ABSTRACT: The coronavirus disease 2019 (COVID-19) has become a huge threat to global public health and affected 188 countries and territories. As of May 24, 2020, it has caused a pandemic outbreak with more than 5,311,0893 confirmed infections and more than 342,104 reported deaths in 188 countries and territories worldwide. The three main intentions of this paper are: (1) Collection of limited publicly available data from the Tourism Bureau, Ministry of Transportation and Communications (M.O.T.C.) and the Taiwan Centers for Disease Control, Ministry of Health and Welfare (M.O.H.W.) followed by adoption of a nonparametric statistics method to understand the difference between epidemic and non-epidemic period, and also the correlation between the number of confirmed infections and the data related to tourist hotel operations; (2) Sort out the various relief and revitalization measures proposed by Taiwan government to the hospitality industry in response to the COVID-19 epidemic; (3) Several recovering strategies will be proposed for government agencies and related hoteliers in light of the post-COVID-19 epidemic era.

Subjects: Events; Hospitality; Tourism

Keywords: COVID-19 (Coronavirus disease 2019); hospitality industry; recovering strategy; nonparametric statistics; Taiwan
1. Introduction
An outbreak of severe pneumonia of unknown cause was reported in early December 2019 in Wuhan, Hubei Province, China. On January 7, 2020, World Health Organization (WHO) named this novel virus Novel coronavirus (2019-nCoV); on February 12, 2020, WHO announced at the Global research and innovation forum that the 2019-nCoV was renamed COVID-19 and officially included in the work scope of United Nations Disaster Management Team (UNDMT) (Jung et al., 2020; Pan et al., 2020). The main symptoms of the infection of COVID-19 are fever, cough, sore throat, runny nose, hyperpnea, or dyspnea, and it can lead to bilateral lung infiltrates on imaging or even death. Once a person is infected, everywhere he goes or anything he has contact with (through mouth, nose, or eyes) would be contaminated (Lu et al., 2020). As of May 24, 2020, the number of confirmed infections of COVID-19 is 5,311,089, including 342,104 reported deaths in 188 countries and territories worldwide (Johns Hopkins University (JHU), 2020).

Sohrabi et al. (2020) pointed out that there were several things worth discussing on the COVID-19 pandemic. For instance, the lack of information transparency, delays in travel control and in the isolation of patients, misinformation, delays in emergency announcements, and the research and development of effective medications. They also made suggestions for further improvements. First of all, in terms of the lack of information transparency, they suggested that there should be a definite whistle-blowing system to respond to possible global health emergencies. Next, regarding the delay of travel control, they advised that preventive actions, such as screening those citizens who came back from high-risk countries, should be taken as soon as possible. Third, all suspected cases should be quarantined once they were confirmed to pose a threat to public health. Fourth, in regard to the misinformation, the importance of information transparency should be emphasized and all information should be accessible to the public. Fifth, emergency procedures should be established in order to give people warnings about the current situation. Finally, further investment is required and reliable means should be set up so as to hold back the upcoming contagions. To effectively prevent the spread of the epidemic, the Taiwan government set up the Central Epidemic Command Centre (CECC) for COVID-19 on January 20, 2020, and initiated immediately a series of advance deployments, such as requisitioning domestic medical-grade masks, border control measures, guidelines for public meetings and for social-distancing in public spaces, and the passage of the Special Act for Prevention, Relief and Revitalization Measures for Severe Pneumonia with Novel Pathogens (see Figure 1). All of these have received international acclaim and praise.

Figure 1. Significant Events of CPVID-19 pandemic in Taiwan.
Source: sorted out from The Reports. (2020) [https://twreporter.org/a/2019-ncov-epidemic9]
The impacts of the COVID-19 global outbreak on the hospitality industry can be divided into two aspects: supply and demand. Regarding the supply side, with many countries announcing border closers, entry bans, and suspending tourist visas, etc., the supply of the hotel industry is significantly decreased. As to the demand aspect, most consumers consider avoiding travel and accommodation due to health and hygiene concerns. With both supply and demand drastically reduced, the tourism industry has been inflicted heavy losses. There is no exception for Taiwan. Many hotels have even announced their close-down, including Tayih Landis Hotel, Pleasant Hotels International, The Landis Taichung, Leofoo Hotel, Howard Green Bay Resort Hotel, as shown in Table 1.

