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Factors Affecting the Implementation of Online Food Delivery and Its Impact on Restaurant Performance during the COVID-19 Pandemic

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Abstract: During the COVID-19 pandemic, many restaurants implemented online food delivery (OFD) platforms to serve customers. However, it remains unclear how restaurant managers decide to implement OFD and whether or not the implementation can improve performance. We view OFD implementation as a form of service innovation. This study investigates and explains the reasons why restaurants implemented an OFD platform during the COVID-19 pandemic, and the impact of that implementation on restaurant performance, based on service innovation theory. An internet survey was conducted to collect data from restaurant owners or managers to test the proposed research model. The results show that the perceived benefit of increasing the firm's reach is the key driver of OFD implementation, and the implementation has a positive impact on both financial and non-financial performance. A follow-up interview was also conducted to obtain the opinions of industry experts, who explained the phenomena. The research findings can advance our understanding of how restaurant managers decide to innovate by implementing OFD services and help them better understand whether and how the implementation of this service can actually improve performance.

Keywords: online food delivery; service innovation; COVID-19; implementation; firm performance

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1. Introduction

With the rise in digital technology and apps, and as online food delivery (OFD) becomes increasingly popular, customers can use a mobile app or website to identify all nearby restaurants, browse the menus, select the dishes they want to eat, and order dishes by clicking a button or tapping a finger [1]; this process has become a trend. In 2020, the spread of the COVID-19 plunged the world into the greatest disease crisis in recent history. The main infection method of COVID-19 was originally determined to be contact, which means that the risk of human-to-human transmission increases when people are in close proximity to respiratory droplets or have direct or indirect contact with the nasal or oral secretions and body fluids of infected individuals [2]. Many people chose to wear masks to prevent exposure to infection, and concerns about transmission also reduced opportunities for dining out and travel. Given this situation, restaurants had to adopt innovative models to generate revenue. Implementing an OFD platform was often considered the best solution during the pandemic.

According to Grubhub's statistics, during the period from May to August 2020, 25,000 restaurant partners joined the platform, raising the total number of partners to 225,000 [3]. According to a survey conducted by the Market Intelligence & Consulting Institute [4], during the COVID-19 pandemic, 53.3% of Taiwanese netizens ordered food delivery in the first half of 2020. The survey also revealed that 79.6% of netizens in Taiwan had ordered via Foodpanda, and 60.8% via Uber Eats. In addition, 50.4% of netizens ordered food to save time, 39.4% to reduce physical contact with others, 38.7% because of discounts, 38.3% because of bad weather and/or just wanting to stay at home, and 26.4%

because of the wide variety of food delivery choices. Since 2020, especially as the pandemic continued to rage, more restaurants have chosen to join an OFD platform. OFD services can reduce physical contact with others, benefiting public health during the pandemic. The services also provide job and sales opportunities [5]. The implementation of OFD services could improve sustainability. This phenomenon made us curious about the impact of health risks on the decision to implement OFD, and whether or not a restaurant's overall performance can be improved by the implementation of OFD during a pandemic.

Prior studies on OFD have focused on the reasons why consumers use an OFD platform [1,6–11]. Little research has been carried out to understand how restaurants decide to implement an OFD platform and how the implementation of OFD influences firm performance. This study explores the antecedents and consequences of OFD implementation from the service innovation perspective. Service innovation refers to the implementation of a new service process or the addition of a new service to increase the firm's competitive advantage [12]. Service innovation may possibly streamline an existing service, help the customer, differentiate the firm's service, or contribute to the customer experience [13]. OFD is a new business model, and OFD platforms allow restaurants to provide food delivery services to their customers. For restaurants, online ordering and delivery is both a new business model and a new service process. Therefore, OFD implementation is, by definition, a service innovation for restaurants.

This study develops a conceptual model based on resource-advantage theory and user innovation theory. We explore the main factors affecting restaurants' actual use of OFD platforms, and investigate the change in performance after OFD service implementation. The research findings can help OFD companies learn more about why restaurants choose to implement such a service. Restaurant managers can also better understand whether and how the implementation of this service can actually improve performance. The research questions are listed below:

1. How did the organizational, relational, and informational resources influence the implementation of OFD during the COVID-19 pandemic?;
2. How did the managers' perceived benefits of innovation impact the implementation of OFD during the COVID-19 pandemic?;
3. To what extent did the OFD implementation contribute to increasing financial and non-financial performance?

The remainder of this paper is organized as follows. The next section reviews the relevant literature. The third section develops the research model and proposes research hypotheses based on resource-advantage theory and user innovation theory. The research methodology is described in the fourth section. Data analysis results are described and discussed in the fifth and sixth sections. The seventh section concludes with theoretical and practical implications.

2. Literature Review

2.1. Online Food Delivery Platform

An OFD platform is a type of online-to-offline service platform (O2OSP) that uses an app or website to facilitate the ordering and delivery of food from many restaurants. On the platform, consumers can search for their favorite restaurants, choose from available food items, and specify shipping addresses [14]. In other words, OFD services are internet-based (i.e., online) services through which consumers can order the food they want and have it delivered to their home.

Consumers who have hedonic motivations or positive emotions regarding OFD services have a greater intention to repeatedly use OFD [15]. Attitude and subjective norms are also factors that affect OFD usage intention [10]. Kapoor and Vij [1] noted that the collaboration design has a strong effect on the customer act of placing an order via the mobile app and making the payment for the ordered food. Collaboration design refers to alliances between the online food aggregator and other e-commerce players in order to provide discounts or cash back. This finding is consistent with Osuna et al. [16], who found

that customers are driven by the discounts provided by online retailers. Perceived ease of use, perceived usefulness, and perceived value also play a significant role in influencing consumers' intention to use OFD [8,17,18]. In addition, performance expectancy, social influence, trust, habit, perceived food safety, and food delivery hygiene have impacts on continuance intention [9,11,19].

While prior studies have discussed why consumers use an OFD platform, the question of how restaurants decide to implement OFD services is also worthy of investigation because an OFD platform needs both demand and supply sides in order to generate transactions. This study uses service innovation theory as the basis for exploring the factors that drive restaurants to implement OFD services.

