The Effects of Multichannel Shopping on Customer Spending, Customer Visit Frequency, and Customer Profitability

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ABSTRACT Multichannel strategy—in which firms offer their products or services using multiple outlets—gives firms an opportunity to tap into their broader customer base while also enhancing their shopping convenience. In this study, we investigate the antecedents of multichannel shoppers using both actual and stated behavioral data. Furthermore, we quantify the consequences of multichannel shopping along three dimensions: customer spending, customer visit frequency, and customer profitability. Our results suggest that customer-intrinsic factors have a significant effect on multichannel shoppers with customers' technical expertise and internet service adoption having a positive impact, and deal sensitivity and shopping experience having a negative impact on multichannel adoption. Furthermore, multichannel shopping has significant positive effects on customer spending, customer visit frequency, and customer profitability. Our results provide a better understanding of customers' multichannel shopping behavior along the stated dimensions that can be used for effective multichannel decision making by firms.

Multichannel strategy, combined with the use of multiple touch points to engage with customers, has become customary practice for all firms alike (Kannan, Reinartz, and Verhoef 2016). In addition to being exposed to a variety of products, customers can now make purchases across multiple channels offered by firms such as "brick and mortar" stores (offline channel/physical store), online channels (websites), mail order, and catalogs, among others. Firms are increasingly interacting with customers across multiple channels to engage with them as a part of their multichannel strategy (Grewal, Levy, and Kumar 2009). Such proliferation of channels with multiple objectives creates extensive challenges for researchers and practitioners alike to understand customers' multichannel shopping behavior (Neslin et al. 2006).

In such a multichannel environment, on the one hand, firms have divergent goals and objectives (Sarner 2015); on the other hand, customers' shopping behavior has become complex (De Keyser, Schepers, and Konuş 2015). Thus, managing the marketing (Kumar and Venkatesan 2005) and communication mix (Dinner, Van Heerde, and Neslin 2014) has become critical for firms to formulate their multichannel strategy. However, these marketing tools in themselves are not sufficient and effective, since several other factors influence customers' multichannel shopping behavior, such as customer demographics (Bhatnagar and Ghose 2004; Kushwaha and Shankar 2013) and customer psychographics (Konus, Verhoef, and Neslin 2008; Gensler, Verhoef, and Böhm 2012). In addition to these aforementioned factors, there are several external factors that also need to be taken into consideration for an effective multichannel strategy, such as situational or environmental factors (Keen et al. 2004). Thus, understanding the interplay of these factors across multiple channels (although complex) is becoming more important. Therefore, investigating the several factors that affect multichannel shopping has become salient to effectively manage firms' multichannel strategy.

This study advances the understanding of multichannel strategy by examining both the antecedents and consequences of multichannel shopping (most prior studies have examined one or the other). Following prior literature, we use an exhaustive list of antecedents to explore multichan-

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nel shopping behavior based on both actual and stated behavior. In contrast, past research has typically examined either actual or stated behavior but not both. Also, we capture the consequences of multichannel shopping along three dimensions—customer spending, customer loyalty (as captured by visit frequency), and customer profitability—after controlling for a large number of relevant variables and estimate them jointly.

Based on the existing studies, we consider an exhaustive and rich set of antecedents that affect multichannel shopping. In table 1, we outline a list of antecedents used in our study in comparison to the existing research wherein we also note our contribution vis-à-vis other studies. We divide these antecedents into two categories, internal and external. Internal factors consist of firm-specific (marketing and communication mix) and customer-specific (customer-intrinsic factors, customer characteristics, and shopping attributes) correlates that directly affect multichannel shopping and are implicit considerations in the firm's multichannel strategy. Furthermore, customer-specific covariates (e.g., demographics) can significantly explain the heterogeneity across multichannel shoppers (Montoya-Weiss, Voss, and Grewal 2003; Konuş et al. 2008; Gensler et al. 2012; De Keyser et al. 2015) and therefore are important in explaining differences in behavior across customers in a multichannel shopping environment. With regard to firm-specific factors, the most common covariates that have been reported to affect customer decisions in a multichannel setting relate to the marketing (Chu, Chintagunta, and Cebollada 2008; Valentini, Montaguti, and Neslin 2011; Melis et al. 2015) and communication mix (Thomas and Sullivan 2005; Montaguti, Neslin, and Valentini 2016) variables. External factors mostly constitute situational factors that are not under the direct control of firms. Nevertheless, they are critical in formulating a multichannel strategy.

In addition, the literature on multichannel marketing is reasonably extensive with regard to the consequences concerning multichannel customer behavior (Balasubramanian, Raghunathan, and Mahajan 2005; Neslin and Shankar 2009). In table 2, we present the various consequences of multichannel shopping on customer behavior outlined in previous studies and also our study. In this table, we also highlight the consequences that have been studied in prior literature and also provide an exhaustive comparison of outcome variable(s) that we include in our study and how it differs from prior work. For instance, previous work on this topic includes assessing the impact of customer and supplier specific activities on channel choice (Kumar and Venkatesan 2005), investigating relative benefits of shopping online versus offline (Forman, Ghose, and Goldfarb 2009), linking customer profitability because of channel adoption (Venkatesan, Kumar, and Ravishankar 2007; Montaguti et al. 2016), investigating customer channel migration patterns (Ansari, Mela, and Neslin 2007), and customer satisfaction in an online channel (Montoya-Weiss et al. 2003), to name a few. In this regard, we note that we also consider profitability (along with customer spending and loyalty) to be an important metric that has largely been ignored by past research.

In this study (extending prior research), we consider the role of a rich set of antecedents and multiple consequences of multichannel shopping. Additionally, in this research, we use a combination of revealed/actual (obtained through purchases/transactions) and stated (obtained through surveys) data for the same set of customers. Doing so enables us to get a clearer picture of the motivations that underlie customers' multichannel choice behavior and their subsequent responsiveness, thus allowing us to capture a richer facet of multichannel shopping. Retail strategies thus developed with a thorough understanding of customer behavior across multiple channels can help target specific segments of customers for appropriate channels (Valentini et al. 2011). An understanding of how multichannel shopping behavior translates into spending, loyalty, and profits while also looking at the role of the relevant factors as mentioned previously will prove useful for retailers in better managing their customers while also enabling them to compare the effectiveness of diverse marketing strategies for efficient allocation of promotion dollars.

To summarize, although research on multichannel shopping behavior is extensive and has considered many of the issues undertaken in this study, it is still devoid of substantial analysis involving multiple decision outcomes (estimated simultaneously) in the presence of multiple variables; this is an endeavor that we undertake in this research. However, we note that we make an incremental contribution to the multichannel marketing literature.

CONCEPTUAL FRAMEWORK

In figure 1, we present our conceptual framework. We focus on two important issues: antecedents and consequences of multichannel shopping.

Antecedents of Multichannel Shopping

Based on prior literature (e.g., Neslin et al. 2006; Blattberg, Kim, and Neslin 2008), we identify the antecedents of

multichannel shopping as marketing and communication mix variables, customer-intrinsic factors, customer characteristics (e.g., demographics), and situational factors.

