APPLYING THE PRINCIPLES OF SEPARATION IN DEVELOPMENT OF THE RESTAURANT BUSINESS

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Abstract

Purpose – The paper aims to contribute to the knowledge of the problem-solution and the creation of a successful idea of the restaurant business development (in particular, through applying of the separation principles).
Methodology/Design/Approach – A case study is conducted as a research strategy to test propositions expressing a necessary condition to investigate the possibility of applying the separation principles to solve a problem. The restaurant industry is defined as the area to which the theory is applied and from which cases are selected for testing.
Findings – The application of separation principles as a methodological tool contributes to finding an effective solution to problems of the restaurant business development.
Originality of the research – This paper represents the analysis of how some restaurateurs have overcome the COVID-pandemic problems. A model of the invention process is proposed, which helps practitioners to find an effective solution for the development of the restaurant business under crisis conditions and to implement the successful idea in time. The results of the study show the possibility of improving the created idea and its development. Two ways of implementing this process were identified: alternate application of the principles of separation and unification of different parameters.
Keywords Principles of separation, TRIZ methodology, creative idea generation, restaurant resumption, crisis

Original scientific paper
Received 21 November 2022
Revised 16 February 2023
28 April 2023
Accepted 5 May 2023
https://doi.org/10.20867/thm.29.3.4

INTRODUCTION

The safety of guests and staff is the first restaurateurs' priority nowadays. The COVID-lockdown limitation is lifted up. However, the number of COVID cases still rises in some countries (e.g., in China, November 2022). Scientists also consider safety and security as a main factor that influence tourists' choice of a destination and particular service provider currently (Kusumah et al., 2022; Rahman et al., 2022; Seyitoglu & Ivanov, 2021). Governments worldwide update the advice about the restaurant activity due to new COVID-cases, new information about the coronavirus influence on people or, at all, new diseases. Since 2020, one of such advices is to keep a "social distance" and place guests 2 m apart or separate them by a barrier. In 2020, it looked like a problem that cannot be solved, especially for small restaurant establishments (bars, pubs, etc.). Nevertheless, restaurateurs have overcome this problem. Currently, there are plenty of solutions that represent different approaches to make the decisions (French, 2021; Global Time, 2022; Liu & Yang, 2022; Ong, 2020). Most of them show creative ideas: tables taken up by mannequins dressed in 1940's era attire; putting plush animals at the tables, asking the guests to put on hats with "foam noodles", etc. Plenty of creative ideas like these had been implemented in hospitality during the COVID lockdowns 2020-2021. However, around the world, restaurants were closed for several months in 2020. Some of them were temporary closed, but a significant group of restaurants was closed permanently due to colossal losses. The US National Restaurant Association considers this situation as a "free fall" in the restaurant industry (Sink, 2020). Scientists consider several factors that caused such a "fall". As one of them, they discuss the lack of implementation of the decision, which was caused by a gap in the investigative practice for decision-making. For instance, Chang & Wu (2021, p.2) indicate that there are no "correct methods of decision-making, efficient and quick" in this economic sub-sector. Thus, it is crucial to examine how restaurateurs overcame the COVID-pandemic problem not to marvel at their ability to create ideas but to investigate the methodological tools that can be applied to design solutions of the restaurant business development under crisis conditions. This knowledge could be used by the restaurateurs to act effectively in future.

Hence, this paper aims to contribute to the knowledge of the problem-solution and the creation of a successful idea of the restaurant business development (in particular, through applying of the separation principles). Specifically, this paper examines the following propositions P1-P4:

P1. A successful idea for restaurant development could be created by applying the principle of separation in space.
P2. A successful idea for restaurant development could be created by applying the principle of separation in time.
P3. A successful idea for restaurant development could be created by applying the principle of separation between part and whole.
P4. A successful idea for restaurant development could be created by applying the principle of separation upon condition.

This paper suggests contribution to a solution to a problem of the hospitality business development under crisis conditions. In the first section of the literature review, the practitioners' problem and the knowledge needs are defined. In the first study step, based on the result of this part of the literature review the problem contradiction in the restaurant business is ascertained. In the second section of literature review, the principles of separation are established as methodological tools that should help restaurateurs to solve the problem contradiction. In the second study step, the possibility to apply these tools to solve the "social distance" problems in restaurants is proved by the cases of the real-life practice. Finally, based on the study result, the Model of the inventive process is proposed that should help the practitioners to design a strategy of their business development and implement the successful idea in time.

1. LITERATURE REVIEW

1.1. Definition of the practitioners' problem and the knowledge needs

The analysis of the restaurants' activity points out that the implementation of the disease protection solutions in the development strategy is currently becoming a norm. Governments around the world initiated a multitude of measures and protective solutions to support hospitality. During the COVID period 2020-2022, the restaurateurs also realized a lot of solutions to adapt their business to the problems caused by the coronavirus impact (Ayyildiz et al., 2022; Gaur et al., 2021; Kusumah et al., 2022; Song et al., 2022). Some researchers consider the possibility to implement new technologies (artificial intelligence, robots, information and communication technologies, etc.) (Belanche et al., 2020; Fusté-Forné & Jamal, 2020; Kusumah et al., 2022; Perić, & Vitezić, 2021). The coronavirus outbreak had speeded up the process of replacing human by robots but analysts hesitate whether the rise in a number of robots is for better or for worse (Fusté-Forné & Ivanov, 2021; Zeng et al., 2020). The literature review shows a high discussion about an effectiveness of total changing from human staff to modern technologies in hospitality (Ayyildiz et al., 2022; Gaur et al., 2021; Kusumah et al., 2022). Nevertheless, scientists predict that robots will constitute only around 25% on the workforce (Abou-Shouk et al., 2022). Thus, the guests and staff safety cannot be ensured by only one solution nowadays. The COVID-period 2020-2022 has shown that it is not easy to integrate new technologies in the restaurant business. Therefore, researchers offer a dual service provision: some segments prefer the human interactions and human touch, and others – the basic services provided by autonomous systems (Belanche et al., 2020).