2.2. Service Innovation

Innovation is broadly defined as the implementation of a new or significantly improved product (service), process, marketing method, or organizational method [20]. Hansen and Wakonen [21] concluded that innovation is something that is created for the first time and then becomes commercially successful. Service innovation refers to companies implementing new service processes or using new services [12]. When products or services become more homogeneous or cannot maintain their original competitive advantages, service innovation becomes an effective way for companies to increase their growth rate and profitability [22].

Compared to traditional commodity innovation, service innovation refers to the use of specialized capabilities (knowledge and skills) to provide services through commodities (tools, distribution mechanisms) that benefit entities [23]. When competing products all have the same price, the application of new technological knowledge, market knowledge, and business models can deliver higher value services to the customer and further increase purchase intention [24]. Thus, service innovation implementation is a means by which companies can create competitive advantages. For this reason, many companies introduced service innovations, such as the use of self-service technologies in retail stores. The goal is to use IT-enabled services to enhance service quality, increase customer satisfaction and loyalty, and reduce operating costs while improving operational efficiencies [25]. Similarly, using an OFD platform is a form of service innovation for restaurants. Hence, this study takes the perspective of service innovation to better understand the factors that motivate restaurants to implement OFD services.

Resource-advantage (R-A) theory postulates that resources enable a firm to produce efficient or effective offerings that have value for some market segments, helping the firm to achieve superior performance [26]. A firm can obtain a comparative advantage when it has a resource that is rare among its competitors. A comparative advantage in resources will yield a competitive advantage and result in superior performance because of resource immobility. Both reactive and proactive innovation depend on complex resources. Chen, Tsou, and Huang [12] argued that innovation practices in service delivery are mainly influenced by organizational (e.g., company culture), relational (e.g., relationships with partners), and informational (e.g., technology) resources. They developed a conceptual model (hereafter known as the CTH model) based on R-A theory, explaining how innovation orientation, external partner collaboration, and IT capacity affect service innovation and further determine financial and non-financial performance. Our study extends the CTH model by considering another organizational resource, customer orientation, whose positive impact on service innovation has been found in previous research [24]. In addition to the firm perspective based on R-A theory, we also developed our research model from the user perspective based on user innovation theory, since restaurants are the *users* of an OFD platform rather than the developers of it. User innovation theory postulates that the benefits users expect to receive from innovating are positively related to the likelihood that they will innovate [27]. If users can perceive the benefits from creating or implementing an innovative solution to their needs, they are more willing to innovate. The following subsections introduce the antecedents and consequences of service innovation.

2.3. Antecedents of Service Innovation

2.3.1. Customer Orientation

The term "customer orientation" refers to a continuous and positive attitude toward identifying the needs of the target customer and providing sufficient value to meet those needs [28]. Generally speaking, customer-oriented companies have the ability to generate, disseminate, and respond to information about consumer needs better than their competitors [29]. A customer-oriented company must not only meet current consumer needs, but also develop products or services that can meet potential future needs, thereby strengthening the company's market position over time [30].

Thoumrungroje and Racela [31] drew on R-A theory to propose that customer orientation is a higher-order resource that can facilitate innovation. If enterprises can effectively understand customer needs and preferences and can effectively predict and respond to market changes, they can also use these advantages to create new services to meet customer needs [24,31]. The relationship between customer orientation and service innovation underlines the significance of fulfilling consumer needs, so companies must continue to explore innovative ways to create value for their customers. Day [32] also noted that only market-oriented companies are customer-oriented companies, so they can perceive and respond to changes in customer needs faster than their rival companies. This type of customer-oriented activity enables companies to gain information advantages over their competitors, and they can use these advantages to execute tailor-made services to meet the needs of their current and potential customers [33].

2.3.2. Innovation Orientation

Innovation orientation is an aspect of a firm's culture, which refers to an organization's openness to new ideas [34]. It is the tendency to change via the adoption of new technologies, resources, skills, and management systems [35]. Innovation orientation also consists of both the openness to innovation [36] and the capacity to innovate [37]. Openness to innovation is a key part of the innovation process and is determined by the degree to which the members of the organization are willing to consider adopting new ideas [36,38]. Capacity to innovate refers to the ability to introduce some new process, product, or idea within the organization [39].

When a company is innovation-oriented, it creates an open atmosphere and emphasizes creativity, and its members are usually more accepting of novel ideas and methods. A positive team culture stimulates the innovation process and contributes to testing and implementing ideas. The main mechanism underlying an organization's ability to change is innovation, which can be described as an attitude that helps organizations to see beyond the present and concentrate on the future [40,41]. Chen, Tsou, and Huang [12] explained that a company that focuses on innovation can create breakthrough innovations, thereby creating and providing more new and convenient service delivery channels to customers, thus realizing better service innovations.

2.3.3. External Partner Collaboration

Faems et al. [42] defined the concept of external partner collaboration as an interactive process of exchanging complementary assets with external partners. When a company's internal resources are insufficient, the company is more likely to cooperate with other companies that have complementary resources and goals, which may include sharing tangible and intangible resources and capabilities [43].

Companies are often compelled to cooperate in order to innovate because they often do not have all the necessary innovation resources internally and can obtain the required resource support only by cooperating with external partners. Therefore, collaborative processes with consumers, partners, and employees are vital for innovation [44,45]. Inter-organizational collaboration is essential for enhancing innovation activities within the organization [46,47]. Chen, Tsou, and Huang [12] noted that cooperation between banks and other companies can enhance the innovation of service delivery models and enable the

firms to introduce more convenient transaction channels for customers. Collaboration with external partners enables a company, particularly a medium-sized enterprise (SME), to develop absorptive capability through the mutual learning process and to share innovation costs [48].

2.3.4. IT Capability

Chen and Tsou [49] identified four dimensions of IT capability: (a) IT infrastructure, (b) IT business experience, (c) IT relationship resources, and (d) IT human resources. This classification is commonly used in the literature when measuring IT capabilities [50–52]. Technology may affect a company's ability to create value, thereby changing the way customers interact with the company. For example, IT can enhance the company's response to customer needs by shortening the service delivery time and enabling customers to monitor the delivery process [53].

