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경영학석사학위논문

**The Influence of Risk Reduction Methods on
Chinese Customers' Order Intentions to Online
Food Delivery (OFD) in Public Health Emergency
- Take COVID-19 as an Example -**

공중 보건안전 비상 사건 발생시 리스크 예방 방안들이 中國
소비자에게 온라인 푸드 배달 서비스 주문의도에 미치는 영향
- 코로나-19 예를 중심으로 -

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ABSTRACT

The Influence of Risk Reduction Methods on Chinese Customers' Order Intentions to Online Food Delivery (OFD) in Public Health Emergency - Take COVID-19 as an Example

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The condition of COVID-19 is being worse and worse. It has become a global public health emergency event. The purpose of this dissertation is to evaluate whether the epidemic prevention methods (related with avoid coronavirus) advertised by O2O online food delivery service platform could reduce customers' perceived physical risk effectively in China during COVID-19 happened. We compare which one could reduce physical risk effectively among several epidemic prevention methods. Further, we test whether the relieved delivery process could reduce customers perceived risk, then resulting high order intentions in low virus risk zone (versus high virus risk zone). The results show that relieved delivery process not only could reduce customers perceived physical risk effectively, but also promote the OFD brand trust, then resulting in high order intentions in low virus risk zone. However, in high virus risk zone, relieved delivery process has no effective influence on promoting order intention of customers. We suggest that OFD platform should generate appropriate strategies by monitoring COVID cases condition of each zone.

Keywords: online food delivery (OFD), perceived risk, brand trust, order intention

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1. INTRODUCTION

COVID-19 outbreak began in Wuhan, the capital of Hubei Province in central China, which is a big city with the population of more than 11 million. The majority of infectors are reported in mainland China but confirmed cases now have been founded around world. Globally, as of 12:31pm CEST, 29 May 2020, there have been 5,701,337 confirmed cases of COVID-19, including 357,688 deaths, reported to WHO.

Because this virus is highly contagious, which means it can spread easily, of the health of many people are threatened around the world, especially in China. Since COVID-19 is getting more and more serious, a plenty of restaurants have been closed, and most Chinese are required to stay at home, many of whom decide to hoard food. Although eating together at restaurants is forbade by local government, few markets and food shops still offer home delivery service by cooperating with third-party takeaway service companies, like “hungry now?”. Since many people have known that going out to buy daily necessities would risk themselves by facing the virus directly, they turn to the food delivery service for help, not only to buy daily necessities, but also to enjoy some fast foods and drinks, such as coffee (Starbucks), or hamburger (McDonald's).

Third-party food delivery service companies are developing some special services like non-contact delivery, which provides customers with some basic health information about delivery clerks, like body temperature to reduce customer perceive risk. The aim of this dissertation is to evaluate whether these methods which reduce customer perceived physical risk could effectively affect customers’ willingness to order take-out delivery food in high-risk zone (outbreak zone) versus low-risk zone in the background of COVID-19 in China. It is important to test it because implement the methods would increase a lot of extra cost to the online food delivery (OFD) service company.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2-1 Perceived Risk

Marketing literature started exploring the issues of perceived customer risks since the pioneering works of Cox and Rich (1964), Cox (1967), and Bauer (1967). Purchase risk is an important construct in marketing field, particularly in studies of online customer behavior (*Brent Lynn Selby Coker, 2009*). McCorkle (1990) was one of the first to consider the product and the mode of purchase as sources of potential risk. He identified six dimensions of risk: financial, social, performance, time, psychological and physical. [Table 1].

Table [1] Operational definitions of perceived-risk dimensions

Risk dimension	Operational definition
Financial risk	Related to the loss of money in the case of a bad purchase
Performance risk	Related to the functional aspects of the product
Psychological risk	Reflects an individual's disappointment in him/herself
Physical risk	Related to safety or health
Social risk	Reflects disappointment in the individual among friends
Time risk	Related to the time spent for the purchase of a product and the time wasted in the case of a bad purchase

Risk plays an essential role in customer behavior, and it makes a valuable contribution towards explaining information - searching behavior and customer purchase decision making (Mayer et al., 1995; Corbitt et al., 2003; Barnes et al., 2007). Previous research show that perceived risk reduces the willingness of customers to buy goods over the internet (Tan,1999). There could be various types of risks, among which performance risk

and financial risk are the two types that have received strong attention in the marketing literature (Bettman, 1973; Grewal et al., 1994).

However, different products carry out different degree and type of risks (Soo Jiuan Tan, 1999). In this dissertation, we focus on physical risk related to safety or health (virus spread risk) in the background of COVID-19. It should be noted that this dissertation focused on perceived physical risk of customers, rather than the real or “true” risk outcomes.

2-2 Physical Risk

In marketing literature, research has shown that the use of certain risk-reduction strategies such as brand reputation, product trial, and warranty are successful in reducing the risk perception of customers (e.g. Roselius, 1971; Shimp and Bearden, 1982; Innis and Unnava, 1991; Boulding and Kirmani, 1993). In this dissertation, risk reduction strategies are not the same as those mentioned in prior research articles. The risk reduction strategies aim to reduce perceive physical risk of customers. For instance, delivery clerks who wear masks could not only protect themselves against the virus due to it can spread easily by droplet transmission but also could make customers who order it will be at ease when delivery clerks delivery food to customers. Hence, it is reasonable to except that customers will perceive a lower level of risk when delivery clerks wear mask. Therefore, it can be hypothesized that:

H1: Customers perceive a low level of physical risk when delivery clerks wear masks than that who not when order online food delivery.

Given that risk perception and tolerance differ among individuals, depending on the individual's demographic and psychographic characteristics (Assael, 1981). Empirical studies show that perceived risk reduces the willingness of customers to buy goods over the internet (Tan, 1999; Barnes et al., 2007). Based on the previous research, lead to hypothesis 2.

H2: Customers perceive a low level of physical risk will positively influence online food delivery order intentions.

