounds		
H5a	Price (P)→SOV	CS	0.090 (0.055)	0.022 (0.063)	0.069 (0.028)	0.016	0.127	0.011	Supported
H5b	Service (S)→SOV	CS	-0.074 (0.050)	-0.100 (0.051)	0.026 (0.012)	0.006	0.054	0.008	Supported
H5c	Convenience (C)→SOV	CS	0.202 (0.046)	0.192 (0.046)	0.010 (0.007)	0.0000	0.028	0.041	Supported

**Table 4.**  
Mediation analysis results

**Note(s):** Values in parentheses are standard errors, Lower/Upper bounds values are bias-corrected 95% confidence intervals and *p* is the value of the two-tailed significance probability

**Table 5.**  
Moderation analysis  
results

	Hypothesised paths	$\chi^2/Df$	$\beta$		Hypotheses testing
			e-retailing usage: Yes	e-retailing usage: No	
H6a	Price (P)→SOV	0.233	0.001 (-0.150, 0.149)	0.075 (-0.204, 0.329)	Not supported
H6b	Service (S)→SOV	0.101	-0.101 (-0.211, 0.013)	-0.134 (-0.361, 0.099)	Not supported
H6c	Convenience (C)→SOV	0.066	0.178** (0.074, 0.285)	0.237* (0.037, 0.425)	Not supported
H7a	CS→SOV	0.010	0.150* (0.028, 0.274)	0.122 (-0.199, 0.364)	Not Supported
H7b	CS→SOW	7.758**	-0.019 (-0.068, 0.031)	0.106* (0.021, 0.185)	Supported
H8	SOV→SOW	15.140***	0.818** (0.785, 0.847)	0.875* (0.821, 0.917)	Supported

**Note(s):**  $\beta$  = standardised regression weight, Values in parentheses are Lower/Upper bounds values of bias-corrected 95% confidence intervals, \* is  $p < 0.05$ , \*\* is  $p < 0.01$  and \*\*\* is  $p < 0.001$

are non-significant). Regarding moderating effects of e-retail usage on CS-retail patronage behaviour (SOV and SOW) relationship, the results supported the moderating effect of e-retail use on CS-SOW and SOV-SOW relationships (difference in  $\chi^2 = 7.758, 15.140, p = 0.005, < 0.001$ ), whilst providing no evidence that it affected the CS-SOV relationship (difference in  $\chi^2 = 0.010, p = 0.919$ ). This means that e-retailing usage moderates the relationship between CS and SOV and between SOV and SOW.

## 6. Discussion and conclusion

### 6.1 Findings and discussion

Our moderated path analyses for shaping retail patronage formation in fill-in shopping in the age of retail digitalisation provided three findings. First, our proposed model suggests two ways to increase SOW. One is to increase SOV (H4) and another is to increase CS amongst those who do not usually use e-retailing (H7b). However, the influence of SOV and (e-retail non-users) CS on SOW was markedly different: the impact of SOV was strong (standardised direct effect = 0.833), whereas that of (e-retail non-users) CS was weak (standardised direct effect = 0.106). Hence, increasing SOV is an effective means of increasing SOW. Increasing SOV can be achieved in several direct/indirect ways. The direct way to increase SOV is to reduce service ratings and increase convenience ratings (standardised direct effects = -0.100 and 0.192).

Interestingly, price, regarded as the most influential factor of retail patronage in retail literature, did not directly affect SOV. Customers that frequently evaluate price are more sensitive to price (Bolton *et al.*, 2004), thus spreading their budget across multiple outlets in search of the best deal (Van Heerde *et al.*, 2008), which may have caused the results. The indirect pathway increases SOV via CS by increasing price, service and convenience ratings (standardised indirect effects = 0.069, 0.026 and 0.010, respectively). As existing literature suggests, store attribute evaluations and CS play important roles in retail patronage formation (e.g. Blut *et al.*, 2018; Hunneman *et al.*, 2015).

Second, we identified the impact of retail digitisation in the retail patronage formation model of fill-in shopping by examining the moderating effect of customers' e-retailing usage. The results of the moderation analysis suggest the influence of customers' use or non-use of e-retailing on SOW formation. As mentioned above, only for e-retailing non-users, SOW increases when CS increases ( $\beta = 0.106, p = 0.012$ ). Although existing research demonstrated a positive relationship between store satisfaction and SOW (Hunneman *et al.*, 2015; Shaikh *et al.*, 2018), the present study confirmed this relationship only for customers not using e-retailing options. In addition, the degree to which SOV increases SOW is higher for customers who do not use e-retailing ( $\beta = 0.875, p < 0.001$ ) than for those who use e-retailing

( $\beta = 0.818, p = 0.001$ ). In other words, e-retailing users are less likely to achieve relative retail patronage in grocery fill-in shopping at physical outlets than non-users. This result is consistent with existing research finding that multi-channel grocery shoppers expand the SOW allocated to the chains they visit online (Melis *et al.*, 2016).