By integrating technological systems and the tacit skills of human resources, IT enables companies to process customer information quickly and efficiently and to infuse the unique knowledge of employees into the service innovation process. In addition, companies use IT advantages when designing or modifying new processes for service innovation. To create a new channel or method of service, firms must possess IT infrastructure, human IT resources, and intangible resources (i.e., IT business experience and IT relationship resources) that support the technology [54]. IT capability can help companies anticipate customers' needs, share and integrate resources among various departments, and carry out technology-driven service innovations. Chen, Tsou, and Huang [12] found that IT plays a critical role in the implementation of service delivery innovation practices. It supports flexible service delivery and continual service innovation. The firm's IT capability can enhance the innovation of service delivery models and enable the creation of more convenient transaction channels for customers.

2.3.5. Perceived Benefits

Perceived benefit refers to the perception of the positive consequences that are caused by a specific action. Generally, the greater the perceived benefits the greater the intention to perform the action [55]. When people perceive the benefits of using an information system, they will increase their intention to use the system. For example, a previous study noted that, when companies realize that the use of the inter-organizational information system may shorten the time of product launch and delivery and increase efficiency, their willingness to adopt the system increases [55].

Perceived benefit of innovation refers to the anticipated reward for having created an innovative solution to users' needs. When people expect increased benefits from the innovation, whether it is internal revenue or external rewards, their intention to innovate increases [27]. People consider the positive and negative aspects of likely results when making a decision. Perceived benefits can explain the adoption of innovations at both the individual and firm levels [56].

2.4. Consequences of Service Innovation

Service innovation is based on the organization's ability to effectively manage changes in the industry to provide customers with quality services [57]. It can help companies be more competitive and perform better in the marketplace [58]. In general, firm performance is defined as any recognized achievement in a business context. Therefore, according to Lumpkin and Dess [59], company performance can be measured by the expected level or outcome of sales, profit, or market share. Firm performance represents the extent to which the firm's goals are achieved in terms of workforce, capital, marketing, and financial matters.

Davis [60] divided firm performance into two aspects: financial and non-financial. Financial performance is directly related to charts of accounts and is found on a firm's profit and loss statement or balance sheet, including inventory levels, profit, cash on hand,

market growth rate, etc. However, non-financial aspects may be related to marketing issues, such as "customer satisfaction scores on product or service quality measures". This kind of performance is usually subjective and qualitative and includes such things as customer service quality, marketing effectiveness, strategic achievement, employee satisfaction, and corporate culture [61,62]. Chen, Tsou, and Huang [12] found that banks' innovation in delivery models can improve financial and non-financial performance, allowing them to increase customer loyalty and improve profitability.

3. Research Model and Hypothesis Development

3.1. Research Model

This study explores the factors that motivated restaurants to implement OFD services during the COVID-19 pandemic, and the consequences of that implementation, from the perspective of service innovation. A conceptual model was developed to explain and investigate the antecedents and consequence of OFD implementation (see Figure 1). The model considered the antecedents of service innovation, i.e., customer orientation, innovation orientation, external partner collaboration, IT capability, and perceived benefits. In the OFD context, key benefits include increases in market reach and convenience. Prior studies have found that perceived health risk affects usage intention [63]. The health risks from COVID-19 may include sequelae after recovery, including asthma, cerebrovascular disease, cystic fibrosis, hypertension or high blood pressure, liver disease, etc. [64]. Therefore, this study also considered the reduction of health risks as a restaurant manager's perceived benefit of OFD implementation. We also investigated the influence of OFD implementation on firm performance for restaurants during the pandemic.

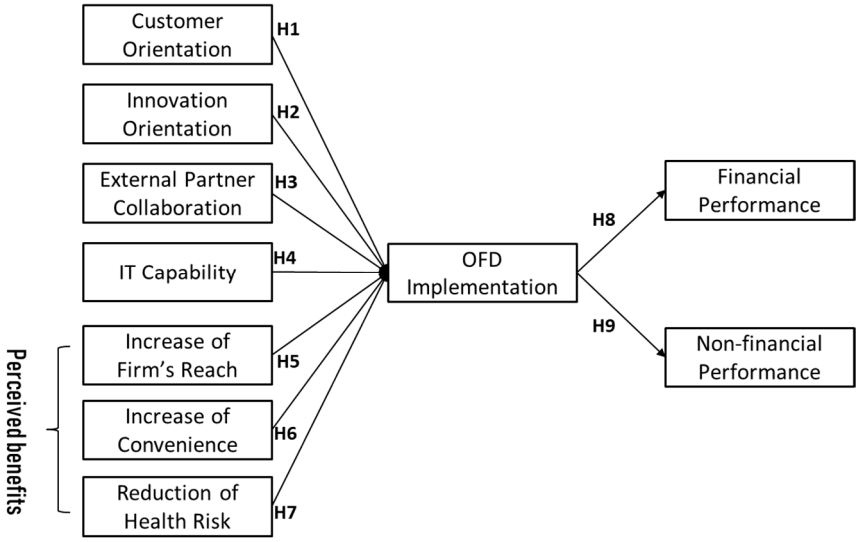

Figure 1. Research model.

3.2. Hypothesis Development

OFD implementation is defined as an organizational effort to disseminate an OFD platform and services within a user community. Adoption means use or usage at the individual level, and is usually measured by either the intention to use or the actual usage. Implementation means execution or dissemination at the organizational level and is usually measured by the extent to which an organization integrates an information system or innovation within its business functions, units, processes or regions [65,66]. The extent of implementation is better than adoption as a measurement of the quality of the innovation [65]. A restaurant can list a selection or all of its foods on an OFD platform and can use some or all of the functions provided by the OFD platform (e.g., menu management, order management, customer service, etc.).

There is an important positive relationship between the organization's customer orientation and service innovation [67]. Customer-oriented companies can better understand customer needs and try to meet all of them. Therefore, the more customer-centric an organization, the more likely the firm will be to embrace innovation, and the greater its tendency to develop new products or services to meet consumer needs. This may ultimately result in high levels of performance [67,68]. These days, many paid workers and working mothers place a high value on time and convenience, relying more on manufactured ready meals and food delivery [69]. Thus, OFD implementation by restaurants presents more choices to those who do not have much time to cook, and offers them greater convenience. Therefore, restaurants that are strongly customer-oriented will be more likely to implement OFD to meet customer needs and provide better service. As such, we proposed H1.