Customer-Intrinsic Factors. These factors have a significant influence on multichannel shopping behavior (Montoya-Weiss et al. 2003; Gensler et al. 2012; De Keyser et al. 2015). In this context, utilitarian values related to impulse buying, variety seeking, innovativeness, and time pressure have significant effect on channel information search and ultimately adoption and purchases across offline and online channels (Noble, Griffith, and Weinberger 2005). For example, customers are less likely to engage in impulse buying and variety seeking in online environments (Business Insider 2015); therefore, those customers who are more inclined toward impulse buying and variety seeking may be more likely to visit and purchase predominantly from physical stores. Furthermore, innovative customers might prefer to use multiple channels to enhance their shopping experience (Steenkamp and Baumgartner 1992) and hence would exhibit multichannel shopping behavior. In addition, customers who are under time pressure might be more inclined to shop in physical stores to get immediate ownership of the product and therefore may be less likely to use/visit multiple channels for their shopping needs. If customers attribute a higher risk to internet transactions, it may deter them from making online purchases (Noble, Griffith, and Weinberger 2005), and such customers may shop from only offline channels. Thus, customers who are more facile with using internet technologies are more likely to be multichannel shoppers. Relatedly, customers who are more likely to stay engaged online through social media and online networking may be more likely to be multichannel shoppers. In summary, specific customer-intrinsic variables identify unified perceptions that the customers have concerning online and offline shopping environments, and these influence their multichannel shopping behavior. In this regard, customers who enjoy shopping (Balasubramanian, Raghunathan, and Mahajan 2005), have more experience with the firm (Kumar and Venkatesan 2005), and are looking for better deals would be more inclined to use multiple channels. Given the above, we recognize and highlight the prominent role played by customer-intrinsic factors in shaping multichannel choice.

Marketing and Communication Mix. Customers' decisions in a multichannel environment are influenced by the retailers' marketing mix strategies. Valentini et al. (2011) find differential impact of channel-specific prices and promotions on channel choice and subsequently product choice. Furthermore, Montaguti et al. (2016) find positive effects of promotional campaigns in inducing multichannel shopping behavior. Therefore, we consider prices and promotions in our framework. Marketing communications, consisting of both traditional and digital, have been shown to have a significant impact on multichannel shopping behavior (Thomas and Sullivan 2005; Ansari, Mela, and Neslin 2008). Different communications could influence multichannel shopping via own- and cross-effects wherein a certain mix of traditional and digital (e.g., catalogs, emails) media can have synergistic effects, while others cannot be optimal in a multichannel retailing environment. Owing to this, we include both traditional as well as digital communications in our framework. In the interest of space, we refer the reader to table 3 for details on the included marketing and communication mix variables.

Customer Characteristics. There is a significant effect of customer characteristics (e.g., demographics) on customers' multichannel shopping. For example, income and education positively influence multichannel shopping (Donthu and Garcia 1999; Kushwaha and Shankar 2008). Higher income customers possess the ability and resources to shop across multiple channels, and better educated customers tend to process information more efficiently across channels (Konus et al. 2008). However, whereas Ansari et al. (2008) find that age negatively affects multichannel shopping behavior, Strebel, Erdem, and Swait (2004) find evidence to the contrary. Due to their importance in predicting multichannel shopping behavior, we recognize their explanatory value and include them in our framework.

Situational Factors. Customer shopping dynamics in a multichannel environment are also dictated by factors such as store distance and purchases made for special occasions (Thomas and Sullivan 2005); therefore, we consider them in our framework.

Consequences of Multichannel Shopping

With respect to the consequences of multichannel shopping, the important issues identified by past literature are what happens to customer spending (Kushwaha and Shanker 2013) and how it affects customer loyalty and profitability (Kumar, Shah, and Venkatesan 2006). Therefore, consistent with prior research (Ansari et al. 2008; Montaguti et al. 2016), we evaluate the impact of multichannel shopping

Table 1. Antecedent of Multichannel Shopping

	Internal		External		
	Firm level		Customer level		
	Marketing mix	Communication mix	Customer-intrinsic factors	Customer characteristics	Situational factors
Montoya-Weiss et al. (2003)	✗	✗	Navigation structure perceptions	✗	✗
			Information content perceptions		
			Graphic style perceptions		
			General internet expertise		
			Channel service quality perceptions (online vs. others)		
			Online channel risk perceptions		
Thomas and Sullivan (2005)	Price	Direct marketing communication	✗	Relationship duration	Store distance
	Product category				
Venkatesan et al. (2007)	Price cuts	Direct mail	✗	Income, gender	Travel cost
	Immediate product availability	Email		Basket size, cross-buying, returns	
				Purchase frequency	
Ansari et al. (2008)	✗	Catalogs	Customer experience (operationalized using RFM (recency, frequency, monetary value variables)	Income	Situational factors (time trends)
		Emails		Age	
				Household size	
Konuş et al. (2008)	Product category	✗	Price consciousness	Age, gender	✗
			Loyalty	Education, income	
			Shopping enjoyment	Household size	
			Time pressure	Urbanization	
			Motivation to conform	Welfare	
			Innovativeness		
Valentini et al. (2011)	✗	- Email	✗	Age, gender	✗
		- Catalog		City dwellers	
				Returns	
				Sate dependence	
Gensler et al. (2012)	✗	✗	Channel perceived quality	Channel experience	✗
			Channel perceived convenience		

Table 1 (*Continued*)

	Internal		External		
	Firm level		Customer level		
	Marketing mix	Communication mix	Customer-intrinsic factors	Customer characteristics	Situational factors
			Channel perceived risk		
			Channel perceived price		
Dinner et al. (2014)	Promotion	Traditional ads	✗	✗	Special occasion
	Market characteristics	Online display ads			Unemployment rate
		Paid search ads			
		Competitors' ads			
De Keyser et al. (2015)	✗	✗	Innovativeness	Age	✗
			Risk aversion	Gender	
			Product complexity	Loyalty	
			Perceived price		
			Customer involvement		
Melis et al. (2015)	Price	✗	✗	Category share	✗
	Assortment			Brand share	
				Store preference	
				Online loyalty	
				Experience	
Breugelmans and Campo (2016)	Promotions	✗	✗	Consumption rate	✗
				Inventory	
				Loyalty	
				Category share	
Montaguti et al. (2016)	Promotion	Catalogs	✗	✗	✗
This study	Price	Email	Internet usage	Age	Special occasion
	Promotion	Catalog	Internet service adoption	Household size	Store distance
		Educational program	Technical expertise	Education	
			Shopping enjoyment	Gender	
			Impulse buying	Customer tenure	
			Variety seeking		
			Innovativeness		
			Time pressure		
			Online socialization		
			Online membership		

Note.—Drawing upon past studies our study uses an exhaustive list of antecedents to model many consequences of multichannel shopping (please see table 2).

