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Study on the Satisfaction of Consumers with Online Ordering Services and Its Influencing Factors in O2O mode: A Microcosmic Perspective on the Provision of Takeout Services

Jiaxiang HU¹, Xingyu CHEN²

Abstract

The rapid development of online to offline (O2O) mode has brought great opportunities and challenges to the catering industry. However, the limited understanding of the real needs of consumers has resulted in many incidents related to customer dissatisfaction, thereby resulting in huge consumer losses that have seriously affected the healthy development of the catering industry. To identify those factors that limit the satisfaction of consumers with online meal ordering services, a survey was conducted among 270 consumers in Shanghai, Beijing, Hangzhou, Wuhan, Shenzhen, Guangzhou, Wenzhou, Nanjing, Fuzhou, and Chengdu in February 2018. Ordered logistic regression was also performed, and the satisfaction of consumers with online ordering services and those factors that influence such satisfaction were empirically analyzed from the perspective of providing takeout services. The results point toward the low satisfaction of consumers with online ordering services and the services of offline merchants. First, the satisfaction of consumers with online ordering services is influenced by the quality of takeout services provided by ordering platforms, offline merchants, and logistics distributors. Second, the lack of aesthetics, safety, and reliability of ordering platforms, the poor quality of food provided by offline merchants, and the low service quality and failure of logistics in ensuring the integrity of their food can all explain the low satisfaction of consumers with online ordering services. Third, the reasonable price of dishes, convenience of taking meals, appropriate portion size of dishes, and meeting the specific requirements of consumers have been identified as the four factors with the largest effect on customer satisfaction. Suppliers of takeout services can retain and improve the satisfaction of their

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consumers by designing a beautiful and innovative ordering platform, improving the quality of their food, and using effective distribution tools, all of which are important in ensuring the healthy development of the takeout ordering industry.

Keywords: O2O, online ordering, consumer satisfaction, offline business

Introduction

In the age of the Internet, the rapid development of the online to offline (O2O) mode has brought great opportunities and challenges to the catering industry. iiMedia Research Group, the world's leading data mining and analysis agency for the new economy, reported that the value of the takeout market in China has exceeded \$200 billion in 2017 and is expected to reach \$243 billion in 2018. In 2017, the number of customers of online takeout services in China exceeded 300 million and is expected to reach 355 million in 2018 (iiMedia Research, 2018). The rapid development of the O2O catering market has also introduced several social problems, such as poor food hygiene, food workshops without licenses, and lack of channels for consumers to file their complaints. These problems result in the dissatisfaction of consumers with online ordering services, destroy the market order of the takeout industry, and threaten its development. The satisfaction of customers in a network environment plays a key role in the profit generation of enterprises (Guo, Ling & Liu, 2012), but several factors, such as the low cost performance of goods, poor service attitude of employees, slow response of the O2O platform, delayed food deliveries, and unsanitary food, discourage consumers from purchasing products online in the future (Garcia, Pieters, Zeelenberg & Bigne, 2012). Based on the basic connotation of service provision (Wu & Lu, 2018), previous studies show that the overall impact of the services provided by ordering platforms, offline merchants, and logistics distributors (China Internet Network Information Center, 2018) on satisfaction can be evaluated from the perspective of providing takeout services by investigating the satisfaction of consumers with online ordering services and by analyzing several influencing factors. In this way, those enterprises that offer takeout services can identify those factors that limit the satisfaction of their consumers and implement the necessary intervention measures to increase customer satisfaction, which also plays a key role in the success of the takeout industry in the next stage of competition (China Internet Network Information Center, 2018).

To address this problem, previous studies suggest that online customer satisfaction is determined by customer pre-sale services, the competitive advantage of commodity prices, logistics, and distribution services, and the front-end services provided by websites (Cheung & Lee, 2005). Meanwhile, other studies show that the satisfaction of consumers in an online healthy community is affected by the provision of online services (Wu & Lu, 2018). However, these studies do not

consider the characteristics of food itself. At the same time, researchers believe that the quality of food (Liu & Jang, 2009), restaurant environments, and services play decisive roles in influencing the satisfaction of consumers with their meals (Kisang, Hye & Woo, 2012). Moreover, most of the existing studies have analyzed the satisfaction of customers with the traditional catering mode. In the O2O mode, customers do not need to go to physical restaurants to have their dinner; instead, the restaurants deliver meals to their customers through a dispatcher. In this case, how can we comprehensively analyze those factors that influence the satisfaction of consumers with online ordering services from the perspective of providing services in the O2O mode and based on the characteristics of online meal ordering services? Moreover, how can we analyze the impact of these factors on consumer satisfaction? These questions have not yet been addressed in the literature.

In sum, this study examines two factors, namely, the satisfaction of consumers with online ordering services and the impact of the factors on the degree of consumer satisfaction. By conducting a questionnaire survey, this study analyzes the status quo and factors that influence the satisfaction of consumers with online ordering services from the perspective of takeout service provision and proposes the necessary intervention measures that can help ordering platforms, offline merchants, and logistics distributors retain their consumers and increase their satisfaction.