H1: *Customer orientation is positively related to the extent of OFD implementation.*

An innovation-oriented atmosphere can increase the company's acceptance of new ideas, and its members will be more willing to try new technologies and adopt new ideas. Hurley and Hult [34] studied the consequences of innovation orientation and concluded that innovation orientation is the determinant of organizational innovation. They also pointed out that innovation orientation is a key driver for overcoming obstacles and enhancing the company's ability to successfully adopt or implement new systems, processes, or products.

Companies must find ways to better tailor products to customers' needs, and offset and/or surpass competitors' advantages. Innovation-oriented companies consider how to develop and deploy knowledge and skills to effectively provide new and existing customers with services, such as developing new ideas to enhance new and existing service delivery methods, or to meet needs through innovative culture [34]. Therefore, a company's ability to introduce new customer service methods, to improve existing customer service methods, and to compete with competitors depends on the company's innovation orientation.

Online food delivery and ordering is a new business model and a new service process, so OFD implementation is a new idea for restaurants. Thus, a restaurant whose organizational atmosphere is strongly innovative will be more likely to implement the OFD.

H2: *Innovation orientation is positively related to the extent of OFD implementation.*

Cooperation with external partners can make up for a company's lack of resources and technology [70]. A company can improve its ability to innovate by managing its relationships with suppliers and customers [71]. Innovation cooperation refers to two or more different companies providing each other with resources and capabilities to offer innovative services. Therefore, companies can create and provide innovative services based on their collaboration with external partners (e.g., customers, suppliers, research institutions, and universities). Simme [72] noted that creating new ideas requires collaboration between people with various kinds of knowledge, because everyone has different areas of expertise, and the cooperation between people can combine their complementary expertise to develop more new ideas and innovations. Therefore, professional skills, tacit knowledge, and communication with external partners are important sources of innovative ideas, and companies can generate more innovative ideas or behaviors through cooperation.

We believe that companies that strengthen cooperation with external partners will better develop new service methods for suppliers or customers. In this study, external partner collaboration refers to a restaurant's tendency to cooperate with other companies that have complementary resources and goals. If a restaurant is willing to cooperate with external partners, it is more likely to implement OFD to cooperate with OFD companies (e.g., Uber Eats (San Francisco, CA, USA), Foodpanda (Berlin, Germany)). The restaurants can simply prepare the meals and then wait for the OFD companies' designated drivers to pick up the meals and deliver them to customers. Cooperation with the OFD company can make up for the restaurant's insufficiency in the development and maintenance of the ordering system, as well as the restaurant's lack of delivery personnel.

H3: *External partner collaboration is positively related to the extent of OFD implementation.*

Technology may affect a company's ability to create value, thereby changing the way customers interact with the firm's products. For example, IT can enhance the company's response to customer needs by shortening delivery times [53] and enabling customers to monitor their delivery [73]. IT enables the company to process customer information quickly and effectively by integrating the IT system and the skills of human IT resources, and then infuse the service innovation process with employees' unique knowledge. Companies can also use IT to design new service processes or smooth out the user experience [54].

In order to create new service channels or methods, companies need to have IT infrastructure, IT business experience, IT relationship resources, and human IT resources to support the technology. Companies with stronger IT capabilities will be more successful at implementing innovative services. Therefore, IT capability is the operational resource for new services. In this study, IT capability is the extent to which a restaurant has the proper IT equipment and capabilities to support the implementation of OFD. When it has sufficient IT capability, the company will be more willing to implement the OFD service.

H4: *IT capability is positively related to the extent of OFD implementation.*

Outsourcing to a third party can help increase a restaurant's exposure and help the restaurant achieve a wider customer reach [74]. Using online food ordering and delivery platforms is a quick and effective way to ensure the restaurant's brand name is seen. Participating with an OFD platform greatly increases the chances that a given restaurant will be seen by the users who access the platform and search for food ordering options.

As the capacity for indoor dining is limited, sales are constrained and maintaining this additional stream of revenue becomes vitally important for the business. Hence, outsourcing to third-party OFD service providers can enable restaurants to obtain substantial income by offering specialized delivery services, thus giving their food a wider market despite the restaurant's limited number of seats [75]. This allows customers to enjoy their meals without going to the restaurant, and the number of orders and sources of revenue are no longer solely provided by dine-in business. The wider exposure can also expand the company's customer base to include potential diners who do not live or work near the restaurant. A restaurant can take advantage of the OFD platform to reach customers in different geographical locations. This allows customers who do not want to go out (or do not have a means of transportation) to enjoy the restaurant's food by ordering online via the OFD platform. Therefore, implementing an OFD service may increase the restaurant's customer reach. This perceived benefit will affect the restaurant's OFD implementation.

H5: *The perceived increase of a firm's reach is positively related to the extent of OFD implementation.*

Many reports have indicated that it is more convenient to outsource food delivery services than to establish an in-house delivery service because most of the responsibilities can be delegated to OFD service platforms [74,75]. By outsourcing food delivery to a third-party OFD service provider, restaurants need only to prepare the food for delivery drivers to pick up. On top of that, there is no need to create an online food ordering system or hire additional employees for food delivery services. The number of orders and the revenue will increase at the relatively low cost of the commission fees incurred for the food delivery service [74,75]. An OFD platform also provides tools that allow restaurants to keep track of new orders and manage daily deliveries and gives access to menus, payment information, sales data, and customer insights. Since implementing an OFD service may provide more convenience, this perceived benefit will affect the extent to which the restaurant implements OFD.

H6: *The perceived increase of convenience is positively related to the extent of OFD implementation.*

The COVID-19 pandemic has increased the general public's fear of health risks, especially the risk that a product or service may harm the health and safety of oneself or others [76]. Choi, Lee, and Ok [63] showed that, when customers perceive buying street

foods as incurring a significant health risk, their consumption of such food decreases. The health risk of street food is caused by poor sanitation because the food is not easy to store. Consumers are more likely to experience symptoms such as diarrhea, cramping, vomiting, and nausea when they eat spoiled food [77–79]. As mentioned earlier, when people perceive increased health risks, they tend to not perform any behavior that might hurt their health.

Similarly, during the COVID-19 pandemic, people stopped going to restaurants as frequently because of the perceived health risks, and they started to use other innovative services such as OFD. For restaurants, implementing OFD can not only reduce infections that may occur when customers come to dine inside the restaurant, but can also help the restaurant protect its staff by reducing the risk of infecting the employees. This perceived reduction of health risks can be regarded as a kind of perceived benefit, which may positively affect the restaurant's implementation of OFD.