Due to the need for epidemic prevention and control in China, some OFD companies developed and updated some risk reduction strategies to make customers understand the thorough process of online food delivery safety clearly.

“Safety card” - composed of three items: position, name, and body temperature, fill in this information of personnel for kitchen production, meal preparation, delivery clerk. This measure could achieve the entire process of “producing, preparing, and delivering” safety and traceability.

- WANGYI NEWS

Relieved delivery process mainly consisted of 2 parts, first part is described “safety card” which reported by WANGYI NEWS, second part is ‘non-contact delivery’ method ensures that delivery clerks wear masks, which is that he (she) and users do not need to contact strangers during the whole delivery process, which could greatly reduce the risk of cross infection against the virus. However, are these risk reduction strategies could reduce customers perceive risk and promote online food delivery order intentions of customers at all zones? It means zones could be divided to high risk zone, medium risk zone and low risk zone in China according to the zone classification standard according to epidemic situation set by China State Council (For details, see Table 2).

Table [2] Risk Zones Classification Standards

High risk zone	Cumulative number of confirmed cases in this administrative area is more than 50, and cluster outbreak happened during past 14 consecutive days.
Medium risk zone	Cumulative number of confirmed cases in this administrative area is more than 50 but no cluster outbreak happened during past 14 consecutive days.
Low risk zone	No confirmed cases in this administrative area, or no new confirmed cases since past 14 consecutive days.

It's remaining whether the relieved delivery methods will have a similar positive effect on customers' order intentions in all risk zones (high, medium, low). We manipulated the zones by varying whether the customer in high risk zone (high probability of contacting virus) versus low risk zone (low probability of contacting virus). We predicted that for customers who stayed in a low risk zone, the relieved methods are effectively to reduce their perceived risk. However, in high risk zones, probability of contacting virus perceived to be higher, and hence, the relieved methods could not reduce customers' perceived risk effectively. Thus, in this case, online food delivery order intention of customers would not be promoted. This leads to hypothesis 3.

H3: Relieved delivery strategy will positively influence customers' order intention of the online food delivery brand in low risk zone (versus high risk zone).

2-3 Brand Trust [Full Mechanism]

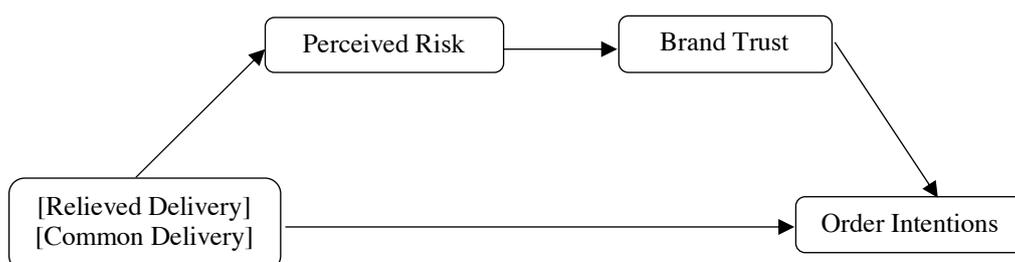
In the present study, we define brand trust as the willingness of the average consumer to rely on the ability of the brand to perform its stated function (Chaudhuri and Holbrook, 2001). Brand trust is especial important for O2O brand due to it is an underlying dimension of brand loyalty. For instance, online shopping brand 'JINGDONG' in China and 'G-market' in Korea, they have achieved strong brand trust from local customers. It means when people decide purchase products at shopping site, most of them are willing to seek the target product from these brand websites. A lot of new E-business brands also

aim to develop new customers by various marketing promotion strategies. It is due to a high level of brand trust may ultimately convert a satisfied customer into a loyal one (Hong-Youl Ha, 2004). The development and maintenance of consumer brand trust on the Web is at the heart of companies' marketing plans, especially in the face of highly competitive markets with increasing unpredictability and decreasing product differentiation (Fournier and Yao, 1997).

In this dissertation, we propose perceived brand trust as mediator 2 which influences customers' order intentions to the OFD brand during this special period. That is lower perceived risk leads to higher brand trust, then positively influence customers order intentions of the OFD brand in low virus risk zone rather than high virus risk zone. In sum, we test both mediation and moderation: customers' perception of physical risk and brand trust, then examine whether they mediate customers' order intentions in low risk zone versus high risk zone. Hypothesis 4 was developed as below.

H4: Customers perceived physical risk and brand trust mediated this effect on online food delivery order intention in low risk zone (versus high risk zone).

[Research Model]



High virus risk zone
vs. Low virus risk zone

2-4 O2O Food Delivery Service Introduction

O2O mode connects the offline business opportunities with the Internet, makes the Internet be the front counter of offline trade (Yingsheng Du, 2014). With the development

of smart-phone and internet connection speed, the convenience of mobile payment is becoming more and more easily in China. Some companies based on O2O business platform are developing rapidly such as Ctrip which provide online ticket service.

In this dissertation, we focus on the third-party delivery companies based on O2O platform which connect offline restaurants and provide food delivery service for online customers. Namkung proposed variety of the menu, food presentation, healthiness, taste, freshness, and food temperature to evaluate food quality (Namkung & Jang, 2007). Further, Sulek and Hensley (2004) state that appeal, safety, and dietary factor are the common characteristics customers use to determine the quality of food. Under the O2O platform mode, different with food supplied in restaurants, logistic delivery could also be an essential element due to it related to food freshness. As customers who decide to order food by third-party delivery service, they will evaluate the food (restaurant) but also the service (third-party delivery company).

Dong-Sun (2018) has summarized attributions which affect Chinese customers' satisfaction toward O2O platform food delivery service. Including 4 items: food quality, service quality, marketing promotion and platform quality.