State of the Art

Cardozo introduced the concept of customer satisfaction in the field of marketing in 1965 (Cardozo, 1965). Since then, theories on customer satisfaction have been developed in various academic fields. Oliver argued that customer satisfaction pertained not only to the emotional reactions of consumers after the satisfaction of their needs but also to their degree of satisfaction and their subjective judgment on whether their purchased products and services have met their needs (Oliver, 1981). Assessing customer satisfaction has become critical in the service sector. To improve the business performance and competitiveness of enterprises, online retailers must develop a comprehensive and in-depth understanding of customer satisfaction in an online environment. Customer satisfaction plays a very important role in online shopping and affects the decisions of consumers to continue online shopping (Tandon, Kiran & Sah, 2018). In the O2O mode, network platforms provide consumers with basic information services (e.g., price, brands, and discounts), offline merchants provide real commodity experience services, and logistics distributors provide commodity distribution services (Yu & Ren, 2018). The provision of all these types of services can affect the satisfaction of consumers (China Internet Network Information Center, 2018).

Scholars established a conceptual model for the satisfaction of customers with Internet retailing and confirmed that website design, shopping convenience,

financial security, and commodity information all have significant positive effects on customer satisfaction (Szymanski & Hise, 2000). Nanjae & Sanghyuk (2001) stated that online consumer satisfaction is influenced by nine factors, namely, interface design, customer service, additional information services, procurement process, purchase results, payment, usability, payment method, and delivery time. Parry et al. (2012) argued that a well-developed online review system can influence the satisfaction and purchase intention of consumers through perceived usefulness and ease of use. Elbeltagi and Agag (2016) found that the safety and reliability of online retailing platforms can significantly influence customer satisfaction. Apart from website design and ease of navigation, the perceptions of consumers on time performance, including the timeliness of the platform in solving problems, can strongly affect customer satisfaction (Tandon, Kiran & Sah, 2016). Tandon, Kiran & Sah (2017) showed that website quality can be conceptualized as a combination of clear navigation, information usefulness, beautiful platform or interface design, safety and reliability of the platform, easy ordering and customization, and website quality, all of which can positively affect purchase intention and customer satisfaction. Pereira, Salgueiro & Rita (2017) argued that the brand image of the website can significantly influence the degree of customer satisfaction. Tandon, Kiran & Sah (2018) argued that the functionality of websites and including more promotional activities can positively influence customer satisfaction. Other studies show that the satisfaction of consumers in an online environment is affected by several factors, including the interface, search function, safety and reliability, services, image, and timely response of the platform, the inclusion of promotional and preferential activities, and the use of a perfect customer evaluation system. Compared with generic commodities, food has several unique characteristics, such as taste, health, safety, and variety. Previous studies have investigated generic commodities from the perspective of the network platforms instead of ordering platforms.

Andaleeb & Conway (2006) identified direct contact with employees and cost effectiveness as those factors with the greatest effects on consumer satisfaction. Liu & Jiang (2009) argued that the impact of consumer satisfaction differed across various catering markets and that the quality, hygiene, safety, taste, and variety of food (Liu & Jang, 2009) had the greatest impact on consumer satisfaction. Terblanche & Boshoff (2010) found that in the new era, strengthening the personalized services of an enterprise to meet the requirements of its consumers plays a key role in improving customer satisfaction. Chun & Lim (2017) argued that the quality of the food and services provided by hotels can influence their service value, which in turn will affect the satisfaction of their consumers; they also identified the brand image of hotels and the attitude of their staff as the main factors that drive service quality. Wang, Lu & Tan (2018) argued that product attributes, including prices, can influence customer satisfaction. Previous studies show that the satisfaction of customers with the traditional catering industry is affected by several factors, including business image, service attitude, food hygiene, safety,

price, variety, taste, and portion size, and ability to meet the specific requirements of consumers. Despite the differences between traditional restaurants and online ordering services in terms of their provided information, payment methods, and logistics distribution, only few studies have examined whether these factors can influence the satisfaction of customers with online ordering services.

Xing & Grant (2006) proposed that consumer satisfaction must be examined from four aspects, namely, timeliness, convenience, integrity, and return of goods. Zheng, Jin, Dong & Liu (2007) developed a logistics distribution service index system for online shopping that is measured by the speed of logistics distribution, the reliability of logistics distribution services, the service attitude of the delivery staff, the integrity of commodity distribution, the price of logistics distribution services, and the image of logistics enterprises. Huang & Wang (2011) identified the integrity of commodity distribution as the most important factor that influences the satisfaction of customers with logistics distribution services for online retailers and found that the timeliness and accuracy of logistics distribution only has a slight effect on such satisfaction. Henseler & Coelho (2012) found that providing personalized logistics services to customers can increase their satisfaction and help build their loyalty. Zhang, Cheung & Lee (2012) developed a customer satisfaction structure model for online shopping and identified eight indicators for the entire distribution process for online retailing, namely, flexibility, personalization, timeliness and accuracy of the delivery, response, delivery conditions, fairness of procedures and policies, and emotional input. Most of the existing studies on the satisfaction of consumers with logistics distribution services have focused on the general definition of online shopping and have ignored those factors related to food distribution, such as food distribution equipment and convenience of taking meals (Yeo, Goh & Rezaei, 2017).

