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The Impact of Adding Online-to-Offline Service Platform Channels on Firms' Offline and Total Sales and Profits

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Abstract

Online-to-offline service platform (O2OSP) channels offer innovative means for customers to order local, daily services online (via apps) and have them delivered almost instantly offline. By comparing the business models underlying O2OSP, traditional online and offline, and platform-based e-commerce channels, this article aims to identify the short- and long-term impacts of adding an O2OSP channel on firms' offline and total sales and profits. The analysis focuses primarily on a recent set of daily data gathered from a Chinese fast-food restaurant chain with 35 physical stores that also participates in four food delivery O2OSP channels. The panel data regressions with fixed effects reveal that adding O2OSP channels hurts offline and total profits in the short run but improves offline and total sales and profits in the long run. Specifically, offline and total sales increase by 23.28% and 33.94%, respectively. Thus, the O2OSP channel can serve as a complement to, rather than a substitute for, the offline channel. These results challenge previous research on the sales effects of adding (pure) online or offline channels and highlight the attractiveness of O2OSP channels for improving sales and profits. However, negative interaction effects among different O2OSP channels also signal that adding more O2OSP channels does not necessarily lead to profitable growth.
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Keywords: Online-to-offline service platform; Channel addition; Omnichannel; Mobile apps; Emerging markets

Although these new mobile Internet platforms are attracting considerable investment and high valuations—already, five are valued at more than $1 billion—little real knowledge about market dynamics, growth potential, or customer behavior exists (Hirschberg et al. 2016).

Introduction

In its early days, electronic commerce (e-commerce) focused on products, but as it has matured, the mobile Internet has fundamentally reshaped the service sector as well. From restaurants to florists, laundry to medicine, services have become available for purchase through mobile devices (online), with rapid home delivery (offline). Indeed, customers are becoming more comfortable with ordering services via mobile apps in general: U.S. usage of service apps (especially fresh market delivery services such as grocery and meal kits) grew 49.6% in 2018 (eMarketer 2018). Delivery Hero, the largest food delivery app in the world, has 150,000 restaurant partners across 40 countries and processed 130 million orders in the first half of 2017.[1] In China, service sales generated through mobile apps surpassed $100.50 trillion in 2018 (eMarketer 2016). With this emerging mobile lifestyle (Shankar et al. 2010), customers can access a range of services anytime and anywhere; in response, many service industries are following the example of

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[1] Accessed on February 20, 2019, from https://en.wikipedia.org/wiki/Delivery_Hero.

travel booking and shifting rapidly to more mobile, online, and online-to-offline functionalities (Hirschberg et al. 2016).

Online-to-offline service platforms (O2OSP, see Fig. 1) are a recent manifestation of this shift. We distinguish these platforms specifically from product-focused online-to-offline platforms, such as Amazon.com or JD.com. In the O2OSP business model, customers order local, daily services online using platform-based mobile apps and then receive the service output almost instantly, delivered to their door. The goal is a seamless, omnichannel experience (Verhoef, Kannan, and Inman 2015). Branded O2OSP apps such as Just Eat, Delivery Hero, Uber, Instacart, Washio, and Handy constitute an important new sales channel (Verhoef, Kannan, and Inman 2015) that supplements both existing Internet and physical channels (Shankar et al. 2010). In China, the three large information technology companies compete heavily on O2OSP; for example, Baidu (China's Google) invested $250 million in the food delivery app Baidu Waimai (Lunden 2018), Tencent (China's Facebook) invested $4 billion in Meituan Waimai in 2018 (Global Times 2018), and Alibaba (similar to eBay and Amazon.com) bought Ele.me for $9.5 billion (Banjo and Ramli 2018). By 2018, more than 1.3 million restaurants in 2,000 cities had contracted with the O2OSP channel Ele.me, through which more than 16 million orders move daily (Singh 2018).

Despite the vast reach of and interest in this channel, it remains unclear whether and how O2OSP might be profitable for companies. Many channel addition decisions seem based on

gut feelings or copying what competitors have done (Young 2015). Yet, because O2OSP represents an independent sales channel, its introduction could give customers an appealing alternative to purchase from physical stores, in which case cannibalization might occur. At the same time, the offline channel might not suffer and even could benefit from spillover effects, due to a (geographically) larger customer base and enhanced brand equity if O2OSP customers also buy from the offline channel. Likewise, profits could increase or decrease, reflecting scale and cost efficiencies or else increased competition and margin cannibalization (Deleersnyder et al. 2002; Gentzkow 2007; Smith and Telang 2009).

Prior research has investigated these sales and cannibalization effects for adding a firm-owned online or offline channel, as Table 1 summarizes. We aim to contribute to this literature stream in three main ways. First, we add to channel addition literature by evaluating the introduction of an *emerging new channel type*. The O2OSP channel differs from traditional online channels in at least three ways: higher sales potential, lower risk, and lower investment (as we detail subsequently). Accordingly, we predict and find higher sales and profit effects than those that result from adding traditional online channels.

Second, data limitations have prevented researchers from analyzing the impact of channel additions on *profits*, leading to dominant considerations of sales revenues (Avery et al. 2012; Pauwels and Neslin 2015) or investors' predictions of future profits (e.g., Deleersnyder et al. 2002). For managers, revenues
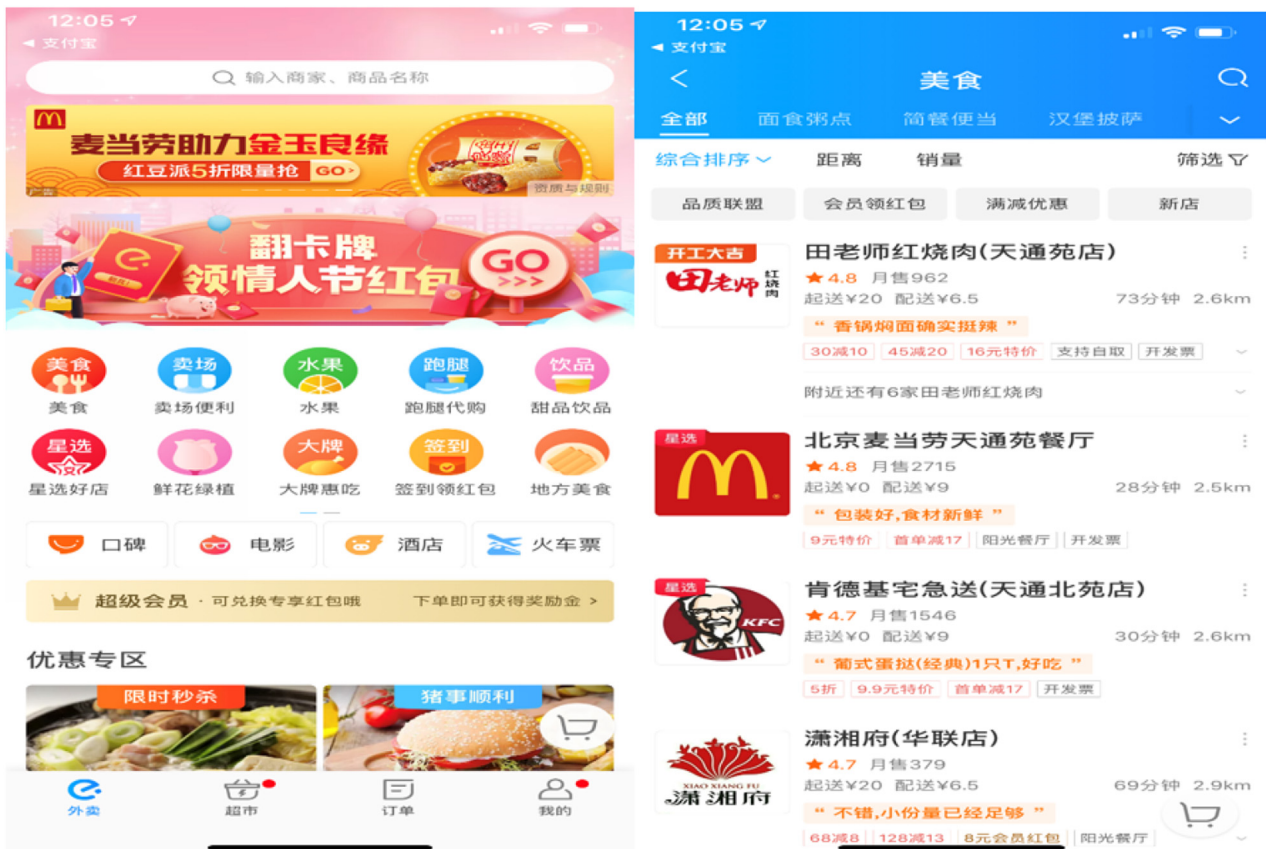