H7: *The perceived reduction of health risk is positively related to the extent of OFD implementation.*

Service innovations help provide customers with better services, thereby enhancing firm competitiveness and obtaining better market performance [57,58]. To many restaurants, implementing an OFD service is a kind of service innovation. Through this innovation, they can better meet their customers' needs, which can enhance customer loyalty and increase the purchase rate. The long-term consequence is the ability to offer high-quality services to customers, increase the market position of the firm, and increase firm profitability.

Knight and Cavusgil [80] noted that service innovation also uses cost-effective and efficient processes to provide small and medium-sized enterprises with the ability to provide unique services. Service innovation reduces the company's cost expenditures, thereby increasing profitability. For restaurants, the implementation of OFD can also reduce the cost of personnel (e.g., couriers), thus improving financial performance.

H8: *The extent of OFD implementation is positively related to the restaurant's financial performance.*

Past studies have also found that service innovation can improve a firm's non-financial performance, including customer loyalty and the firm's reputation [12,24]. Good reviews on an OFD platform can help a restaurant gain a better reputation and strengthen its non-financial performance. At the same time, consumers will have a better impression of the restaurant because of the easier purchasing process. Thus, implementing an OFD service also enhances a firm's ability to lock in customer loyalty via an easier ordering process, clearer communication of deliverables and outcomes, and an increased ability to meet customer needs, which results in a competitive advantage in the market. Thus, we propose the following hypothesis.

H9: *The extent of OFD implementation is positively related to the restaurant's non-financial performance.*

4. Research Methodology

4.1. Measurement

Based on the research model and a detailed review of the related literature, we developed a questionnaire with measurement scales. To the extent possible, previously published items were adapted to fit our study [6,12,28,49,65,76,81–83]. This questionnaire was designed to measure the antecedents of OFD implementation in the catering industry, the degree of OFD implementation, and the impact on restaurant performance. All constructs, except the extent of OFD implementation (OFDEX), were measured using a 7-point Likert scale that ranged from "strongly disagree" (1 point) to "strongly agree" (7 points). The OFDEX was measured using a 7-point Likert scale that ranged from "none" (1 point) to "all" (7 points).

4.2. Data Collection

During the period from 16 April to 9 May 2021, an announcement was posted on Facebook communities regarding the Foodpanda and Uber Eats restaurant groups and

restaurant owner groups. To participate, respondents were required to be in a position to evaluate OFD services, and the restaurant had to still be in business. Participants were also required to note whether the restaurant had or had not implemented OFD service after the COVID-19 outbreak (i.e., 13 March 2020). Participants were informed that, to preserve confidentiality, their responses would remain anonymous and would be used for academic purposes only. In addition to asking for responses to the scales and demographic data, we asked respondents to note the brand of OFD platform implemented (if the restaurant had implemented the OFD service).

5. Data Analysis and Results

5.1. Sample Description

The sample consisted of 137 restaurants. We further checked the trap question ("Actually, I do not meet the requirement".) and deleted the ineffective responses. As a result, the effective sample size was 104. The basic information about the restaurants is shown in Table 1. The OFD platforms implemented by the restaurants that had implemented OFD service were Uber Eats (47 restaurants), Foodpanda (42 restaurants), and Foodomo (1 restaurant).

Table 1. Basic information about the restaurants.

Attribute	Category	Frequency	Percent
OFD service	Implemented	59	56.73%
	Not implemented	45	43.27%
Cuisine	Chinese	24	23.08%
	Dim sum	4	3.85%
	Healthy food	9	8.65%
	Snacks-Local dishes	19	18.27%
	Japanese and Korean	8	7.69%
	South East Asian	1	0.96%
	European food	9	8.65%
	Desserts	3	2.88%
	Vegetarian food	4	3.85%
	American food	8	7.69%
	Drinks	10	9.62%
	Other	5	4.81%
Price of the meal	Under 100 NT dollars	48	46.15%
	100–199 NT dollars	34	32.69%
	200–299 NT dollars	15	14.42%
	300–399 NT dollars	3	2.88%
	400–499 NT dollars	1	0.96%
	500–599 NT dollars	1	0.96%
	600 NT dollars or above	2	1.92%
Position	Owner	80	76.92%
	Manager	21	20.19%
	Chef	3	2.88%

5.2. Measurement Model

We eliminated five items measuring customer orientation, three items measuring external partner collaboration, and one item measuring perceived increase in convenience because their factor loading values were less than 0.7. As Table 2 indicates, all Cronbach's alpha values were greater than 0.7. Furthermore, all values of the average variance extracted

(AVE) of the constructs were higher than 0.5, and all the values of composite reliability (CR) were greater than 0.7, so the reliability was good.

Table 2. Factor analysis result.

Construct	Item Wording	Factor Loading	ITC
Customer Orientation (COR) Alpha = 0.892 AVE = 0.753 CR = 0.924	We have routine or regular measures of customer service.	0.814	0.691
	Our service development is based on good customer information.	0.842	0.774
	We know our customers well.	0.906	0.808
	We have a good sense of how our customers value our services.	0.905	0.781
Innovative Orientation (INNOR) Alpha = 0.937 AVE = 0.752 CR = 0.948	Our company pays close attention to innovation.	0.871	0.847
	Our company emphasizes the need for innovation for development.	0.910	0.887
	Our company promotes the need for development and utilization of new resources	0.880	0.882
	The extent to which this firm embraces, accepts, and measures innovation	0.797	0.742
	Management actively seeks innovative ideas.	0.891	0.820
	People are encouraged to provide new ideas even if they don't work.	0.850	0.707
External Partner Collaboration (EPC) Alpha = 0.866 AVE = 0.868 CR = 0.929	Our company has innovation-related collaborations with business partners to create new competences.	0.884	0.764
	Our company has innovation-related collaborations with customers to discover the needs of existing market segments.	0.977	0.764
IT Capability: IT Infrastructure (ITI) Alpha = 0.959 AVE = 0.960 CR = 0.980	Our company has established a generous budget for establishing IT hardware.	0.980	0.920
	Our company has established a generous budget for purchasing and developing IT software.	0.980	0.920
IT Capability: IT Business Experience (ITBE) Alpha = 0.939 AVE = 0.846 CR = 0.956	Our IT applications have been implemented to deploy business strategies.	0.900	0.825
	Our IT projects have been developed in compliance with business strategies.	0.920	0.855
	Our IT staff has been knowledgeable of the firm's business operations.	0.922	0.860
	Our IT staff has been knowledgeable of the firm's business strategies.	0.935	0.881
IT Capability: IT Relationship Resources (ITRR) Alpha = 0.952 AVE = 0.876 CR = 0.966	Our IT function has interacted with departmental operations.	0.950	0.906
	Our IT function has integrated with other business functions.	0.955	0.919
	Our IT function has cooperated with departmental operations.	0.957	0.919
	Our IT has supported employee empowerment adequately.	0.879	0.801