Hence, the practitioners try to create different types of solutions to develop their business. For example, to maintain social distance, the restaurateurs use plexiglass pods for outdoor dining (Ong, 2020), implement takeaway services or restaurant delivery services (Liu & Yang, 2022), etc. On the other hand, a number of new problems also arise when implementing these solutions. For instance, the takeaway service does not fit all types of the restaurants. In particular, during pandemic lockdowns, "hotpot restaurants" like Beijing's Pengran Siji Catering usually wait for the guests to return to dine-in services because soupy food is not a convenient takeout option (Liu & Yang, 2022). Nowadays, there are a lot of the solutions to the COVID-problems in hospitality. Nevertheless, the latest research results show that some of these solutions are insufficient to protect customers and staff. Therefore, the restaurateurs are still considering how they can work and assure their guests' and staff's safety. The designers also do not stop elaborating on new protective equipment for restaurants like the social dividers (screens, barriers, etc.) because the restaurateurs point out the higher requests. For instance, some restaurateurs need flexible zoning, others the cheaper equipment, etc. Customers also need more "social" features of distancing. Therefore, the designers must continuously improve their solutions. Analysis of practitioners' problems also shows a lack of "idea quality". The solutions often are "not conducive to an aesthetically pleasing environment that will let customers experience atmosphere and ambiance". Due to complaints like this, they consider not only disease protection and quality but the style and the ability to personalise the design. For instance, the designers began to suggest for restaurateurs new, more creative social dividers available to suit different spaces and budgets (Space Plus, 2022). Currently, many solutions allow to provide activity at a restaurant with confidence and style without compromising design. On the other hand, it should be taken into account that not all solutions (which are nowadays created) fit every restaurant. For instance, the "luxury" solutions do not fit all restaurant establishments. One such idea is the "living verdant wall". It divides perfect space and looks natural and lush inside or outside. But the implementation of "living verdant wall" idea needs a budget and often involves maintenance by staff in the future. It should be also taken into account that restaurants usually have an economic problem in crisis times (Hall et al., 2020). The restaurateurs often see only the achieved goals of their competitors and do not see the way and tools they use to succeed. However, it is essential to understand how others achieve their success and use these practical tools to develop business. Thus, there is a need to study the experience of restaurateurs in solving the problem of business development in crisis conditions using examples of social distancing implemented during the COVID pandemic.

The result of the literature review gives the background to formulate the restaurateurs' problem (caused by the measure of the COVID-19 pandemic social distance) as a radical contradiction: the restaurant visitors must have human-to-human contact during the service process and be apart from staff and other guests. Many real-life cases approve the possibility of overcoming this "insuperable hindrance". Therefore, there is a question about how some restaurateurs have overcome this problem and could the others use it this way. And moreover, there is the next question concerning if they could use this approach next time, under other crisis conditions.

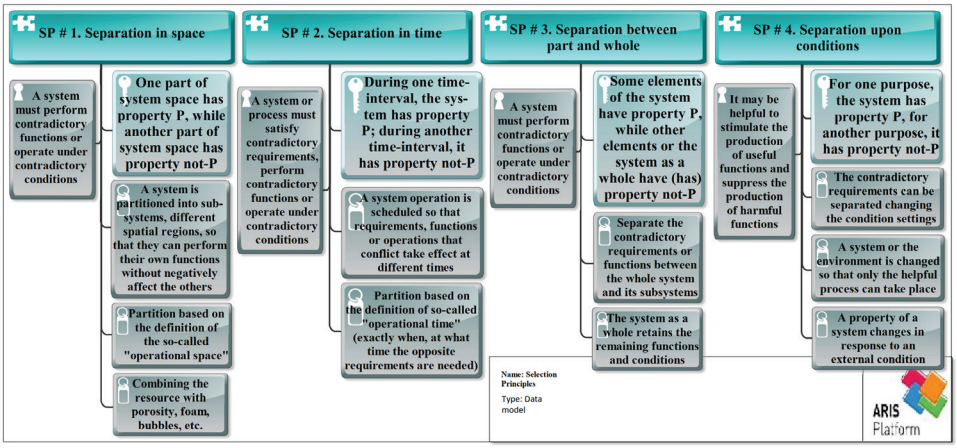
1.2. Theoretical background

1.2.1. An intervention to solve the restaurant development problem

The academic literature does not represent any deeply studied methodological tools that help restaurateurs to solve unexpected problems like total lockdowns during COVID-pandemic. On the other hand, numerous problem-solving methods are used in different sectors of the economy, including the service sector (Koziolek et al., 2018). Scientists use the Theory of Inventive Problem Solving to resolve complex problems effectively (Chechurin, 2016; Kutz, 2015; Koziolek et al., 2018). This Theory is better known by its acronym TRIZ because it was proposed and developed by a soviet engineer and inventor Genrich Altshuller from Central Asia (Chai et al., 2005; Justel et al., 2006; Wang et al., 2022). There is a lot of evidence that created by TRIZ ideas have been successfully implemented in the service sector (Chai et al., 2005; Nikulin et al., 2013). The TRIZ methodology is effectively used to solve the food industry problems (Koziolek et al., 2018). Scientists try to apply it to the restaurant domain (Chai et al., 2005; Nikulin et al., 2013). Chang & Wu (2021) study a possibility to apply TRIZ tools to decision-making for tourism recovery under the COVID-pandemic conditions. One of the key TRIZ tools is Separation Principles (Nikulin et al., 2013; Mao, 2008; Ouezgan et al., 2020). Some of the separation principles are used to solve the distance problem during the COVID-lockdowns in the related subsectors (e.g., separation in space in the transportation industry) (Chang & Wu, 2021). The academic literature review shows that the above-formulated restaurateurs' problem could be solved by using the TRIZ methodology, in particular, the separation principles. However, there is no study how the separation principles could be applied to solve the restaurateurs' problems caused by the COVID-19 pandemic or another crisis.

Currently, the academic literature shows the TRIZ methodology and their cross-domains transferability potential in detail (Chang & Wu, 2021; Chechurin, 2016; Hipple, 2005; Kutz, 2015; Koziolek et al., 2018). Therefore, this paper does not describe the TRIZ methods in detail but represents the study of the possibility to apply the 4 TRIZ separation principles to problem solution of the restaurant business development. The academic literature mostly shows how the contradiction could be overcome by dealing with one of the four TRIZ separation principles (the 4 SPs) (Chechurin, 2016; Kutz, 2015; Koziolek et al., 2018; Mao, 2008; Ouezgan et al., 2020). Thus, the result of the academic literature review that covers the main definitions of the 4 separation principles is represented as the Data Model of Separation Principles (the SPs Data Model) (fig. 1). This SPs Data Model represents the information that provides an analysis of the distinction between the 4 SPs and explains how each of them could allow solving the restaurant problems. The definition of each separation principle considered in academic literature is represented as a "key element" in the SPs Data Model (fig. 1). A performance of a system is shown as "foreign keys." The main possibilities of its use are represented as "attributes" in the SPs Data Model. Thus, these attributes of the separation principle represent a set of ways to implement the decomposition of problem contradictions. Some scientists consider possibility of using other approaches to definition of separation principles or add the fifth separation principle (Ko et al., 2015; Lee, 2018). However, there is no thorough result of such research and thoroughly developed methodical tools. Thus, in an initial study the application of the main 4 SPs (or one of them) is reasonable. In exploring the theory, the aforementioned propositions P1-P4 were formulated.