Fig. 1. Screenshots, Ele.me app.

Table 1
Studies of the impact of channel additions on the sales of existing channel(s).

Author	Added Channel Type	Context	Country	Data Period	Methodology	Performance Metric	Conclusion
Deleersnyder et al. (2002)	Internet	Newspaper	United Kingdom and Netherlands	1994–2000	Structural break time-series econometrics	Sales revenues, investor opinion of future profits	Offline sales (non-significant)
Van Nierop et al. (2011)	Informational website	Department stores	Netherlands	2000–2002	Poisson model and type-II Tobit model	Number of shopping trips, amount of money spent	Offline purchase frequency (−) Offline order size (−)
Pauwels et al. (2011)	Informational website	Department stores	Netherlands	2000–2002	Latent class analysis and VARX	Sales revenues	Offline sales depend on product category and customer segment
Avery et al. (2012)	Offline store	High-end apparel, accessories, and home furnishings	United States	2004–2006	Matching method	Sales revenues	Short run: Catalog sales (−) Internet sales (non-significant) Long run: Catalog and Internet sales (+)
Bang et al. (2013)	Mobile	E-market	South Korea	2009–2011	Counterfactual analysis based on VARX	Number/size of orders/cancellations/returns	Online sales (+5.6%) Total sales (+18.4%)
Pauwels and Neslin (2015)	Offline store	Durables and apparel	United States	1997–2002	Multivariate baseline analysis	Sales revenues	Catalog sales (−) Internet sales (non-significant) Total sales (+20%)
This study	O2OSP channel	Service (catering)	China	2013–2015	Panel regression models	Sales revenues and profit	*Short run*: Offline sales (non-significant) Offline/Total profit (−) Long run: Offline sales (+23.28%) Total sales (+33.94%) Offline/Total profit (+)

are only part of the equation (Srinivasan et al. 2004), and both Avery et al. (2012) and Pauwels and Neslin (2015) call for research on the profitability of channel additions. With this study, we aim to answer these calls.

Third, many studies investigate companies operating in Western markets and rely on relatively older data. We are aware of only one study conducted in an Eastern, developed country (South Korea; Bang et al. 2013). In this sense, current marketing literature is silent on how adding an O2OSP channel affects offline and overall performance in *emerging markets*. Do results obtained in the United States suggesting 20% more total revenues due to online channel additions (Avery et al. 2012; Pauwels and Neslin 2015) hold up in China? We consider this unlikely, because China currently leads the world in digital retailing (KPMG 2014), surpassing the rest of the world by at least two years when it comes to O2OSP adoption (Alibaba 2016). Furthermore, China is the global leader in mobile payments (a driver of O2O growth), such that 79.3% of China's Internet users (i.e., more than one billion people) will use mobile payments in 2021, compared with only 30.8% in the United States and 22% in Germany (eMarketer 2017). As Jack Ma, founder of Alibaba, stated, "In other countries, E-commerce is a way to shop; in China it is a lifestyle" (KPMG 2014).

To address these research goals, panel regression models quantify the short- and long-term performance impacts of introducing O2OSP channels on firms' (1) offline sales revenues, (2) offline net profit, (3) total sales revenues, and (4) total net profit. We use daily data from a fast-food company

that runs 35 physical stores and joined four food delivery O2OSP channels in China (Baidu, Meituan, Ele.me, and Koubei) between February 5, 2013, and December 31, 2015. Food delivery is an important category in O2OSP for several reasons. First, it is a key example of the "high frequency, low price" local, daily services that characterize O2OSP (Zhao and Wu 2015). Second, the food industry has taken the lead in exploiting the new O2OSP sales channel. As Daniel Zhang, CEO of Alibaba, noted, food delivery is the single most important entry point for the local service sector (Banjo and Ramli 2018). Thus, the food delivery industry acts as a pacesetter for the O2OSP economy overall and may foreshadow trends that are emerging more slowly in other O2OSP industries, such as florists, groceries, housework, taxi hailing, medicine delivery, nail and hair services, and private chefs.

Definition and Positioning of O2OSP within Online Channels

Despite an influx of capital into the industry (Global Brand Insights 2013), the O2OSP channel continues to lack a unified definition (eMarketer 2016). We define O2OSP as *platform-based mobile apps that allow customers to order local, daily services online and quickly receive them offline to fulfill their need for instant gratification*. In Fig. 2, we clarify how the O2OSP channel differs from other online channels on two key dimensions. First, compared with firm-owned channels (e.g., McDonald's website or delivery app), the O2OSP channel is a *platform* with considerably more users than any single service

Product	Quadrant I **Internet channel** Product, firm-owned (e.g., building Nike's website)	Quadrant II **E-Commerce channel** Product, platform-based (e.g., adding Amazon)
Local daily service	Quadrant III **Mobile channel** Service, firm-owned (e.g., building McDonald's app)	Quadrant IV **O2OSP channel** Service, platform-based (e.g., adding Delivery Hero)
	Firm-owned	**Platform-based**

Fig. 2. Key differences between online channels.

firm has. A second difference with traditional e-commerce is the focus on products (e.g., Amazon.com) versus *local, daily services* in O2OSP. The resulting four quadrants in Fig. 2 have received vastly different levels of research attention.

In Quadrant I, firms set up their own websites to offer a wide selection of easily distributed products (Verhoef, Kannan, and Inman 2015). Most previous channel addition literature explores this type of channel (e.g., Deleersnyder et al. 2002; Pauwels et al. 2011; Van Nierop et al. 2011). Adding this traditional firm-owned online channel requires significant investments to design and operate and then to advertise it, without greatly expanding the existing customer base (CEO Interview 2018). By contrast, the O2OSP channel greatly extends each service firm's customer base. It also offers a low-investment method for service firms to accept online orders. With the O2OSP channel, firms pay a fixed margin (generally 15%) of order revenues to the channel; if no sales result, firms pay nothing. In interviews with the CEO of the firm that provided the data for this study, we learned that a key perceived benefit of this novel channel is the promise of a large customer base with minimal investment.