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Table 2. Consequences of Multichannel Shopping

Study	Consequences of multichannel shopping on customer behavior	Major findings
Montoya-Weiss et al. (2003)	Overall satisfaction	Website design characteristics (information content, navigation structure, and graphic style) and customer evaluation of online channel (service quality and risk perception) drive online channel use and customer satisfaction.
	Online channel use	
Thomas and Sullivan (2005)	Channel choice	Marketing communications can be used to segment the consumers in a multichannel shopping environment.
Venkatesan et al. (2007)	Channel adoption duration	Multichannel shopper is more profitable. Frequency-related interaction characteristics and purchase-related interaction characteristic have the greatest effect on second and third channel adoption respectively.
Ansari et al. (2008)	Channel choice	Interaction of marketing communications (own and cross) have a significant effect on multichannel incidence and order size.
	Purchase frequency	
	Purchase size (order size)	
Konuş et al. (2008)	Channel usage for search	Consumer intrinsic factors composed of psychographics and F are a good predictor of multichannel segment membership.
	Channel usage for purchase	
Valentini et al. (2011)	Channel choice	Based on the evolution of customers channel choice decision processes there are two types of customer segments: stayer and learner, and the effectiveness of marketing strategies vary across them.
Gensler et al. (2012)	Channel choice for search, purchase, after-sales, checking and brokering	In an integrated channel choice process channel attributes, experience and spillover have significant effects on different usage situations in a multichannel environment.
Dinner et al. (2014)	Sales	There is a significant cross effect of advertising in one channel to the other channel. Online display is more effective than traditional advertising due to strong cross effects on the offline channel.
	Search Impression	
	Search click-through rate	
De Keyser et al. (2015)	Channel usage for search, purchase, and after-sales	Channel usage (search, purchase, and after-sales) can help in market segmentation (authors find six segments), and that psychographics can be a good predictor of segment membership.
Melis et al. (2015)	Channel choice	Offline environment (such as store preference and assortment) affect customers' online channel choice.
Breugelmans and Campo (2016)	Purchase incidence	Cross-channel promotions are asymmetric with promotion in one channel negatively affecting category purchase in another channel during the promotion period.
	Purchase quantity	
Montaguti et al. (2016)	Customer profit	Properly designed marketing campaigns induce multichannel shopping (i.e., increases the number of multichannel customers) and improve customer profitability.
This study	Channel choice	Marketing and communication mix variables, customer-intrinsic factors and situational factors are important determinants of multichannel shopping behavior. Multichannel shopping has positive effects on customer responses (spending, visit frequency, and profitability).
	Customer spending	
	Customer visit frequency	
	Customer profitability	

Note.—Please see table 1 for details regarding the antecedents.

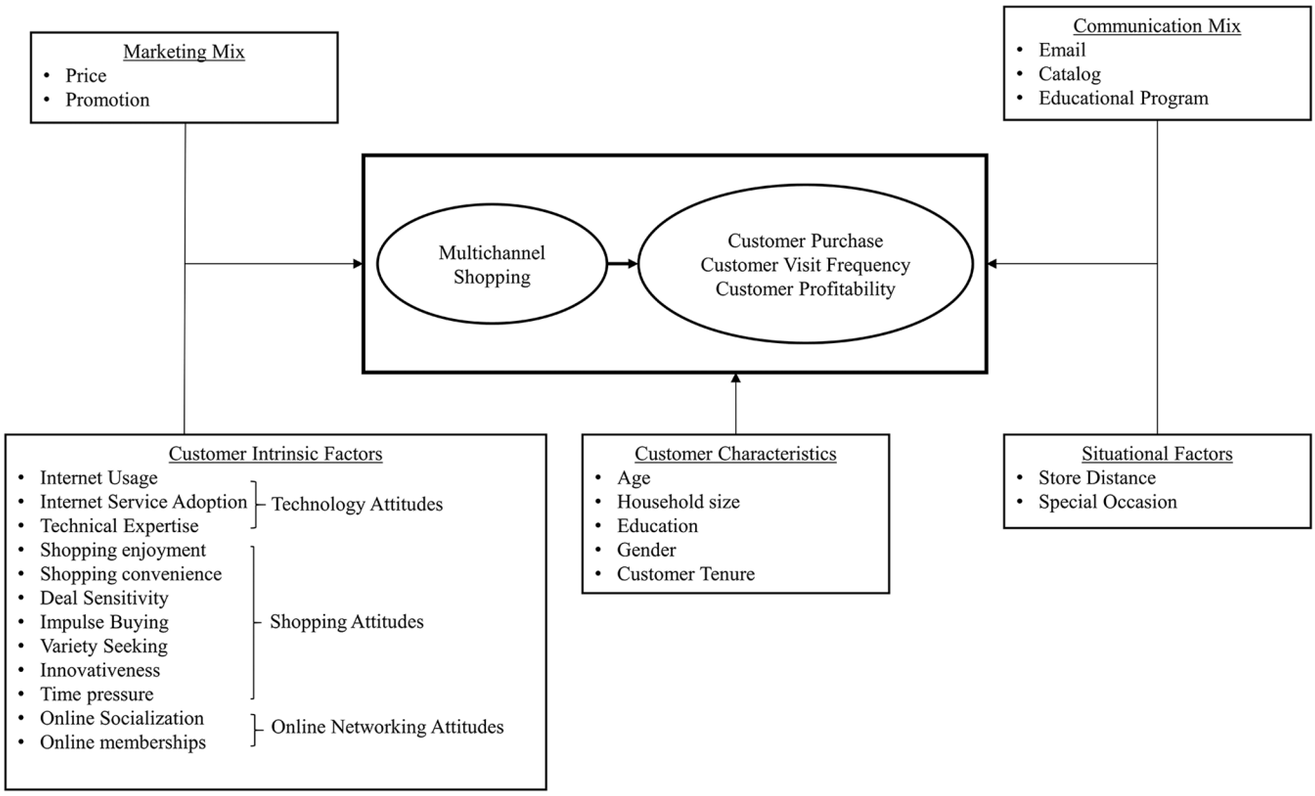

Figure 1. Conceptual framework.

along the three dimensions of customer spending, visit frequency, and profitability. Customer spending is a metric that affects retailers' bottom line, customer visit frequency can serve as a proxy for customer loyalty, and customer profitability directly affects firm-performance. In line with past literature, we expect multichannel shopping to increase customer spending (Ansari et al. 2008) and customer profitability (Montaguti et al. 2016). While no studies on multichannel shopping investigate its effect on customer visit frequency (extant studies use proxies such as channel choice (Thomas and Sullivan 2005; Melis et al. 2015), channel usage (De Keyser et al. 2015), and channel adoption duration (Venkatesan et al. 2007)), we expect multichannel shopping to increase customer visit frequency based on loyalty and switching cost theory. The loyalty programs of many multichannel retailers encourage customers to visit the store frequently thereby creating footfalls or foot traffic—which indeed is a metric tracked by industry as a measure of how well a firm is doing (Handly 2018). In addition, in a multichannel environment, customers adopting multiple channels tend not to be free riders (Van Bal and Dach 2005) due to high switching costs thereby increasing customer retention rates.

DATA AND MEASURES

The data set for this research comes from a leading retailer in the state of New York. The retailer sells alcohol and similar products. The retailer is one of the largest in the region with more than 50% market share. It uses a multichannel strategy to sell its products through both offline (physical stores) and online stores. For our empirical analysis, we use data spanning a 2-year period from January 2008 to December 2009 that contain sufficient purchase histories for a large number of households. We construct the data set for this study using multiple sources: transaction data, marketing and communication mix data, and survey data.