In sum, previous studies have examined the factors of consumer satisfaction from the perspective of network platforms, logistics, and distribution and have analyzed those factors that affect the satisfaction of consumers with the traditional catering industry from the perspective of merchants. Despite the existence of several ordering platforms in China (e.g., ELM, MeiTuan, and Baidu takeout), no study has analyzed those factors that influence the satisfaction of consumers with online meal ordering services from the perspective of takeout service provision, that is, the service quality of online ordering platforms, offline merchants, and logistics distribution. To fill such gap, this study examines the O2O mode of the online takeout industry based on those factors that influence the satisfaction of consumers with online shopping services by investigating the actual behavior of consumers, the status quo of consumer satisfaction with online ordering services, and the difference in the satisfaction of consumers with traditional and online catering services. Based on the analysis of the sample population, this study examines the differences in the effects of various factors on the satisfaction of consumers with online catering services.

Methodology

Data source

To investigate the satisfaction of consumers with online meal ordering services, the author and the research team conducted a questionnaire survey in February 2018. To objectively and accurately reflect the satisfaction of consumers with online meal ordering services, the regional, age, and gender differences among the respondents are considered in the selection of sample points. Moreover, to increase the meaningfulness of the research findings, this study selects 10 cities with the largest number of takeaway orders (Eleme, 2018), including Shanghai, Beijing, Hangzhou, Wuhan, Shenzhen, Guangzhou, Wenzhou, Nanjing, Fuzhou, and Chengdu, and chooses the consumers in these 10 cities as its research objects. The questionnaires are distributed online and offline, and 120 and 150 offline and online questionnaires have been returned, respectively. Among the 270 returned questionnaires, 264 are valid, thereby yielding an effective response rate of 97.78%. All in all, these questionnaires are deemed random and representative.

Sample information

Overall situation of the sample

Table 1 presents the basic information of the sample and offers four key takeaways. First, the proportion of male and female respondents does not significantly differ and all age ranges and types of occupations have been covered in the sample, thereby indicating that the survey results are balanced and reasonable. Second, the respondents in the 18-25 and 26-32 age groups account for the largest proportion of the sample (41.67% and 30.68%, respectively), with the respondents aged between 33 years and 40 years accounting for 12.88%. These figures indicate that young people avail takeout services more often than older people given that they access and use the Internet more often than the latter. This trend can also be attributed to the fact that young people tend to be busy with their work and are unwilling to go outside to take their meals. Third, undergraduate or tertiary students account for 50.76% of the sample and show the highest distribution, thereby suggesting that a large part of the respondents are students or fresh graduates who are familiar with selling and ordering meals, thereby providing value for this research. Fourth, the income of the respondents is mainly distributed among 2000 Yuan and below, between 4001 Yuan and 6000 Yuan, and between 6001 Yuan and 8000 Yuan. Those respondents whose income is 2000 Yuan and below account for 25% of the sample and mainly comprise students without any fixed source of income. Meanwhile, those respondents with an income ranging from 4001 Yuan to 8000 Yuan mainly comprise civil servants and employees from enterprises and institutions, who are considered the main customers of online ordering services. All

in all, the results of the questionnaire survey are highly scientific and reasonable and have a certain degree of feasibility.

Table 1. Demographic and behavioral characteristics of the respondents

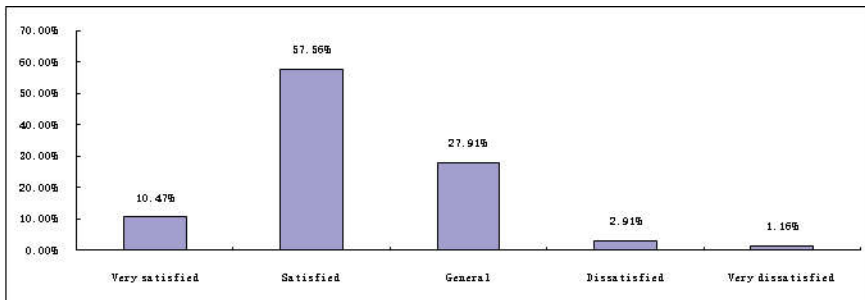
Items	Characteristics	Sample size	Proportion
Sex	Men	135	51.14%
	Female	129	48.86%
Age	Below 18	11	4.17%
	18-25	110	41.67%
	26-32	81	30.68%
	33-40	34	12.88%
	41-50	16	6.06%
	Above 50	12	4.55%
Status or occupation	Student	71	26.89%
	Employees of enterprises and institutions	75	28.41%
	Civil servant	48	18.18%
	Farmer	16	6.06%
	Worker	15	5.68%
	Professional	27	10.23%
	Retired personnel	4	1.52%
	Others	8	3.03%
	Education level	Primary school or below	16
	Junior school	41	15.53%
	High school or polytechnic school	64	24.24%
	Undergraduate or junior college	134	50.76%
	Master's degree or above	9	3.41%
Monthly income (Yuan)	< 2000	66	25%
	2001-4000	48	18.18%
	4001-6000	67	25.38%
	6001-8000	62	23.48%
	8001-10000	14	5.3%
	> 10000	7	2.65%

Note: the data in the table are from the questionnaire.