Quadrant II also focuses on products, but these are sold by platform-based e-commerce retailers such as Amazon.com and JD.com, which offer multiple brands through a single online portal. Despite some similarities to O2OSP, the product nature of the firms in Quadrant II means that the offerings are national or global, unlike the local, daily services delivered through O2OSP. *Local services* make speedy home delivery possible (e.g., customers do not order food from a restaurant hundreds of miles away) and thus can fulfill customers' need for instant gratification. Consequently, traditional e-commerce retailers usually need large warehouses to store products and rely on a heavy capital business model; by contrast, O2OSP requires no warehousing and uses a light capital business model.

Quadrant III includes mobile apps owned by local, daily service companies. Many of these firms have attempted to cash in on the rise of mobile devices in China, where 95% of the 731 million Internet users access the Internet via their mobile phones (China Internet Statistics 2017). However, considering the storage limits imposed by their mobile phones, customers often are reluctant to download apps for each company; even

when they do, many of them use most of these installed apps only once (Tiongson 2015).

Finally, the O2OSP channel in Quadrant IV represents our focal *platform-based app offering local, daily services*, as exemplified by the catering app Ele.me (see Fig. 1), which allows customers to find restaurants within five kilometers of their current location, choose a preferred provider and menu options, and have the food delivered within a half hour. Customers can track the progress of their order (distance and time). Such O2OSP channels attract many, varied service-oriented firms and customers. The scale economies created by O2OSP channels enable them to hire professional delivery teams and generally offer a timed delivery guarantee, in contrast with most firm-owned apps. This added control and convenience does not come at a cost to customers: the O2OSP channel and offline channels often set similar prices for similar items. Our focal firm's CEO noted that "since the introduction of O2OSP channels in 2014, most small to medium-sized companies have closed down their own Internet/telephone ordering system, while large companies continue to maintain their website mainly for image purposes." Even firms that already maintain an ordering website/apps, such as McDonald's, have added O2OSP channels to increase their touchpoints and selling opportunities with a larger potential customer base. Globally then, the O2OSP industry is estimated to grow by 14.9%–25% per year from 2015 to 2020 (Hirschberg et al. 2016).

Conceptual Development

The effects of adding a channel critically depend on how it affects *customers′* decisions on (1) *whether* to buy (in this case, prepared food), (2) *which provider* (the focal firm or other firms) to buy from, (3) *which channel* to use (e.g., sit-down restaurant, delivery, pick-up), and (4) *when* to make this change (e.g., short or long run). Thus, from the *firm's* perspective, sales in the new channel may come from (1) increased customer frequency of eating out (instead of cooking at home), (2) switching competing firms' customers to own customers, and (3) switching channels within the focal firm. The first two options imply an increase in firm sales, while the third

Customer Buying Decisions after Introduction of O2OSP Channel by Focal Firm					
		Offline from focal firm	Offline from another firm	Online from focal firm	Online from another firm	Cook at home

		Offline from focal firm	Offline from another firm	Online from focal firm	Online from another firm	Cook at home
Customer Buying Decisions Before	Offline from focal firm	No change	*Cell A* Offline sales (−) Total sales (−)	*Cell B* Offline sales (−) Total sales (=)	*Cell C* Offline sales (−) Total sales (−)	*Cell D* Offline sales (−) Total sales (−)
	Offline from another firm	*Cell E* Offline sales (+) Total sales (+)	No change	*Cell F* Offline sales (=) Total sales (+)	No change	No change
	Online from another firm	*Cell G* Offline sales (+) Total sales (+)	No change	*Cell H* Offline sales (=) Total sales (+)	No change	No change
	Cook at home	*Cell I* Offline sales (+) Total sales (+)	No change	*Cell J* Offline sales (=) Total sales (+)	No change	No change

Fig. 3. Different sources of offline and total sales changes after adding the O2OSP channel.*. * A customer who used to buy offline from the focal firm (top row) now buys online from focal firm (third column). As a result, offline sales decrease but total firm sales stay the same (Cell B).

(cannibalization) does not. Fig. 3 illustrates these options.[2] Which of the cells in Fig. 3 are most likely to occur in our specific case of adding an O2OSP channel? To answer this question, we turn to the customer perspective in a series of surveys and experiments and the firm perspective in channel capabilities theory.

Customer Perspective: Findings from Surveys and Scenario-Based Experiments

We conducted two surveys and one scenario-based experiment (see Appendix A for the survey specifics). For insights into customers' buying decisions, we first asked about the out-of-home ordering frequency before and after use of the O2OSP channel. We found that 79.5% of survey respondents increased their ordering frequency with the O2OSP channel introduction. We further compared the order frequency of O2OSP users and non-users and found that O2OSP users indeed ordered more frequently than non-users (from "1–2 times a week" to "2 times a week"; Mann–Whitney $U = -2.17$; $n_{non-user} = 105$, $n_{user} = 113$; $p < .05$, two-tailed). Thus, customer self-reports indicate changes to the decision on *whether* to buy and, thus, the possibility of an increase in total sales.

For information about *which provider*, we had respondents choose between an often-visited restaurant A and a restaurant X (which respondents have not visited but have seen on food delivery apps). Of the respondents, 64.5% were "very" or "extremely" likely to choose the new restaurant X, indicating a willingness to change the decision of *which provider* to use.

As to *which channel* to use, survey respondents reported almost equal frequency of "eating at the restaurant" (40.29%) and "get delivered home from the restaurant" (39.06%), while 20.64% chose "pick up at the restaurant." When customers decide whether to order online or visit a physical store, they

must make several trade-offs (Gupta, Su, and Walter 2004), such as the economic cost–benefit ratio of each channel (Neslin et al. 2006). Many online and offline benefits and costs are homogeneous across customers. For example, all customers generally face the independent, fixed shipping/delivery cost associated with buying from online channels. Other costs are heterogeneous though, such as when buying offline, monetary travel costs, inconvenience costs (e.g., population density or traffic patterns near a restaurant), and the opportunity cost of time (Forman, Ghose, and Goldfarb 2009). In considering these costs, customers try to maximize their utility by choosing between offline and online channels depending on the prices offered, offline transportation costs, and online disutility costs (Forman, Ghose, and Goldfarb 2009). When deciding to order food online, 76.5% of respondents reported using an O2OSP app given its "ease of use" (51.5%) and "access to a variety of restaurants" (29.8%).

Finally, for the *timing of the change*, we randomly assigned survey respondents to either the short-run scenario (restaurant X appears on the app for less than a week) or the long-run scenario (restaurant X appears on the app for a long time). The results indicate that those in the short-run scenario were less likely to switch to another firm's O2OSP channel than those in the long-run scenario. In the same vein, customers online from another firm were less likely to be attracted to the offline channel of the focal firm in the short run than in the long run (see Appendix A). Thus, we infer a time lag between channel introduction and customers' change in the decisions of whether to buy, from which provider to buy, and which channel to use.