Transaction Data

Transaction data include both offline and online sales and promotion data at the customer level. The data obtained through customer loyalty cards for all of the products sold contain information pertaining to regular prices, all types of promotions, discounts, and costs at the individual stock-keeping unit (SKU) level across channels and also includes store visits. Moreover, for the individual SKUs, the relevant price/cost information is also available that enables us to

Table 3. Variable Operationalization and Summary Statistics

Measure	Variable	Symbol	Operationalization	Mean	SD
			Dependent measures		
Multichannel	Multichannel shopper	$MultiChannel_h$	1 if customer h is multichannel, 0 otherwise.	20%	
Customer responses	Customer spending	$Spending_{ht}$	Total $ spending by customer h ($/customer/qtr.)	731.14	362.48
	Customer visit frequency	$VisitFreq_{ht}$	Times customer h visited the retailer (per qtr.)	8.95	5.80
	Customer profitability	$Profits_{ht}$	Total $ profit from customer h ($/customer/qtr.)	213.06	99.55
			Independent measures		
Marketing mix	Price	$Price_{ht}$	Average price paid by customer h ($/ml)	.82	.41
	Promotion	$Promo_{ht}$	Proportion of items bought on deal by customer h	.43	.24
Communication mix	Email	$Email_{ht}$	No. of emails received by customer h	2.15	5.62
	Catalog	$Catalog_{ht}$	No. of catalog received by customer h	.52	.68
	Educational program	$EduProg_{ht}$	No. of educational program attended by customer h	.002	.008
Situational factors	Special occasion purchase	$SpecialOccasion_{ht}$	Purchases made on special occasion by customer h	1.24	1.12
	Store distance	$StoreDist_h$	Min. store distance of customer h (miles/customer)	2.93	3.41
Customer intrinsic	Internet usage	$IntUsage_h$	Please see app.	4.11	.64
Factors (technology attitudes)	Internet service adoption	$IntServAdop_h$		2.18	.65
	Technical expertise	$TechExprt_h$		3.22	.49
Customer intrinsic	Shopping enjoyment	$ShopEnjoy_h$		2.59	.95
	Shopping convenience	$ShopConv_h$		3.25	.59
Factors (shopping attitudes)	Deal sensitivity	$DealSen_h$		2.89	.47
	Impulse buying	$ImpulseBuying_h$		2.67	.53
	Variety seeking	$VarietySeeking_h$		3.54	.71
	Innovativeness	$Innovativeness_h$		3.01	.75
	Time pressure	$TimePressure_h$		2.94	.45
Customer-intrinsic factors (online networking attitudes)	Online socialization	$OnSocial_h$		1.75	.75
	Online membership	$OnMem_h$	No. of online memberships of customer h	2.12	4.98
Customer	Customer tenure	$CustTen_h$	Relationship duration of customer h (in weeks)	123.15	21.17
Characteristics	Age	Age_h	Age of customer h (in years)	38.23	14.56
	Household size	$HHSize_h$	Household size for customer h	3.03	6.93
	Education	Edu_h	Education of customer h (in years)	9.76	7.54
	Gender	$Gender_h$	1 if customer h is female, 0 otherwise.	39.50%	

Note.—The duration of the study period is two years from January 2008 to December 2009. The sample size consists of 785 customers; qtr. = quarter.

calculate customer profitability. We use the transaction data to compute the following variables.

Multichannel Shopper. We define a customer as a multichannel shopper (*MultiChannel*) if he or she has purchased at least once from both online and offline channels during the study period. Otherwise, we categorize the customer as a single-channel customer. Single-channel customers in our data set are all offline customers who shop exclusively in physical stores.

Customer Responses. *Spending* is the overall total dollar amount spent by a customer. Consistent with industry practice (Leinbach-Reyhle 2016) and academia (Kumar and Shah 2004) we use *VisitFreq*, the overall number of times the customer visits the store (both online and offline channels) as a proxy for customer loyalty. Finally, *Profit* is the total profit generated by a customer (prices minus costs which are then aggregated for each customer).

Marketing and Communication Mix Data

The data set has information pertaining to marketing and communication mix available at the individual SKU and customer level, respectively, which we use to calculate the following variables.

Marketing Mix. The marketing mix variables in our model constitute price (*Price*) and promotion (*Promo*). We use "category-price," which is operationalized as the weighted average price of the SKUs where the weights are given by the share of each SKU. Promotion is operationalized as the proportion of all SKUs bought on sale.

Communication Mix. Communication mix is operationalized at the individual level as a total number of emails (*Email*) opened by the customer, the total number of catalogs (*Catalog*) received by the customer, and the total number of educational programs (*EduProg*) attended by the customer.

Survey Data

We randomly selected 5,000 customers and surveyed them to obtain information on customer-intrinsic factors and customer characteristics. The survey was sent in early 2010. The survey featured questionnaires to capture factors that influence multichannel shopping as well as other relevant information. We received 1,249 responses, a response rate of 24.98%. After coding the data, we retained 785 customers for our analysis who filled the survey entirely. In our sample, we have 20% multichannel (using both online and offline channels) customers, and the other 80% are single-channel customers (those who shop exclusively in physical stores). We use the survey data to compute the following variables (see tables 1 and 3):

Customer-Intrinsic Factors. These factors that come from the survey are divided into three groups. First, factors that influence customer attitude toward technology and specifically involve the internet. We specifically label them as "technology attitudes." These include the extent of customers' internet usage (*IntUsage*), internet service adoption (*IntServAdop*), and technological expertise (*TechExprt*). Second, we label factors that influence customer's shopping behavior in a multichannel environment as "shopping attitudes." These include shopping enjoyment (*ShopEnjoy*), shopping convenience (*ShopConv*), deal sensitivity (*DealSen*), impulse buying (*ImpulseBuying*), variety seeking (*VarietySeeking*), innovativeness (*Innovativeness*), and time pressure (*TimePressure*). Finally, we include factors that affect customers' motivation for online networking and label them as "online networking attitudes." These include online socialization (*OnSocial*) and the total number of memberships a customer has in online networks (*OnMem*). We provide the relevant items for these scales and other details in the appendix, available online.

Situational Factors. The variable *SpecialOccasion* is defined as a total number of purchases made by a customer during these special occasions.[1] The store distance (*StoreDist*) is operationalized as actual customers' distance from the nearest store in miles. q7

Customer Characteristics. The customer characteristics include customer's age in years (*Age*), the total number of members in the customer's household (*HHSize*), customer's education in years (*Edu*), and customer's gender (*Gender*), which takes value of 1 if the customer is female and 0 otherwise. We use the duration of customers' relationship with the retailer (*CustTen*) as the proxy for customer tenure.

We note that a concern could be that the customer-intrinsic factors measured in the survey (which was done

1. Special occasions are defined as the holidays of Christmas, New Year, Halloween, Columbus Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Valentine's Day, and Mother's Day. We include special occasion because customers can make purchases during such periods for unique purposes such as gift giving, buying for family gatherings, and parties, etc.

after observing the purchase behavior) may or may not be stable during the data analysis period. To establish that they are stable, we conduct an analysis (outlined in the appendix) and find that they do not change that much within the 1-year data analysis period.[2]

Summary Statistics

The summary statistics of the model variables are provided in table 3. On average, customers visit nine times, generating $731.14 in sales and $213.06 in profit quarterly. Customers in the sample receive 2–3 emails, whereas the educational program is attended very sparsely. The average customer age is 38 years with 10 years of education. The sample has approximately 40% female customers.

METHODS

We use separate models to investigate the antecedents of customers' participation in multichannel shopping and its consequences the details of which follow.