Overall consumer satisfaction with online ordering services

Figure 1 shows that 10.47% of the respondents are very satisfied with online ordering services, 57.56% are satisfied, 27.91% have an average degree of satisfaction, 2.91% are dissatisfied, and 1.16% are very dissatisfied. The average overall satisfaction score is 3.73, which indicates that the overall satisfaction degree of the respondents with online ordering services is not very high. Although more than half of the respondents are satisfied, online ordering services require further improvements.

Figure 1. Satisfaction of consumers with online ordering services



Research method and variable setting

Research methods

Online ordering platforms, offline merchants, and distribution services are used as independent variables, while the satisfaction of consumers with online ordering services is taken as the dependent variable. Such satisfaction is rated on a five-point scale, with 5 indicating “very satisfied,” 4 indicating “relatively satisfied,” 3 indicating “generally satisfied,” 2 indicating “dissatisfied,” and 1 indicating “dissatisfied.” Given that the dependent variable “satisfaction of consumers with online ordering services” is rated on a five-point scale, this study adopts the ordered probability model and builds the following ordered logistic model of consumer satisfaction with online ordering services:

$$\ln \left[\frac{p(y \leq j)}{1 - p(y \leq j)} \right] = \alpha_j + \sum_{i=1}^n \beta_i x_i,$$

where $j=1,2,3,4,5$ indicates the five levels of satisfaction, y denotes the overall satisfaction of consumers with online ordering services, x_i is a dependent variable

that influences the satisfaction of consumers with online ordering services, α_j is an intercept parameter, and β_i is a regression coefficient.

Variable setting

According to the purpose of this study, the satisfaction level of consumers with online ordering services is used as the dependent variable. Following Cheung & Lee (2005), this study contends that consumer satisfaction is affected by ordering platforms, offline merchants, and logistics distribution services, which are taken as independent variables in this study to explore their impact on consumer satisfaction.

For ordering platforms, the previous analysis identified nine variables, namely, beautiful interface of the platform (Szymanski & Hise, 2000), clear search function (Tandon, Kiran & Sah, 2017), safety and reliability of the platform (Elbeltagi & Agag, 2016), fast response of the platform (Tandon, Kiran & Sah, 2016), more promotional activities (Yu & Ren, 2018) perfect customer evaluation system (Parry, Kawakami & Kishiya, 2012), timely handling of problems (Tandon, Kiran & Sah, 2016), good platform service (Nanjai & Sanghyuk, 2001), and good brand image of the platform (Pereira, Salgueiro & Rita, 2017).

For offline merchants, eight variables were identified, namely, good business image (Chun & Lim, 2017), good service attitude (Chun & Lim, 2017), food hygiene and safety (Liu & Jang, 2009), reasonable price (Andaleeb & Conway, 2006), food variety (Liu & Jang, 2009), food taste (Liu & Jang, 2009), appropriate portion size (Andaleeb & Conway, 2006), and ability to meet specific customer requirements (Terblanche & Boshoff, 2010). According to the characteristics of online catering services under the O2O mode, two variables, namely, good quality of box packaging and consistency of the presented information, are considered.

For logistics distribution services, four variables, namely, speed of logistics distribution (Zheng, Jin, Dong & Liu, 2007), attitude of the distribution personnel (Xing & Grant, 2006), integrity of food (Zheng, Jin, Dong & Liu, 2007), and convenience of taking meals and configuration of the distribution equipment, are added according to the characteristics of catering distribution services in the O2O mode.

Descriptive statistical analysis

(1) Consumer satisfaction with ordering platform services

Table 2 shows that the satisfaction of consumers with each factor of the ordering platform is not very high (3.72 to 3.84 points). The overall average score for the platform is 3.78, thereby suggesting that consumers are not very satisfied with this platform. Although most of the respondents mention that they are satisfied, the ordering platform has not reached the level of consumer satisfaction. The factors “fast response of the platform,” “clear search function,” “good image of

the platform brand,” and “perfect customer evaluation system” all obtain high scores, while “beautiful interface of the platform” and “safety and reliability of the platform” obtain low scores, thereby indicating that many consumers are not very comfortable with the payment security of third-party ordering platforms.

Table 2. Satisfaction of consumers with online ordering platforms

Satisfaction	Very dissatisfied (1 Point)	Dissatisfied (2 Points)	General (3 Points)	Satisfied (4 Points)	Very satisfied (5 Points)	Average
Beautiful interface of the platform	7(4.07%)	10(5.81%)	47(27.33%)	68(39.53%)	40(23.26%)	3.72
Clear search function	5(2.91%)	13(7.56%)	42(24.42%)	60(34.88%)	52(30.23%)	3.82
Safe and reliable platform	3(1.74%)	13(7.56%)	51(29.65%)	66(38.37%)	39(22.67%)	3.73
Fast response of the platform	4(2.33%)	6(3.49%)	47(27.33%)	72(41.86%)	43(25%)	3.84
More promotional activities	7(4.07%)	12(6.98%)	41(23.84%)	65(37.79%)	47(27.33%)	3.77
Perfect system of customer evaluation	8(4.65%)	9(5.23%)	36(20.93%)	76(44.19%)	43(25%)	3.8
Timely problem handling	5(2.91%)	11(6.4%)	40(23.26%)	76(44.19%)	40(23.26%)	3.78
Good platform service	5(2.91%)	11(6.4%)	47(27.33%)	64(37.21%)	45(26.16%)	3.77
Good image of the platform brand	6(3.49%)	9(5.23%)	39(22.67%)	75(43.6%)	43(25%)	3.81
Subtotal	50(3.23%)	94(6.07%)	390(25.19%)	622(40.18%)	392(25.32%)	3.78

Note: the data in the table are from the questionnaire.