Firm Perspective: Channel Capability Theory

While customers could experience potential benefits from using a new O2OSP channel, the question still remains as to why firms would make investments to build such a channel and facilitate customers' joining the new channel. The relevant theory

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[2] We thank our anonymous reviewers for this suggestion.

is channel capabilities. Channel capabilities refer to "an enabling characteristic of a channel that allows customers to accomplish their shopping goals" (Avery et al. 2012, pp. 96–97). If a new channel closely duplicates (Deleersnyder et al. 2002; Moriarty and Moran 1990) or exceeds (Alba et al. 1997) the capabilities of an existing channel, it may cannibalize sales from that channel. If a new channel instead offers a complementary capability, it can create additional demand (Bang et al. 2013), and synergy occurs. Channel capability theory has informed analyses of online versus offline (Weltevreden 2007), offline versus online (Avery et al. 2012), mobile versus online (Bang et al. 2013), and mobile app versus mobile website (Xu et al. 2014) channel capabilities. For example, Deleersnyder et al. (2002) find that adding online transaction channels rarely cannibalizes offline channels, whereas Weltevreden (2007) reports that in the long run, online shopping substitutes for traditional shopping. Van Nierop et al. (2011) find that adding even a non-transactional website can decrease shopping trips and order size, whereas Pauwels et al. (2011) show that such cannibalization only occurs for specific products and customer segments. In general, previous research agrees that mobile apps complement mobile websites (Xu et al. 2014) and online channels (Bang et al. 2013), but we know of no studies that discuss the channel capabilities of an O2OSP channel and its role as a complement to or substitute for offline channels.

In accordance with channel capability theory, we argue that O2OSP channels exceed the capabilities of traditional offline channels (Fig. 4) because they grant firms access to and greater insights into more customers for less money. The results of our survey indicate that traditional offline stores attract customers within about three kilometers of their locations, but O2OSP channels reach customers within a five-kilometer radius (Mann–Whitney $U = -2.93$; $n_{\text{non-user}} = 105$, $n_{\text{user}} = 113$; $p < .01$, two-tailed). Furthermore, hundreds of customers can order and pay through the O2OSP channel at the same time, whereas offline channels can assist only a limited number of customers at any time. Moreover, marketing communication is faster and less costly in an O2OSP channel because it promotes rapid word of mouth, by displaying product availability and customer comments online. The costs of purchasing banner displays or optimized rankings in O2OSP channels are generally lower than those for traditional advertising. Finally, firms may gain novel insights into customers through the O2OSP platform channel, which automatically records information about each order date, time, size, content, store, and O2OSP channel, as well as each customer's name, address, and phone number. Firms can use these transaction data to calculate repurchase rates, segment customers, and establish customer profiles and preferences.

Hypotheses

Given the likely time lag between channel introduction and customer behavior change (as revealed in our surveys), we differentiate the short- and long-term impacts of adding O2OSP channels on offline and total sales and profits. Following Pauwels et al. (2011), we define the short run as within seven days after the O2OSP channel introduction and the long run as a week or more after this introduction.

Impact of O2OSP Channels on Offline Sales (Cannibalization)

Firm-driven arguments. We begin with a comparison of offline sales channels, which create a pleasurable shopping experience (Avery et al. 2012), with an O2OSP sales channel, which provides several superior capabilities, including (1) expanded restaurant reach, (2) lower advertising costs, and (3) enhanced customer insights. According to channel capability theory (Deleersnyder et al. 2002; Moriarty and Moran 1990), these superior capabilities should lead the O2OSP channel to cannibalize offline channel sales in the long run.
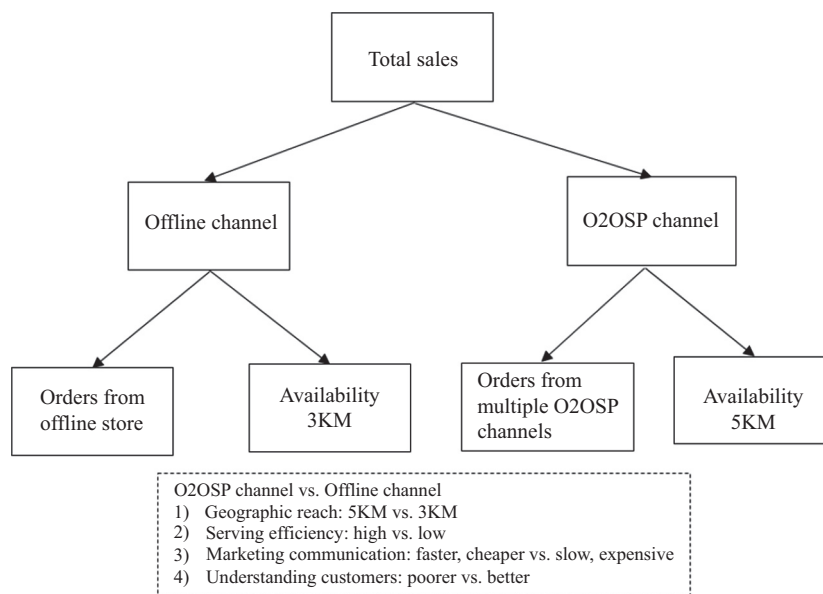

Fig. 4. O2OSP channel versus traditional channel.

Customer-driven arguments. Cannibalization (Cell B of Fig. 3) of the offline channel follows directly from perceived benefits of the O2OSP channel. Whether or not a given customer migrates to the new channel depends on many factors such as how far he or she lives from the firm's physical locations (Pauwels et al. 2011). Crowdedness in large cities also incites a desire to escape from the offline channel (Andrews et al. 2015). Variety-seeking customers may also enjoy the wide variety of choices on display in the O2OSP channel.

In contrast with cannibalization, *spillover* effects may increase offline sales for the focal firm. The O2OSP channel may serve as an advertising platform by increasing online exposures. Such frequent exposure is likely to produce feeling of familiarity (process brands more quickly and more easily) and consequently result in positive evaluation (Fang, Singh, and Ahluwalia 2007) by attracting new customers to the focal firm, some of whom may also frequent its offline channel. Thus, rivals' offline and O2OSP channel customers (Cells E and G in Fig. 3) or potential customers who previously tended to cook at home (Cell I) may be attracted to the focal firm. Indeed, 64.5% of our surveyed respondents reported that they were very or extremely likely to choose to eat at the restaurant offline, after they had seen it online. Overall, our scenario-based, within-subject experiments show that the number of existing offline customers lost (35.25% customers in total) outweighs the number of new customers gained (28.40% customers) (see Appendix A for details). Therefore, we argue that in the long run, the introduction of an O2OSP channel decreases offline sales.

These cannibalization and spillover effects should materialize in the long run rather than the short run. Short-term inertia is likely due to customers' limited cognitive capacity (Anderson and Claxton 1982) and the many restaurants to choose from in the O2OSP channel. Our scenario-based experiments also show that in the short- (vs. long-) run scenario, respondents are less (vs. more) likely to change (Appendix A). Therefore, we propose the following:

H1. The introduction of an O2OSP channel (a) has no impact on offline sales in the short run and (b) decreases offline sales in the long run.

Impact of O2OSP Channels on Total Sales

Firm-driven arguments. According to channel capability theory, with their increased overall channel capabilities, firms can serve customers more efficiently and expand their distribution. An O2OSP channel typically expands a restaurant's reach, from three to five kilometers, thereby increasing the market potential by a factor of 2.77 and encompassing more potential customers (assuming similar population density). This increased channel capability should increase total revenues in the long run (Bhatnagar and Ratchford 2004; Kumar and Venkatesan 2005). Similar growth arguments likely hold for other O2OSP industries; for example, sales of nail salons doubled after they began offering door-to-door services in China (Zheng 2015).

Customer-driven arguments. We expect that in the long run, adding O2OSP channels will increase total sales by both attracting new customers and increasing the purchase frequency and order size of existing customers. First, O2OSP channels could attract new customers because of a wider geographic region and the possible spillover effect of the enhanced online brand equity. For example, our focal firm attracted 131,514 new O2OSP customers within the first six months of 2016, a 73.79% increase over 2015.

