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Open innovation ecosystems of restaurants: geographical economics of successful restaurants from three cities

JinHyo Joseph Yun^a, KyungBae Park^b, Giovanna Del Gaudio^c and Valentina Della Corte^c

^aDGIST, Daegu, South Korea; ^bSangJi University, Wonju, South Korea; ^cUniversity of Naples Federico II, Napoli, Italy

ABSTRACT

This paper investigates the role of open innovation in the success of restaurants. Our research questions are as follows. 'Is open innovation a rational strategy for a small restaurant to attract and maintain customers? Which open innovation strategies should a small restaurant use?' We constructed our research model of open innovation ecosystem of restaurants with ingredients open innovation, recipe open innovation and service open innovation to analyse open innovation in small restaurants, which is a worldwide phenomenon. We chose four successful restaurants from Naples, one restaurant from South Korea, and a North Korean restaurant as our case studies using participant observation, in-depth interviews and semi-structured questionnaires, with the results indicating the following. First, open innovation is essential for the success of small restaurants. Second, if any small restaurant adopts a closed innovation strategy with respect to any of food ingredients, recipes or service, it should choose an open innovation strategy or open innovation platform with regard to the others to maintain its competitive advantage compared to other restaurants in the neighbourhood. Third, an open innovation platform of any of food ingredients, recipes or service, can generate additional revenue by selling independent ingredients or services.

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1. Introduction: research question

Similar to other industries, food firms including restaurants rely on external scientific and technological knowledge, customer knowledge or experiments to foster their own innovation. However, firms in the food industry have several characteristics that distinguish them from firms in other industries: (1) they operate in mature or low-technology sectors; (2) food innovation is often initially developed in smaller companies or restaurants; (3) innovation in the food industry is normally incremental more than radical and (4) patented food technologies are mainly introduced by a few multinational companies (Acosta, Coronado, & Ferrándiz, 2013). Although, for big food firms such as Lindt & Sprüngli AG or Kraft Heinz, open innovation strategies belong to one category of several

CONTACT JinHyo Joseph Yun  jhyun@dgist.ac.kr

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candidates, for small restaurants or food firms, open innovation is a required strategy (Fryer & Versteeg, 2008; Van de Vrande, De Jong, Vanhaverbeke, & De Rochemont, 2009). However, Lindt & Sprüngli AG, which is one of the top global chocolate manufacturers, adopted a 'controlled open approach' to exploit its potential benefits without radically modifying its business model and to maintain its key internal and private capabilities (Lazzarotti & Manzini, 2013b). When Kraft Heinz developed melt-proof chocolate bars, it pursued open innovation using well-constructed intermediary organization to accelerate the innovation cycle (Wielens, 2013).

A critical issue, nowadays, is the need for innovation in restaurants, since they belong to traditional sectors shaped by respect for the raw materials that express local identity, the high human touch through the interaction between human resources and customers and the sedimented knowledge of some chefs that combine local food with recipes passed down through the generations (Ottenbacher & Harrington, 2009). However, we know that there are differences between entrepreneurs who possess higher levels of independence, tolerance of ambiguity, risk-taking propensity and innovativeness, and mere small business owners who focus on marketing orientation and self-efficacy in the hospitality industry including the restaurant sector (Wagener, Gorgievski, & Rijdsdijk, 2010).

When we explore service businesses such as restaurants, the role of the customer in the innovation process is not partial, but significant as a co-creator because there is a tension between standardization, which makes providing the service more cost-effective for the supplier; and customization, which matches the customer's needs, but may require different solutions for each customer (Chesbrough, 2010, p. 54). There are several factors that affect the performance of entrepreneurial service firms such as successful restaurants (Lim, Ribeiro, & Lee, 2008). In the knowledge-based economy, knowledge advantages of scale with 'non-rivalrous knowledge' can continue to accumulate endogenously, promoting powerful economic growth, which drives open innovation in restaurant services, as entrepreneurial orientation can also increase access to financial resources (Chesbrough, 2010; Romer, 1986, 1990; Zampetakis, Vekini, & Moustakis, 2011).

We investigate the role of open innovation in the success of restaurants. Our research questions are as follows:

Is open innovation the rational strategy for small restaurants to attract and maintain customers?

Which open innovation strategies should a small restaurant use?

Our research object is the individual restaurant industry. Therefore, the franchisees' trust, the relationship between franchisor and franchisee, or the franchise partner selection problem of the franchise restaurant industry, etc., are beyond the scope of this paper (Altinay & Brookes, 2012; Altinay, Brookes, Madanoglu, & Aktas, 2014; Brookes & Altinay, 2011).

2. Literature review, hypothesis and research framework

2.1. Literature review and hypothesis

Consumer-driven food and beverage innovation, which develops products to meet consumer needs, can succeed by making consumers participate in the innovation process

(Kemp, 2013). Consumer-centric company culture, such as maintaining good communication with respect to consumer issues, conducting customer research at all stages of the new product development process and reaching data-based qualitative and quantitative findings about customers, is essential for the success of innovation in food firms or restaurants (Moskowitz, Beckley, & Resurreccion, 2012). Co-creation of value with consumers as an innovation strategy in the food and beverage industry has become popular in not only small firms, but also big ones such as in the case of Molson Coors' 'talking can' (Martinez, 2013a). Therefore, co-creation with consumers offers the food and beverage industry an opportunity to add value and extricate themselves from the commodity sectors where the lowest cost provider holds sway (Garcia Martinez, Lazzarotti, Manzini, & Sánchez García, 2014). However, open innovation in the food and beverage industry should be considered a type of organized innovation including internal context, structure of collaboration and external context (Christensen, 2006).