Table 2. *Cont.*

Construct	Item Wording	Factor Loading	ITC
IT Capability: IT Human Resources (ITHR) Alpha = 0.900 AVE = 0.833 CR = 0.937	Our employees have built relevant bridges between old and new IT systems.	0.899	0.756
	Our employees have delivered data across locations and applications.	0.943	0.865
	Our employees have been aware of opportunities to apply new technologies as they become available.	0.896	0.788
Perceived increase of firm's reach (PIFR) Alpha = 0.945 AVE = 0.900 CR = 0.964	Implementing OFD can enhance the company's visibility.	0.943	0.662
	Implementing OFD can extend customer networks.	0.950	0.897
	Implementing OFD can expand markets for existing products/services.	0.954	0.861
	Implementing OFD can open new markets.	0.771	0.842
Perceived increase of convenience (PIC) Alpha = 0.855 AVE = 0.675 CR = 0.892	The online food delivery platform would allow me to provide food any time.	0.915	0.689
	The online food delivery platform would allow me to provide food to any place.	0.765	0.636
	The online food delivery platform would allow me to not need to develop my own ordering system.	0.792	0.765
	The online food delivery platform would reduce the need for me to maintain my own ordering system.	0.806	0.701
Perceived reduction of health risk (PRHR) Alpha = 0.937 AVE = 0.841 CR = 0.955	Implementing the OFD can reduce customers' nervousness about visiting our restaurant because of health concerns.	0.862	0.788
	Implementing the OFD can reduce the risk of COVID-19 infection.	0.933	0.867
	Implementing the OFD can assure customers and us of health safety	0.956	0.912
	Implementing the OFD can reduce the probability that visiting our restaurant would lead to a health problem.	0.915	0.836
Extent of OFD implementation (OFDEX) Alpha = 0.971 AVE = 0.971 CR = 0.986	How many foods and beverages offered to customers by the restaurant can be ordered on the OFD platform?	0.984	0.943
	How many functions do you use on the OFD platform (for example: menu management, order management, help center, etc.)?	0.987	0.943
Financial Performance (FIP) Alpha = 0.898 AVE = 0.693 CR = 0.919	We have enhanced the sales and profitability of the restaurant.	0.801	0.602
	We have been profitable.	0.869	0.691
	We have achieved our profit objectives.	0.869	0.858
	We have achieved our sales objectives.	0.864	0.858
	We have achieved our market share objectives.	0.755	0.757
Non-Financial Performance (NFIP) Alpha = 0.865 AVE = 0.643 CR = 0.900	We have enhanced the loyalty of existing customers.	0.821	0.753
	We have attracted a significant number of new customers.	0.855	0.683
	We have had an important competitive advantage.	0.799	0.679
	We have had a well perceived image.	0.758	0.659
	We have had a good reputation.	0.774	0.656

The factor loadings of all items were greater than 0.7, and all item-total correlations (ITC) were greater than 0.3, so the convergent validity was good. In the correlation matrix (Table 3), the diagonal line of correlation matrix represents the square roots of the AVE, which are greater than the inter construct correlation coefficients [84]. The results suggest that the desired discriminant validity was also achieved. As Table 4 indicates, the variance inflation factor (VIF) of IT Infrastructure (ITI), IT Business Experience (ITBE), IT Relationship Resources (ITRR), and IT Human Resources (ITHR) were all lower than 10, which means that there was no collinearity.

Table 3. Correlation matrix.

	COR	EPC	FIP	INNOR	ITBE	ITHR	ITI	ITRR	NFIP	OFDEX	PIC	PIFR	PRHR
COR	0.868												
EPC	0.566	0.932											
FIP	0.285	0.272	0.833										
INNOR	0.558	0.647	0.221	0.867									
ITBE	0.162	0.248	0.121	0.348	0.920								
ITHR	0.384	0.381	0.350	0.482	0.628	0.913							
ITI	0.186	0.268	0.120	0.290	0.842	0.461	0.980						
ITRR	0.191	0.293	0.224	0.388	0.825	0.805	0.625	0.936					
NFIP	0.406	0.313	0.661	0.402	0.136	0.378	0.081	0.262	0.802				
OFDEX	0.135	0.106	0.233	0.177	−0.011	0.084	−0.023	0.060	0.257	0.986			
PIC	0.261	0.331	0.385	0.330	−0.020	0.259	−0.098	0.047	0.347	0.254	0.822		
PIFR	0.318	0.243	0.204	0.433	0.025	0.279	−0.092	0.120	0.413	0.321	0.655	0.949	
PRHR	0.318	0.352	0.337	0.369	−0.031	0.294	−0.185	0.078	0.413	0.125	0.671	0.562	0.917

Table 4. Variance inflation factor analysis results.

Construct	VIF
IT Infrastructure (ITI)	6.960
IT Business Experience (ITBE)	2.877
IT Relationship Resources (ITRR)	3.630
IT Human Resources (ITHR)	5.616

Dependent Variable: OFD Implementation.

5.3. Testing of the Research Model and Hypotheses

This study used SmartPLS with a PLS bootstrapping algorithm (number of resamples = 5000). The construct of IT capability was conceptualized as a second-order formative, first-order reflective multidimensional construct. The dimensions of IT capability were IT infrastructure, IT business experience, IT relationship resources, and IT human resources [49]. We used the two-stage approach [85] to estimate the model because we focused on the relationships between higher-order constructs. The results of all path coefficients and explained variances are shown in Figure 2. Table 5 summarizes the hypothesis testing results.