Second, existing customers' purchase frequency may also increase from the O2OSP channel's ease of use, more restaurant choices, and time saving. Such features lower customers' perceived transaction costs (Bitner, Brown, and Meuter 2000; Li et al. 2017). Thus, O2OSP channel customers, especially light shopper segments (Li et al. 2017), tend to engage in more transactions over time (Xue, Hitt, and Chen 2011). Empirical evidence shows that online-loyal customers indeed exhibit high sales levels (Ansari, Mela, and Neslin 2008), and companies that can migrate their customers to an Internet channel increase their overall retention rate (Boehm 2008) and purchase frequency. Our survey also finds that respondents ordered more frequently after using O2OSP (Wilcoxon $Z = -7.40$, n = 113, $p < .001$).

Third, existing customers' order size might also be increased after the offline-only service provider adds an O2OSP channel, which can attract multichannel customers. As a multichannel environment creates stronger economic and social bonds (Klein and Ford 2003), the consensus in multichannel marketing literature is that multichannel customers buy more often, purchase more items, and spend more than single-channel customers (Kushwaha and Shankar 2013)—20% to 30% more money on average (Neslin et al. 2006). Our survey results also show that O2OSP users spent more per order than non-users (Mann–Whitney $U = -2.55$; $n_{non-user} = 105$, $n_{user} = 113$; $p < .01$, two-tailed). Finally, empirical findings indicate that moving customers from third-party indirect to company-owned direct channels lowers revenues (Ackermann and von Wangenheim 2014), so we predict that an opposite action will increase revenues, at least in the long run, after customers have had enough time to adopt the new O2OSP channel.

In the short run, similar to H1, we argue that it takes time for existing customers to adopt new channels (Baumgartner, Sujan, and Padgett 1997) and change their formed consumption habits. Attracting new customers also takes time. Thus:

H2. The introduction of an O2OSP channel (a) has no impact on total sales in the short run and (b) increases total sales in the long run.

Impact of O2OSP Channels on Total Profits

Firm-driven arguments. Adding O2OSP channels should improve a firm's total profits in the long run. On the one hand, their addition increases distribution and service efficiency, at a likely cost of only approximately 15% of the revenues (CEO Interview 2018). Although competition might also increase, it remains local (i.e., within the radius of about five kilometers),
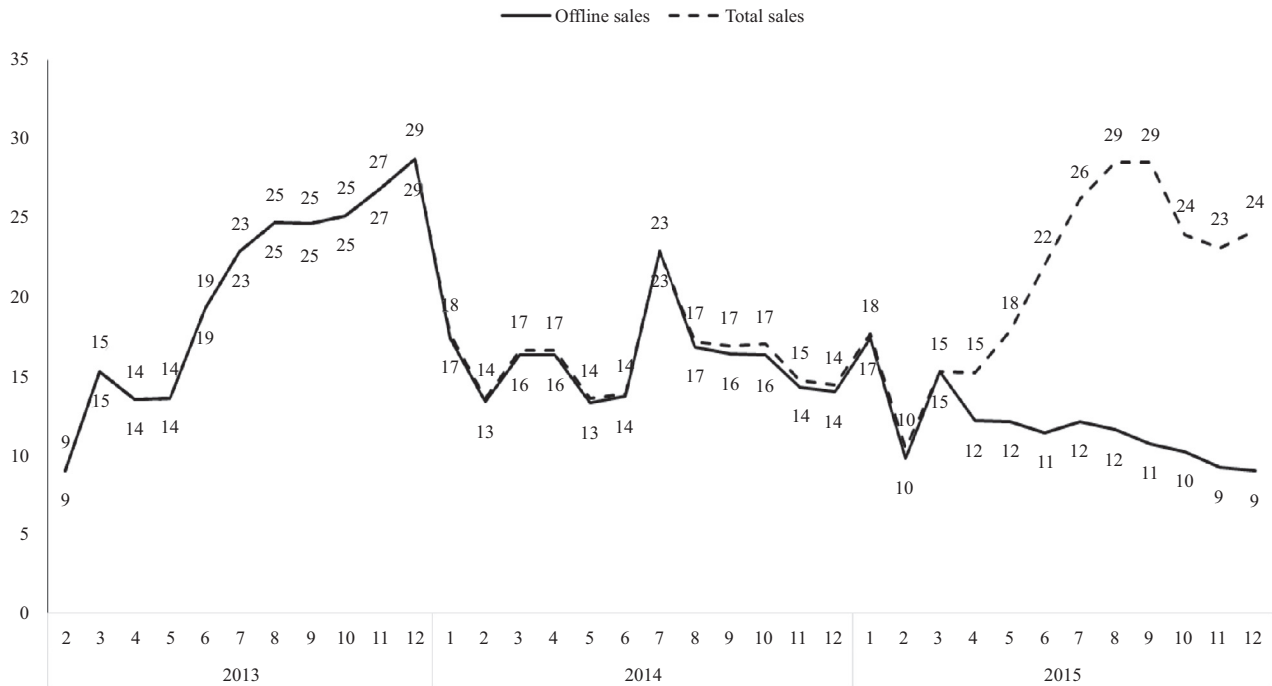
Fig. 5. Offline and total monthly sales per store (unit: 10,000 yuan).

and service providers in the food industry can differentiate themselves on many dimensions, such as cuisine and price. On the other hand, costs such as kitchen equipment and employees do not increase with the addition of a new channel, so they can be spread across offline and O2OSP revenues. Thus, economies of scale might be achieved by adding O2OSP channels, which should result in improved total profitability in the long run. In the banking industry, the cost to process an account transfer is approximately $1.07 through a branch and $0.27 by an automated teller machine, but it is only $0.01 through the Internet (Campbell and Frei 2010). Accordingly, an e-commerce executive at Bank of America claimed that the firm's online banking customers are 27% more profitable than its offline customers (Tedeschi 2005). Comparing the profits earned by physical retail stores, online stores, and hybrid retailers, Levary and Mathieu (2000) assert that hybrid retailers generate maximal profits, and Chiang, Chhajed, and Hess (2003) suggest that an Internet channel indirectly improves firms' overall profitability. Again though, we expect the profit benefits to materialize in the long run. Immediately after the introduction, the service provider may face new costs associated with operating and marketing to entice new customers to join the O2OSP channel. Thus:

H3. The introduction of an O2OSP channel (a) decreases total profits in the short run and (b) increases total profits in the long run.

Data and Variables

The data for our main study come from a representative fast-food chain restaurant in China, established in 2013, that currently maintains 35 brick-and-mortar stores in five large cities (Beijing, Shanghai, Wuhan, Shenzhen, and Xi'an) and has been listed on the NEEQ (National Equities Exchange and Quotations) since April 2017. In 2014 and 2015, it joined four food delivery O2OSP channels: Ele.me, Meituan Waimai, Baidu Waimai, and Koubei. The CEO strongly believes in the channel's benefits (as expressed during our 2018 interview) and thus ensured that all existing stores joined the channel almost at the same time, with new stores joining almost at the moment they open (see Appendix B). In January 2016, we asked each store to report its opening date, the date it introduced each O2OSP channel, daily sales revenues, and daily net profits[3] earned from both offline and O2OSP channels between February 5, 2013, and December 31, 2015 (more than 1,000 days).