Figure 1: **Data Model of Separation Principles**



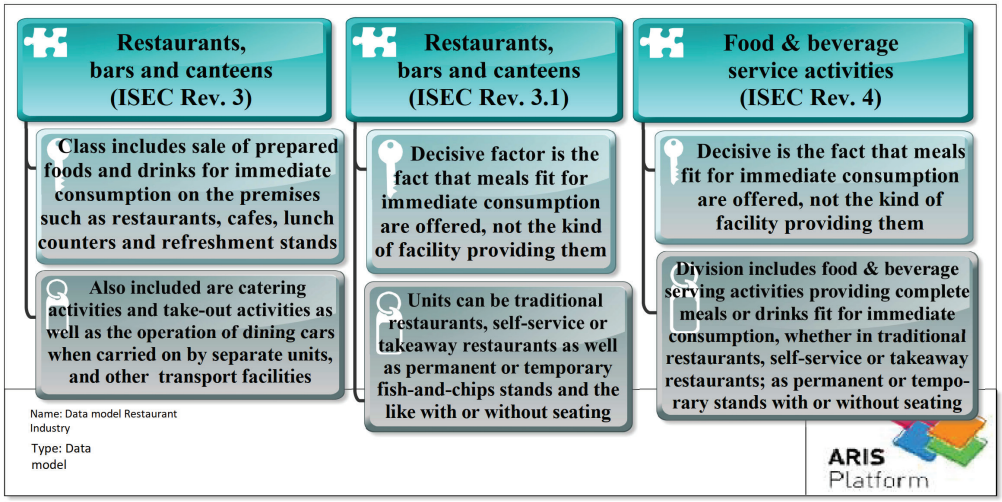
Source: prepared by the author, based on Chechurin, 2016; Hipple, 2005; Ko et al., 2015; Koziolek et al., 2018; Kutz, 2015; Lee, 2018; Mao, 2008; Nikulin et al., 2013; Ouezgan et al., 2020

1.2.2. The initial exploration of existing theory

The literature review shows that the TRIZ is often used in complex with other methods (Hipple, 2005; Wang et al., 2022). The efficiency of such combination points out a need of considering a possibility to apply the separation principles in complex with other methodological approaches. The classical approach of Drucker (1985, p. 57) shows an incongruity between the reality of an industry and the assumption about it as "a symptom of an opportunity to innovate". Scientist stresses that the incongruities are "qualitative rather than quantitative" and do not "manifest themselves in the figures or reports" (Drucker, 1985, p. 57).

Hence, executives cannot usually pay attention to it (Rohoza & Stolyarchuk, 2020). Thus, the incongruity or dissonance between the reality of a change in the restaurant industry and assumptions about it by restaurateurs have to be investigated. The first component (reality of a change in the restaurant industry) is reflected in a row of the versions of ISIC (in particular, Rev. 3 – Rev. 4) as a change in the structure of economic activities (ISIC, 1990 – ISIC, 2008). An overview of conceptual criteria of its definition is represented as the Data Model of a change in the types of the service activities in the restaurant industry (fig. 2). It should be stressed that, in ISIC Rev. 3 (1990), the decisive fact of definition of the unit belonging to the restaurant group is focused on "immediate consumption on the premises". In the current version of standard, "offered meals fit for immediate consumption, not the kind of facility providing them" is represented as decisive fact (ISIC, 2008). Thus, there is a significant change in the structure of economic activities in the restaurant industry (fig. 2). As a result, there is more opportunity to change the focus from facilities (where food and beverage are prepared or consumed) to service activities. The new focus gives an opportunity to cover a range of new services, especially, a variety of "take-away restaurant services" which are in high demand under the COVID-pandemic crisis conditions.

Figure 2: **Data Model of a change in the types of service activities in the restaurant industry**



Source: prepared by the author, based on ISIC, 1990 – ISIC, 2008

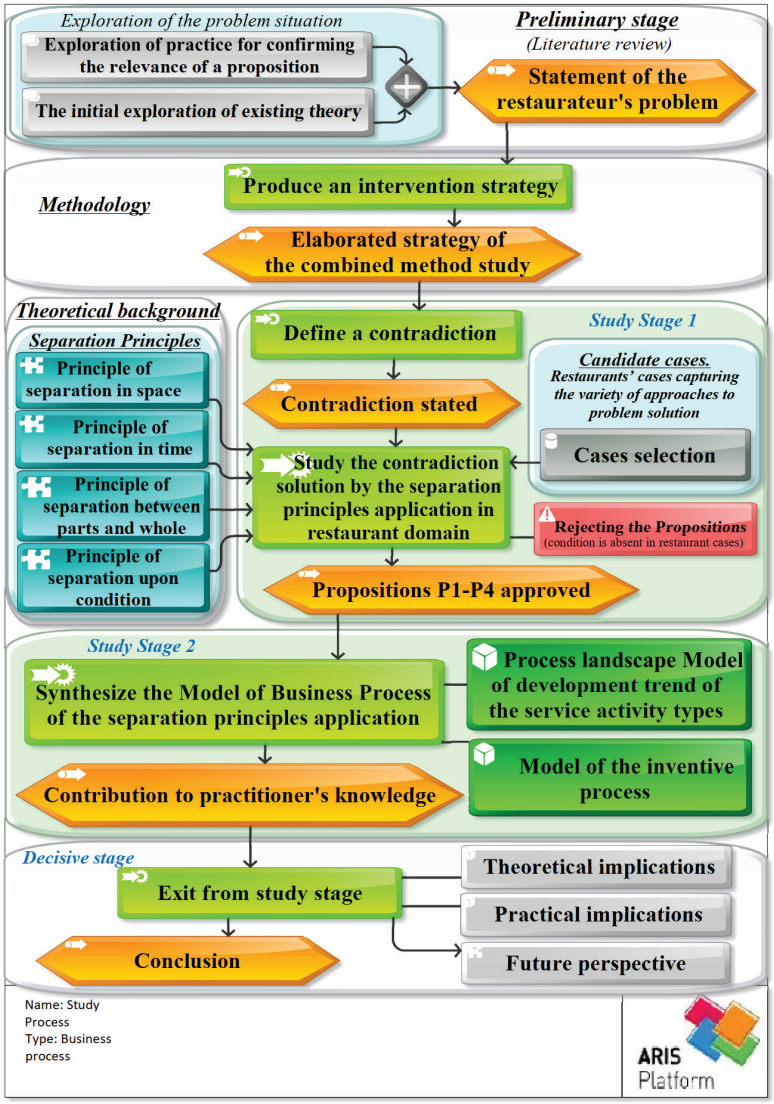
Second component in suggested by Drucker (1985) classical approach to see sources for opportunity (assumption about reality) could be accomplished by applying the TRIZ methodological tools to a problem solution of the restaurant business development. Scientists consider that TRIZ tools have a high potential for innovation (Justel et al., 2006). Lee (2018, p. 34) stresses that TRIZ is "the only technology able to overcome psychological inertia". It should be underlined that the TRIZ methodology provides possibility to generate two types of ideas: traditional (based on the designer's know-how) and innovative (which escape from the knowledge of the designer and therefore, break his psychological inertia) (Justel et al., 2006). Moreover, scientists consider not only the possibility of new idea generation, but also the idea evolution through joining of the obtained parameters (Justel et al., 2006). According to Mao (2008, p. 34) TRIZ "provides systematic approaches to formulate problems, analyze systems, generate innovative ideas, and forecast evolution trends based on the common solutions derived from intensive studies of previous inventions". Hence, the application of the separation principles as the TRIZ tool should provide possibility to overcome current problems through the assumption about the aforementioned change in the types of service activities in the restaurant industry (fig. 2). In addition, the result should provide a basis for a better understanding of the opportunities for the development of the restaurant business and the possibility of the evolution of the created idea.