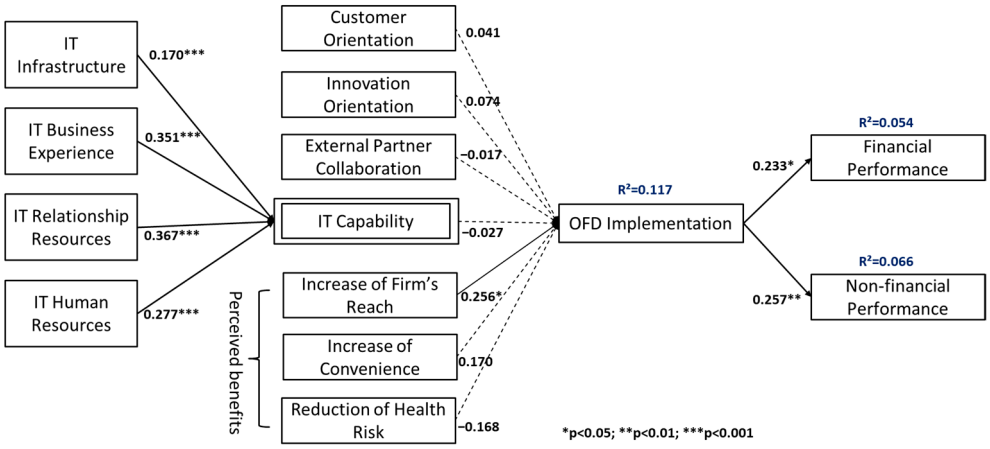

Figure 2. PLS analysis of the research model.

Table 5. Results of the structural model.

Hypothesis	Path Coefficient	T-Value	*p*-Value	Result
H1 COR -> OFDEX	0.041	0.330	0.741	Not supported
H2 INNOR -> OFDEX	0.074	0.480	0.631	Not supported
H3 EPC -> OFDEX	−0.017	0.110	0.913	Not supported
H4 ITC -> OFDEX	−0.027	0.243	0.808	Not supported
H5 PIFR -> OFDEX	0.256	1.976	0.048	Supported
H6 PIC -> OFDEX	0.170	1.074	0.283	Not supported
H7 PRHR -> OFDEX	−0.168	1.356	0.175	Not supported
H8 OFDEX -> FIP	0.233	2.270	0.023	Supported
H9 OFDEX -> NFIP	0.257	2.688	0.007	Supported

Only the antecedent regarding the increase of the firm's reach significantly determined OFD implementation, which means that, when restaurant managers believe that implementing OFD can increase the firm's reach, they will be more likely to implement OFD. The data also clearly show that implementing OFD increases both the financial and non-financial performance of restaurants.

The result regarding IT capability shows that the relationships between first- and second-order constructs are strongly significant. The path coefficients from the dimensions to the aggregate second-order construct are weights that indicate the relative importance of each dimension. The IT infrastructure, IT business experience, IT relationship resources, and IT human resources all play important roles in determining IT capability.

5.4. Common Method Variance

Common method variance (CMV) may be a concern in this study because both the dependent and independent variables were collected from the same respondent at the same time. We used the PLS marker variables method to diagnose and control CMV [86]. We used 10 items of social desirability as marker indicators [87] to create method factors.

The mean correlation between marker items and research items was less than 0.05, which means that the method variance was not a problem in our data. Next, the method factor was added to the model as an exogenous variable that predicted each endogenous variable. We compared the model with the method factor to the baseline model and found that no significant path in the baseline model became insignificant in the method factor model. Therefore, we concluded that there was no CMV problem in the data.

6. Discussion

6.1. Major Findings

This study enhances our understanding of the vital reason why restaurants implement OFD and whether implementing OFD can increase firm performance. We found that perceived increase in a firm's reach has a positive relationship with OFD implementation, and OFD implementation can, in fact, enhance both financial and non-financial performance. However, hypotheses H1, H2, H3, H4, H6, and H7 are not supported. Prior studies have found that customer orientation [24,31,88] and innovation orientation [34,89] are positively related to service innovation. However, our study cannot confirm the relationships between customer orientation, innovation orientation, and OFD implementation. One possible reason is that prior studies measured the general service innovation capability, whereas our study measured a specific innovation behavior, i.e., OFD implementation. A restaurant that is customer- or innovation-oriented might have innovation capability but it might not focus on OFD. A restaurant's tendency to cooperate with other companies did not increase its OFD implementation. One possible reason is that an increasing number of collaborators can introduce an amount of information and complexity that managers find impossible to handle [90]. Prior studies have found a positive relationship between IT capacity and innovativeness [49,91]. Our study did not find this relationship between IT capacity and OFD implementation. This may be because the restaurants did not need to develop and maintain an OFD platform themselves; they were simply the users of an OFD platform, so their IT capacity did not matter. As the users of innovation, restaurant managers' perceived benefits of OFD determine the implementation of OFD. The increased ability to reach customers is the key benefit that drives a restaurant to implement OFD service. In contrast, increased convenience and the reduction in health risks are not key benefits. The conventional motives for a vendor to add an online channel are reaching new customers, increasing profit, and achieving price differentiation [92]. Particularly, during the COVID-19 pandemic, consumers tended to shop online for products that had traditionally been purchased in brick-and-mortar stores. An OFD service provides restaurants with a new channel to effectively reach more customers.

6.2. Interview

We further conducted an interview with industry experts to dig obtain explanations of the phenomena from the managers' point of view. We invited two restaurant managers to have an online interview. Participant A was a manager of a chain European food restaurant, and participant B was the principal owner of a restaurant that served snacks and local dishes. They were both in a position to evaluate OFD services in their restaurant and to understand the overall performance of the restaurant.

Customer orientation did not have a significant relationship with OFD implementation; as participant A explained: "Basically, a chain restaurant implements an OFD service because the restaurant has a customer orientation. Customers complain that it is troublesome not to be able to order the restaurant's meals on an OFD platform, so they can only dine in the restaurant. A chain restaurant would implement an OFD service to satisfy customers. However, a small restaurant may not be able to change to meet the needs of customers in this way because their capabilities are limited". Participant B said, "Small restaurants like us have limited productivity. Joining an OFD platform would affect the dining experience of the on-site guests. Therefore, each restaurant considers different points for customers, so there is no way to say that a restaurant that is customer-oriented will implement an OFD service".