In the food industry, vertical integration and networks play important roles in innovation activities (Karantininis, Sauer, & Furtan, 2010). The vertical integrated collaborators model corresponds to companies that only open their whole innovation funnel to contributions coming from a few types of partners (typically, suppliers and/or customers) (Lazzarotti & Manzini, 2009). Although there is still limited empirical evidence regarding open innovation strategies in the food industry, three different types of open innovation models are identified, namely, (1) the sharing-is-winning model, which is focused on start-ups and individual inventors, (2) the food-machinery framework which focuses on the open food supply chain for the food-machinery firm, and the Want, Find, Get, Manage (WFGM) model which is focused on the open food supply chain among suppliers, food companies and consumers (Bigliardi & Galati, 2013). In addition, a growing number of chain actors, jointly, meeting the heterogeneous needs of customers, end-users, seed firms, farmers, packers, retailers, technology suppliers, legislators and so on, is driving the dynamics of open innovation in the food industry to open up to external sources of knowledge in search of new successful products and technologies (Sarkar & Costa, 2008).

Following the extant literature, we construct Figure 1 to answer the first research question.

Hypothesis: Open innovation in restaurant in developing new ingredients, new menus or new recipes, or new service will increase the revenue of the restaurant. Conversely, closed innovation strategies in a restaurant will reduce its revenues.

However, if we explore the food industry from the perspective of sustainable food consumption, consumers have become increasingly estranged from the production of their food, and despite the recent recurrence of regional food and new trends like slow food and organic products, consumer knowledge of seasonality and regional supply has withered (Reisch, Eberle, & Lorek, 2013). Additionally, out-of home-consumption now accounts for a significant and growing proportion of European food intake, simultaneously, food consumption is increasingly furnished with symbolic meanings and hedonic experiences, and 'social food' has become ever more significant in combatting the perils of an individualized society (Bes-Rastrollo et al., 2010; Reisch et al., 2013; Vandevijvere, Lachat, Kolsteren, & Van Oyen, 2009).

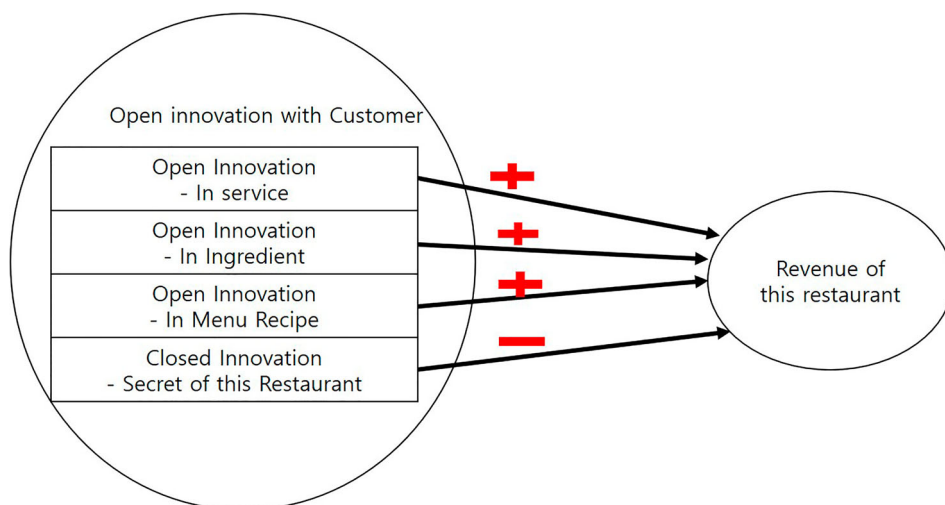


Figure 1. Hypothesis.

The success of Italy's food industry and many Italian restaurants can be traced back to the transfer of diverse and dynamic open innovations in food and agriculture industries from Greece to Italy, from the Roman empire to First World War (Parasecoli, 2014). In the service industry, including restaurants, market-based co-operation and use of market-based information is positively related to the novelty of the innovation introduced by the firm, whereas co-operation with competitors (co-opetition) is not positively related to the novelty of the innovation introduced by the firm (Mention, 2011). Moreover, in the service industry, the higher the firm's level of innovation success is, the more intensive its recourse to cooperation with universities, or customer-provider technological self-efficacy (Janeiro, Proença, & da Conceição Gonçalves, 2013; Suh & Kim, 2012). Furthermore, the restaurant industry normally does not use universities as innovation sources. At present, many new business models are motivated by culture and arts, which have deep relationships with restaurants or foods (Schiuma & Lerro, 2017). Even though many studies point out several potentially valuable sources of knowledge such as customers, suppliers, competitors, universities, etc., in the firm's environment, customers have been identified as a particularly promising source of knowledge, especially when their demand is a precursor of broader market segments (Sofka & Grimpe, 2010; Von Hippel, 2005). More commonly, firms, including restaurants, play a central role in creating and organizing innovation communities which are well organized with or without online platforms (West & Lakhani, 2008). We can enhance the customer experience through a services value web in which there is an iterative process that includes customer engagement, value co-creation, acquiring tacit knowledge, designing experience points and service offering (Chesbrough, 2011). The cultural aspects of food such as the aroma make us focus more on the customer experience (James, 2004).

In fact, small and medium enterprises (SMEs) engage in many open innovation practices primarily for market-related motives such as meeting the customer demands, or keeping up with competitors, and have increasingly adopted such practices recently,

without any differences between the manufacturing and service industries with the arrival of the fourth industrial revolution (Lee et al., 2018; Van de Vrande et al., 2009). In Chez Panisse, which was chosen as the best restaurant in the US by Gourmet magazine in 2001, as one of the top 50 restaurants in the world by Restaurant magazine from 2002 to 2008, and awarded the Michelin star which the restaurant lost in 2010, the hallmark of fine dining, throughout its history, Alice Waters, its founder and owner, and her team have built a local, and now, a global ecosystem using an ‘open innovation’ strategy with stakeholders such as suppliers, alumni chefs and staff, food writers and most customers (Chesbrough, Kim, & Agogino, 2014). In particular, they introduced the open kitchen concept, global top special menus and recipes, and invented menus for individual customers; for example ‘the menu for Celilia for her ninetieth birthday’, in addition to building relationships with suppliers and farmers, enhancing the relationships with customers through the chef alumni system and the Chez Panisse Foundation, and collaboration with food educators (Chesbrough et al., 2014). In the 1970s, Alice Waters established the open innovation ecosystem of Chez Panisse (Waters, 2009). All the points in the restaurant experience, such as (1) make a reservation; (2) arrive at the restaurant; (3) ask for a table; (4) go to the table; (5) receive the menu; (6) order drinks and food; (7) eat; (8) order the bill; (9) pay; (10) visit the restroom and (11) leave, are parts of formulating a service open innovation strategy (Chesbrough, 2010, p. 59). Service open innovation strategies for the food and beverage service business can be derived from the interaction with customers in terms of several values such as the appealing value (e.g. the restaurant image), reflective value (e.g. character of the space) or social responsibility value (e.g. the social message of visible materials) (Nam, Kim, & Carnie, 2018).