(2) Satisfaction of consumers with the services of offline businesses

As shown in Table 3, the satisfaction of consumers with food vendors obtains an average score of 3.73, which is lower than that obtained by the overall satisfaction of consumers with the ordering platform. Among these factors, “variety of food” obtains the highest average score of 3.85, while “consistency of the presented information” obtains the lowest average score of 3.63. The other factors have

obtained scores ranging from 3.68 to 3.77. In sum, a large gap is observed between the highest and lowest scores, thereby indicating that the satisfaction of consumers with food businesses is not balanced. Table 3 also shows that consumers are dissatisfied with the factors of food itself, including price, taste, content, hygiene, and safety. Moreover, the actual food being offered by offline merchants does not match the descriptions presented in ordering platforms, thereby reducing the satisfaction of consumers.

Table 3. Satisfaction of consumers with offline businesses

Satisfaction	Very dissatisfied (1 Point)	Dissatisfied (2 Points)	General (3 Points)	Satisfied (4 Points)	Very satisfied (5 Points)	Average
Good image of business	5(2.91%)	12(6.98%)	45(26.16%)	72(41.86%)	38(22.09%)	3.73
Good attitude of the service	6(3.49%)	11(6.4%)	46(26.74%)	64(37.21%)	45(26.16%)	3.76
Hygiene and safety of food	4(2.33%)	15(8.72%)	49(28.49%)	67(38.95%)	37(21.51%)	3.69
Reasonable price item	6(3.49%)	13(7.56%)	47(27.33%)	70(40.7%)	36(20.93%)	3.68
Variety of food	4(2.33%)	7(4.07%)	41(23.84%)	78(45.35%)	42(24.42%)	3.85
Taste of food	5(2.91%)	13(7.56%)	50(29.07%)	63(36.63%)	41(23.84%)	3.71
Appropriate portion size	6(3.49%)	14(8.14%)	46(26.74%)	63(36.63%)	43(25%)	3.72
good quality of the box packaging	4(2.33%)	13(7.56%)	43(25%)	70(40.7%)	42(24.42%)	3.77

Consistency of information presented	4(2.33%)	17(9.88%)	47(27.33%)	74(43.02%)	30(17.44%)	3.63
being able to meet specific requirements made by consumers	5(2.91%)	15(8.72%)	42(24.42%)	68(39.53%)	42(24.42%)	3.74
Subtotal	49 (2.85%)	130(7.56%)	456(26.51%)	689(40.06%)	396(23.02%)	3.73

Note: the data in the table are from the questionnaire.

(3) Satisfaction of consumers with distribution services

Table 4 shows that the satisfaction of consumers with online ordering and distribution services has an average score of 3.8, which is higher than the score obtained by the satisfaction of consumers with online ordering platforms and offline businesses. No significant difference is observed among the average scores obtained by any of the factors with the exception of “integrity of food,” which obtains the lowest score.

Table 4. Satisfaction of consumers with distribution services

Satisfaction	Very dissatisfied (1 Point)	Dissatisfied (2 Points)	General (3 Points)	Satisfied (4 Points)	Very satisfied (5 Points)	Average
speed of distribution	6(3.49%)	7(4.07%)	45(26.16%)	65(37.79%)	49(28.49%)	3.84
Attitude of distribution personnel	5(2.91%)	10(5.81%)	45(26.16%)	68(39.53%)	44(25.58%)	3.79
Integrity of food	4(2.33%)	17(9.88%)	41(23.84%)	66(38.37%)	44(25.58%)	3.75

Convenience of taking meals	6(3.49%)	5(2.91%)	41(23.84%)	78(45.35%)	42(24.42%)	3.84
configuration of distribution equipment	4(2.33%)	10(5.81%)	46(26.74%)	71(41.28%)	41(23.84%)	3.78
Subtotal	25(2.91%)	49(5.7%)	218(25.35%)	348(40.47%)	220(25.58%)	3.8

Note: the data in the table are from the questionnaire.

Result Analysis

Reliability and validity analysis

Reliability analysis

The internal consistency of the questionnaire is tested based on the Cronbach's α coefficient. As shown in *Table 5*, the overall α of the questionnaire is 0.983, which is greater than 0.8, thereby indicating the high reliability of the questionnaire as a whole. Customer satisfaction is measured in three aspects, namely, their satisfaction with the ordering platform as a whole, offline merchants as a whole, and distribution services as a whole. The α coefficients of these aspects are all greater than 0.8, thereby suggesting that the scale has a high reliability and can be used for further analysis.