The COVID-19 pandemic has had a devastating effect on the global hospitality industry and has attracted a great deal of academic discussions. However, most of the literatures have focused on the prediction and prevention of epidemics (Benvenuto et al., 2020; Chakraborty & Ghosh, 2020; Chen et al., 2020; Lin et al., 2020), with less discussions over the impacts on industries, or even none as to the hospitality industry. Therefore, the three main intensions of this paper stated as follows: firstly, to discuss the impacts of the COVID-19 pandemic on Taiwanese hospitality industry by collecting limited publicly available data from the Tourism Bureau, Ministry of Transportation and Communications (M.O.T.C.) and the Taiwan Centers for Disease Control, Ministry of Health and Welfare (M.O.H.W.); secondly, to collate the various relief and revitalization measures proposed by Taiwan government to the hospitality industry in response to the COVID-19 pandemic; and thirdly, to propose several recovering strategies for government agencies and related hoteliers in light of the post- COVID-19 epidemic era.

### 2. Statistical methods and results of the data analysis

This study collected and compared data on the number of rooms occupied, occupancy rate, total operating revenue, and the number of employees from January to March 2019 (non-epidemic period) and January to March 2020 (epidemic period) from the Tourism Bureau, M.O.T.C. Meanwhile, data on the number of confirmed cases of COVID-19 from January to March 2020 was collected from the Taiwan Centers for Disease Control (Taiwan CDC), to further explore the correlation between the number of confirmed cases and the data related to tourist hotel operations.
2.1. Statistical methods
In the descriptive statistics section, firstly, the changes in the number of rooms occupied, occupancy rate, total operating revenue, and the number of employees during the epidemic and non-epidemic periods are compiled; secondly, the rate of decreases of each variable in different regions (Taipei City, Taichung City, Kaohsiung City, and Hualien County) during the epidemic period and the same period last year are calculated to find out the actual impacts of COVID-19 pandemic on the hospitality industry in Taiwan.

In the inferential statistics section, the research questions to be addressed and the statistical analysis methods used in this study are as follows.

(1) Between the epidemic and non-epidemic periods, is there any significant difference in the number of rooms occupied, occupancy rate, total operating revenue, and the number of employees? The nonparametric Mann–Whitney U test will be conducted to examine this research question.

(2) Among different regions (regardless of the epidemic and non-epidemic periods), is there any significant difference in the number of rooms occupied, occupancy rate, total operating revenue, and the number of employees? The nonparametric Kruskal–Wall test will be used to examine this research question.

(3) From month to month with the progress of epidemic severity, is there any significant difference in the number of rooms occupied, occupancy rate, total operating revenue, and the number of employees? The nonparametric Friedman test will be conducted to examine this research question.

(4) During the epidemic period, is there a significant negative correlation between the number of confirmed cases in the month and the number of hotel rooms occupied per month? The nonparametric Speaman Rank Correlation method will be used to examine this research question.

(5) During the epidemic period, is there a significant negative correlation between the number of confirmed cases in the month and the monthly occupancy rate of the hotel; The nonparametric Speaman Rank Correlation method will be used to examine this research question.

(6) During the epidemic period, is there a significant negative correlation between the number of confirmed cases in the month and the hotel's total monthly operating revenue? The nonparametric Speaman Rank Correlation method will be used to examine this research question.

(7) During the epidemic period, is there a significant negative correlation between the number of confirmed cases in the month and the number of employees per month? The nonparametric Speaman Rank Correlation method will be used to examine this research question.

2.2. Results of the data analysis
2.2.1. Descriptive statistics analysis
The number of rooms occupied, occupancy rate, total operating revenue, and the number of employees during the epidemic period all declined, compared with the non-epidemic period (see Figure 2 and Table 2); it can be found that with the increasing severity of the epidemic, the rate of decrease in all variables has been rising when we compare the rate of decrease between the epidemic period and the same period last year (Figure 3 and Table 3); further observation by region found that in the early stage of the epidemic (January 2020), except for the increasing rate in the eastern region, the number of rooms occupied and the number of employees in the other regions have started to decrease. The reasons for this is believed that due to the open-up of the Suhua Highway, and the Chinese New Year holiday (January 23 to January 29, 2020) and the winter vacation for students in Taiwan, adding that the
government’s ban had not been activated then, the number of tourists traveling to the eastern Taiwan and the demand for accommodation remained high. As the epidemic was getting severer, the variables began to show negative growth. In terms of the rate of decrease in the number of rooms occupied, occupancy rate, and total operating revenue, the northern Taiwan was the most affected, followed by the southern, the central and the eastern orderly; and in terms of the rate of decrease in the number of employees, the southern region was the most affected, followed by the northern, central and eastern, respectively.