The objective of consumer-driven innovation is to create the right process or application to fulfil consumer needs and expectations because consumers themselves are a core part of innovation in the food and beverage industry (Kemp, 2013; Tüzünkan & Albayrak, 2015). In other words, the co-creation of value with consumers as an innovation strategy in the fast-paced or turbulent markets or industries, such as the food and beverage industry, is essential because co-operating with the so-called lead users has been described as an important source of innovation for firms (Martinez, 2013a; Von Hippel, 2005). Evidently, co-creation of innovation, according to an open innovation perspective, requires developing a common language, adopting different approaches with novice and expert customers, and establishing different channels for communication because the restaurant industry is characterized by high human touch; thus a deep level of human-to-human interaction is required (Desouza et al., 2008). Similar to long-term co-innovation partnerships, open innovation in the restaurant business considers the key factors in all phases such as initiation, partner selection, formation, implementation and evaluation (Tepic, Omta, Fortuin, & Saris, 2013). Moreover, similar to the global open innovation structure of Mars Inc., which can be diverse according to food, chocolate, drinks, petcare, gum and sugar, or the Kraft Heinz open innovation framework, open innovation strategies in the restaurant need to be diverse (Lazzarotti & Manzini, 2013a; Martinez, 2013c). Models of adoption of open innovation within the food and beverage or restaurant industries are diverse with many elements from suppliers of food ingredients, menus, and, recipes, to dynamic and specific service industry (Bigliardi & Galati, 2013; Garcia Martinez et al., 2014; Martinez, 2013b).

2.2. Research framework for the analysis of open innovation in the restaurant business

According to the literature on food and beverage, open innovation in restaurants occurs in food ingredients, menu recipes or restaurant services in diverse levels such as closed innovation by the restaurants themselves, open innovation by mainly co-operating with the customers or an open innovation platform, which is a type of an open innovation organization as shown in [Figure 2](#).

Food ingredient open innovation could be measured from the customer satisfaction or restaurant high ranking which is motivated by increasing the number of ingredients and the freshness of ingredients in our interviews. Second, menu recipe open innovation could be measured from the customer satisfaction or restaurant high ranking which is motivated by increasing the number of new menus themselves and the fascinating menus according to our interviews. Last, restaurant service open innovation could be measured from the customer satisfaction or restaurant high ranking which is motivated by customized and sophisticated service which were found during our interviews.

Although there are other important factors to consider such as the budgeting and control system or the management system of the mostly individual and family-owned restaurants, we focus on open innovation in restaurants in this paper (Ahrens & Chapman, 2004; Ozdemir & Caliskan, 2014).

Therefore, we analyse open innovation of target restaurants using this framework of food ingredients, menu recipes and restaurant services. By analysing the open innovation in restaurants, we shall answer the hypothesis and research questions.

2.3 Research methods and scope

We analyse the open innovation of target restaurants chosen as case studies through in-depth interviews using semi-structured questionnaires as shown in [Table 1](#), as well as participant observation. We interviewed mainly chiefs, or managing directors, as our questionnaire is designed for them to answer. Intensive interviewing is very useful for conceptual mapping of open innovation in restaurants (Hochschild, 2009), as one key condition for a good qualitative research is that the researcher should begin with a

Platform Open Innovation	POII Platform Open Innovation In Food Ingredient	POIR Platform Open Innovation In Menu Recipe	POIS Platform Open Innovation In Restaurant Service
Open Innovation	OII Open Innovation In Food Ingredient	OIR Open Innovation In Menu Recipe	OIS Open Innovation In Restaurant Service
Closed Innovation	CII Closed Innovation In Food Ingredient	CIR Closed Innovation In Menu Recipe	CIS Closed Innovation In Restaurant Service
	Food Ingredient	Menu Recipe	Restaurant Service

Figure 2. Research framework for the analysis of open innovation in the restaurant business.

Table 1. A semi-structured questionnaire for in-depth interviews with restaurateurs.

Number	Qualitative answer	Quantitative answer				
		Closed innovation		open innovation		
		1	2	3	4	5
1	How does your restaurant develop new menus and recipes? ()					
2	How does your restaurant develop new ingredients? ()					
3	How does your restaurant develop new services? ()					
4	Would you please introduce one example of innovation in your restaurant? ()					

single or simple focus or concept being explored such as the research framework of open innovation in restaurants shown in Figure 2 (Creswell & Poth, 2017, p. 48). A semi-structured questionnaire is a research method that mixes the interview and questionnaire methods (Harris & Brown, 2010), thus achieving a higher validity than the unstructured approach (Joffe, 1992). In addition, we used participant observation to explore the open innovation realities of restaurants (Clark, Holland, Katz, & Peace, 2009; Nelson & Wright, 1995).

We stayed at the restaurants for 1–2 h as customers to conduct participant observation of these restaurants before the interviews. Sometimes during these participant observations, we asked the customers, chefs or service managers of the restaurant using our semi-structured questionnaire.

We selected restaurants that are evaluated as very successful by customers and themselves at their respective regions. Then, we selected three different groups of restaurants which have more than two times more customers compared to the neighbourhood's similar size restaurants. First, we selected four restaurants in Naples, Sorrento and Capri in Italy. Second, we selected one South Korean sushi restaurant, the Gampo sushi restaurant, among 12 sushi restaurants at Gampo sushi restaurants town in Gyeongju, South Korea. Third, we selected one North Korean restaurant, the Pyongyang traditional cold noodle restaurant in Phnom Penh, Cambodia among four North Korea restaurants in the city.