Table 5. Cronbach's α coefficients

Measurement dimension	Value of α	Discriminant result
Reservation platform	0.992	High reliability
Offline business	0.993	High reliability
Distribution service	0.987	High reliability
Overall questionnaire	0.983	High reliability

Validity analysis

This study uses KMO and Bartlett’s spherical test to verify the validity of the questionnaire data. The 24 factors affecting the satisfaction of customers with online ordering services are divided into three dimensions for the exploratory factor analysis and validity analysis. Factor 1 reflects the satisfaction of consumers with online ordering platforms, factor 2 reflects their satisfaction with offline businesses, and factor 3 reflects their satisfaction with distribution services. Table 6 shows that the loading coefficients corresponding to each item are all greater than 0.4, thereby suggesting a favorable relationship between the items and factors, which is consistent with expectations. The KMO value is 0.948, which is higher than 0.8, while the *P* value is less than 0.01, thereby suggesting that the Bartlett’s spherical test is significant, the factor analysis is feasible, and the results are credible. The total explained variance is 78.860%, which is greater than 50%, thereby indicating that information on the research item can be effectively extracted and that the questionnaire data have good validity.

Table 6. Validity analysis

Project factors	Loading Coefficient of item		
	Factor 1	Factor 2	Factor 3
Beautiful interface of the platform	0.715		
Clear search function	0.634		
Safe and reliable platform	0.594		
Fast response of the platform	0.411		
More promotional activities	0.684		
Perfect system of customer evaluation	0.447		
Timely problem handling	0.543		
Good service	0.595		
Good image of the platform brand	0.581		
Good image of business		0.789	
Good attitude of the service		0.506	
Hygiene and safety of food		0.601	
Reasonable price item		0.478	
Variety of food		0.548	
Taste of food		0.529	
Appropriate portion size		0.514	
Good quality of the box packaging		0.423	
Consistency of information presented		0.440	
Being able to meet specific Requirements made by consumers		0.628	
Speed of distribution			0.506
Attitude of distribution personnel			0.443

Integrity of food		0.482
Convenience of taking meals		0.641
Configuration of distribution equipment		0.424
KMO value	0.948	
Barthes spherical value	3014.875	
df	276	
P value	0.000	
Total explained variance % (After rotation)	78.860%	

Correlation analysis

Pearson’s correlation coefficient is used to analyze the relationship among the factors of ordering platforms, food merchants, and distribution services and the satisfaction of customers with their takeaway orders. This study also checks for a linear correlation between the 24 influencing factors and customer satisfaction and to determine the closeness of such relationship.

Correlation analysis of the ordering platform factors and the overall satisfaction of customers with online ordering services

Table 7. Correlation analysis of the ordering platform factors

Factors of ordering platform		Overall satisfaction of online ordering
Beautiful interface of the platform	Pearson’s correlation	.253
	Significance (bilateral)	.001
	N	172
Clear search function	Pearson’s correlation	.298
	Significance (bilateral)	.000
	N	172
Safe and reliable platform	Pearson’s correlation	.340
	Significance (bilateral)	.000
	N	172
Fast response of the platform	Pearson’s correlation	.210
	Significance (bilateral)	.006
	N	172
More promotional activities	Pearson’s correlation	.340
	Significance (bilateral)	.000
	N	172

Perfect system of customer evaluation	Pearson's correlation	.350
	Significance (bilateral)	.000
	N	172
Timely problem handling	Pearson's correlation	.306
	Significance (bilateral)	.000
	N	172
Good platform service	Pearson's correlation	.357
	Significance (bilateral)	.000
	N	172
Good image of the platform brand	Pearson's correlation	.313
	Significance (bilateral)	.000
	N	172

Note: significant correlation was found in the 0.01 level (bilateral).

Table 7 shows that the factors of the ordering platform are positively correlated with the overall satisfaction of customers with their takeaway orders and that such correlation is significant. Among these factors, “safety and reliability of the platform,” “more promotional/preferential activities,” “perfect customer evaluation system,” and “good platform services” have a stronger correlation with the satisfaction of consumers with takeout orders compared with all the other factors.

Correlation analysis between the offline business factors and the overall satisfaction of customers with online ordering services

Table 8 shows that the factors of offline merchants are positively correlated with the overall satisfaction of customers with online ordering services and that such correlation is significant. Among these factors, “good business service attitude,” “reasonable price of items,” “variety of food,” “taste of food,” “good box packaging quality,” “consistency of information presented,” and “meeting the specific requirements of consumers” have a stronger correlation with the satisfaction of customers with online orders compared with all the other factors. The factors “reasonable price of items” and “consistency of information presented” show the strongest correlation with customer satisfaction.

Table 8. Correlation analysis of the offline business factors

Factors of offline business		Overall satisfaction of online ordering
Good image of business	Pearson's correlation	.301
	Significance (bilateral)	.000
	N	172
Good attitude of the service	Pearson's correlation	.330
	Significance (bilateral)	.000
	N	172
Hygiene and safety of food	Pearson's correlation	.266
	Significance (bilateral)	.000
	N	172
Reasonable price item	Pearson's correlation	.447
	Significance (bilateral)	.000
	N	172
Variety of food	Pearson's correlation	.326
	Significance (bilateral)	.000
	N	172
Taste of food	Pearson's correlation	.325
	Significance (bilateral)	.000
	N	172
Appropriate portion size	Pearson's correlation	.301
	Significance (bilateral)	.000
	N	172
Good quality of the box packaging	Pearson's correlation	.341
	Significance (bilateral)	.000
	N	172
Consistency of information presented	Pearson's correlation	.371
	Significance (bilateral)	.000
	N	172
Being able to meet specific Requirements made by consumers	Pearson's correlation	.364
	Significance (bilateral)	.000
	N	172

Correlation analysis of the distribution service factors and the overall satisfaction of consumers with online ordering services

Table 9 shows that the factors of distribution services are positively related with the overall satisfaction of customers with online ordering services and that such correlation is significant. Among these factors, “convenience of taking meals” and “configuration of distribution equipment” shows the strongest correlation with the satisfaction of customers with online ordering services.