Table [3] Elements Affect Customers' Satisfaction

Food Quality	Food Packaging; Food Safety
Service Quality	Delivery Cost Time; Service of Deliveryman
Marketing Promotion	Price, etc.
Platform Quality	Platform Operation Technology; Platform Brand Population

Under the background of COVID-19, it's necessary to compare these attributions customers pay most attention to before and after COVID-19 happened. In other words, we want to explore the change of these attributions which affect satisfaction of customers.

3. STUDIES & RESULTS

3-1 Discrepant Study

This discrepant study aims to compare important attributions customers consider when using online food delivery service before COVID-19 (control group) happened with after COVID-19 happened. In control group, participants read that “when you use online food delivery service, which factors are important you considering?”, then they were required to write three most important factors they consider. In COVID-19 group, participants read that “After COVID-19 event happened, which factors you concerned are important when you use online food delivery service?”. As same as control group, they were required to write three most important factors.

Results and Discussion

Fifty-three Chinese students from Seoul National University anticipated this questionnaire in exchange for monetary payment. Participants were randomly assigned to one of control group and COVID-19 group. Before COVID-19 event happened, key-words “convenience, service, food tasty, delivery time, food packaging, price” are mentioned with high frequency. After COVID-19 happened, key-words “health, food safety, delivery time, food tasty, mask, service” are mentioned with high frequency [Table 4].

Table [4]

Before COVID-19 happened (control group)	convenience, food packaging, price, <i>service, food tasty, delivery time</i>
After COVID-19 happened	health, food safety, mask, service, delivery time, food tasty
Common factors	<i>service, delivery time, food tasty</i>

The results indicated that “service, delivery time, food tasty” are common important factors when customers use online food delivery service before and after COVID-19 happened. Besides these factors, “convenience, food packaging, price” are also important

factors customers concerned before COVID-19 happened. However, after COVID-19 happened, “health, food safety, mask” as important factors are mentioned. Obviously, after COVID-19 happened, these additional factors are related to physical risk. Thus, we suppose risk reduction methods are essential in background of COVID-19. However, if these methods could reduce customers perceive risk effectively? it will be exhibited in study 1.

3-2 Study 1

After COVID-19 happened, restaurants and online food delivery companies have taken some measures to avoid the virus for instance: (a) OFD brand promise clerks will wear mask; (b) OFD platform provide none-contact delivery service & safety card and (c) restaurants promise of disinfecting tableware and inner space every day. This study aims to compare which method is most effective to reduce customers perceived risk with none-treatment-control group. Participants indicate the chance that if restaurant or OFD platform take the method may not be safe (perceive physical risk); i.e., may be (or become) harmful or injurious to your healthy? (1=very safe; 9=very unsafe) (Jacob Jacoby, 1972). For details, see appendix B.

Results and Discussion

Seventy-eight ($M_{age} = 26.6$; 38.0% male) Chinese young people participated in this questionnaire in exchange for monetary payment. Participants were randomly assigned to one of risk reduction method conditions (control group; mask group; none-contact delivery & safety card group and disinfection group). One-way ANOVA on perceive risk data revealed significant main effect of the methods $F(3,75) = 3.73$, $p = 0.015$. For detail data of the four groups, [see Table 5].

When OFD platform promise of delivery clerks wearing masks, this way could significantly reduce customers perceived risk ($M = 4.27$, $SD = 2.3$) compared to control group ($M_{control\ group} = 5.71$, $SD = 1.8$; $p = .03$). None-contact method could also significantly reduce customers perceived risk ($M = 3.62$, $SD = 1.7$) compared to control

group (M_control group=5.71, SD=1.8; p= .002). However, when restaurants promise of disinfecting and cleaning inner space regularly, this way could not significantly reduce customer perceived risk (M=5.0, SD=2.2) compared to control group (M_none-treatment=5.71, SD=1.8; p=0.3). We also compared mask group with none-contact group, perceived risk of mask group (M=4.27, SD=2.3) is not significant different from none-contact group (M=3.62, SD=1.7; p=0.3).

In sum, clerks wear masks or none-contact delivery, the two risk-reduction methods could both reduce customers perceived risk effectively. However, when restaurants promise of disinfecting and cleaning inner space regularly, this way has no significant effect on reducing perceived physical risk of customers compared with control group.

Table [5]

Result \ Treatment	Mean	Std. Deviation	LSD [None] Sig.
None (control group)	5.71	1.8	*
Mask	4.27	2.3	0.03
None-contact & Safety Card	3.62	1.7	0.002
Disinfect and Clean	5.0	2.2	0.3

3-3 Study 2

Study 2 will provide an initial test whether customers perceive a lower risk when delivery clerk wear a mask than that who not, and when perceive lower risk it will positively affect order intentions. Study 1 have shown that if delivery clerks wear masks, this way could reduce customers perceive risk effectively. In the background of COVID-19, participants are informed that he/she decides order one cup of milk-tea by OFD service after COVID-19 break. Choosing milk-tea as target product due to it is popular among Chinese young people. In mask condition and no-mask condition, participants were given information

about whether delivery clerks wear masks. Specifically, in mask condition, they will read that “Delivery clerks will wear masks to finish this beverage delivery”. In contrast, In the no mask condition, participants read that “Delivery clerk has no protection measures to finish this beverage delivery process”.

Participants indicate the chance that order this milk-tea may not be safe (perceive physical risk); i.e., may be (or become) harmful or injurious to your healthy? (1=very safe; 9=very unsafe) (Jacob Jacoby, 1972). Then indicate their willingness to order this delivery beverage - milk-tea (1=Not likely at all; 7=Extremely likely). For details, see appendix C.