"Usually restaurant innovation is mainly in meals and marketing", said Participant A. "We use our creativity only to develop new meals and hold marketing activities, and we rarely update the service process".

Participant B also elaborated: "We usually only use our creativity in the research and development of meals. We have relatively fewer innovative ideas in other areas, so we would not implement OFD services for the sake of innovation". Thus, we can see that even

innovation-oriented restaurants focus their innovations mainly on their meals instead of on services.

External partner collaboration did not have an impact on OFD implementation. Participant A explained: "Usually the external partners of restaurants are ingredient suppliers, because the long-term cooperation can usually result in more favorable prices to save costs. However, long-term cooperation with an OFD platform cannot reduce the commission ratio. Therefore, you will not join an OFD platform only because you have experience in external cooperation".

IT capability had no influence on the implementation of OFD. Participant A explained: "Usually, a restaurant's IT equipment, such as the POS machine and ERP inventory system, is outsourced to other manufacturers, which means that restaurant employees need to know only how to use the IT equipment. In fact, a restaurant does not need complicated IT capabilities, so it does not have much impact on the OFD implementation".

Participant B explained further: "In the catering industry, only relatively large chain restaurants have the opportunity to develop IT capabilities. Other small restaurants, like us, usually outsource IT-related matters to a cooperative manufacturer, and do not need much IT capability".

The perceived increase in convenience failed to have an impact on the implementation of OFD, which may come from some limitations of the OFD platform itself. Participant A stated, "If the OFD platform does not have sufficient deliverymen to take orders, there will be no way to get benefits. For example, if there is no deliveryman to take orders in a severe epidemic situation, the restaurant would rather go out on its own to deliver the order. In addition, the OFD platform has a delivery distance limit, and it cannot deliver as far away as may be necessary". In the same way, Participant B also elaborated: "Sometimes customers wanted to order food through the platform, but there was no deliveryman nearby, which made it impossible for us to take orders. There were also deliverymen who took too many orders at once, making customers very angry because they waited too long". The answers of the participants indicate that an OFD platform is not as convenient as we had thought.

Finally, the reduction in perceived health risks failed to influence the implementation of OFD because restaurants still feel that cooperation with the platform cannot completely mitigate the health risks. "The deliverymen may also be the ones who bring the virus. There is no way to completely protect the employees and customers. It remains risky unless there is zero contact between the deliverymen and the restaurant. However, the meal needs to be checked and deliverymen have to enter the store", said Participant A. Participant B also noted that "Deliverymen can also be carriers of the virus, and sometimes there were incidents in which deliverymen ate the customer's food without permission, which may also cause some health concerns".

7. Conclusions

7.1. Theoretical Implications

This study discovered the factors that affect restaurants' implementation of OFD services and examined the improvement in the restaurant's performance as a result of the implementation. In general, past studies on information system (IS) implementation have discussed the success or failure of the system implementation, and have seldom discussed the reasons behind the company's decision to implement the system [93–95]. This study advances our understanding of IS implementation from the perspective of service innovation and finds that perceived benefit is the major driver of IS or service implementation.

Past OFD studies have, generally, explored the factors driving consumers' OFD adoption [1,6–8]. The present study extends the OFD research by exploring the factors driving restaurants to implement OFD services and finds that the implementation can improve restaurant performance. Perceived benefits drive consumers to use OFD services [8,17,18]. Similarly, perceived benefits also drive restaurants to implement OFD services. The per-

ceived health risk caused by the pandemic has been considered as a factor in the model. This helps researchers better understand whether the reduction in a perceived health risk can determine the implementation of OFD. Prior studies have found that the perceived susceptibility to and severity of COVID-19 increases consumers' perceptions of the usefulness of OFD services, and further increases their willingness to use the services [17]. We found that restaurants implemented OFD during the pandemic because they thought that the OFD could increase their market reach, not because they believed it could reduce the health risk.

7.2. Management Implications

Based on our findings, we can conclude that the person in charge of the catering industry can still consider cooperating with an OFD platform because the implementation of OFD can actually enhance the restaurant's financial and non-financial performance, thereby make it profitable and sustainable.

For restaurants that have not implemented OFD, we suggest that they must understand that an OFD platform is not as convenient as they may think. Whether or not the platform can offer sufficient delivery drivers must be considered. In addition, the OFD implementation may not decrease the health risk. If delivery drivers comply with the real-name tracking system, take their body temperature, wear a mask, and clean their hands every time they enter the restaurant, the perceived health risk can actually be reduced. The managers of the OFD platform can use the increase in the firm's reach as an incentive to attract restaurants to join the platform. We also recommend that such managers consider other ways to achieve greater exposure for the collaborating restaurants.

Based on the interview, we can conclude that delivery personnel are the key to the operation of OFD services. As the two restaurant managers pointed out, it was not unusual for a customer to place an order when there was no driver near the restaurant to deliver the meal. To avoid negative reviews from consumers after the transaction, we recommend that OFD platforms add a function to the order page that informs consumers that there is no delivery driver nearby and the delivery time needs to be longer. In addition, we also recommend designing a mechanism to protect the restaurant. If the restaurant encounters a delivery driver who fails to take the order more than a certain number of times (e.g., three times) on the same day, the OFD platform will not collect the commission from the restaurant on that day.

In terms of reducing perceived health risks, we recommend setting up restaurant whistleblowing mechanisms on the platform. The whistleblowing mechanism could impose sanctions on delivery drivers who are unwilling to comply with the epidemic prevention regulations designed to protect restaurant employees and consumers. We also suggest that the daily body temperature of the driver should be disclosed on the system, so that the employees and customers who have contact with the delivery driver can feel more at ease.

7.3. Limitations and Future Research

At the time of our investigation, Taiwan had not yet experienced the peak of the COVID-19 pandemic. The COVID-19 pandemic became serious in Taiwan after an outbreak of 180 cases on 15 May 2021. A stronger perception of severe health risks may have a significant impact on the research results. The survey area was also restricted to Taiwan. Other countries whose experience with the pandemic was more severe may have different results. Furthermore, the impact of the size of restaurant was not considered, and it is possible that the research results may differ between chain restaurants and general restaurants. These research limitations point out potential research directions for future studies on OFD implementation.

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