Table 9. Correlation analysis of the distribution factors

Factors of distribution service		Overall satisfaction of online ordering
Speed of distribution	Pearson’s correlation	.308
	Significance (bilateral)	.000
	N	172
Attitude of distribution personnel	Pearson’s correlation	.312
	Significance (bilateral)	.000
	N	172
Integrity of food	Pearson’s correlation	.255
	Significance (bilateral)	.001
	N	172
Convenience of taking meals	Pearson’s correlation	.389
	Significance (bilateral)	.000
	N	172
Configuration of distribution equipment	Pearson’s correlation	.398
	Significance (bilateral)	.000
	N	172

Regression analysis

The SPSS 10.0 software is used for the model regression, which employs the ordered logistic method of forward stepwise regression. After conducting stepwise regression and excluding the insignificant variables, 10 factors with the greatest significant impact on overall customer satisfaction have been identified, namely, complete distribution equipment, good service attitude of merchants, safe and reliable platform, fast distribution speed, sufficient food content, and true and

actual information. The regression equation is established based on the results of the regression analysis.

The regression model has an R value of 0.825, which square is 0.681 and adjusted R^2 is 0.673. Given that the regression relationship can explain 67.3% of the variations in the dependent variable, the independent variable selected by the model has a high explanatory power. The F value is 123.275 and the Sig value is less than 0.01, thereby suggesting that the regression model has a significant practical significance and that the regression equation is tenable. The final results of the model are presented in Table 10, which shows that “safe and reliable platform,” “good service attitude,” “reasonable price of items,” “taste of food,” “appropriate portion size,” “consistency of the presented information,” “being able to meet the specific requirements of consumers,” “speed of distribution,” “convenience of taking meals,” and “configuration of distribution equipment” have regression coefficients of 0.048, 0.017, 0.193, 0.041, 0.083, 0.060, 0.074, 0.043, 0.140, and 0.061, respectively. These factors have P values of less than 0.05, thereby highlighting their significant impacts on the satisfaction of customers with online ordering services. Moreover, when these factors increase or decrease, the satisfaction of customers with online ordering services will also increase or decrease to a certain extent.

Table 10. Regression analysis results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig
	B	Standard errors	Trial Edition		
(Constant)	2.069	.248		2.356	.000
Safe and reliable platform	.048	.066	.045	2.733	.001
Good attitude of the service	.017	.071	.014	3.232	.002
Reasonable price item	.193	.071	.191	5.721	.000
Taste of food	.041	.074	.038	3.562	.001
Appropriate portion size	.083	.069	.081	4.201	.001
Consistency of information presented	.060	.078	.059	3.770	.001
Being able to meet specific Requirements made by consumers	.074	.073	.066	3.010	.001
Speed of distribution	.043	.072	.041	2.461	.001
Convenience of taking meals	.140	.082	.136	4.226	.000
Configuration of distribution equipment	.061	.081	.059	3.381	.001

The regression analysis results indicate that among those factors that influence the satisfaction of consumers with online ordering services, “reasonable price of items,” “convenience of taking meals,” “appropriate portion size,” and “being able to meet the specific requirements of consumers” have the greatest impacts. These findings can be attributed to three reasons. First, given that college students and employees are the main customers of takeout services, the price of food and the convenience of taking out meals are the key factors that affect the satisfaction of these consumers with takeout services. Second, “taste of food” and “appropriate portion size” greatly affect customer satisfaction, which can be mainly attributed to the fact that under normal circumstances, the taste of food will not change much yet their content can directly affect the price-performance ratio of food in the minds of consumers, thereby affecting their satisfaction. Third, given the obvious personalized characteristics of food, consumers have developed different tastes and requirements. Therefore, the ability of merchants to satisfy the requirements of their consumers can influence their satisfaction with online ordering services to a large extent. Although the factor for the satisfaction of customers with online ordering services is not significant enough, these factors cannot be easily ignored. To a certain extent, these factors can still influence the satisfaction of consumers with online ordering services.