Modeling Stage 1: Antecedents of Multichannel Shopping

Let $MultiChannel_h$ be a binary variable that takes a value of 1 if customer h is shopping across multiple channels and 0 otherwise. Let U_h be the corresponding utility for customer h. We model this latent utility, U_h, as a function of marketing and communication mix variables, customer-intrinsic factors and customer characteristics (captured through customer heterogeneity) as follows:

$$\begin{aligned} U_h &= \alpha_{0h} + \alpha_1 IntUsage_h + \alpha_2 IntServAdop_h \\ &\quad + \alpha_3 TechExprt_h + \alpha_4 ShopEnjoy_h + \alpha_5 ShopConv_h \\ &\quad + \alpha_6 DealSen_h + \alpha_7 ImpulseBuying_h \\ &\quad + \alpha_8 OnSocial_h + \alpha_9 OnMem \\ &\quad + \alpha_{10} Price_h + \alpha_{11} Promo_h + \alpha_{12} Email_{ht} \\ &\quad + \alpha_{13} Catalog_{\mathrm{ht}} + \alpha_{14} EduProg_{\mathrm{ht}} + \epsilon_h, \end{aligned} \tag{1}$$

where the effects of technology attitudes are captured through variables: internet usage (*IntUsage*), internet service adoption (*IntServAdop*), and technical expertise (*TechExprt*), the effects of shopping attitudes captured through shopping enjoyment (*ShopEnjoy*), shopping convenience (*ShopConv*), deal sensitivity (*DealSen*), and impulse buying (*ImpulseBuying*); and the effects of online networking attitudes captured through the variables online socialization (*OnSocial*) and online membership (*OnMem*). The effects of marketing mix is captured through average price (*Price*) and promotion (*Promo*) availed, whereas the effects of communication mix is captured using the variables *Email*, *EduProg*, and *Catalog*. We capture the customer heterogeneity using the random effects for the inherent preference parameter (α_{0h}). The relationship between the observed variable and the latent utility is given by

$$MultiChannel_h = \begin{cases} 1 & \text{if } U_h > 0, \\ 0 & \text{otherwise.} \end{cases} \tag{2}$$

Assuming that the error term follows a normal distribution, that is, $\epsilon_h \tilde{} N(0, \sigma^2)$, the specification leads to binary probit.

Modeling Stage 2: Consequence of Multichannel Shopping

Let $Spending_{ht}$, $VisitFreq_{ht}$, and $CustProfit_{ht}$ be customer spending, customer visit frequency, and customer profitability for customer h for a given period of time t (we use quarterly measure).

$$\begin{aligned} \log(Spending_{ht}) &= \eta_{0h} + \eta_1 Price_{ht} + \eta_2 Promo_{ht} \\ &\quad + \eta_3 SpecialOccasion_{ht} \\ &\quad + \eta_4 VarietySeeking_h + \eta_5 Innovativeness_h \\ &\quad + \gamma MultiChannel_h + \xi_{ht}, \end{aligned} \tag{3}$$

$$\begin{aligned} \log(VisitFreq_{ht}) &= \theta_{0h} + \theta_1 Email_{ht} + \theta_2 EduProg_{ht} \\ &\quad + \theta_3 Catalog_{ht} + \theta_4 ImpulseBuying_h \\ &\quad + \theta_5 TimePressure_h + \theta_6 StoreDist_h \\ &\quad + \lambda MultiChannel_h + \varsigma_{ht}, \end{aligned} \tag{4}$$

$$\begin{aligned} \log(Profit_{ht}) &= \beta_{0h} + \beta_1 Price_{ht} + \beta_2 Promo_{ht} \\ &\quad + \beta_3 SpecialOccasion_{ht} \\ &\quad + \beta_4 Innovativeness_h + \beta_5 CustTenure_{ht} \\ &\quad + \delta MultiChannel_h + \zeta_{ht}. \end{aligned} \tag{5}$$

A few issues about the above model given in equations (3)–(5) need clarification. Since the three responses are estimated jointly, we need exclusion restrictions to identify the model. In other words, we cannot have the same variables in all

2. We thank an anonymous reviewer for this suggestion.

three equations. We use price (*Price*) and promotion (*Promo*) in each of the equations since we expect marketing mix variables to affect each of the above responses. Similarly, we use the variable *MultiChannel* in each of the equations because we want to understand the impact of multichannel shoppers on each of the responses. The variables *SpecialOccasion* and *Innovativeness* are included in customer spending and profits equations because special occasions can accelerate customer purchases, thereby affecting spending and profits. Likewise, customers who are more innovative could be willing to buy more, thus affecting spending and profits. However, there is no straightforward reason to expect these variables to differentially affect the response of visit frequency (a proxy for loyalty). We include the variable *VarietySeeking* in the customer spending equation because customers who like variety for the category under consideration in our analysis (wine) might be likely to buy more (e.g., have a certain varietal of wine like white and red for specific meals). Customers who are more prone to impulse buying and time pressure could be less likely to shop around for deals, thus staying more loyal to the firm. Similarly, customers who are physically close to the firm/store are more likely to be loyal to it. Finally, we expect customers who have a longer tenure with the firm to be more profitable customers and so include this variable in the profit equation. The error $\sum = (\xi_h,\ \varsigma_h,\ \zeta_h)'$ is distributed multivariate normal, that is, $\sum \sim MVN(0,\ \Omega)$, where Ω is a variance-covariance matrix.

The core parameters of interest in our model are γ, λ, and δ, which capture the effect of multichannel shoppers on spending, visit frequency, and profitability, respectively. We note that due to customer self-selection, *MultiChannel* is potentially endogenous. Therefore, following prior literature (Algesheimer et al. 2010; Papies, Ebbes, and van Heerde 2017), we use the instrument variable approach to account for this. In this regard, we use a linear probability model to predict the probability of a customer being multichannel (i.e., *MultiChannelPropen*) from the first stage and use this predicted *MultiChannelPropen* in the second stage instead of *MultiChannel*.

We capture heterogeneity using random effects in the intercept terms. More specifically, let $\Delta_h = [\eta_{0h},\ \beta_{0h},\ \theta_{0h}]'$l; then we have

$$\Delta_h = D_h\mathrm{K} + \mathrm{Y}_h, \tag{6}$$

where D_h is a matrix of customer characteristics of age (*Age*), household size (*HHSize*), education (*Edu*), and gender (*Gender*); K is the matrix corresponding to the coefficients associated with D_h; and $\mathrm{Y}_h \sim MVN(0, \Lambda)$ is the variance-covariance matrix, where Λ represents the residual correlation. We estimate our model using the Bayesian method where a multivariate normal distribution is used to model unobserved heterogeneity. Markov chain Monte Carlo (MCMC) techniques are used to estimate the parameters of the model.

RESULTS

Results Stage 1: Antecedents of Multichannel Shopping

In table 4, we present the results of stage 1. We find that technology attitudes such as internet usage (0.08, $p < .01$), internet service adoption (0.35, $p < .01$), and technical expertise (0.46, $p < .01$) positively correlate with the adoption of multichannel shopping. Concerning shopping attitudes, we find that shopping enjoyment (-0.04, $p < .10$) negatively correlates with multichannel shopping. Additionally, we find that effect of deal sensitivity (-0.08, $p < .10$) is marginal and negative. On the other hand, shopping convenience (0.12, $p < .05$) has a positive effect. We find that customers' motivation for online socialization (0.17, $p < .01$) positively correlates with their multichannel shopping behavior. Marketing mix factors such as price (1.90, $p < .01$) and promotion (9.14, $p < .01$) have a positive association with multichannel shopping. Similarly, communication mix such as email (0.02, $p < .01$) and catalog (2.94, $p < .05$) positively correlate with multichannel shopping. Finally, regarding customer characteristics, we mostly find only marginal significance for them. Our results indicate that customers with larger households (0.003, $p < .10$) and higher levels of education (0.02, $p < .05$) are more likely to become multichannel shopper, whereas older (-0.03, $p < .10$) and female (-0.55, $p < .10$) customers resist multichannel shopping. To make the estimates comparable, we present the elasticity analysis in figure 2. We find that customers' technical expertise and their proclivity for internet service adoption have a relatively larger positive influence on their multichannel shopping behavior. On the contrary, customers who are deal sensitive and give importance to shopping convenience resist multichannel shopping.