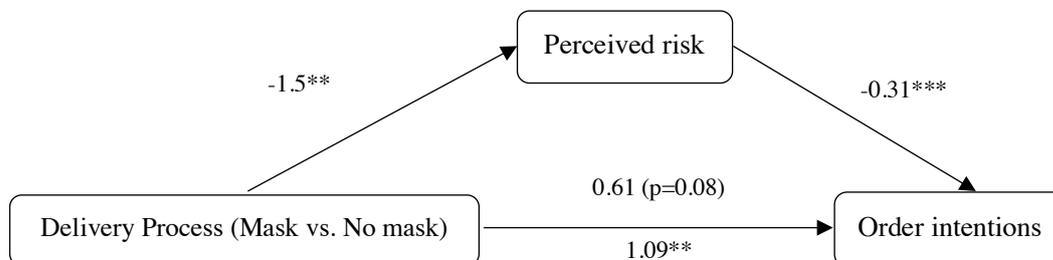
Results and Discussion

Eighty-five ($M_{age} = 27.9$; 33.3% male) Chinese young people participated this questionnaire in exchange for monetary payment. Participants were randomly assigned to one of these two delivery process conditions (mask, no-mask).

Participants indicated that they would evaluate order the milk-tea lower risk when delivery clerks wear masks ($M=3.81$, $SD=2.0$) versus delivery clerks didn't wear masks ($M=5.33$, $SD=2.42$), $F(1, 83) = 9.98$, $p = .002$. Participants also indicated that they have higher willingness to order the milk-tea if delivery clerks wear masks ($M=4.37$, $SD=1.45$) versus delivery clerks didn't wear masks ($M=3.29$, $SD=1.85$), $F(1, 83) = 9.1$, $p = .003$. We theorized that participants have higher order decisions of the milk-tea when clerks wear masks because they perceived the milk-tea lower risk than that when clerks have no protection methods. To test this theorizing, we conducted a mediation model with bootstrapping (Hayes 2013) to examine whether perceived risk mediated the effect of delivery process (mask versus no-mask) on this milk-tea order intentions. We coded no-mask group as '1'; mask group as '2'. Consistent with our theorizing, the analysis revealed that participants in mask condition perceived lower risk than no-mask group, resulting in greater willingness to order it (95% CI for the indirect effect: [0.1246, 0.9638]; see figure 1).

FIGURE 1

MEDIATION OF DELIVERY PROCESS CONDITION ON ORDER INTENTIONS



NOTES: The path coefficients are unstandardized betas. Values in the path indicate the effect of delivery process condition on order intentions after controlling for the mediator. * $p < .05$; ** $p < .01$; *** $p < .001$.

These results are consistent with our hypothesis 1 and hypothesis 2. In background of COVID-19, Customers perceive a low level of physical risk when delivery clerk wear a mask than that who not when order online food delivery service. When customers perceive a low level of physical risk, it leads to positively influence on order intentions of the milk-tea. Perceived risk as an important variable has a significant mediation effect on dependent variable - online food delivery order intentions.

3-4 Study 3

Roselius (1971) defined a risk-reliever as any action initiated by a buyer or seller and used as a strategy for resolving risk. In line with this definition, a risk-reduction strategy will be understood here as a strategy devised by a consumer from a set of possible relievers likely to diminish the risk level until it reaches a level judged low enough for the consumer to decide to purchase the product.

The attribution of San Martín' (2009) article about 'how perceived risk affects online buying' is that the analysis of risk as a moderating variable, which can produce differences in perceptions, attitudes and behavior depending on the level of risk that consumer perceives when buying online. Previous studies found that perceived risk has a significant influence on online brand trust (D. Hoffman, 1998; Hong-Youl Ha, 2004; S. L. Jarvenpaa, 1999). However, Syed Shah Alam (2010) show that perceived risk has no direct and

significant effect on online brand trust from online tickets buyers. The reason might be respondents do not see it as a factor that could affect online brand trust because they do not have the experience. Different from online ticket service, in the background of COVID-19, we suppose perceived physical risk would be an important variable to influence the OFD brand trust. This is also important for OFD brand to establish and maintain loyalty customers through building great brand trust.

We suppose relieved delivery process could reduce perceived risk of customers who are in low risk zones then lead to perceiving higher brand trust of the OFD brand, as a result, they would have higher intentions to order food by the OFD brand. We manipulate zone virus risk (low risk zone & high risk zone). According to table 2 in page 4, we set the confirmed case to 53 in high virus risk zone condition, as contrast, no confirmed case in low virus risk zone condition. In high virus risk zone, we propose though using the relieved delivery method, it couldn't reach a level judged low enough for customers to positively influence their order intentions.

In sum, we propose relieved delivery process could reduce physical risk enough then increasing customers perceived of the OFD brand trust, as a result of increasing order intentions in low virus risk zone rather than high virus risk zone.

We choose "KFC" as target order food for three reasons: 1. "KFC" had entered in China for more than 30 years and it is common known among Chinese people. 2. "KFC" as fast food brand, it is appropriate as offline restaurant connected with online food delivery service. 3. "KFC" has a relatively medium price. Study 3 is manipulated 2(low virus risk zone, high virus risk zone) X 2(relieved delivery, common delivery) between-subjects design.

Participants completed the same risk measurement as same as in study 1 and study 2. We assessed OFD brand trust using a three-item scale from pervious literature (Shah Alam, S., & Mohd Yasin, N. 2010). Finally, anticipants indicated their order intentions of the meal (1: not at all; 7: extremely). [See appendix D]

Results and Discussion

One hundred thirty-seven Chinese young people participated ($M_{age} = 26.6$; 39% male) in this study in exchange for monetary payment. Participants were randomly assigned to one condition in a 2 (zone: high risk vs. low risk) X 2 (delivery process: common delivery vs. relieved delivery) between-subjects design.

A 2 (low risk zone, high risk zone) X 2 (relieved delivery, common delivery) ANOVA on perceived risk data revealed main effect of risk zone, $F(1,133) = 12.4$, and significant main effect of delivery process, $F(1,133) = 11.1$. Also revealed significant interaction, $F(1,133) = 4.2$, $p = 0.04$. In low virus risk zone, the meal was perceived lower risk ($M = 3.1$, $SD = 1.45$) when online food delivery platform applicate relieved delivery than common delivery ($M = 4.9$, $SD = 1.5$; $p = 0.000$). In contrast, in high virus risk zone, there was no difference between common delivery ($M = 5.3$, $SD = 1.95$) and relieved delivery ($M = 4.9$, $SD = 2.2$; $F < 1$). Moderating effect of delivery process on dependent variable perceived risk could be found in figure 2.