2. METHODOLOGY

2.1. Study process

The conceptual model of this study is represented as the Model of the Study Process of the Separation Principles Application to the restaurateurs' problem solution (fig. 3). The study process is divided in two Study Stages. "Study Stage 1" provides the process of the propositions testing (P1-P4) by using the case study method, according to the Dul & Hak's approach (2007). The firm's strategy must be flexible (Dul & Hak, 2007). In this paper, as a type of this flexibility a practitioner's ability to create an effective idea is considered. Moreover, this idea has to appropriate not only to the restaurant's possibility to implement it but to design it in a short period to achieve results at the right moment. Therefore, in order for practitioners to use the knowledge effectively in his/her actual situation, the result of this study is represented as the Model of the inventive process and "Study Stage 2" provides for its synthesizing. Based on the results of literature review (section 1.2.2 the initial exploration of existing theory), restaurateurs must see the discrepancy between reality and assumptions about it to create an effective idea. In order to facilitate a vision of this opportunity by designers, the Process landscape Model of the development trend of the service activity types is also elaborated. A possibility to involve this last model in inventive process is shown in "Study Stage 2".

Figure 3: **Model of the study process of the separation principles application to the restaurateurs' problem solution**



Source: prepared by the author

2.2. Case study methodology application

The case study research strategy for testing propositions that express a necessary condition is used to prove propositions P1-P4. The research in "Study Stage 1" is based on the conceptual model of "the independent concept A as the cause of the dependent concept B, which is the effect" (Dul & Hak, 2007, p. 36). Considering this concept, study stage 1 (fig. 3) of this research is designed as a case study in which "a necessary condition with a case study" is realised to test the propositions P1-P4. To achieve this goal, guidance is taken into account: practice-oriented research is the collection and evaluation of observed facts "by means of which it is proved that 'success' has occurred as a result of an intervention" (Dul & Hak, 2007, p. 31). Therefore, if the propositions are proven to be accurate, the restaurant can successfully restart activity by implementing an idea created using one of the 4 separation principles. The criterion for success is a conclusion that implemented idea allows a restaurant to provide activity under COVID-pandemic conditions.

Based on the abovementioned concept, the necessary condition is expressed as "B exists only if A exists" (Dul & Hak, 2007, p. 91). To test the necessary condition, the case must have effect B present for the case to be accepted for testing. The restaurant industry is defined as the domain to which the theory is applied. In this domain, a set of cases is searched as candidate cases. This selection of the candidate case is essentially an arbitrary choice (Dul & Hak, 2007, p. 93). The "most likely" case is selected from the candidate cases. This case is verified whether it is an instance of the object of study in which the proposition is indeed present. If the case cannot be used for testing the proposition, another case is selected (Dul & Hak, 2007). The propositions are tested by using particular cases regarding realising the idea of the social distance under the COVID-pandemic conditions. In this paper, the subgroups of cases with the same value of B are defined to study the possibility of designing various of the creative ideas. The cases with the same value of concept B are grouped based on the theoretical background

(fig. 1). Therefore, a parallel case study for each proposition is realised. Restaurant cases were selected both from specialized literature (in particular, professional and trade literature), and from general mass media (newspapers and television news), as well as from restaurant websites, according to Dul & Hak (2007). The issues that the practitioners describe as "yes, it is solved" are considered to identify the successful application of the knowledge to idea creation.

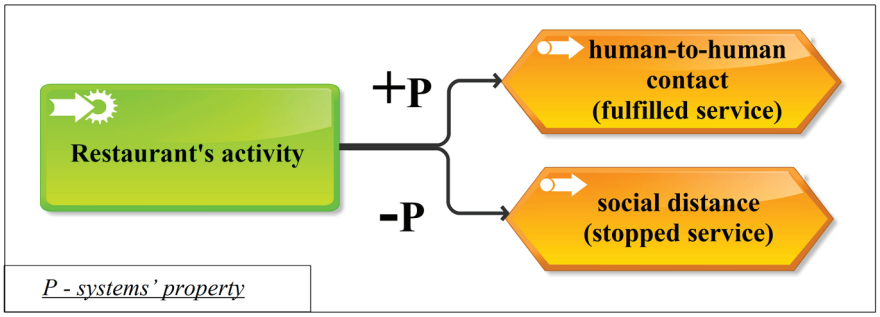
3. RESEARCH RESULTS

3.1. Study Stage 1. The study of the restaurants' cases

3.1.1. The ascertainment of the problem contradiction in the restaurant business

The analyse of the activity in the restaurant industry during the COVID-19 pandemic period 2020-2022 has revealed the contradictive situation as follows: if a guest is serviced in a restaurant, there is a social contact (the guest could be ill). If there is no person-to-person contact, the guest cannot get sick, but the restaurant cannot carry out its activities. Thus, the COVID-19 pandemic caused the paradox: the restaurant's guests should have contact (with staff and/or other guests) and have a social distance simultaneously. This main paradox in the restaurant industry could be represented as human-to-human contact vs. social distance (fig. 4).