3. Open innovation in Naples restaurants

First, we interviewed the first chef, Gaetano Boatelli, at Ristorante Barbarossa (A) at Capri from 2 to 4 pm on 26th October 2018. New menus or recipes are being developed to meet the diverse customer demands from all over the world all the year. Thus, there is a moderate level of open innovation in menus and recipes (OIR). Additionally, all ingredients such as sea food, fruits and so on, are changed every season according to the production from the Capri Island and other areas near Naples and the requirements of customers, thus demonstrating a high level of open innovation in food ingredients at this restaurant. The table carton in this restaurant is changed whenever a new customer takes a seat, with employees checking several times the customer satisfaction level with food when serving it. Then the managing director is given the feedback about the customers' opinions directly. The employees change the service contents nearly every day according to the customers' requirements; for example, decoration of the tables, serving of breed, etc. The chef reported that they are trying to meet the customers' demands at the top global levels at every moment. Therefore, the restaurant has a

high level of open innovation in service (OIS) through the intimate interaction with customers as shown in Figure 3.

Second, we interviewed the chef, Fabio Cirillo at Hotel Elisabetta restaurant (B) at Via Pozzano, 18, 80053 Castellammare di Stabia, Italy between 8 and 10 pm on 26th October 2018. He started his career as a cook when he was 24 years old, he was 38 at the time of interview, working 15 years in the kitchen. He worked as an executive chef of Gordon Ramsey restaurants at Forte village, then became the first chief at B. At the restaurant, every day the menus and recipes are changed. He tries to ask what the customer ate the day before when he receives order or before cooking. Then, he always inquires indirectly about the customer's taste of food of his customer. Through this process, he develops a very creative and specific menu or recipe, which meets the taste of the customer. During or after eating, he asks the customer about his/her satisfaction level with the food, and develops a new concrete menu or recipe, or changes the old menu to a new style. The open innovation level in recipe in B was also very high as shown in Figure 3, with most of its food ingredients coming from the farm, which is located behind the hotel with a distance of one acre. The chef of B takes the seasonal vegetables every day from the hotel farm. However, if customers require other ingredients such as carruba, which is not cultivated at the farm, he orders it from near farm, and tries to grow the ingredient at the hotel farm. Additionally, he makes red and white wine by himself according to the customers' demands from the hotel farm grapes, as he preserves the bottles at the hotel farm winery, and happily serves them when the customer order wine. He normally uses turkey, beef or seafood ingredients from near Naples farms or producers' union because he can trust the quality of food ingredients. When the chef receives an order from a customer in advance, he asks about the preference of the customer regarding the food ingredients, and then chooses them to meet the customer requirements. Chef, Fabio Cirillo, adopts a very high-level open innovation strategy in food ingredient by following the taste of customers, succeeding in diversifying the food ingredients. Customers of the Elizabethes hotel are not only from Sorrento or Naples in Italy but also from many countries such as Germany, France or Korea because of the fantastic view at which the tourist can see all the seaside of Sorrento and the very diverse food and food ingredients. In addition, this small restaurant can host diverse parties such as wedding parties, family parties, local community parties or academic meeting, collaborating with flower

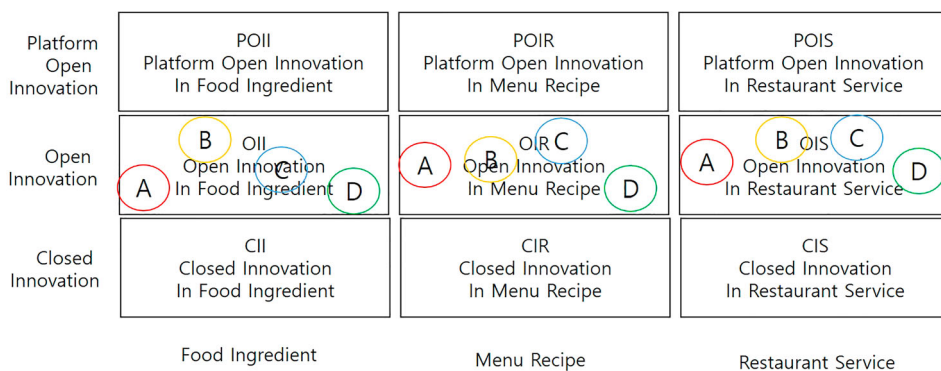


Figure 3. Locations of the four Italian restaurants in the open innovation ecosystem.

decoration companies, and actively restructuring tables. According to the direct or indirect requirements of customers, the table structure, flower decoration, food menu at the restaurant are changed every morning. We could have enjoyed open innovation in the restaurant service which was extremely dynamic and high as seen in [Figure 3](#).

Third, we interviewed Raffaele Di Maio (D), the manager of hotel Miramare restaurant (C) between 1 and 3 pm on 27th October 2018. C was trying to develop a new menu or recipe which could offer implications to customers in addition to meeting their individual requirements. By asking the customers directly about their satisfaction level with the served food, and providing a feedback to the chefs, the restaurant succeeded in several detail differentiations of the same menu item such as pasta, being a representative example of an extremely high open innovation in recipe as illustrated in [Figure 3](#). Additionally, the restaurant uses all ingredients from Naples because the chef grew up at Naples, knowing nearly all great food ingredients and understanding all the seasonal ingredients from Naples. Moreover, the chef tried to mix diverse ingredients from Naples to meet the new requirements of global customers, creating several inventions and promoting new open innovation in food in the restaurant. For example, the mixing of seafood and mustard resulted in a new innovative food with a positive feedback from customers. C has a high level of open innovation in ingredients due to the chef who was born in Naples as shown in [Figure 3](#). Through enjoying diverse exhibitions and painting galleries, in addition to meeting very strange and diverse requirements and comments from Italian and global customers, the creative and fantastic decorations of this restaurant were possible; for example, a sitting and sleeping chair, real-tree style decorations, a glass wall between the beach and the restaurant, or a beach chair made of wood at the veranda. Dishes, cups, table covers and food dishes were all constructed according to books, conferences and global customers' taste. The manager reported 'We do not provide water, but the service which provides the water while stimulating the emotion of customers'. Therefore, this restaurant implemented a very high open innovation strategy in restaurant service through diverse channels, not just customers.