While some of our results corroborate the findings from earlier research with respect to customer-intrinsic factors (Montoya-Weiss et al. 2003; Konuş et al. 2008), and customer characteristics (Venkatesan et al. 2007; Valentini et al. 2011; Melis et al. 2015), we find contrasting results for these variables as well. For example, on the one hand, technology attitudes such as technical expertise and internet service adoption boost multichannel shopping, on the other hand, shopping attitudes such as deal sensitivity

Table 4. Parameter Estimates from Stage 1

	Variables	Parameter	D
	Intercept	−9.8578***	3.5850
Customer-intrinsic factors (technology attitudes)	Internet usage	.0761***	.0198
	Internet service adoption	.3543***	.1281
	Technical expertise	.4615**	.2161
Customer-intrinsic factors (shopping attitudes)	Shopping enjoyment	−.0364*	.0219
	Shopping convenience	.1224**	.0600
	Deal sensitivity	−.0764*	.0427
	Impulse buying	.3756*	.2091
Customer-intrinsic factors (online networking attitudes)	Online socialization	.1692***	.0529
	Online membership	.0034	.0198
Marketing mix	Price	1.9002***	.7030
	Promotion	9.1358***	.9326
Communication mix	Email	.0184***	.0063
	Catalog	2.9361**	1.1486
	Educational program	−.2000	.1625
Customer characteristics (heterogeneity)	Age	−.0269*	.0152
	Household size	.0003*	.0002
	Education	.0231**	.0091
	Gender	−.5496**	.2526
Log marginal density		−278.34	

The log marginal density is computed using the Newton and Raftery (1994) approach.
* $p < .1$.
** $p < .05$.
*** $p < .01$.

and shopping enjoyment still favor the single channel (brick-and-mortar channel). Based on the importance and contrasting effects of these customer-intrinsic factors, we provide some insights into segmentation of multichannel customers in the managerial implications section.

Results Stage 2: Consequences of Multichannel Shopping

We present the parameter estimates of stage 2 model in table 5.

Effects of Multichannel Shopping. Our results show that multichannel shopping has a positive association with customer spending (0.0328, $p < .01$), visit frequency 1.8469, $p < .05$), and customer profitability (0.0926, $p < .01$). More specifically, customer spending and customer profitability increase by approximately 3.28% and 0.04%, respectively. Our results are consistent with prior findings on the positive effect of multichannel shopping on spending (Ansari et al. 2008; Breugelmand and Camp 2016), visit frequency (Ansari et al. 2008), and profitability (Montaguti et al. 2016).

Effects of Marketing and Communication Mix. As expected, price has a negative correlation with spending (−0.8116, $p < .01$) and a positive correlation with profitability (0.3682, $p < .01$). However, promotions positively affect spending (3.2182, $p < .01$) but hurt profitability (−1.8924, $p < .01$). Marketing communications, in general, have a significant positive correlation with customers' visit

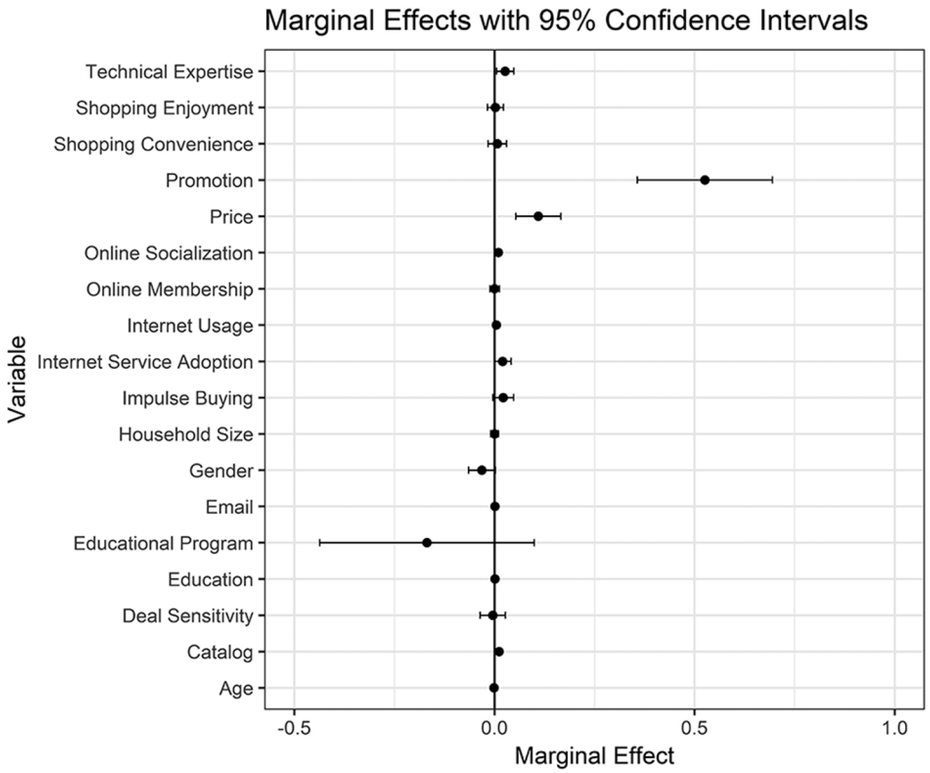

Figure 2. Marginal effects of stage 1 variables on multichannel shopping.

frequency. Results indicate that catalog (1.6219, $p < .01$) and email (0.3815, $p < .01$) have a strong effect, while educational programs (3.1239, $p < .10$) have a marginal effect on visit frequency. Unlike some prior studies on multichannel shopping that capture the effects of marketing and communication mix on single customer decision such as channel choice (Thomas and Sullivan 2005; Valentinit et al. 2011; Melis et al. 2015) or customer profitability (Montaguti et al. 2016), we capture their effects on multiple dimensions of customers' purchase behavior that are relevant for calculating return on investment from multichannel strategy.

Effects of Customer-Intrinsic Factors, Customer Characteristics, and Situational Factors. Our results show that innovativeness (0.0992, $p < .01$) has a positive correlation with spending. We find that variety seeking (0.0866, $p < .10$) and time pressure (-0.6013, $p < .10$) have a positive and negative association with visit frequency respectively. However, both these effects are marginal. Finally, innovativeness (0.0117, $p < .01$) and customer tenure (0.0055, $p < .01$) both have a significant positive association with customer profitability. Concerning customer characteristics, our results show that older customers tend to spend more (0.0153, $p < .05$) and that household size has a negative correlation with customer profitability (-0.0193, $p < .01$). Also, we find that female customers spend less (-0.0649, $p < .01$), visit more (0.1469, $p < .01$) and generate less profit (-0.0153, $p < .10$). However, the effect on profitability is marginal. We find that special occasions have a significant positive association with both customer spending (0.0808, $p < .01$) and customer profitability (0.0731, $p < .01$). As customers' distance from the store increases, their visit frequency (-2.0278, $p < .01$) decreases.