According to the above mentioned, it can be found that the COVID-19 pandemic has caused huge impacts on Taiwanese hospitality industry. Fortunately, Taiwan’s proactive disease prevention measures have made it possible for the epidemic to be well controlled, and the Taiwan CDC’s advanced deployments have gained international acclaim and praise. Subsequently, on February 25 the Taiwan government passed the Special Act for Prevention, Relief, and Revitalization Measures for Severe Pneumonia with Novel Pathogens to actively assist hoteliers to tide over the pandemic.

Table 2. Comparison of the tourist hotel sector between epidemic and non-epidemic periods

| Period                  | Number of Rooms Occupied | Occupancy Rate | Total Operating Revenue | Number of Employees |
|-------------------------|--------------------------|----------------|-------------------------|---------------------|
| Non-epidemic periods   | 93266.92                 | 61.27          | 900647930.17             | 4611.58             |
| (2019.1 ~ 2019.3)       |                          |                |                         |                     |
| Epidemic periods       | 46682.50                 | 37.63          | 562577999.00             | 4357.25             |
| (2020.1 ~ 2020.3)       |                          |                |                         |                     |

Source: sorted out from the Tourism Bureau, M.O.T.C. (2020)
Figure 3. Analysis of the downturn in the tourist hotel sector during the epidemic and non-epidemic periods. (a) Taipei City (b) Taichung City. (c) Kaohsiung City (d) Hualien County.

Source: sorted out from the Tourism Bureau, M.O.T.C. (2020)

Table 3. Analysis of the downturn in the tourist hotel sector

| Region/Item/Month | 2020.1 VS 2019.1 | 2020.2 VS 2019.2 | 2020.3 VS 2019.3 |
|-------------------|-------------------|-------------------|-------------------|
| Taipei City       |                   |                   |                   |
| Number of Rooms Occupied | −11.44       | −55.99           | −86.22            |
| Occupancy Rate    | −11.75           | −57.35           | −86.17            |
| Total Operating Revenue | 0.77            | −50.31           | −72.13            |
| Number of Employees | −2.35          | −2.97            | −4.79             |
| Taichung City     |                   |                   |                   |
| Number of Rooms Occupied | −13.49       | −29.62           | −67.00            |
| Occupancy Rate    | −13.37           | −31.96           | −66.96            |
| Total Operating Revenue | 7.25            | −51.20           | −65.4             |
| Number of Employees | −2.50          | −2.41            | −4.75             |
| Kaohsiung City    |                   |                   |                   |
| Number of Rooms Occupied | −19.40       | −60.89           | −80.40            |
| Occupancy Rate    | 3.42             | −51.54           | −75.00            |
| Total Operating Revenue | 6.86            | −59.57           | −68.12            |
| Number of Employees | −14.71         | −16.87           | −18.35            |

(Continued)
2.2.2. Inferential statistics analysis

2.2.2.1. Difference analysis. According to the Mann–Whitney U test results, the number of rooms occupied, and occupancy rates during the epidemic period are significantly different from those during the non-epidemic period, occupancy rates are especially more significantly different. It indicates that the COVID-19 pandemic did cause a huge decrease in the actual room occupancy rate (see Table 4, 5, 6).

(1) The Kruskal–Wall test results show that, regardless of whether or not during the epidemic period, the number of rooms occupied, total operating revenue, and the number of employees in different regions are significantly different, indicating that there is an uneven development in Taiwan.