Fourth, we interviewed the managing director of Le Bistort Bordeaux (D) at the downtown of the Naples between 6:30 and 8:30 pm on 27th October 2018. The restaurant employees have always paid attention to customers, surrounding environment and the changing trends of market. According to the manager, if we pay attention to the changing taste of customers, and the changing situation of market, we can make new menus and recipes successfully, for example Fili di neve, or Spaghetti with potatoes, garlic, oil and pepper. Even the restaurant in downtown also pursued the normal open innovation in recipe as demonstrated in [Figure 3](#). In this restaurant, the main food ingredients used were seasonal ingredients from Naples and near areas. The principle of food ingredients of D was 'The natural ingredients should be used at the nature'. For example, Raffaello, which is a red and small radish, could be eaten deliciously just with salt and olive. This downtown restaurant has tried to implement an open innovation strategy in food ingredients despite the poor location as shown in [Figure 3](#) by paying attention to the momentary requirements of customers at the restaurant. In addition, they have always tried to catch the related markets trends of dishes, tables, and covers to update and innovate the restaurant service, and to communicate with customers and people located on the value-chain to achieve a high level of open innovation in restaurant service.

As shown in Figure 3, even though there were differences among the restaurants, all successful restaurants of Italy adopted joint open innovation strategies in ingredients, recipes and service. The successful restaurants in Naples, Italy, showed representative methods and examples of open innovation in food ingredients, menu recipes, and restaurant service, which are listed in Appendix 1 according to our participant observation.

4. Open innovation in the Gampo sushi restaurant in Gyeongju, South Korea

We visited this restaurant seven times between January 2013 and December 2014, finding the special open innovation platform. Additionally, we conducted participant observation at the restaurant and interviewed Hejin Park, the managing director and president of this restaurant four times on 9th November 2018, 4th, 5th and 12th January 2019.

The Gampo sushi restaurant has more than five times more customers than the other 12 sushi restaurants in the same region. The characteristic factor of this restaurant is the open innovation platform structure of ingredients as shown in Figure 4. In the case of the main dish, sushi, the restaurant provides diverse ingredients of sushi in three steps. First, it provides six ingredients such as Semiyuk, Trunk of Sea Tangle, Fermented Kimchi, Gori-ragi, GochuJangachi and Toasted Mackerel pike which are obtained from areas near the restaurant with two base food ingredients, i.e. laver and lettuce. At this step, customer enjoys diverse sushi, i.e. $3 \text{ (Laver, Laver + Lettuce, Lettuce)} \times 2^6 = 192$ ways. At the second step, the customer can enjoy more diverse ways, namely, $192 \text{ ways} \times 3 \text{ (Vegetables Mix, Raw Fish and Vegetables mix with raw fish)}$. At the third step, the customer can enjoy diverse sushi recipes. All ingredients at the first step are obtained from seasonal ingredients from near locations and could be changed according to the customers' requirements. The second step ingredients are also changed according to the available seafood and vegetables near the location, in addition to the customers' special requirements. Moreover, the subcomponents of the rice with vinegar recipe at the third step can be changed according to the customer requirements.

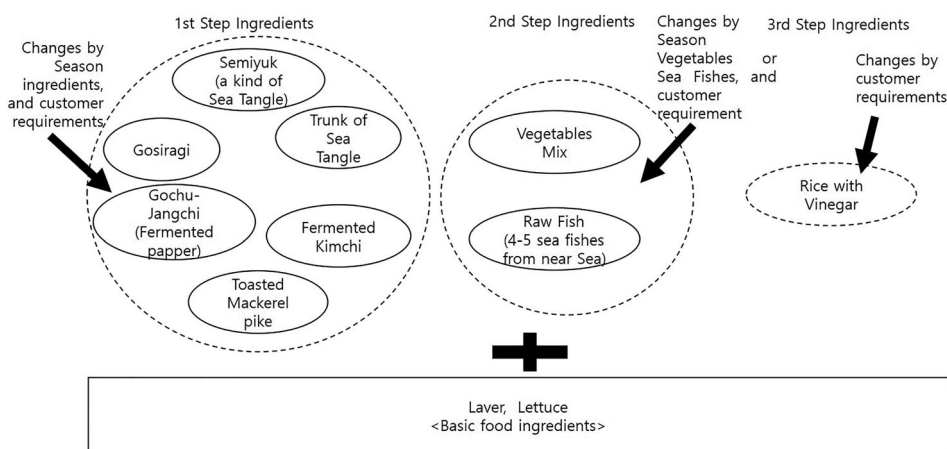


Figure 4. The open innovation platform structure of ingredients in Gampo sushi restaurant.

The open innovation platform of ingredients in the Gampo sushi restaurant gave chances for the restaurant to sell ingredients like laver, Semiyuk, trunk of sea tangle, salted and fermented fish, seafood and other products, in addition to the selling of other side-dish ingredients such as sweet rice drink, braised sole, salted seafood, as shown in [Appendix 2](#). At present, the portions of selling these ingredients are rapidly increasing. To summarize, the Gampo restaurant established an open innovation platform of ingredients and developed steps to sell ingredients separate from sushi, which is the main dish of this restaurant, as illustrated in [Figure 5](#) and [Appendix 2](#).

The first chef of this restaurant was the mother of its president, while another chef is the president of the restaurant, HaeJin Park, with the last chef being Ahn who has worked at Korean Sushi restaurants for a long time. All menus and recipes were developed by the president and her mother. In addition, this restaurant developed new menus such as Junbok-Juk or roasted rockfish. However, it does not have a feedback system from customer to chef through the serving manager; thus, the menus and recipes of the Gampo sushi restaurant are almost a closed innovation ([Figure 5](#)).