Cross-Correlation. Unobservable factors or errors between customer spending and customer profitability are positively correlated (0.5723, $p < .01$), whereas customer's visit frequency and customer profitability are negatively but marginally correlated (-0.0216, $p < .10$). The negative correlation between visit frequency and profitability could be because a customer who visits the firm more frequently is well aware of its promotional offerings and therefore might purchase or visit only during the promotional periods, thereby bringing the profits down.

Table 5. Parameter Estimates from Stage 2

	Customer responses					
	Customer spending		Customer visit frequency		Customer profitability	
Variables	Parameter	SD	Parameter	SD	Parameter	SD
Intercept	3.9827***	.0930	2.8385**	1.2446	3.7533**	1.4939
Effects of marketing mix:						
Price	−.8116***	.0727	. . .	. . .	.3682***	.1411
Promotion	3.2182***	.2463	. . .	. . .	−1.8924***	.2779
Effects of communication mix:						
Email	. . .	. . .	.3815***	.0495	. . .	. . .
Catalog	. . .	. . .	1.6219***	.4327	. . .	. . .
Educational program	. . .	. . .	3.1239***	1.1930	. . .	. . .
Effects of customer-intrinsic factors:						
Impulse buying	. . .	. . .	.1687	.7432	. . .	. . .
Time pressure	. . .	. . .	−.6013***	.1962	. . .	. . .
Variety seeking	.0866***	.0028	. . .	. . .	. . .	. . .
Innovativeness	.0992***	.0167	. . .	. . .	.0117***	.0033
Effects of situational factors:						
Special occasion	.0808***	.0143	. . .	. . .	.0731***	.0145
Store distance	. . .	. . .	−2.0278***	.1769	. . .	. . .
Effects of multichannel shopping:						
Multichannel shopping	.0328***	.0058	1.8469**	.9041	.0004**	.0002
Customer characteristics:						
Age	.0153**	.0077	.0645	.0920	.0013	.0009
Household size	−.0020	.0025	−.0627	.0906	.0193***	.0024
Education	.0032	.0114	.0359	.0457	.0032	.0112
Gender	−.0649***	.0108	.1469*	.0795	−.0153*	.0087
Customer tenure	. . .	. . .	. . .	. . .	.0055***	.0014
Cross-correlation:						
Customer spending	1		.0621		5,723***	
Customer visit frequency	.0621		1		−.0216	
Customer profitability	.5723***		−.0216*		1	
R^2	.96		.68		.86	

R^2 is computed using Gelman et al.'s (2017) approach.

* $p < .1$.

** $p < .05$.

*** $p < .01$.

Additional Analysis

To obtain more insights into the behavior of shoppers with respect to when they become multichannel shoppers, we conduct the following analysis.

Late versus Early Adopters of Multichannel Shopping. We divide our multichannel shoppers into two categories, early adopters who became multichannel shoppers during the period January 2007 to June 2007, and late adopters who became multichannel shoppers during the period July 2007 to December 2007. Then we specify the response models from equations (3)–(5) as follows:

$$\log(Response_{ht}) = \pi_{0h} + \pi_1 X + MultiChannel_h(\varphi_0 + \varphi_1 EarlyAdopter_h) + \varsigma_{ht} \quad (7)$$

where *Response* corresponds to customer spending, customer visit frequency, and customer profitability, X are explanatory variables whose specification is similar to that in equations (3)–(5).[3] *EarlyAdopter* is a dummy variable taking the value of 1 for early adopters (i.e., shoppers who adopted multichannel shopping during the period January 2007 to June 2007); otherwise, it is 0. The parameter of interest is φ_1 that captures the additional effect of multichannel shopping for early adopters in comparison to late adopters. We find φ_1 to be 0.0168, 1.0001, and 0.00023 for spending, visit frequency, and profitability respectively (significant at 95% level). Thus, approximately two-thirds of the benefits from multichannel come from early adopters.[4] Therefore, it is important for the firms to come up with such a multichannel strategy that helps customers to adopt multiple channels for their shopping purposes early on.[5]

Summary and Discussion of Results

Although many of our results confirm existing research findings, our results also add to the literature in the following ways. We find a significant positive effect of multichannel shopping on customer spending, customer visit frequency, and customer profitability consistent with prior studies (e.g., Ansari et al. 2008; Montaguti et al. 2016). However, we would like to highlight that our study models these three decisions jointly accounting for the cross-correlations among them. In this regard, we find that the observed negative (positive) correlation between customer profitability (customer spending) and customer visit frequency (customer profitability), to a certain extent, can be mitigated (boosted) by converting single channel customers into becoming multichannel shoppers. Moreover, our study introduces a new communication mix to the literature: educational programs. We find that they have a positive effect on customer visit frequency. We also find that catalogs have a positive effect on visit frequency for multichannel shopping (which has largely been ignored by past literature).

To summarize, our overall results suggest that along with marketing and communication mix, customers' intrinsic and situational factors are good determinants of multichannel shopping. We especially find that technical expertise and internet service adoption have the strongest effect on being a multichannel shopper, whereas deal sensitivity and shopping experience greatly affect the consequences of multichannel shopping. Regarding the consequences, results suggest that overall quarterly spending and profitability increase by 2.68% and 0.04% respectively, whereas multichannel shoppers' visit frequency is approximately two times more than single-channel shoppers—which fosters a stronger customer-firm relationship. Consistent with prior studies (De Keyser et al. 2015), our results show that the marginal effects of technical expertise and internet service adoption are positive, whereas marginal effects of deal sensitivity and shopping experience are negative on the adoption of multichannel.

MANAGERIAL IMPLICATIONS

We illustrate below how managers can use the results of our analysis for better multichannel decision making. For this purpose, we focus on consumer intrinsic factors and wish to note that a similar analysis can be performed for other variables of the model.

Technology Attitudes

We divide the customers into four groups based on the median split of technical expertise and internet service adoption. These groups are classified as tech-savvy connected customer (high technical expertise and high internet service adoption), tech-savvy disconnected customers (high technical expertise and low internet service adoption),

3. For the sake for brevity we write just one equation, but the model is for each of the three customer responses just like model specification in eqs. (3)–(5) that is estimated jointly.

4. We arrive at this value by taking the ration of φ_1/φ_0 from eq. (7). We find φ_0 to be 0.0252, 1.4999, and 0.000341 for spending, visit frequency, and profitability, respectively.