A 2 (low virus risk zone, high virus risk zone) X 2 (relieved delivery, common delivery) ANOVA on brand trust data revealed main effect of risk zone, $F(1,133) = 4.75$, and significant main effect of delivery process, $F(1,133) = 14.6$, $p = 0.000$. There is a marginal significant interaction, $F(1,133) = 3.49$, $p = 0.064$. In low virus risk zone, in relieved delivery condition, participants perceive higher brand trust ($M = 3.97$, $SD = 1.57$) than common delivery condition ($M = 5.38$, $SD = 1.09$; $p = 0.000$). In contrast, in high virus risk zone, there was no difference between common delivery ($M = 3.9$, $SD = 1.5$) and relieved delivery ($M = 4.4$, $SD = 1.6$; $p = 0.2$).

A 2 (low virus risk zone, high virus risk zone) X 2 (relieved delivery, common delivery) ANOVA on order intentions data revealed marginal effect of risk zone, $F(1,133) = 3.75$, $p = 0.055$, and significant main effect of delivery process, $F(1,133) = 12.7$, $p = 0.001$. Also revealed significant interaction, $F(1,133) = 8.05$, $p = 0.005$. In low virus risk zone, participants indicated higher order intention when relieved delivery ($M = 5.53$, $SD = 1.32$)

than common delivery (M=3.75, SD=1.65; p=0.000). In contrast, in high virus risk zone, there is no differences between common delivery (M=4.0, SD=1.63) and relieved delivery (M=4.2, SD=1.9; F<1).

FIGURE 2

MODERATING EFFECT OF DELIVERY PROCESS CONDITION ON PERCEIVED RISK IN STUDY 3

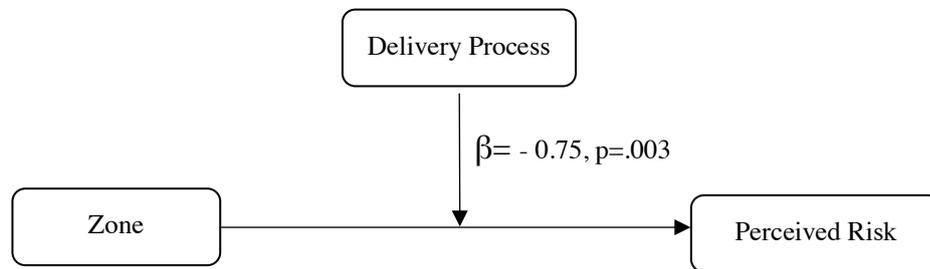
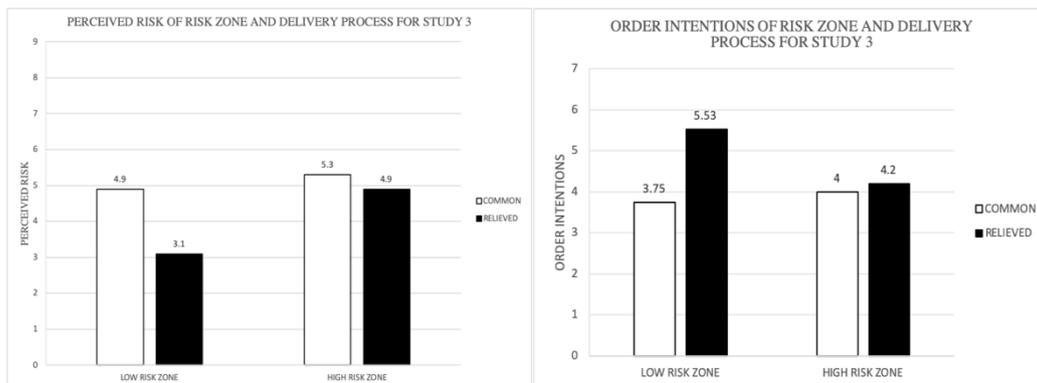


Table [5] Delivery process moderating effect

	B	SE	Beat	t	p-value	R ²	Adjust R ²	F	D-W value
Constant	7.498	1.628	-	4.605	.000**				
Zone	-.873	1.027	-.211	-.849	.397	.19	.172	10.398	1.864
Process	-3.09	1.009	-.749	-3.064	.003**				
Interaction	1.34	0.647	.672	2.071	.04*				

Dependent variable: perceived risk

*p<0.05 **p<0.01



To test our proposed process, we ran a mediation model at each level of virus risk zone (high risk zone; low risk zone), with perceived risk and brand trust as sequential mediators. As perceived, in low risk zone, when the meal delivered by relieved delivery process (vs. common delivery), the meal was perceived lower risk, which increase the OFD brand trust, resulting in higher order intentions (95% CI for indirect effect: [.1633, .8984]). Importantly, we tested reverse model [mediator 1=brand trust; mediator 2=perceive risk], we found no mediating path from brand trust to perceive risk (95% CI for indirect effect: [-.0764, .2390]). As predicted, we tested this mediation path in high risk zone, we found no significant indirect effect from perceive risk to brand trust leading to order intentions (95% CI for indirect effect: [-.2174, .5153])