(2) According to the Friedman test results, there are significant differences in the number of rooms occupied, occupancy rate, total operating revenue, and the number of employees in different months. This shows that as the epidemic was getting severer, the differences among the variables became more significant.

| Region/Item/Month       | 2020.1 VS 2019.1 | 2020.2 VS 2019.2 | 2020.3 VS 2019.3 |
|-------------------------|------------------|------------------|------------------|
| Hualien County          |                  |                  |                  |
| Number of Rooms Occupied| 25.97            | −7.07            | −36.58           |
| Occupancy Rate          | 25.98            | −10.22           | −36.58           |
| Total Operating Revenue | 92.59            | −21.67           | −37.47           |
| Number of Employees     | 7.33             | −0.53            | −0.54            |

Source: sorted out from the Tourism Bureau, M.O.T.C. (2020)

*\( p < 0.05; \) **\( p < 0.01 \)

### Table 4. Difference analysis for hotel operations variables under epidemic premise

| Hotel operations variables | Epidemic period | Non-epidemic period | \( p \) value |
|----------------------------|-----------------|---------------------|--------------|
| Number of Rooms Occupied   | 46,682.50       | 93,266.92           | 0.045*       |
| Occupancy Rate             | 37.63           | 61.27               | 0.001**      |
| Total Operating Revenue    | 562,577,999     | 900,647,930         | 0.514        |
| Number of Employees        | 4357.25         | 4611.58             | 0.514        |

### Table 5. Difference analysis for hotel operations variables in different regions

| Hotel operations variables | Taipei City | Taichung City | Kaohsiung City | Hualien County | \( p \) value |
|----------------------------|-------------|---------------|----------------|----------------|--------------|
| Number of Rooms Occupied   | 184,953     | 22,715        | 55,752         | 16,479         | 0.001**      |
| Occupancy Rate             | 54.67       | 50.66         | 49.93          | 42.55          | 0.481        |
| Total Operating Revenue    | 2,235,109,423| 186,842,817   | 405,507,679    | 98,991,940     | 0.001**      |
| Number of Employees        | 12,462.83   | 1431.67       | 3105.83        | 937.33         | 0.001**      |
2.2.2.2. Correlation analysis. Spearman Rank Correlation analysis results show that only the occupancy rate was found significantly negatively correlated with the number of confirmed cases in the very same month, the other variables were not significant. It can be seen that people are more aware of the epidemic prevention in general, and tend not to stay away from home to avoid infection in the midst of the severe epidemic (see Table 7).

### Table 6. Difference analysis for hotel operations variables in different months during the epidemic period

| Hotel operations variables | 2020.1 | 2020.2 | 2020.3 | p value |
|---------------------------|--------|--------|--------|---------|
| Number of Rooms Occupied  | 80,734 | 40,135 | 19,178 | 0.018*  |
| Occupancy Rate            | 57.38  | 35.86  | 19.64  | 0.018*  |
| Total Operating Revenue   | 1,011,699,355 | 411,739,000 | 264,295,643 | 0.018*  |
| Number of Employees       | 4446.25 | 4366.25 | 4259.25 | 0.018*  |

**

### Table 7. Analysis of correlation between the number of confirmed cases and hotel operations variables

| Spearman rho | Confirmed cases | Number of Rooms Occupied | Occupancy Rate | Total Operating Revenue | Number of Employees |
|--------------|-----------------|--------------------------|----------------|-------------------------|---------------------|
| Confirmed cases | 1               | -.096 (.654)            | -.519** (.009) | .129 (.348)            | .182 (.394) |
| Number of Rooms Occupied | -096 (.654)       | 1                        | .701** (.000) | .947** (.000)          | .897** (.000) |
| Occupancy Rate | -.519** (.009)   | .701** (.000)            | 1              | .575** (.003)          | .480** (.018) |
| Total Operating Revenue | .129 (.548)       | .947** (.000)            | .575** (.003) | 1                      | .947** (.000) |
| Number of Employees | .182 (.394)       | .897** (.000)            | .480** (.018) | .947** (.000)          | 1                  |

Bracket indicates P value; * P < 0.01; ** P < 0.05

3. The specific relief and revitalization measures for Taiwan’s hospitality industry in response to the COVID-19 pandemic