Figure 4: **Problem contradiction in the restaurant business**



Source: prepared by the author

Therefore, a solution to the restaurant's problem consists of the solution to the contradiction. "Social distance" (whether between restaurant guests or restaurant staff) is established as the contradictory element. As established in the theoretical background, the separation principles applying provides for separating the contradictory properties (+P/-P) and, as a result, for this contradiction solution. The restaurant case studies that described current practice are analysed to find whether using the separation principles could lead the restaurateurs to solve the contradiction (fig. 4).

3.1.2. Problem resolution

3.1.2.1. The case studies of the solution of the problem contradiction in the restaurant domain by the principle of separation in space

At first glance, the principle of separation in space fits the best to solve the problem of contradiction in the restaurant business (fig. 4). Based on the theoretical background (fig. 1), one part of the system at Place 1 has the property +P. In contrast, another part at Place 2 has the property –P. Thus, the restaurant should be separated into different space zones to solve the problem contradiction. A guest can take place in the relevant zone without human-to-human contact with other guests or staff. These contradictory requirements are solved through the invention of "a social distancing wall". For instance, these divider walls for restaurant space are offered by the Space Plus, a division of The Sliding Door Company (appendix A, fig. A1). Based on the business conditions and the number of guests, the restaurant hall could be divided by distancing wall into subsystems, so that they can perform the functions. Depending on the restaurateur's needs, the designers suggest different possibilities (separate a hall for a small group of visitors or individual for each visitor) (appendix A, fig. A1). Thus, the analysed above example confirms that the idea could be created using the separation principle in space. Moreover, this idea has been successfully implemented in the restaurant business.

In the methodological part of the article, the implementation of a parallel case study was established for each proposal and the study of subgroups of cases with the same value of B. Therefore, the next example (that confirms the problem solution by using the principle of separation in space) has been looked for in the restaurant domain. The result of the literature review shows that there are several approaches to the problem solution by the principle of separation in space. One of them is a combination "with porosity, foam, bubbles, etc." (fig. 1). An excellent example of the application of this approach to solving a problem based on the principle of division in space is the idea of a "bubble restaurant". (appendix A, fig. A2). These "outdoor dining igloos" help the guests to keep a distance from other people. One of the restaurants that implemented this idea is "Cafe du Soleil" in

New York (appendix A, fig. A2). This case of implementation "igloos" idea proves that it is possible to apply the principle of separation in space by combining with "bubbles resource" to restaurant's problem solution. So, these two parallel examples (appendix A, fig. A1-2) show the successful implementation of the ideas created by the principle of separation in space realised through different approaches and confirm proposition P1.

3.1.2.2. The case studies of the solution of the problem contradiction in the restaurant domain by the principle of separation in time

In order to realise the principle of separation in time, the contradictory requirements in a system should be divided into different timelines (fig. 1); the variable has the property +P at Time 1 and the property –P at Time 2. The new restaurant service launched at the Seattle Great Wheel (appendix B, fig. B1) confirms the possibility of creation of an idea using the principle of separation in time in the restaurant domain. In order to solve the problem contradictory, the service for each guest (or little group of visitors) is separated in time. The Seattle Great Wheel offers one dinner course per rotation of the wheel. Each cabin of the wheel has a maximum of four people seats. The guest (of a group of four guests) has a private dinner and is socially distanced - the wheel's rotation schedules the guest service process without contradiction.

The second parallel case is studied to confirm the possibility of an idea created by using the principle of separation in time in the restaurant domain. The different restaurants around the world use social distancing screens. This example looks like the implication of the principle of separation in space. However, there is a type of "temporal" screen. For example, such temporal screens are offered by "Inside out" and successfully used in several restaurants (appendix B, fig. B2). A feature of this subtype of screen is their temporary use. The staff use these divorcers periodically (for example, with the onset of illness). The temporally screens also could be set at different times for different periods due to the number of restaurant visitors to balance adherence to social distancing measures. The restaurant can provide activity without the screens during time T1. If it has a "fully booked" occasion in the pandemic period, the temporary screens could be set (time period T2). The social distancing screens can be easily removed or relocated anytime if staff need. Moreover, the restaurant equipment producers offer several subtypes of such screens: "floor standing screen", "tabletop screen" (a freestanding countertop version), "fixed screen" (screws to the underside of a table counter for extra stability), etc. (appendix B, fig. B2). Thus, the staff can use one of these «temporary" screens at appropriate time. The screens are designed to protect the restaurants' guests and staff and could be set in different restaurant spaces, from the restaurant, café or pub's hall to staff's workspaces. Therefore, the operational time for each guest (or group of two-four guests) is realised. The system requirements can be met at different times without contradiction. Further, the screen producers offer an additional option to cover these screens with anti-bacterial powder periodically that helps adherence to disease measures. This additional service could also be considered a scheduling aspect of the system. Thus, the idea of the "temporary" screens also confirms the implementation of the principle of separation in time. So, the analysed above cases (the restaurant services launched at the wheel and the "temporary" screens) demonstrate proposition P2 and show the successful implementation of the idea created by applying the principle of separation in time.

3.1.2.3. The case studies of the solution of the problem contradiction in the restaurant domain by the principle of separation between the whole and its parts

The "Nowhere restaurant" has launched a new service (appendix C, fig. C1). The restaurant offers its services "in the middle of nowhere", in particular, a table located in nature (near Stockholm, Sweden). According to the theoretical background (fig. 1), this idea is generated by applying the principle of separation between part and whole. In order to solve the established problem contradiction in the restaurant business (fig. 4), the entire system and its components should have the versus properties. In the studied case, the restaurant as a whole system stopped serving the guests (in the usual way in the restaurant's hall), and it has a property -P. But a table located in nature, as a separated part of them, as its subsystem, can realise the traditional function and shows property +P (appendix C, fig. C1). So, this case confirms the possibility of solving the restaurant's problem by the principle of separation between the whole and its subsystems.

Several restaurants in Beijing (China) launched a new "take away" service due to the COVID-19 pandemic lockdown (appendix C, fig. C2). This case shows that a restaurant as a system performs contradictory functions: it is closed (to realise traditional service), but it is open (to realises their services in a new way). Some of Beijing's restaurants launched "a street sale" during the COVID-19 pandemic lockdowns. They have separated their functional unit to implement this idea (appendix C, fig. C2). This successful idea, implemented in the Beijing restaurants, proves that a restaurant as a whole system stopped activity. Nevertheless, the restaurant's unit is providing a part of the activities. So, these two parallel cases (appendix C, fig. C1-2) confirm proposition P3 and show the successful implementation of the idea created by applying the principle of separation between the whole and its parts.