Third, via analysis, we found that service evaluation plays an unexpected role in the overall model. The lower the assessment of service, the higher the SOV ( $\beta = -0.100, p = 0.047$ ), but the higher the evaluation of service, the higher the CS ( $\beta = 0.187, p < 0.001$ ) and the higher the evaluation of CS, the higher the SOV ( $\beta = 0.137, p = 0.013$ ). The lower the service rating, the higher the SOV may be because customers prefer more simplified services in fill-in shopping. Whilst improving in-store customer service ratings is important for food retailing to increase CS (Huddleston *et al.*, 2009), we might need a different perspective when examining relative retail patronage behaviour. In the present empirical analysis, the overall effect of the service on SOV was negative; thus, the negative direct effect was larger than the positive indirect effect. Nevertheless, based on our findings, the decision is to choose between increasing SOV by investing in-store services and increasing CS or increasing SOV by omitting store services.

### 6.2 Implications

The theoretical implications of this study are as follows. First, we showed that the multi-attribute utility model based on the S-O-R theory has explanatory power in fill-in shopping at mini-supermarkets. In this regard, our contribution was to confirm the scope of the theoretical model in retail patronage formation research. Second, we clarified the relationship between SOW and SOV in relative patronage formation path structure. Although we noted that SOW and SOV are highly correlated but not the same variable (Mägi, 2003), few studies have addressed this relationship. Therefore, this study is meaningful as it deepens the academic understanding of relative retail patronage behaviour. Third, in fill-in shopping, we identified the moderating effect of e-retail usage status on the formation of relative retail patronage behaviour. Despite relatively small effects of Internet shopping on grocery retail, the results still suggest that the e-retail shopping experience influences retail patronage formation in in-store purchases as in the pioneering retail literature (Melis *et al.*, 2016). The positive relationship between store satisfaction and SOW (Hunneman *et al.*, 2015) was only confirmed for e-retail non-users in this study, which buttresses the impact of digitalisation on retail patronage formation.

The practical implication is that the factors that form relative retail patronage in fill-in shopping, as revealed by this study, will provide clues for practitioners in retail management and strategy building. As higher evaluations of price and convenience directly or indirectly help form retail patronage in fill-in shopping, practitioners must continue to improve these parameters. Concerning service, practitioners need to choose between increasing SOV by simplifying staff service or by increasing CS through a more helpful staff service. In addition, younger customers tend to have higher SOV, which can help practitioners determine favourable store locations and customer communication.

### 6.3 Limitations

The limitations of this study are as follows. First is the survey's limited scope (fill-in shoppers in urban mini-supermarkets in Japan). Although we assumed that fill-in shopping in large cities with diverse choices in grocery purchases is similar globally, there may be socio-cultural system influences on the Japanese study (Arnold *et al.*, 1983; Hofstede *et al.*, 2002). Second, unaccounted factors that explain relative retail patronage formation remain (the R-squared score was as low as 0.089 for SOV and as high as 0.705 for SOW, but SOV explains most of it). Note, however, that explanatory power for retail patronage behaviour (not the

attitude) is approximately 10% in the relevant literature (Blut *et al.*, 2018). Therefore, the explanatory power was not low in only our study as similar trends were observed in prior literature. Third, we were unable to provide logical explanations for the unsupported hypotheses. We must carefully consider why the hypotheses were not supported from the perspective of the relied-upon theory, the obtained observational data and the statistical processing technique.

#### 6.4 Conclusion

This study concluded that various factors, directly and indirectly, influence the model of relative retail patronage behaviour in grocery fill-in shopping, with the impact of retail digitisation emerging in some inter-variable relationships. This study fills a research gap in which, despite the growing relative importance of grocery fill-in shopping, research results still meet the practical requirements of the era of retail digitalisation.

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## Appendix

We conducted the following four-step systematic review using "Scopus" to explore the latest developments in grocery retail patronage formation research in the era of widespread online shopping. In the first step, we successively fed in search terms to narrow down the relevant literature. First, we checked whether the search term "grocery" appeared in the headings, abstracts and keywords of academic articles. We found 1,743 articles in the field of "Business, Management and Account" since 2000, when the diffusion of digital technology in the retail sector began. The search was then narrowed down by adding the terms "digital" and "retail" and 203 papers were found. When the search was further narrowed down to articles published in reputable journals (impact factor of 1 or more), 187 papers were found. In the second step, we eliminated papers that did not address retail management or retail marketing: of the 187 articles, 65 were studies unrelated to retail management and retail marketing, such as human resources, supply chain, productivity and system optimisation issues. Of the remaining 122 papers, 86 did not address retail patronage in the broad sense (CS or store loyalty, but also retail brand equity, engagement, store choice, etc.). In comparison, the remaining 36 papers discussed retail patronage. In the third step, we scrutinised 36 papers discussing food retail patronage and found that 22 studies focussed solely on online (including qualitative and conceptual papers), whilst 12 focussed on real shops. The 12 articles were further scrutinised; four were (almost) unrelated to retail digitalisation and the remaining eight discussed the impact of retail digitalisation on the formation of retail patronage in real outlets.

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