We plot the aggregated monthly offline and total sales in Fig. 5. Offline sales reveal a downward trend, but total sales grow, suggesting that the O2OSP channel addition may harm offline sales but benefit total sales. However, we cannot draw any specific scientific conclusions from these figures, which do not consider other sales drivers.

In Table 2, we provide the operationalization of each variable in our analysis. Similar to Pauwels et al. (2011), we consider four step dummies (i.e., Baidu, Meituan, Ele.me, and

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[3] The daily net profit comes from the firm's Profit & Loss Statement and is calculated according to article 14 of *Accounting Standards for Chinese Small Businesses*. Specifically, daily net profits are sales revenues less tax, direct food costs, wrap costs, delivery costs, labor salary, management labor salary, insurance, rent, depreciation, energy costs, promotion, and other expenses. The tax, direct food costs, wrap costs, and delivery costs are per dish/order; the other daily costs are derived from the monthly costs divided by 30 days.

Table 2
Variable operationalizations.

	Variable	Abbreviation	Operationalization
Dependent variables	Total sales	Sale_total	Log of total sales for store i on day t (yuan) ("log" represents the natural logarithm)
	Total profits	Pro_total	Total profits for store i on day t (yuan)
	Offline sales	Sale_offline	Log of offline sales for store i on day t (yuan)
	Offline profits	Pro_offline	Offline profits for store i on day t (yuan)
Main explanatory variable	Long-term effect: Baidu	Baidu	Step dummy variable with value 0 before Baidu introduction and 1 after introduction
	Long-term effect: Meituan	Meituan	Step dummy variable with value 0 before Meituan introduction and 1 after introduction
	Long-term effect: Ele.me	Ele.me	Step dummy variable with value 0 before Elem introduction and 1 after introduction
	Long-term effect: Koubei	Koubei	Step dummy variable with value 0 before Koubei introduction and 1 after introduction
	Short-term effect: Baidu	WIntro (Baidu)	Pulse dummy variable with value 1 in the week of Baidu introduction and 0 otherwise
	Short-term effect: Meituan	WIntro (Meituan)	Pulse dummy variable with value 1 in the week of Meituan introduction and 0 otherwise
	Short-term effect: Ele.me	WIntro (Ele.me)	Pulse dummy variable with value 1 in the week of Ele.me introduction and 0 otherwise
	Short-term effect: Koubei	WIntro (Koubei)	Pulse dummy variable with value 1 in the week of Koubei introduction and 0 otherwise
Control variables	Quarterly fluctuation	Quarter	A vector of three dummy variables indicating quarters 2, 3, and 4 on day t, respectively
	Weekend	Weekend	Dummy variable indicating a weekend effect on day t
	Time trend	Trend	Log of the number of days between the date when store 1 opened and current date t [a]
	Weekly online search index	OSI	Weekly OSI of "O2OSP food delivery apps"
	CEO change	Leader	Step dummy variable with value 0 before appointing a new CEO and 1 afterward
	Holiday effect	Holiday	Dummy variable with value 1 for statutory holidays and 0 otherwise on day t
	Weather conditions	Weather	Dummy variable with value 1 for rainy or snowy weather and 0 otherwise for store i on day t
	Temperature	Temp	Seasonally adjusted average temperature for store i on day t (°C) [b]
	Chinese stock price index	Stock	Log of adjusted Hushen300 stock index on day t (yuan) [c]
	Beef channel change	Beef	Step dummy variable with value 0 before the new beef providing channel and 1 afterward

[a] We use the log of the trend to avoid multicollinearity.

[b] We remove quarterly fluctuations in temperature to make it stationary.

[c] Hushen300 is the Chinese S&P 500 Index, which can be used to represent the development of the overall stock market. We adjust the stock price by removing the effect of one structural break and then take the logarithm of the stock to make it stationary. The structural break happened around January 1, 2015—exactly the date the company changed leadership. Therefore, we do not need to introduce an extra dummy to represent this breakpoint.

Koubei) to measure the long-term impact of adding channels. We use four pulse dummies (e.g., WIntro [Meituan]) to capture the short-term impact of the O2OSP channel addition. To address important exogenous events, we create two step dummies to denote the effect of appointing a new CEO (January 1, 2015) and changing the source of beef (September 15, 2015). We also include a trend to capture natural growth by the focal firm. Moreover, we use a weekly online search index (OSI) for "O2OSP food delivery apps" (frequency of keywords "Baidu Waimai," "Meituan Waimai," "Ele.me," and "Koubei" in the most popular search engine in China) as a proxy for the gradual adoption of O2OSP food delivery apps. To account for economic development, we introduce the Chinese daily stock price index. We add lagged dependent variables to capture carryover effects (Leeflang et al. 2014). Finally, we control for weekends, holidays, climate conditions, temperature, and quarterly fluctuations.

Methodology

Following Pauwels et al. (2011), we adopt a dummy approach to quantify the performance change due to the addition of O2OSP channels. The panel regression model follows three steps.

Step 1: Unit-root tests. For each store, almost all continuous variables (i.e., four dependent variables and Temp, OSI, and

Stock) are stationary at a 0.001 significance level according to the Phillips and Perron (1988) test, for which the null hypothesis is that the time series is non-stationary.[4]

Step 2: Selection of panel regression model. Before panel regression model estimation, we test for a pooled ordinary least squares model, a fixed-effects panel regression model, or a random-effects panel regression model. Chow (1960) and Hausman (1978) tests indicate a fixed-effects model.

Step 3: Model specification. We specify the model as follows

$$
\begin{aligned}
y_{it} = {} & \beta_0 + \beta_1 \text{Baidu}_{it} + \beta_2 \text{Meituan}_{it} + \beta_3 \text{Ele.me}_{it} \\
& + \beta_4 \text{Koubei}_{it} + \beta_5 \text{WIntro(Baidu)}_{it} \\
& + \beta_6 \text{WIntro(Meituan)}_{it} + \beta_7 \text{WIntro(Ele.me)}_{it} \\
& + \beta_8 \text{WIntro(Koubei)}_{it} + \gamma y_{i,t-1} + s_i + C_{it} + \varepsilon_{it}, \text{ and} \quad (1)
\end{aligned}
$$

$$
\begin{aligned}
C_{it} = {} & \theta' \text{Quarter}_t + \delta_1 \text{Weekend}_t + \delta_2 \text{Trend}_t + \delta_3 \text{OSI}_t \\
& + \delta_4 \text{Leader}_t + \delta_5 \text{Holiday}_t + \delta_6 \text{Weather}_{it} + \delta_7 \text{Temp}_{it} \\
& + \delta_8 \text{Stock}_t + \delta_9 \text{Beef}_t \quad (2)
\end{aligned}
$$

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[4] The maximum percentage of non-stationary series across stores is 5.7%. For example, offline sales are stationary for all except store 10. We decided to keep these series in the analysis to avoid biasing the findings. Integrating the results is straightforward, given our definition of the long run as seven days after the introduction.

where the dependent variables in Eq. (1) are offline and total sales/profits at the daily level. We use the logarithm of offline and total sales but the original level of offline and total profits, because some profit observations are negative. In Eq. (1), the coefficients β_{1-4} represent the long-term impact of the O2OSP channel addition, and β_{5-8} capture the short-term impact. Finally, s_i denotes store heterogeneity, and Quarter = (Quarter 2, Quarter 3, Quarter 4)′ are dummies for quarters 2, 3, and 4 with coefficients $\theta = (\theta_1, \theta_2, \theta_3)'$.