In response to the impacts of the COVID-19 pandemic, the Ministry of Transportation and Communications (M.O.T.C.) announced on March 12, 2020, the “M.O.T.C.’s Measures to Alleviate and Revitalize the Hardships in Operation of Industries Affected by COVID-19.” In Article 6, specific relief, subsidies, and revitalization measures for tourism-related sector are proposed, with a total budget of over NT$7 billion. M.O.T.C. further released the “Tourism-related Industries Relief Measures 2.0” on April 13, 2020, to increase the wage subsidies for employees and to cover part of the operational expenses (at least USD 200,000 for each) in order to help tourism-related businesses who are hit by the COVID-19 pandemic and amid the slowdown. According to the statistics of the M.O.T.C (2020), as of now (May 20, 2020), in terms of the talent-training of tourism industry, 677 cases have been received and 516 cases have been approved, 70,000 people are expected to enroll in the training program. A total amount of NT$1,460,67 billion in subsidies has been approved, while 322 cases of them with the amount of NT$950.83 million has already been granted. Regarding the financial loans and interest subsidies, there have been 799
Table 8. Specific relief and revitalization measures for the hospitality industry in response to the COVID-19 pandemic

| Type         | Specific Measures                                                                                                                                 |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Relief       | • Providing aids to the travel, accommodation, and tourism industries with trade-finance loans and interest subsidies. (NT$1.2 billion)              |
|              | • Promoting the talent-training program for the travel, accommodation and tourism industries. (NT$500 million)                                      |
|              | • Wage subsidies to employees. (NT$5 billion)                                                                                                      |
|              | • Essential operational expenses subsidies for the tourist hotel sector and the hotel sector. (NT$ 1.5 billion)                                      |
|              | • Subsidies to domestic group tour, independent travel accommodation, and discount coupons of the amusement park industry. (NT$ 2 billion)               |
|              | • Assisting the travel industry, tourist hotel industry, hotel industry, B&B, tourism industry, and other travel industry associations, etc. to deal with inter-county and regional cooperation in tourism development and transformation, as well as industry matchmaking and marketing. (NT$400 million) |
|              | • Subsidies to the local governments to plan activities featuring local characteristics according to seasons, unique regional tourism elements, folklore festivals, and attractions. (NT$300 million) |
|              | • Providing subsidies to the tourist hotel industry, hotel industry, and B&Bs for constructing tourist-friendly facilities, barrier-free rooms, universal facilities, also for the related hardware and software fees to join the “Taiwanstay” network set up by the Tourism Bureau, M.O.T.C. (NT$400 million) |
|              | • Subsidies to the amusement park industry for installation of new rides, reprovision of equipment, and rewards for innovative services and digital upgrades. (NT$300 million) |
| Revitalization| • Scaled-up marketing in foreign markets in response to that fewer tourists are traveling to Taiwan due to the COVID-19 pandemic. (NT$500 million)          |
|              | • Awarding local governments and tourism industry associations for proposing international tourist products that promote the quality of Taiwan’s tourism and integrate the local tourism resources and regional characteristics. (NT$400 million) |
|              | • Introducing “International Visitors Immigration Rewards Scheme”, subsidizing overseas tours, overseas charter flights of the civil air transport enterprises and the travel industry, and extending the awards for the “Certification of High-quality travel in Taiwan Rewards Scheme for Global Markets”. (NT$880 million) |
|              | • Propelling the intellectualized transformation of tourism, subsidizing NGOs to digitally promote tourism activities, conducting digital value-added experiences, and building a tourism video database. (NT$200 million) |

Source: sorted out from the Tourism Bureau, M.O.T.C. (2020)
loan applications (399 in the hotel industry, 112 in the B&B industry, 286 in the travel industry, and 2 in the amusement park industry), with a total loan amount about NT$5.354528 billion. In respect of the subsidization of the operational expenses of the hotel industry, a total amount of NT$1.2111 billion has been approved for 2,189 hotels, and a total of NT$1.0673 billion have already been granted. As for the subsidies to the operations expenses of the tourism industry and to the wage for employees, a total of NT$4.992646 billion has been approved and NT $4.207011 billion has already been granted. It can be seen that the government has allocated a huge amount of money to help the hospitality industry to survive this global disaster. Specific relief and revitalization measures related to the hospitality industry are shown in Table 8.

4. Conclusions and recovering strategy recommendations
According to the results of data analysis, this study found that the COVID-19 pandemic had a great impact on the Taiwan’s hospitality industry. Many hotels have announced their closure due to the impact of the epidemic outbreak. Primarily, in the difference analysis part, on account of the COVID-19 pandemic, the number of rooms occupied and occupancy rate have dropped significantly. It can even be found that, with the severity of the epidemic, the number of rooms occupied, occupancy rate, total operating revenue, and the number of employees has decreased significantly. Secondly, in the correlation analysis part, it was only found that the number of confirmed cases was significantly negatively proportional to the occupancy rate in the same month. Perhaps it is caused since the period is too short and the data acquisition is limited. If there is complete data in the future, I believe that it will be of great help to understand the full picture of the impact of COVID-19 pandemic on the hospitality industry.