FIGURE 3

MEDIATION OF DELIVERY PROCESS CONDITION ON ORDER INTENTIONS IN LOW RISK ZONE IN STUDY 3

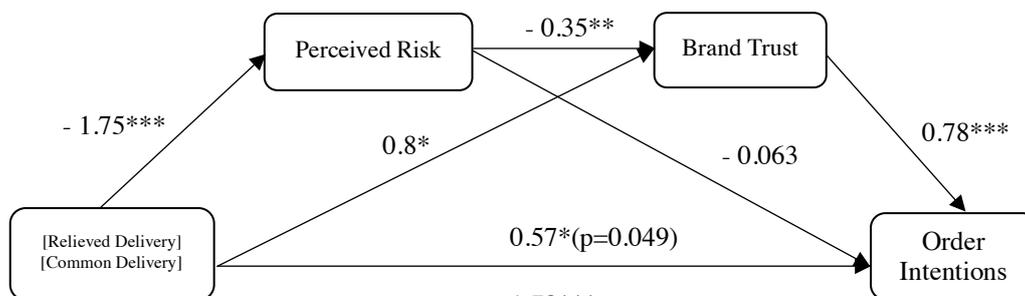
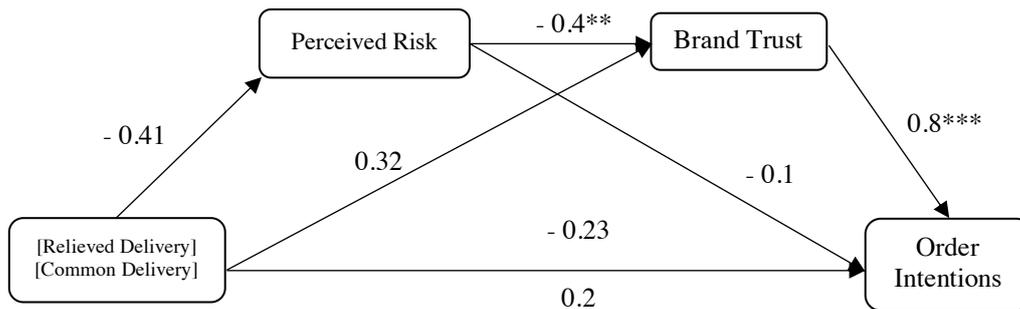


FIGURE 4

MEDIATION OF DELIVERY PROCESS CONDITION ON ORDER INTENTIONS IN HIGH RISK ZONE IN STUDY 3



NOTES: Mediation analysis reveals a significant indirect effect in low risk zone. In high risk zone, the indirect effect was not significant (the path from delivery process to perceived risk is not significant). The path coefficients are unstandardized betas. Values in parentheses indicate the effect of delivery process condition on the dependent variables after controlling for the mediators. *p < .05; **p < .01; ***p < .001.

In sum, customers will have higher order intentions when OFD platform provide relieved delivery service than common delivery in low risk zone other than high risk zone. In high risk zone, relieved delivery could not decrease customer perceived risk significantly compared with common delivery, however low perceived risk lead to high brand trust, and no significant differences in order intentions. However, different from high risk zone, relieved delivery process could reduce customers perceived risk significantly in low risk zone. Therefore, hypothesis 3 and hypothesis 4 have been accepted.

4. GENERAL DISCUSSION

Based on previous research (Jiang et al., 2013), results have shown that a consumer's perception towards online will improve if the service is able to provide access convenience, which is the ability to shop online at anytime and anywhere. Vincent pointed out that when users are able to save time, they are more likely to use OFD services (Vincent et al., 2016). According to the results, it is confirmed that when customers make order decisions on OFD platform, convenience and delivery time are important attributions to customers

before COVID-19 happened from the result of discrepant study. These results are consistent with previous research results. However, look at the answers of that when asked “what are the important factors that you consider when using online food delivery service after COVID-19 outbreak. The answers have changed a bit. Some keywords related to “health, food safety, mask” emerged. Then compared three virus prevention methods with the control group (non-treatment). “delivery clerks wear masks” and “none-contact delivery”, the two risks avoid methods have a significant effect on reducing risk rather than that of “restaurants promise of disinfecting...”.

In study 2, we tested perceived risk mediated the effect on order intentions. Anticipants have significant higher order intentions when delivery clerks wear masks compared to those who do not. Mediator - perceived risk is lower when clerks wear masks than those who do not.

In study 3, we tested whether relieved delivery (mask, non-contact delivery & safety card) is effective in low virus risk zone versus high virus risk zone. The result is consistent with hypothesis 3 and 4. The relieved delivery process could reduce physical risk effectively in low virus risk zone rather than in high virus risk zone. In low risk zone, the lower perceived risk of the delivery process was followed by enhanced trust of the OFD brand then promote order intentions. In contrast, this mediation path is not significant in high virus risk zone. This is contrast to Tan, S. J's (1999) finding that perceived risk would not affect online reputation. And Shah Alam (2010) figured that perceived risk would not affect online brand trust. But in our research, perceived risk could affect OFD brand trust during this special period (when COVID -19 outbreak).

5. IMPLICATION

The epidemic of COVID-19 has spread rapidly all over the world, which has caused a very negative impact to all countries. Some medical supplies price such as “mask” and “thermometer” associated with coronavirus were on the rise when COVID-19 break. Hence, it will greatly increase lots of service cost of the OFD platform if provide medical supplies.

This dissertation not only evaluated which way is effective in reducing COVID risk, also could provide reference for other countries. Importantly, in high virus risk zone, the relieved delivery process could not positively influence order intentions of customers. Thus, we suggest OFD platform stopping online food delivery service in high virus risk zone. In low virus risk zone, relieved delivery process could promote order intentions of customers effectively. It's also a great opportunity to build and develop loyalty customers for the OFD brand by providing relieved delivery services.

In company production management field, physical risks are those related to damage inflicted on infrastructure and other assets, such as factories and supply - chain operations. In 2012, one of the world's largest agricultural companies, posted its worst quarterly earnings in two decades, in large part because of the US drought. This is an example of how climate can and does affect business prospects (2015, July, McKinsey & Company). In marketing field, another example is that all aircrafts of Korea air are equipped with air circulation systems, which could completely filter foreign substances and sterilize inner air to reduce physical risk of customers.

A briefing note of COVID-19 by McKinsey & Company pointed out a potential second wave of COVID-19 in the northern hemisphere this autumn is certainly possible. It means business activities will still face challenges in following long term period. Especially, in other O2O business platform, how to reduce customers perceived physical risk could still be a long-term topic. Also, such relieved delivery process, security of non-contact delivery

process should be important to applicate. However, it should make sure customers could receive the food rather than others take it away.