The Gampo restaurant communicates in three phases when selling sushi to each customer group by introducing the method of first-step platforms, second-step platforms and third-step platform. By communicating with customers during the serving process, this restaurant receives new ideas about ingredients such as the ingredients physical platforms or changing of ingredients. Furthermore, during the serving process, they set up a sleeping accommodation system to meet the requirements of customers who want to spend the night at Gampo, then eat the next morning at the restaurant. Moreover, during the serving, the restaurant sends the packaged ingredients to the customers' houses through an express distribution system so that customers can receive them when they are back home. Following this process, the Gampo sushi restaurant implements an open innovation strategy in service ([Figure 5](#)).

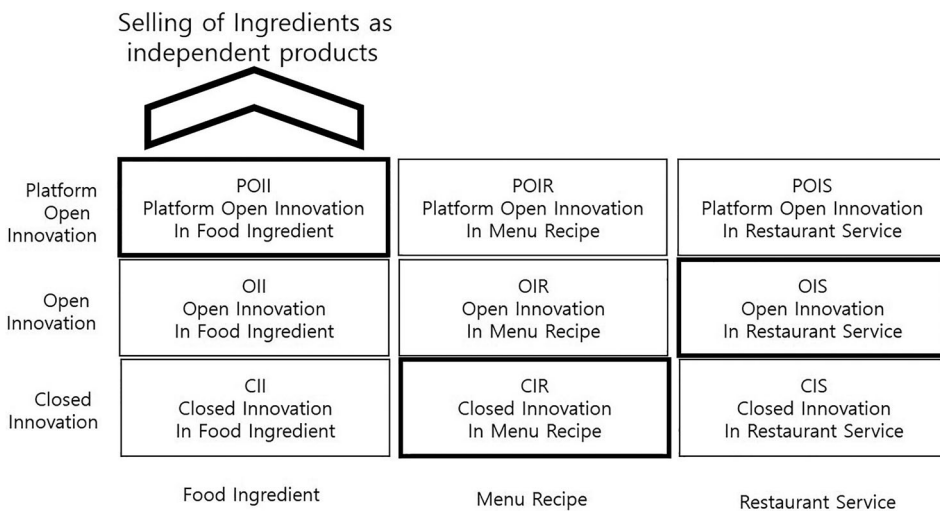


Figure 5. The open innovation ecosystem of the Gampo sushi restaurant.

The Gampo restaurant has established an open innovation platform for food ingredients, promoting the selling of packaged ingredients, since some customers who used the platform want to experience it at their homes by buying some ingredients.

Therefore, the closed innovation in this restaurant is covered by the open innovation in service and its feedback to the open innovation platform of ingredients. In addition, the closed innovation in the menus and recipes in this restaurant because of the veteran chefs of seafood motivate the creation of additional menus for customers who do not enjoy seafood sushi.

5. Open innovation in the North Korean Pyongyang traditional cold noodle restaurant in Phnom Penh, Cambodia

We conducted participant observation at the Pyongyang traditional cold noodle restaurant in Phnom Penh, Cambodia on 11th, 14th, 18th and 21st December 2018 in addition to interviewing employees at the restaurant.

First, we investigated its open innovation platform of performances which have been its competitive advantages compared to other North Korean, Chinese, Western, South Korean restaurants in Phnom Penh. In the restaurant, there are 14 serving employees who serve and do performance simultaneously. The restaurant has 18 performance modules, which are composed of 6 dancing modules, 8 musical instrument-playing modules and 4 singing modules. Among the 18 modules, the restaurant puts on 11 performances which are new combinations of the original 18 modules as illustrated in Figure 6. For example, one performance on 18th December 2018 consisted of 3 singing and dancing with 6 musical instrument-playing modules. The performing employees receive feedback from customers during serving such as a new performance combination requirement or a new song which is popular now in the US and China. The 14 performing

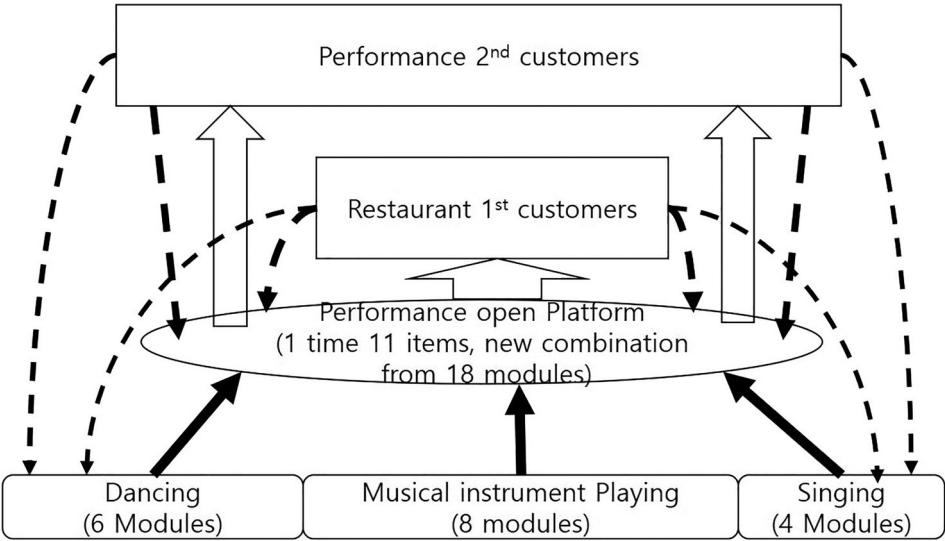


Figure 6. Open innovation platform for performance service in the Pyongyang traditional cold needle restaurant.

employees update the 18 modules according to the feedback from customers and the inner opinions of 3 module groups. In addition, they perform the 11 new performances which are new combinations of the original 18 modules based on the customer composition of the day, or the customer feedback the day before.