3.1.2.4. The case studies of the solution of the problem contradiction in the restaurant domain by the principle of separation upon conditions

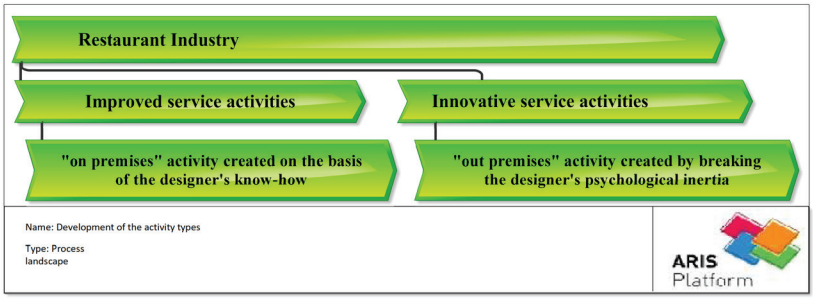
In order to realize the principle of separation upon conditions, the restaurant as a system under condition 1 must have the property +P, and under the other condition 2 it must have the property -P (fig. 1). The successful idea of the solution of the problem contradiction by the principle of separation upon conditions is implemented in Vilnius (Lithuania) restaurants (appendix D, fig. D1). As usual, the restaurateurs try to increase the number of the seats in the restaurant's hall by design a development strategy (Condition 1). On the contrary, during the COVID-19 pandemic, they decrease the number of seats through the mannequins setting (Condition 2), which helps to ensure the social distance measures and, as a result, provide service (appendix D, fig. D1).

The second parallel case is successfully implemented by the Burger King chain (appendix D, fig. D2). They do not usually require their guests to wear special clothes (the system under Condition 1 has property +P). During the COVID-19 pandemic, they ask their visitors to wear "giant crowns" (Condition 2). This case represents a possibility of changing a property of a system in response to an external condition. The restaurateurs realise this strategy not to have fun but to be successful. The last is proved by the next fact. At first, this idea was successfully implemented at the German restaurant and then disseminated around the world (in particular, it was implemented in Singapore too) (appendix D, fig. D2). Thus, the analysed above two parallel cases confirms the proposition P4 and shows the successful implementation of the idea created by the application the principle of separation upon conditions.

3.2. Study Stage 2. The application of the principles of separation to the idea creation of the restaurant business development

The result of the case studies proves that it is possible to create a row of the diversified solutions by using the separation principles to overcome the problems and develop the restaurant business under crisis conditions. However, the analysis of the solutions implemented in real-life practice reveals their different efficiency. Especially, the solutions which involve the restaurant activities on premises are less effective. For instance, the ideas created by applying the separation principle in space cause dividing the service hall or production area into several rooms (appendix A, fig. A1). In turn, it causes less effective using of the restaurant space, destroyed a traditional way of staff work, etc. The idea created through the separation upon conditions causes reduction in the number of the restaurant seating places and results its capacity limitation (appendix D, fig. D1). Therefore, the type of solutions that involve the activities on premises is less effective. The result of this analysis points out an incongruity of these new services activities to current trend of development of the restaurant industry (fig. 2). On the other hand, the studied cases show that it is possible to create more effective solutions. For instance, the "Nowhere restaurant" (appendix C, fig. C1) had implemented new type of "out premise" service activity and provided it profitable during the COVID-pandemic lockdowns. Undoubtedly, the implementation of the less effective solutions had provided possibility to carry out the restaurant activities that is better than be total closed during the COVID-pandemic lockdowns 2020-2022. This aspect is considered by accepting of a success of created idea. However, the result of study reveals that solutions covered possibility to provide "out premise" service activities are more effective that should be taking into account in the decision-making in future. This type of solutions represents the designers' ability to see opportunity of development in incongruity (fig. 2), according to Drucker's approach (1985). In order to provide possibility to use this research result by idea generation the Process landscape Model of the development trend of the service activity types in the restaurant industry is elaborated (fig. 5). Accepting this trend of development, designers can find more effective innovative solution.

Figure 5: **Process landscape Model of the development trend of the service activity types**