Empirical Results

Table 3 presents the results of Eq. (1) with different dependent variables. The overall model is significant in all four cases ($\chi^2(55) = 585{,}203.74$, $p < .001$; $\chi^2(55) = 432{,}861.49$, $p < .001$; $\chi^2(55) = 358{,}268.80$, $p < .001$; $\chi^2(55) = 508{,}345.24$, $p < .001$) and explains 83.7%, 62.1%, 81.8%, and 71.1% of the variance in offline sales, offline profits, total sales, and total profits, respectively. This model fit is acceptable (Liu, Chugh, and Gould 2016). The variance inflation factor is small on average (2.40) and well below 10, so our models do not appear to suffer from severe multicollinearity.

To capture the overall effect of adding O2OSP channels, we test the null hypothesis that the linear combination of coefficients is equal to 0.[5] The overall impact on offline sales indicates support for H1a, because the O2OSP channel introduction has no impact on offline sales in the short run (b = 0.095, $p > .05$). However, in contrast with H1b, O2OSP channel introduction has a *positive* impact on offline sales in the long run (b = 0.211, $p < .001$). Furthermore, offline profits decrease in the short run (b = −460.650, $p < .001$) but increase in the long run (b = 722.395, $p < .001$). We find support for H2: O2OSP channel introduction has no significant impact on total sales in the short run (b = −0.027, $p > .05$) and a positive impact in the long run (b = 0.293, $p < .001$). Finally, in support of H3, the O2OSP channel introduction hurts total profits in the short run (b = −819.119, $p < .001$) but improves total profits in the long run (b = 782.630, $p < .001$).

To put these effects into perspective, we follow Leeflang et al. (2014, p. 115) and derive the long-term incremental percentage increases in offline and total sales due to O2OSP channel additions: 23.28% and 33.94%, respectively. This total sales increase is considerably higher than the 20% total sales increase reported as attributable to the addition of a physical store channel in U.S.-based studies (Avery et al. 2012; Pauwels and Neslin 2015) or the 19.8% increase in total sales after the addition of a firm-owned mobile channel in a South Korean study (Bang et al. 2013).

Table 3
Results of panel data regression with fixed effects.

	Offline sales	Offline profits	Total sales	Total profits
Overall Long-term Impact	0.211*** (0.0551)	722.395*** (29.515)	0.293*** (0.0349)	782.630*** (43.848)
Overall Short-term Impact	0.0951 (0.0918)	−460.650*** (36.681)	−0.0271 (0.0453)	−819.119*** (65.086)
Long-term impact				
Meituan	0.103*** (0.0203)	293.6*** (11.62)	0.0551*** (0.0150)	238.6*** (17.55)
Baidu	0.0536* (0.0217)	219.5*** (12.09)	0.106*** (0.0152)	193.6*** (18.00)
Ele.me	−0.0108 (0.0282)	4.983 (13.26)	0.0689*** (0.0194)	33.68 (22.51)
Koubei	0.0650 (0.0356)	204.4*** (20.98)	0.0629** (0.0225)	316.7*** (30.36)
Short-term impact				
WIntro (Meituan)	−0.00875 (0.0430)	−104.3*** (27.40)	−0.0350 (0.0241)	−195.2*** (34.08)
WIntro (Baidu)	0.0650 (0.0427)	−214.7*** (24.84)	0.0566* (0.0249)	−271.4*** (37.82)
WIntro (Ele. me)	0.0474 (0.0505)	−54.04* (25.94)	−0.0102 (0.0294)	−204.3*** (40.46)
WIntro (Koubei)	−0.00855 (0.0448)	−87.60*** (25.03)	−0.0385 (0.0231)	−148.3*** (35.13)
Control variables				
Lag term of the first order	0.784*** (0.00587)	0.616*** (0.00287)	0.796*** (0.00464)	0.653*** (0.00452)
Weekend	0.0495** (0.0157)	−2.504 (8.014)	0.0616*** (0.0104)	−10.53 (12.72)
Trend	−0.0739*** (0.0140)	410.9*** (11.49)	−0.0659*** (0.0110)	407.4*** (15.61)
Leader	0.0627 (0.0340)	−529.6*** (19.71)	0.0609** (0.0229)	−473.1*** (28.83)
Weather	−0.00382 (0.0223)	9.033 (11.10)	0.0182 (0.0148)	21.62 (18.87)
Temp	0.00154 (0.00130)	0.0669 (0.684)	0.00158 (0.000905)	−2.262* (1.138)
Stock	−0.118 (0.0826)	−80.97 (42.98)	−0.127* (0.0553)	−13.12 (68.71)
Holiday	−0.110*** (0.0271)	92.35*** (14.29)	−0.0969*** (0.0182)	86.35*** (22.73)
OSI	0.000000495 (0.000000656)	0.00157*** (0.000344)	0.00000110* (0.000000439)	0.00298*** (0.000546)
Quarter (overall)	0.0802 (0.0833)	−250.690*** (48.100)	0.181** (0.0561)	−266.325*** (70.750)
Beef	0.0442 (0.0484)	56.30* (27.01)	0.0956** (0.0320)	87.87* (42.46)
Intercept	3.157*** (0.686)	−1,680.7*** (356.0)	3.053*** (0.460)	−2,138.9*** (567.8)
N	11,681	11,681	11,681	11,681
R^2	0.837	0.621	0.818	0.711

Notes: Standard errors are in parentheses.
*$p < .05$, **$p < .01$, ***$p < .001$.

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[5] The linear combination is $Baidu_{it} + Meituan_{it} + Ele. me_{it} + Koubei_{it}$ in the long run and $WIntro(Baidu)_{it} + WIntro(Meituan)_{it} + WIntro(Ele. me)_{it} + WIntro(Koubei)_{it}$ in the short run. Similarly, we compute the overall effect of quarterly fluctuations.

Table 4
Interaction effects across O2OSP channels.

Main explanatory variables	Offline sales	Offline profits	Total sales	Total profits
Case 1				
Meituan	0.0533***	0.0616***	0.0870***	0.0401***
	(0.00568)	(0.00408)	(0.00410)	(0.00541)
Baidu + Ele.me + Koubei	0.0189***	0.0101***	0.0497***	0.0328***
	(0.00299)	(0.00212)	(0.00216)	(0.00267)
Meituan × (Baidu + Ele.me + Koubei)	−0.00972***	−0.00822***	−0.0184***	0.000514
	(0.00132)	(0.00124)	(0.000930)	(0.00163)
Case 2				
Baidu	0.0322***	0.0218***	0.0820***	0.0434***
	(0.00503)	(0.00369)	(0.00375)	(0.00439)
Meituan + Ele.me + Koubei	0.0185***	0.0256***	0.0347***	0.0410***
	(0.00258)	(0.00188)	(0.00208)	(0.00271)
Baidu × (Meituan + Ele.me + Koubei)	−0.00732***	−0.0160***	−0.0102***	−0.00882***
	(0.00122)	(0.00115)	(0.000909)	(0.00129)
Case 3				
Ele.me	0.0366***	0.00813	0.0801***	0.0244***
	(0.00623)	(0.00481)	(0.00441)	(0.00602)
Baidu + Meituan + Koubei	0.0253***	0.0330***	0.0491***	0.0353***
	(0.00281)	(0.00209)	(0.00210)	(0.00268)
Ele.me × (Baidu + Meituan + Koubei)	−0.00980***	−0.0104***	−0.0158***	0.00228
	(0.00132)	(0.00117)	(0.000952)	(0.00141)
Case 4				
Koubei	0.00545	0.0316***	0.0165***	0.0190***
	(0.00448)	(0.00327)	(0.00288)	(0.00455)
Baidu + Meituan + Ele.me	0.0217***	0.0101***	0.0520***	0.0321***
	(0.00260)	(0.00177)	(0.00195)	(0.00217)
Koubei × (Baidu + Meituan + Ele.me)	−0.00132	−0.00270*	−0.00541***	0.00748***
	(0.00111)	(0.00112)	(0.000787)	(0.00157)

Notes: Standard errors are in parentheses.
*$p < .05$, **$p < .01$, ***$p < .001$.