5. We thank an anonymous reviewer for suggesting this analysis.

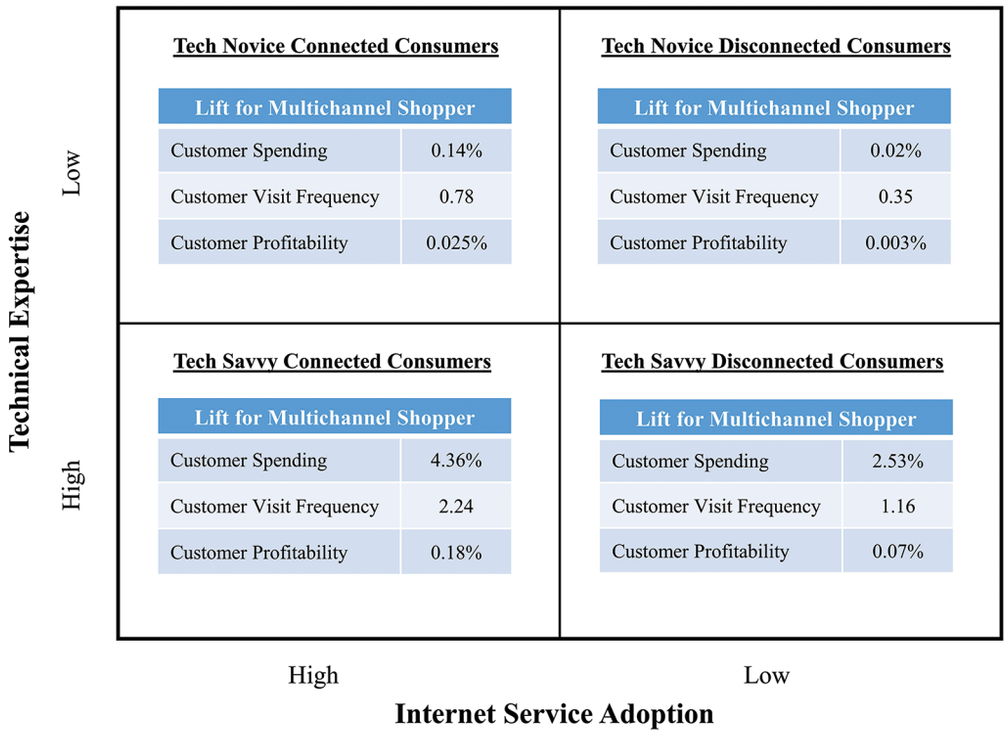

Figure 3. Importance of technology attitudes. All the lifts are significant at 90% level.

tech-novice connected customer (low technical expertise and high internet service adoption), and tech-novice disconnected customer (low technical expertise and low internet service adoption). Then for each segment, we calculate the lift in customer spending, customer visit frequency, and customer profitability.[6] The results are shown in figure 3. Multichannel tech-savvy connected customers bring maximum benefits (lifts are 4.24%, 2.16, and 0.12% for spending, visit frequency, and profitability, respectively) to the firm. Therefore, the takeaway for managers is that they must target and nudge customers who are more tech savvy to bring more benefits.

Shopping Attitudes

Based on deal sensitivity and shopping experience, we divide the customers into four segments, namely, economic experiential customers (with high deal sensitivity and high shopping experience need), economic nonexperiential customers (with high deal sensitivity but with low shopping experience need), innovative experiential customers (with low deal sensitivity but high shopping experience need), and innovative nonexperiential customers (with low deal sensitivity and low shopping experience need). Then for each segment, we investigate lift in spending, visit frequency, and profitability. The results are shown in figure 4. Innovative experiential customers bring maximum benefits (lifts are 3.25%, 2.59%, and 0.089% for spending, visit frequency, and profitability, respectively). Therefore, the takeaway for retail managers is to target low deal-sensitive multichannel customers for maximum benefits.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

Although we use a rich data set to empirically examine customers' multichannel shopping behavior, there are some limitations of our study. First, our study uses data from a loyalty program. While loyalty program data provide access to customers' rich purchase histories, it also brings in bias in the interpretation of observed effects as the loyalty program itself could be responsible for the behavioral change

6. Lift is operationalized as percentage change in the behaviors of different groups of multichannel shoppers in comparison to nonmultichannel shoppers; thus, $lift = [(Respone_{MCGroup} - Respone_{NonMCGroup})/Respone_{NonMCGroup}] \times 100$, where *Response* is any of the variables corresponding to spending, visit frequency, and profitability, *MCGroup* indicates different groups of multichannel shopper, and *NonMCGroup* indicates nonmultichannel shopper.

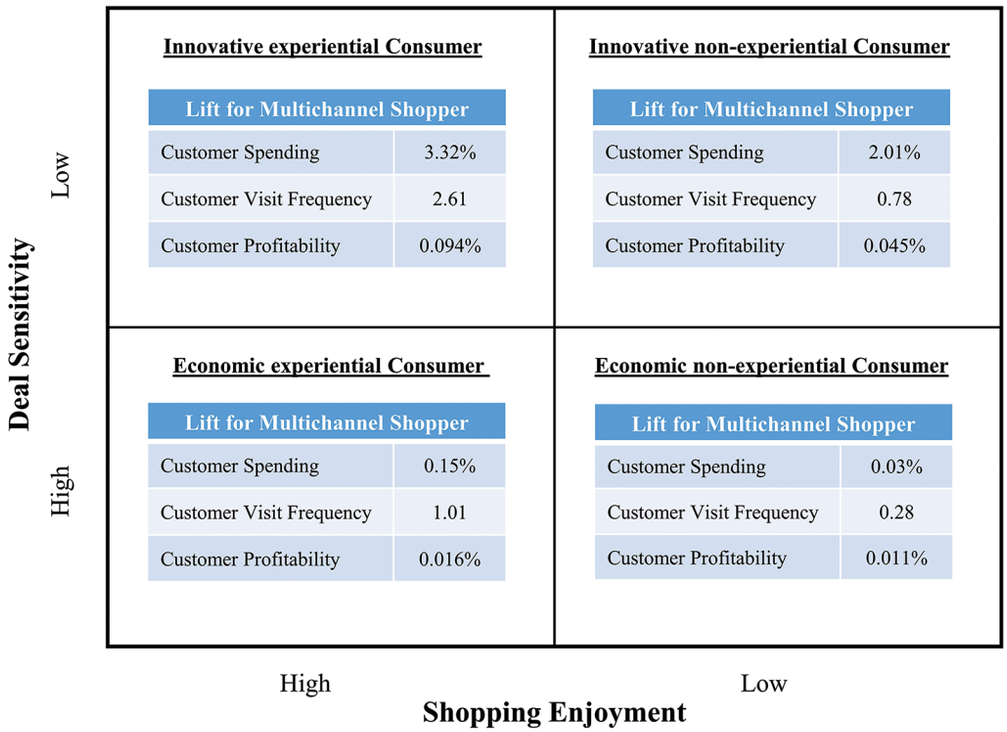

Figure 4. Importance of shopping attitudes. All the lifts are significant at 90% level.

(Dorotic et al. 2012). However, it has been reported that though more frequent customers join the loyalty program, the slight changes in the customers' postpurchase behavior erodes after 6–9 months of joining (Meyer-Waarden and Benavent 2009). We note that the average customer tenure in our data is 123 weeks, that is, more than 9 months. Furthermore, our model explicitly accounts for the endogeneity issue due to customers' self-selection. Second, though our managerial implications suggest the importance of targeting multichannel customer with high technical expertise and low deal sensitivity to bring maximum benefits for the firms, our study does not explain the retailing strategy (e.g., tier programs) for such actions. Third, the behavioral measures used in our analysis are assumed to be static over the study period. Future studies can use longitudinal data to account for the dynamics of these factors. A concern could be that the customer-intrinsic factors measured in the survey (which are done after observing the purchase behavior) may or may not be stable over time. Although we conduct an analysis to show that they are, future research can examine this issue more closely. Recently, omnichannel marketing is gaining ground wherein firms can seamlessly connect with customers across devices (such as tablets, smartphones, desktops) via multiple touch points. Similarly, customers are increasingly making use of social media to communicate with firms as well as other customers. At the same time, new channel formats, both online and offline (e.g., limited assortment stores, convenience stores), are gaining ground. These changes in the industry landscape will influence multichannel behavior. We leave these issues for future research studies.

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