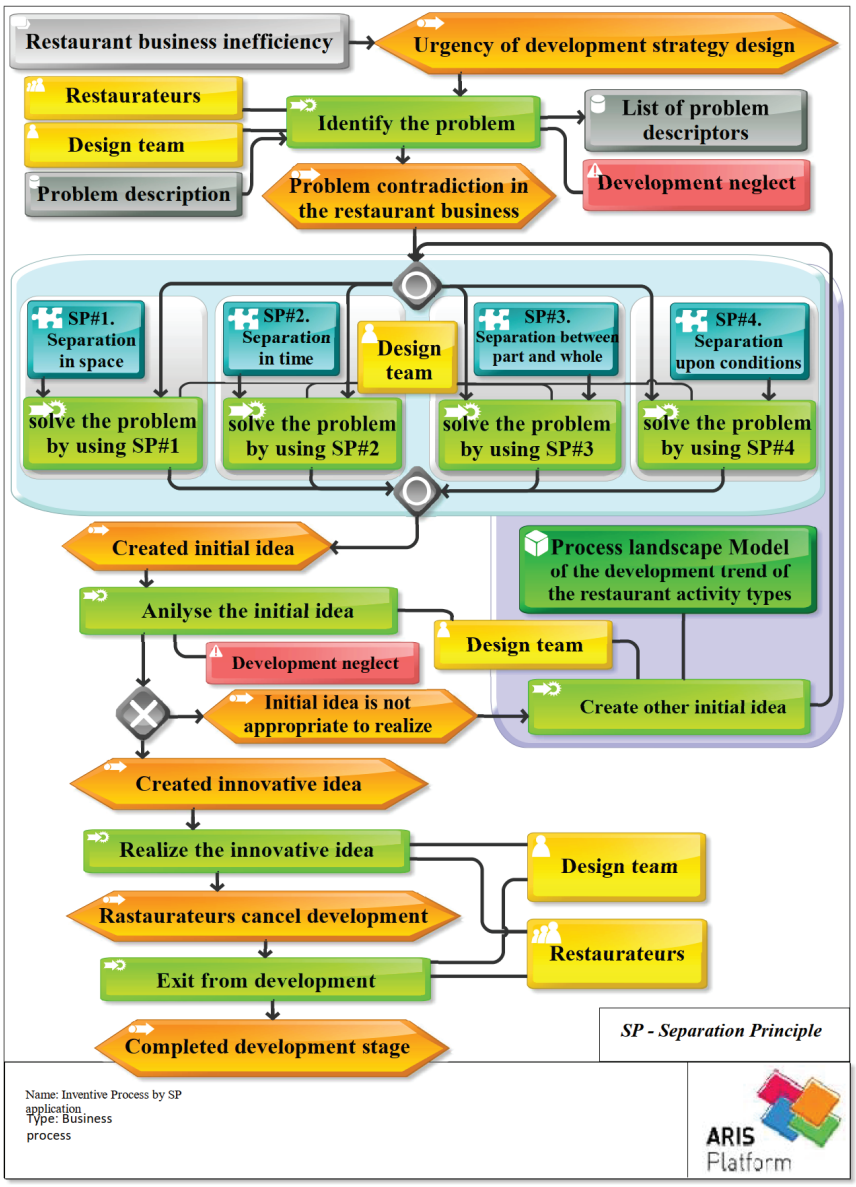


Source: prepared by the author

Based on the result of the case studies and the aforementioned analysis, the Model of the inventive process (the IP Model) is synthesised (fig. 6). The IP Model represents framework to find a solution by the simultaneously application the separation principles (fig. 1) and the accepting the current development trend of the service activity types in the restaurant industry (fig. 5). The IP Model (fig. 6) depicts the main information about the using the separation principles and facilitates the process of the idea creation. It has to be noted that, at first, the problem contradiction should be identified. Then, the design team provides

the idea generation session. They can use one of the SPs or apply them one by one. The idea generation process could also be realised by a restaurant owner, CEO, manager, etc. In such a way, they can generate plenty of new ideas. The design team can generate a high number of initial ideas. A lot of lacks are revealed during the idea implication in practice. Therefore, it needs to be underlined that regardless of the number of the initial ideas, each of them has to be thoroughly analysed. Each initial idea should be discussed in turn by design team members and by the restaurateurs that will implement the result in real life. An innovative idea that best fits to development of a particular restaurant under particular conditions should be chosen. Suppose the restaurateurs see that the initial idea does not fit the implementation. In that case, they must generate a new one applying another separation principle (fig. 6). Thus, the restaurateurs can use the IP Model as a guideline to create a successful idea for developing of their business.

Figure 6: **The Model of the inventive process**



Source: prepared by the author

The literature review shows that TRIZ methodology could provide the evolution of the creative idea. The study results show that it is possible to realise this process by step-by-step application of different separation principles. For instance, firstly, the idea of "distance wall" (appendix A, fig. A1) appeared by applying the principle of separation in space. Then, it is improved in case "temporary" screen (appendix B, fig. B2) by applying the principle of separation in time. The results of the analysis of the cases shows that the created idea could be also improved by joining different parameters. For instance, the using "bubbles" parameter in the idea of "bubble restaurant" (appendix A, fig. A2). The additional using anti-bacterial powder in the case of "temporary" screen (appendix B, fig. B2) could be considered as such joint parameter, too. So, there are two ways to facilitate the evolution of the created idea: by applying another separation principle or joining different parameters. These both possibilities are taken into account in the Model of the inventive process (fig.6).

4. DISCUSSION

At first, the applying of the principle of separation in space looks like the easiest way to solve the "social distance" problem in a restaurant. Nevertheless, the case analysis shows a number of the issues that could additionally appear during the solution implementation in real-life. For instance, during the first period of the COVID-pandemic (spring, 2020), "bubble restaurant" (appendix A, fig. A2) looked like an excellent idea to serve guests in an outdoor area on the pedestrian sidewalk, streets, and parking lots. The restaurateurs started using different types of tents, bubbles, etc. Then, many of the lacks of the "bubble" using appeared in practice. For example, experts focus on the sustainability targets and appellate that polyvinyl chloride is toxic when it burns. The health experts also point out that the guests have to evaluate who they are dining with. Additionally, the airflow within the igloos space must have high-quality ventilation and access to the outside air. So, to allow for air circulation, these "space bubbles" have been improved, and, as a result, one type of them can be zippered open and closed on all sides. The next period of the COVID-pandemic (in autumn, 2020) with the cool fall weather and daily rains shows an additional advantage of this idea implementation. The restaurateurs continue to improve their "bubble" innovation and realise new experts' pieces of advice. The bubbles and tents of various types and shapes, made from plexiglass and different natural materials, have shown up. Nevertheless, it should be emphasised, that the pros and cons of this "igloo idea" are still highly discussed by both restaurateurs and their visitors (Ong, 2020). Based on the abovementioned analysis, it should be stressed that each idea needs thorough elaboration. The harmful elements must be revealed and eliminated before their implementation to obtain a higher quality of solution. On the other hand, Mao (2008. p. 31) points out that, using the TRIZ methodology, designers should obey a "Law of Ideality", attempt to create an ideal system that "performs the function at zero cost and with no harm". Scientist considers that ideality reflects the "maximum utilization of existing resources within the system or organization", including some free or idle resources (e.g., existing features, company experience, skills of employees) (Mao, 2008. p. 31). Thus, the designers have to keep the ideal objective in mind during the process of problem solving, in order to make a simpler, more reliable, and effective solution. Therefore, the step of an analysis of the initial idea is provided in the Model of the inventive process by the separation principles application (fig. 6).

More attention should be paid to the ideas of "social distancing wall" (appendix, fig. A.1) and "a temporary screen" (appendix, fig. B.2). These cases point out that the applying of two separation principles crosses over (in particular, the principle of separation in space and the principle of separation in time). It should be noted that some scientists try to add the 5th separation principle. For instance, Kutz (2015, p. 387) considers the 5th separation principle as a "combination" of the 4 separation principles. But the academic literature does not represent the unanimous decision about the 5th SP. This issue needs deeper theoretical study. Therefore, the 5th SP is not represented in the Data Model of Separation Principles (fig. 1). However, the finding in this paper also points out a need to study a possibility of a complex applying of several separation principles simultaneously more thoroughly. Hence, the Model of the inventive process (fig. 6) makes available for use other separation principles in turn by process of the idea improving. So, the results of this study show that the restaurateurs should not try to solve their business problems in a "search for fortune" or "eureka" way. They should use the inventive methodological tools to have a unique way of systematic thinking and creative idea generation.