Discussion

The above analysis reveals that the overall satisfaction of consumers with online ordering services differs across each takeout service provider. Specifically, the average satisfaction of consumers with online ordering services is lower than their satisfaction with the three providers of takeout services, namely, ordering platforms, offline merchants, and logistics distributors. These results highlight the need to further improve online ordering services. Among the factors of the ordering platform, “beautiful interface of the platform” and “safety and reliability of the platform” have received low consumer satisfaction scores, thereby suggesting that many consumers are not very confident about the payment security of ordering platforms. These consumers are also generally dissatisfied with “more promotional/preferential activities” because they feel that their degree of preference for the food being advertised on these platforms has decreased along with the increasing amount of activities being offered. In the early stages of their development, online ordering platforms launch certain activities, such as huge discounts and red envelopes, to attract more users. However, they begin to limit their provision of such discounts after they reach a certain market size. As for offline businesses, consumers are dissatisfied with the price, taste, size, hygiene, and safety of the food being provided by these businesses. They are also dissatisfied with the “consistency of information presented” probably because their online orders are being delivered to them by logistics distributors. Information distortion also leads

to a low consumer satisfaction, especially when the food provided by offline merchants does not match the descriptions presented on the ordering platforms. For logistics distribution, consumers are dissatisfied with the “integrity of food” and the “configuration of distribution equipment” yet are satisfied with the other factors. These findings may be ascribed to the fact that food delivery services still use motorcycles as their main means of transport and that the delivered food may be damaged when these vehicles hit bumps on the road. These delivery services also use foam insulation boxes to store their food during delivery, but these boxes have a poor insulation effect. Therefore, in long-distance deliveries, the food ordered by consumers may be delivered to them cold, thereby reducing their satisfaction with the delivery service.

The satisfaction of consumers with online ordering services is also influenced by the quality of takeout services provided by ordering platforms, offline merchants, and logistics distributors, while such quality in turn is positively correlated with the overall satisfaction of consumers with online ordering services. Consistent with the arguments of Elbeltagi and Agag (2016), the “safety and reliability” of the platform has a significant impact on the satisfaction of consumers with online ordering services. Based on the analysis of the satisfaction of consumers with ordering platforms, the following two interventions can be adopted to improve the satisfaction of consumers. First, the interface of ordering platforms must be improved. Second, the innovation of these platforms must be strengthened and certain activities, such as cash discounts and red envelopes, must be launched to attract consumers and to distinguish these platforms from other similar ordering platforms operating in the market.

The factors for offline merchants, including “good service attitude,” “reasonable price of items,” “taste of food,” “appropriate portion size of dishes,” “authenticity and reality of information,” and “meeting the specific requirements of consumers,” have a significant impact on consumer satisfaction, which is consistent with the works of Andaleeb & Conway (2006), Liu & Jang (2009), Terblanche & Boshoff (2010) and Chun & Lim (2017). The findings also reveal that those factors that influence the satisfaction of consumers with traditional restaurants, such as business image, service attitude, and food hygiene, price, type, taste, and weight, can also affect the satisfaction of these consumers with online restaurants. “Reasonable price of items” has been identified as the factor with the greatest influence on consumer satisfaction. This result can be attributed to the fact that the survey mainly included respondents whose average monthly income is not very high, thereby increasing their sensitivity to fluctuations in food prices. Therefore, to increase consumer satisfaction, offline businesses must improve the quality of their food while lowering their prices. They must also strictly abide by food safety laws, promote food hygiene, and ensure the safety of their food.

“Speed of distribution,” “convenience of taking meals,” and “configuration of distribution equipment” all greatly affect consumer satisfaction, while “speed of distributor greatly affect satisfaction” are consistent with the conclusions of

Zheng, Jin, Dong & Liu (2007). In addition, “convenience of taking meals” has a lower impact on consumer satisfaction compared with “reasonable price of items” because the consumers of online ordering services mainly comprise college students and employees. Based on the above analysis, logistics distributors must adopt the following intervention measures to increase the satisfaction of their consumers. First, they can use other efficient distribution tools, such as small four-wheeled vehicles. They can also cooperate with transportation industries to effectively reduce their distribution costs. Second, they must upgrade their distribution equipment to reduce the damage to their food during delivery and to ensure the integrity and right temperature of their food

Conclusion

Suppliers of food takeout services must consider those constraints that hinder the satisfaction of consumers with online meal ordering services. By conducting a survey among consumers in 10 cities in China, this study examines the satisfaction of consumers with online ordering services in O2O mode and the factors that influence such satisfaction from the perspective of providing takeout services. The following conclusions are drawn from the empirical analysis:

(1) Consumers generally have a low satisfaction with online ordering services, with the factors “beautiful design of the platform interface,” “safety and reliability of the platform,” “consistency of the information presented,” and “integrity of food” receiving low satisfaction scores.

(2) The overall satisfaction of consumers with the quality of takeout services offered by ordering platforms, offline merchants, and logistics distributors shows a significant correlation. Among those factors that influence the satisfaction of consumers with online ordering services, “reasonable price of items,” “convenience of taking meals,” “appropriate portion size of dishes,” and “meeting the specific requirements of consumers” show the greatest impact on consumer satisfaction.

(3) From the perspective of providing takeout services, several interventions, such as designing a simple, beautiful, and innovative ordering platform, improving food quality, and using effective distribution tools, must be implemented to increase consumer satisfaction.

Apart from offering a new perspective to improve the operation of ordering platforms, offline merchants, and logistics distributors, this study also measures the satisfaction of consumers with online ordering services, identifies those factors with the greatest effect on consumer satisfaction, and proposes intervention measures that can address those factors that have received the lowest consumer satisfaction scores. In sum, the practical significance of this study lies in its provision of a reference or guide for ensuring the healthy development of the catering and takeout industry.

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