Robustness Checks

Interaction Effects

We assess whether the results are stable after including interaction terms; the four O2OSP channels arguably could affect one another. To avoid multicollinearity problems, we use the sales of each O2OSP channel instead of the channel introduction dummy.[6]

As Table 4 shows, the main effects (direction and significance) overall remain stable both before (Table 3) and after we add the O2OSP channel interactions. Most of the interaction effects are negative, indicating that the four O2OSP channels compete with and substitute for one another. For example, the positive effects of adding Baidu to offline and total sales/profits decrease with greater sales growth of the other three competing O2OSP channels. Overall, these interaction effects indicate that O2OSP channels are

competitors, and the benefits of adding more O2OSP channels, in terms of sales and profits, are limited.

Endogeneity Test: Pseudo-Introduction Date

The CEO of the focal firm indicated no strategic plan in introducing O2OSP channels in specific stores (and not others), so there is limited potential for endogeneity, and we cannot use a difference-in-differences approach to analyze it. Still, we adapt Linden's (2015, p. 480–483) endogeneity test to empirically verify whether confounds render our analysis invalid:

1. Create a pseudo-introduction date for each O2OSP channel that is before the true introduction of the O2OSP channel. Following Linden (2015), the pseudo-introduction date we use is the median time point of the pre-introduction period.
2. With this pseudo-introduction date, create step dummies and replace the dummies for the true introduction dates with these pseudo dummies.
3. Estimate the model using only samples during the pre-introduction period.

If the pseudo-introduction date effects are significant, the true introduction effects likely are confounded by factors that

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[6] The four O2OSP channels result in six pairs of two-way interactions, so we multiply each O2OSP channel by the summed sales of the other three channels to reduce model complexity and facilitate interpretation. For example, we consider Baidu × (summed sales of Meituan, Ele.me, and Koubei) to depict the interaction of Baidu with the competing channels. As the multiplication leads to a much larger number magnitude, we standardize all continuous variables to make coefficients easier to display in the table.

Table 5
Endogeneity tests.

Main explanatory variables	Offline sales	Offline profits	Total sales	Total profits
Case 1				
Pseudo-Meituan	−0.177	−0.180	399.7	402.5
	(0.215)	(0.225)	(548.3)	(547.9)
Case 2				
Pseudo-Baidu	0.0411	0.0753	152.8	78.65
	(0.148)	(0.149)	(134.0)	(136.5)
Case 3				
Pseudo-Ele.me	−0.127	0.0409	159.8	159.4
	(0.146)	(0.147)	(214.4)	(215.3)
Case 4				
Pseudo-Koubei	−0.0406	−0.00789	9.107	−29.61
	(0.0994)	(0.103)	(55.38)	(104.2)

Notes: Standard errors are in parentheses.
$*p < .05$, $**p < .01$, $***p < .001$.

our model fails to take into account (e.g., the natural growth of the focal firm, to the extent not captured in the time trends). The results in Table 5 show that all pseudo-introduction effects are non-significant, so the system we analyze does not change significantly until the true introduction date. Therefore, we conclude that conditional on the store's opening, sales can be attributed to the O2OSP channel.

Generalizability Check

To check the generalizability of our results, we analyze the effects of introducing O2OSP channels by two firms (Laobaixing and 85 °C) in two industries (pharmacy and bakery). Laobaixing and 85 °C are publicly listed companies, so we have access to their quarterly sales and profits figures,[7] and news reports indicate when they added O2OSP channels (2015Q4 and 2015Q1, respectively).[8]

We collect all the publicly disclosed quarterly data—that is, total sales and profits of Laobaixing (85 °C)—from 2014Q1 (2009Q1) to 2018Q2 (2018Q2). After controlling for possible confounding effects (i.e., trend, quarterly dummies, introduction dummies, and a dummy denoting the quarter when the firm became listed), we find that for Laobaixing (85 °C), total long-term sales increase 33.79% (11.70%) as a result of the O2OSP channel addition (Laobaixing: b = 0.30, $p < .05$; 85 °C: b = 0.11, $p < .001$). Also congruent with our main conclusions, total profits significantly increase in the long run (Laobaixing: b = 0.25, $p < .05$; 85 °C: b = 0.86, $p < .001$). Consistently, neither Laobaixing's nor 85 °C's total sales significantly increase in the short run ($ps > 0.05$), but total profits decrease in the short run (Laobaixing: b = −0.08, $p > .05$; 85 °C: b =

−0.98, $p < .001$). We conclude that our findings likely generalize to the population of Chinese service providers.

Discussion

The growth of the O2OSP business model in China and worldwide involves thousands of companies joining these channels, but does doing so cannibalize their offline sales revenues or profits? Or do O2OSP sales channels improve firms' total sales and profits? Scant previous empirical research has addressed these critically important managerial questions. By investigating the short- and long-term effects of O2OSP channel introduction on offline and total sales/profits, we quantify the value of introducing these channels, beyond simply serving as a pathway to increase sales revenues. Although adding O2OSP channels hurts offline and total profits in the short run, it boosts offline and total sales/profits in the long run. In particular, offline and total sales increase by 23% and 34%, respectively. The increase in short-term costs is faster than the increase in sales, resulting in short-term harms to offline and total profits. However, in the long run, sales revenues increase more than costs do. Therefore, managers should adopt a long-term view when introducing O2OSP channels.

Prior channel literature finds mixed effects on the impact of adding an online channel on offline sales. In this paper, we show that O2OSP channels complement traditional offline channels' sales, consistent with previous research that indicates that "the often-cited cannibalization fear has been largely overstated" (Deleersnyder et al. 2002, p. 346). For managers, our results indicate that adding O2OSP channels "makes the pie bigger" by attracting more customers to purchase both online and offline, thereby improving total sales and profits. This important general finding confirms managers' intuitive predictions, which are manifested in the rapid growth of O2OSP channels. Still, managers must acknowledge some negative interaction effects and recognize that different O2OSP channels compete, so the benefits of adding more O2OSP channels, in terms of sales and profits, have limits.

Although our study provides new insights, we also note some limitations that suggest avenues for further research. First, our study is limited to the variables to which we have access. For example, no daily marketing activity data nor competitive activity variables were available, so additional research should work to collect and include such variables. Second, we use step and pulse dummies to capture the effects of O2OSP channel additions, assuming a consistent impact over time. This assumption ignores the possibility that the impact of the first adopted O2OSP channel could change when additional O2OSP channels become available. A fruitful avenue for research would be to set channel impact dummies differently to determine whether the results still hold. Third, we analyze data from the Chinese catering market, which is currently a global leader in O2OSP services. We hope this study inspires additional research in other service categories and in other countries to glean insights into the generalizability and

boundary conditions of these important findings regarding the effects of adding O2OSP channels.

Acknowledgments

Appendices A and B. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.intmar.2019.03.001.

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