The performance in this restaurant is executed in the evening for nearly a maximum of 1 h. Therefore, the dinner service in this restaurant looks like a type of performance because all serving employees are simultaneously doing performance and serving, changing their clothes between three to four times.

The diverse performance contents are serviced to the restaurant customers first, then to the performance-specialized customers at the performance-oriented rooms after the main performance (Figure 7). Thus the open innovation platform of service is being sold independently from the main customers in this restaurant whose situation is similar to the Gampo restaurant.

Second, the menus or recipes of this restaurant are changed, at least, according to seasons, with the maximum being every month according to the customers' requirements such as a new menu of North Korean food for South Korean customers or a new menu of Chinese food for Chinese customers (Figure 7). Hence, this restaurant changes, adds and deletes new menus dramatically according to the fluctuating requirements from customers. At present, the restaurant is adding new menus and recipes to meet the requirements from increasing Cambodian customers. In preparing alcoholic beverages, this restaurant tries to meet the changing requirements of customers; for example it prepares a wine type which was popular in South Korea when many South Korean customers came. In addition, they prepare South Korean traditional alcoholic beverages, such as Makkolli, raw rice wine, which has Seoul mark. Thus the Pyongyang traditional cold noodle restaurant implements a high open innovation strategy in menus and recipes.

Third, regarding the food ingredients, the restaurant adopts a closed innovation strategy, by which it obtains food ingredients from Cambodian providers without other requirements except receiving powdered red pepper directly from North Korea. Although

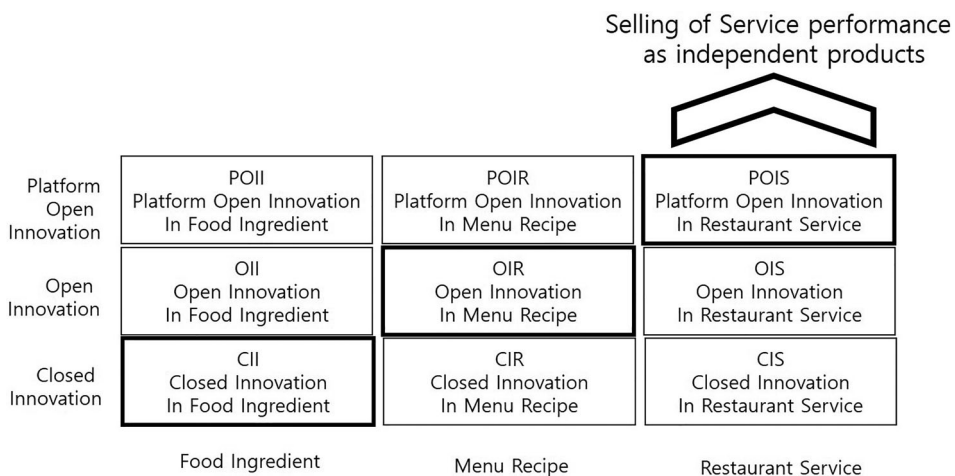


Figure 7. The open innovation ecosystem of the Pyongyang traditional cold noodle restaurant.

many food ingredients were imported from North Korea until 5–6 years ago, currently, most of the food ingredients come from fixed Cambodian providers (Figure 7).

As shown in Figure 7, the Pyongyang traditional cold noodle restaurant in Phnom Penh has established an open innovation platform for service that has additional independent customers. Additionally, although the restaurant implements an open innovation in menus and recipes, it adopts closed innovation in food ingredients now.

6. Discussion and conclusion

6.1. Discussion: causal restaurant business model; two steps of open innovation

There are two steps in open innovation (OI) in the restaurant business model (BM) as illustrated in Figure 8. We can find two steps of OI, such as OI itself and open innovation platform (OIP), from the successful cases of restaurant businesses. The first step is open innovation itself, as it creates ‘customer and market information’ and promotes communications with customers, suppliers and other collaborators. These communications give ‘customer and market information’, which reinforces ingredient, recipe and service creation through the reinforcing loop of (R-OI) as follows: open innovation → customer and market information → ingredient, recipe and service creation → customer value creation → open innovation.

The second and more advanced step is the open innovation platform, which creates ‘combinative innovation and customer self-creation’. The platform enables the combination creation, and from the combinations, many innovations can occur. Additionally,

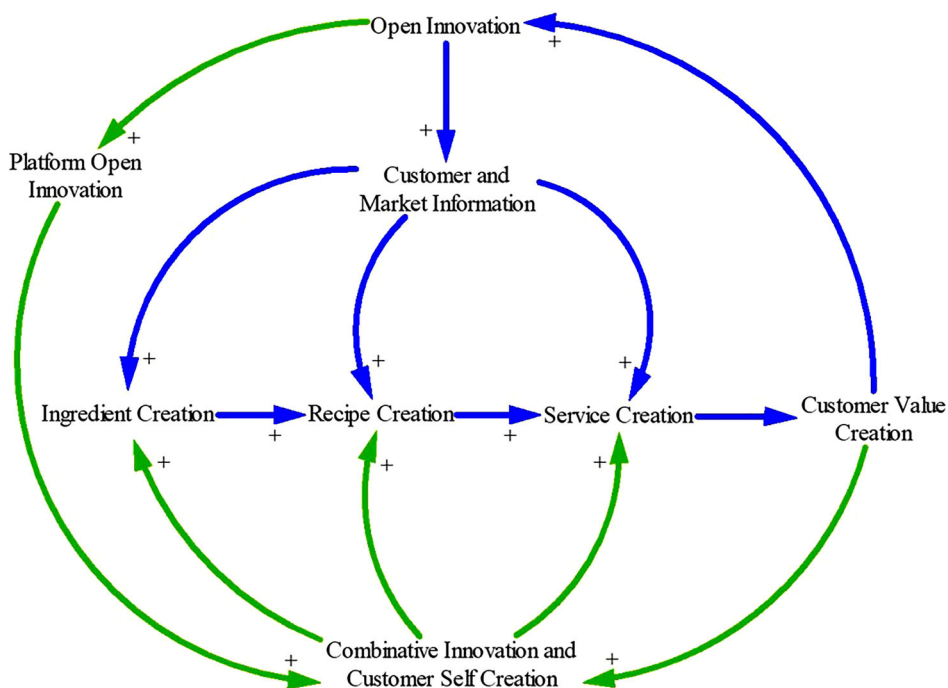


Figure 8. Causal loop model of restaurant open innovation.