CONCLUSION

Social distance is one of the problems of the restaurant industry caused by the heath crisis 2020-2022. It has been established that the decision of this problem could be achieved through solving the problem contradiction: human-to-human contact vs. social distance. The series of analysed practical cases confirms the possibility to apply the separation principles as the methodological tool to solve this problem contradiction in the restaurant industry. The research result shows that the separation principles are the effective methodological tool for idea generation that helps a restaurateur think like "a creative designer". But they should not use this technique to generate an idea like "eureka". The interest of using the separation principles is in ensuring a way to make an effective solution of the current problem in the restaurant industry. The research results also provide background to conclude that the restaurants should not focus on the "on premise services". The innovative approach (focus on "out premise services") could cardinally change the results of the problem solution, in particular, to distancing in the COVID-pandemic period. However, the case study reveals that the restaurateurs do not assume about this incongruity of their service activities. Therefore, they did not see the opportunities of the effective development of their business in the heals crisis period 2020-2022. Based on the result, the Model of the inventive process has been elaborated. The suggested model covers the possibility of applying the separation principles and accepting the current development trend of the restaurant service activity that boosts the more effective problems solution. This approach application yields new innovative subtypes of the service activities. The restaurateurs could use the separation principles as the appropriate methodological tool to design an effective development strategy and restart their business in crisis time.

Theoretical implications of the results

This paper contributes towards enhancement of knowledge about the separation principles and a possibility of their applying to problem solution of the restaurant business development. First, this study contributes to the theory of transferring the methods of creative ideas generation from other scientific fields to hospitality, in particular, applying the separation principles to problem-solution. Second, the results of study reveal a possibility of improving of the created idea (or its evolution), There are two ways to realize this process. One of them is the alternate application of the separation principles. The next one is the joining of different parameters. Third, the analysis of the restaurant cases points out that more effective solution could be created by accepting the current trend of the restaurant activity development, according to Drucker's approach to sources for innovative opportunities. Based on the results of study the Model of the inventive process has been elaborated. The study results point out also that process of improving the created idea ensures an increase in the efficiency of the achieved results. It should be underlined that this last establishments about effectiveness of idea is a result of a first step of investigation and needs to be studied more thoroughly by using other methodological approach that is beyond this paper. This issue should be considered as explanation that helps to decide whether the deeper theory-building research is needed. Additionally, this study shows that hospitality domain gives good possibility to test theory by using the case study methodology in the practice-oriented research.

Practical implications of the results

In this paper the methodological tool of a successful idea creation is demonstrated to restaurant owners, managers, and designers. In order to facilitate the using of the knowledge by practitioners (in his/her particular situation), the result of this study is represented as the Model of the inventive process by the separation principles application. This model expounds on the process of using the separation principles and represents several sub-ways of the idea creation. This inventive process Model also represents framework to find a solution by the simultaneous application the separation principles and the accepting the current development trend of the service activity types in the restaurant industry. The last aspect is important to provide efficiency of the created idea. Using the elaborated model, the practitioner can choose one or several suggested ways to generate a creative idea depending on circumstances and his/her options for action (e. g., the attractiveness, price, etc.). Such ideological diversity ensures the flexibility of the restaurateur in responding to a changing state of crisis. A practitioner, using the suggested Model of the inventive process, gets an ability to create the effective idea appropriated not only to the restaurant's implementation capability. He/she can create an effective idea in a short period that provides the results accomplishment at the right moment. The restaurateurs can also generate several multifarious ideas that could be implemented one by one with different timings. Further, the analysis of the restaurants' cases, depicted in the paper, facilitates a visual representation of the results of the application of the separation principles in hospitality. It shows a possibility of using this methodological tool for practitioners just starting to learn it in a more illuminating way. It should be also underlined that the results of case studies reveal that the restaurateurs, considering "social distance", focus more on the restaurants' guests than on staff. Thus, they should pay more attention to the safety of staff under health crisis conditions.

Limitations and future research

Several limitations of this study need to be thought over. Firstly, the initial idea evaluation is not considered in detail because it is beyond the aim of this paper. Nevertheless, there is a need to study this issue thoroughly and apply the results to the suggested inventive process. The research result points out that the use of several separated principles simultaneously could provide for an elaboration of different subtypes of created ideas. This approach could help to improve the initial idea but it needs an additional deeper study. It is also essential to investigate new_subtypes of the 4 SPs more thoroughly. On the other hand, an integration of the separation principles into modern multicomplex methods have to be investigated to get a synergy and higher the effectiveness of their using. Future research also should examine the possibility of the transference of other effective methodological tools into the restaurant industry. Another suggestion for future research is to identify whether the separation principles could lead to development idea generation in other hospitality subsectors, particularly the accommodation industry. Also the opportunity to apply the separation principles to solve the problem of the restaurant development under other crises conditions needs a more thorough study.

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Please cite this article as:
Stolyarchuk, V. (2023). Applying The Principles of Separation in Development of the Restaurant Business. Tourism and Hospitality Management 29(3), 365 - 380, https://doi.org/10.20867/thm.29.3.4

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APPENDIX

Appendix A. The study of the solution of the problem contradiction in the restaurant domain by the principle of separation in space

Figure A.1: **The example of the idea created by using the principle of separation in space through separation into functional subsystems**

Source: prepared by the author, based on Space Plus (2022)

Figure A.2: **The example of the idea created by using the principle of separation in space combined with "bubbles resource"**

Source: prepared by the author, based on Ong (2020)

Appendix B. The study of the solution of the problem contradiction in the restaurant domain by the principle of separation in time

Figure B.1: **The example of the idea created by using the principle of separation by the service schedule**

Source: prepared by the author, based on French (2021)

Figure B.2: **The example of the idea created by using the principle of separation in time**

Source: prepared by the author, based on Inside out (2022)

Appendix C. The study of the solution of the problem contradiction in the restaurant domain by the principle of separation between the whole and its parts

Figure C.1: **The example of the idea created by using the principle of separation between part and whole**

Source: prepared by the author, based on Romano (2020)

Figure C.2: **The example of the idea created by using the principle of separation through the performance of a system and its subsystem the contradictory functions**

Source: prepared by the author, based on Global Time (2022); Liu & Yang (2022)

Appendix D. The study of the solution of the problem contradiction in the restaurant domain by the principle of separation upon conditions

Figure D.1: **The example of the idea created by using the principle of separation upon conditions**

Source: prepared by the author, based on French (2020)

Figure D.2: **The example of the idea created by using the principle of separation through changing a property of a system in response to an external condition**

Source: prepared by the author, based on Lifestyle (2020)