6. LIMITATION & FUTURE RESEARCH

After COVID-19 event happened, different countries have different propaganda and policies. Result of study 2 shown that disinfection could not reduce customers perceived physical risk effectively, as contrast, the other two methods have an effective effect. This might be associated with Chinese Government Officials who disseminate to its citizens that it is necessary to wear mask and limit social interactions with others. In other countries, the policies and results may turn to change. Thus, the results are limited applicable in some other countries.

In this dissertation, we select the OFD platform as a research subject. Some other face-to-face delivery services, such as express delivery if build express cabinet could reduce the risk of the contact between delivery clerks and customers then enhance satisfaction of customers.

If epidemic situation in a region becomes particularly serious, people decide to order some daily necessities (utility consumption) online, even if the delivery platform does not adopt some virus avoid prevention methods, we suppose order intentions would not decrease due to daily necessities are belong to utilitarian consumption rather than ‘milk-tea’ or ‘KFC’ related to hedonic products in this dissertation. Of course, in the case of epidemic, we hope that everyone will take relevant protective measures to protect their own safety and personal health.

After this epidemic, people will pay more and more attention to personal health and safety. Of course, the relevant risk reduction methods should be closely related to the route or mode of the virus transmission. However, if people have health or safety issues, such physical risks would be raised to highest level. Marketing researchers should attach importance to relevant risk reduction strategies.

7. APPENDIX (Questionnaire)

APPENDIX A - Discrepant Study

1-1 (Before COVID 19 event happened)

Third part food delivery service is becoming more and more popular among modern life. It connects offline restaurant and online customers to create more business opportunities for offline restaurants and provide convenience for online customers.

Write three most important factors you concerned when you decide use online food delivery service.

1-2 (After COVID 19 event happened)

Third part food delivery service is becoming more and more popular among modern life. It connects offline restaurant and online customers to create more business opportunities for offline restaurants and provide convenience for online customers. After COVID-19 event happened, it spread across rapidly around the world.

Write three most important factors you concerned when you decide use online food delivery service after COVID-19 event happened.

APPENDIX B - Study 1

Third-party food delivery service is gradually integrating into people's daily lives and favored by customers. It creates more business opportunities by connecting online customers and offline restaurants, and especially provides convenience for online customers. With COVID-19 break over the world, many restaurants have stopped “sit down” service turned to provide service through online food delivery platforms. Restaurants and online food delivery platforms have taken measures to avoid corona virus. Please fill in the evaluation of perceive risk according to the following description.

i (None-Treatment)

The restaurant and online food delivery platform are the same as before.

ii (Mask)

The online food delivery platform promises that all delivery clerks will wear masks to provide delivery service throughout full delivery process.

iii (None-Contact)

This online food delivery platform promises that all food order will be finished by relieved delivery, including safety card (record position, name, body temperature of the person participated in your order food entire process) and provide non-contact delivery.

Iv (Disinfect & Clean)

The restaurant promises of disinfecting tableware and inner space every day.

Q1 – According to the description, what’s the chance you perceive risk; i.e., may be (or become) harmful or injurious to your healthy?

1=Very safe _____ 9=Very unsafe

**Notes: Anticipants are randomly assigned to one of these four conditions.*

APPENDIX C - Study 2

2-1(Mask group)

In the background of COVID-19 virus, it has broken rapidly around the world. You decide order one cup of “Yidiandian” milk-tea by online food delivery service one day. The online food delivery service you choose promise delivery clerk will wear mask to finish your order throughout the whole delivery process.

Q1 - What’s the chance that order this milk-tea may not be safe (perceive physical risk); i.e., may be (or become) harmful or injurious to your healthy?

1=Very safe _____ 9=Very unsafe

Q2 - What’s your willingness to order this delivery food – milk-tea?

1=Not likely at all _____ 7=Extremely likely

2-2(No mask group)

In the background of COVID-19 virus, it has broken rapidly around the world. You decide order one cup of “Yidiandian” milk-tea by online food delivery service one day. The delivery clerk has no protect methods when he finishing the delivery of your orders.

Q1 - What’s the chance that order this milk-tea may not be safe (perceived physical risk); i.e., may be (or become) harmful or injurious to your healthy?

1=Very safe _____ 9=Very unsafe

Q2 - What’s your willingness to order this delivery food – milk-tea?

1=Not likely at all _____ 7=Extremely likely

APPENDIX D - Study 3

3-1 (Low Virus Risk Zone x Relieved Delivery)

In the background of COVID-19 virus, this virus has broken rapidly around the world. “No confirmed cases in this administrative area, and no new confirmed cases since past 14 consecutive days.” - This is the description of COVID-19 condition about your living zone announced by zone local administration office.

You decide order “KFC” meals by online food delivery service [Brand A] one day. This online food delivery service [Brand A] promised all food order will be finished by relieved delivery including delivery clerks will wear mask, safety card and non-contact delivery to avoid the virus.

Relieved delivery safety card

Restaurant	Position	Name	Body Temperature
KFC (** STORE)	Kitchen Production	WANG **	36.7 °C
	Meal Preparation	YANG **	36.5 °C
	Record data: **. **		

Q1 -What’s the chance that order this “KFC” meals may not be safe (perceived physical risk); i.e., may be (or become) harmful or injurious to your healthy?

1=Very safe _____ 9=Very unsafe

Q2 - I feel very comfortable order food by this online food delivery brand.

1= Very disagree _____ 7=Very agree

Q3 - Consider this OFD brand is my first choice if I use food delivery services through online.

1= Very disagree _____ 7=Very agree

Q4 - This online food delivery brand is a name I can always trust.

1= Very disagree _ _ _ _ _ 7=Very agree

Q5 - What's your willingness to order this delivery food – “KFC meals”?