customers can make their own trials and creations themselves through the platform. This combinative innovation and customer self-creation motivate the second-step customers such as in the independent ingredient selling at the Gampo restaurant, or the performance second-step customers at the Pyongyang restaurant. The open innovation platform of recipes or menus produces additional revenue by independent products or services such as opening a cooking school, publishing a food or restaurant journal, or selling menus or other sources in successful big restaurants such as Chez Panisse; however, we did not find out the evidence by ourselves (Chesbrough et al., 2014). ‘combinative innovation and customer self-creation’ reinforce ingredient, recipe and service creation through the reinforcing loop of (R-POI) as follows: open innovation → open innovation platform → combinative innovation and customer self-creation → ingredient, recipe and service creation → customer value creation → open innovation.

Therefore, the open innovation platform will be the new cash cow of restaurants in addition to providing the restaurants with competitive advantages compared to closed innovation or open innovation oriented restaurants.

6.2. Implications

This study investigates the open innovation ecosystem of successful restaurants based on the case studies of four successful restaurants in Naples, Italy, one South Korean sushi restaurant in Gyungju, South Korea, and one North Korean restaurant in Phnom Penh, Cambodia, using a research framework consisting of three components, namely, food ingredients, menus and recipes, and service.

According to these case studies, first, open innovation in restaurants is essential to the sustainable development of any restaurant.

Second, closed innovation in any component of the open innovation ecosystem should be covered by open innovation or open innovation platform with respect to other components to attract more customers than the other restaurants in the same region.

Third, an open innovation platform of ingredients, menus and recipes, and service can produce additional independent products or customer groups. Therefore, it should be established, developed, and maintained.

Fourth, this paper contributes to the current literature, since it deepens the streams of research on closed innovation and open innovation platform, which are understudied. Additionally, the overlapping approaches to open innovation, open innovation platform and closed innovation allow us to have a more comprehensive view on the concept of restaurant innovation.

Fifth, this paper also constitutes an important base for managerial implications. Evidently, the application of this precise theoretical framework in the restaurant industry can help restaurants create both economic value and customer value by implementing an open innovation strategy within their ecosystems.

6.3. Future research

This study focuses on successful restaurants; however, we need to further investigate failure and success cases in the open innovation ecosystem simultaneously to find out additional factors that affect the ecosystem.

In addition, we need to study the differences between the open innovation ecosystems of restaurants based on the cultural differences. The food industry, including restaurants, is treated as a culture-sensitive industry (Han & Ryu, 2009; Ryu, Han, & Jang, 2010). Thus the differences between open innovation ecosystems according to different cultures in Europe, Asia, the Americas, Africa, etc., should be further studied.

Since the novelty of this paper is exploring the perspective of chefs and managers, future research can further study other human resources at the organizational level.

Last, open innovation platform of menus or recipes in small restaurants could also be an additional research topic. Futures studies can explore the possibility of additional independent products or services from open innovation platforms in menus and services of small restaurants.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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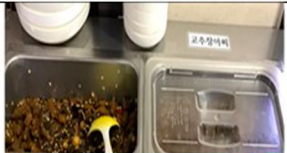





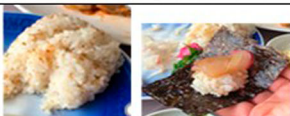
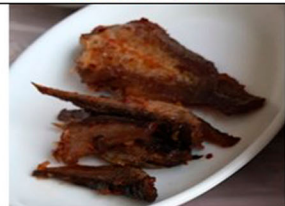

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Appendices

Appendix 1. Open innovation ecosystem realities of restaurants in Italy.

Category of open innovation	Contents
Ingredients	<ul style="list-style-type: none"> Use seasonal food ingredients Prepare food ingredients in advance according to the food orders according to the special requirements from customers Establish restaurant farms and grow food ingredients, which can be used at the restaurant Harvest food ingredients on the morning of the order day by the chef himself/herself if possible Form collaborative networks with trustable firms like production unions when buying food ingredients
Menu or recipe	<ul style="list-style-type: none"> Ask the customer what he or she ate the day before when taking the order Ask two or more times if they are satisfied with the food or if they need an additional requirement, and give the feedback directly to the chef Offer special recipes according to customers from the same menu such as different types of pasta noodles Do not hesitate to prepare a new menu, if the customer orders in advance
Service	<ul style="list-style-type: none"> Collaborate with the florists or flower shops to prepare for special events at the restaurant Do not hesitate to change the tables' structure every morning according to special customers of the day Keep up with international trends in furniture, paintings, colours, ceramic wares by attending international conferences, global art museum exhibitions and reading global journals or recent related books Change the tablecloth according to every customer group Keep in mind that the service is an essential part of the restaurant experience Ensure that the service jobs in the restaurant are full-time or lead to a chef career course

Appendix 2. Ingredients used in the Gampo sushi restaurant.

Basic food ingredients		
<div>Laver</div> 	<div>Lettuce</div> 	
1st Step Ingredients		
<div>Semiyuk</div> 	<div>Gosiragi</div> 	<div>Gochu- Jangchi</div> 
<div>Toasted Mackerel pike</div> 	<div>Fermented Kimchi</div> 	<div>Trunk of Sea Tangle</div> 
2nd Step Ingredients		3rd Step Ingredients
<div>Vegetables Mix</div> 	<div>Raw Fish</div> 	<div>Rice with Vinegar(&Example)</div> 
Independent Selling Ingredients(Including the above three with red box lines)		
<div>Braised Sole</div> 	<div>Salted Seafood</div> 	<div>Sikhye(Sweet rice runch)</div> 