1=Not likely at all _ _ _ _ _ 7=Extremely likely

3-2 (Low Virus Risk Zone x Common Delivery)

In the background of COVID-19 virus, this virus has broken rapidly around the world. “No confirmed cases in this administrative area, and no new confirmed cases since past 14 consecutive days.” - This is the description of COVID-19 condition about your living zone announced by zone local administration office. You decide order “KFC” meals by online food delivery service [Brand A] one day. This online food delivery process [Brand A] has no change compared to before.

Q1 -What's the chance that order this “KFC” meals may not be safe (perceived physical risk); i.e., may be (or become) harmful or injurious to your healthy?

1=Very safe _ _ _ _ _ 9=Very unsafe

Q2 - I feel very comfortable order food by this online food delivery brand.

1= Very disagree _ _ _ _ _ 7=Very agree

Q3 - Consider this OFD brand is my first choice if I use food delivery services through online.

1= Very disagree _ _ _ _ _ 7=Very agree

Q4 - This online food delivery brand is a name I can always trust.

1= Very disagree _ _ _ _ _ 7=Very agree

Q5 - What's your willingness to order this delivery food – “KFC meals”?

1=Not likely at all _ _ _ _ _ 7=Extremely likely

3-3 (High Virus Risk Zone x Common Delivery)

In the background of COVID-19 virus, this virus has broken rapidly around the world. “Cumulative number of confirmed cases in this administrative area is 53, and cluster outbreak happened during past 14 consecutive days.” - This is the description of COVID-19 condition about your living zone announced by zone local administration office. You decide order “KFC” meals by online food delivery service [Brand A] one day. This online food delivery process [Brand A] has no change compared to before.

Q1 -What's the chance that order this “KFC” meals may not be safe (perceived physical risk); i.e., may be (or become) harmful or injurious to your healthy?

1=Very safe _ _ _ _ _ 9=Very unsafe

Q2 - I feel very comfortable order food by this online food delivery brand.

1= Very disagree _ _ _ _ _ 7=Very agree

Q3 - Consider this OFD brand is my first choice if I use food delivery services through online.

1= Very disagree _ _ _ _ _ 7=Very agree

Q4 - This online food delivery brand is a name I can always trust.

1= Very disagree _ _ _ _ _ 7=Very agree

Q5 - What's your willingness to order this delivery food – “KFC meals”?

1=Not likely at all _ _ _ _ _ 7=Extremely likely

3-4 (High Virus Risk Zone x Relieved Delivery)

In the background of COVID-19 virus, this virus has broken rapidly around the world. “Cumulative number of confirmed cases in this administrative area is 53, and cluster outbreak happened during past 14 consecutive days.” - This is the description of COVID-19 condition about your living zone announced by zone local administration office.

You decide order “KFC” meals by online food delivery service [Brand A] one day. This online food delivery service [Brand A] promised all food order will be finished by relieved delivery including delivery clerks will wear mask, safety card and non-contact delivery to avoid the virus.

Relieved delivery safety card

Restaurant	Position	Name	Body Temperature
KFC (** STORE)	Kitchen	WANG	36.7 °C
	Production	**	
	Meal Preparation	YANG **	36.5 °C
Record data: **. **			

Q1 -What’s the chance that order this “KFC” meals may not be safe (perceived physical risk); i.e., may be (or become) harmful or injurious to your healthy?

1=Very safe _____ 9=Very unsafe

Q2 - I feel very comfortable order food by this online food delivery brand.

1= Very disagree _____ 7=Very agree

Q3 - Consider this OFD brand is my first choice if I use food delivery services through online.

1= Very disagree _ _ _ _ _ 7=Very agree

Q4 - This online food delivery brand is a name I can always trust.

1= Very disagree _ _ _ _ _ 7=Very agree

Q5 - What's your willingness to order this delivery food – “KFC meals”?

1=Not likely at all _ _ _ _ _ 7=Extremely likely

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국문초록

공중 보건안전 비상 사건 발생시 위험 예방 방안들이 중국
소비자에게 온라인 푸드 배달 서비스 주문의도에 미치는
영향

- 코로나-19 예를 중심으로

코로나 사태는 계속 심화되고 있고 세계적인 공중보건 비상사태가 되어 가고 있다. 본 석사논문의 연구목적은 중국 O2O 온라인 음식 배달 서비스 회사가 홍보하고 있는 코로나 예방법이(코로나 바이러스 예방 관련) 코로나 발생시 소비자들이 인지된 물리적 리스크를 효과적으로 줄일 수 있는지를 평가하는 데 있다. 본 석사논문에서 몇 가지 코로나 예방법들을 비교하여 어떤 방법이 효과적으로 신체적 리스크를 줄일 수 있는지를 테스트 하였다. 또한 안심 음식 배달 서비스가 저위험 구역에서 (vs.고위험 구역) 소비자 인지 리스크를 감소시키고, 음식 배달 서비스 주문의도를 촉진할 수 있는지를 평가하고자 했다. 연구결과는 고위험 구역이 아닌 저위험 구역에서 안심 배달서비스는 고객들의 온라인 음식 주문의도를 촉진한다는 것을 확인하였다. 본 논문의 종합적인 연구결과는 코로나 배경으로 OFD 플랫폼이 안심 배달 서비스를 실행될 때 저위험 구역에서 고객이 인지하는 위험을 줄일 수 있을 뿐만 아니라 OFD 브랜드 신뢰도를 증진시킬 수 있고, 고객의 주문 의도를 촉진된다는 것을 보여주었다. 그러나, 안심 배달 서비스가 고위험 구역에서는 고객 인지 리스크를 줄이는데 효과가 없을 것을 확인하였다. 코로나 사태 배경에서 본 연구는 OFD 플랫폼이 중국 국내 전 구역의 코로나 바이러스 전염 사태를 모니터링하여 적절한 전략을 수립해야 한다고 제안하였다.

주요어: 온라인 음식 배달; 인지 리스크; 브랜드 신뢰도; 주문의도

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