In view of the post-COVID-19 epidemic era, this study proposes several recovering strategies for the hospitality industry to provide hotel operators as a reference for subsequent operations. Predominantly, in the face of a major crisis such as the COVID-19 epidemic, hoteliers should establish a risk warning mechanism. Operators should strengthen risk and crisis awareness training to enable operators and employees to establish strong crisis awareness and anti-risk capabilities; At the same time, a crisis management agency must be established to monitor, identify, diagnose, and rectify the strategic and execution management of the enterprise, thereby strengthening the company’s operating fitness (Aliperti et al., 2020; Yue et al., 2020). Furthermore, Big data and the development of artificial intelligence (AI) has increased, and many service providers have launched smart services that are commonplace within hospitality and tourism industry (Kabadayi et al., 2019; Wuenderlich et al., 2015). With such smart technology platforms, companies can effectively increase business revenue, monitor competitors’ performance, expand the distribution channels, improve corporate image, and formulate the best marketing strategy (Leung, 2019; Mohanty, 2017). Moreover, strategic alliances are trading partnerships and new forms of business that enable participating companies to achieve strategic goals that exceed their existing capabilities by facilitating mutual resource exchanges (technologies, skills, or products) (Yoshino & Rangan, 1995). Mariani et al. (2019) pointed out that conjoint investment and pooling resources have generated positive eWOM at the global level and by targeting domestic and international travelers, this would be essential for strategic alliance partnerships. In the tourism supply chain, airlines not only provide a single delivery service but also cooperate with tourism-related industry players to launch various types of package tours and to provide passengers with a higher quality of travel services through the airline’s own brand to available upmarket customers. Therefore, selection behavior of airlines choosing a suitable hotel for that partnership, in addition to affecting passenger satisfaction, will also affect the cooperative performance of each business (Fu et al., 2020). Finally, hotel operators can provide novel, interesting, and pleasurable accommodation experiences which may increase tourists’ authentic happiness, and further provide opportunities for tourists to gain positive, unforgettable memories from their experience. In addition to experience tourism, a new economic model of authentic happiness tourism will likely emerge (Fu & Wang, 2020). Hotel operators can also develop appropriate strategies based on different market segments to satisfy the needs of different lodging target groups (Ihtiyar et al., 2019).
Funding
The author received no direct funding for this research.

Author details
Yan-Kai Fu, Sc.
E-mail: yankaifu@ccust.edu.tw
ORCID ID: http://orcid.org/0000-0002-6750-5789
1 Department of Aviation Services and Management, China University of Science and Technology, Taipei, Taiwan.

Citation information
Cite this article as: The impact and recovering strategies of the COVID-19 pandemic: Lessons from Taiwan’s hospitality industry, Yan-Kai Fu, Cogent Social Sciences (2020), 6: 1829806.

References
Aliperi, G., Nagai, H., & Cruz, A. M. (2020). Communicating risk to tourists: A mental models approach to identifying gaps and misperceptions. Tourism Management Perspectives, 33, 106615. https://doi.org/10.1016/j.tmp.2019.100615
Benvenuto, D., Giovanetti, M., Vassallo, L., Angeletti, S., & Ciccozi, M. (2020). Application of the ARIMA model on the COVID-19 epidemiic dataset. Data in Brief, 29, 105340. https://doi.org/10.1016/j.dib.2020.105340
Chakraborty, T., & Ghosh, I. (2020). Real-time forecasts and risk assessment of novel coronavirus (COVID-19) cases: A data-driven analysis. Chaos, Solitons & Fractals, 135, 109850. https://doi.org/10.1016/j.chaos.2020.109850
Chen, Y. C., Lu, P. E., Chong, C. S., & Liu, T. H. (2020). A time-dependent SIR model for COVID-19 with undetectable infected persons. https://gisb1.ee.nthu.edu.tw/A_TIME_DEPENDENT_SIR_MODEL_FOR_COVID_19.PDF
Fu, Y. K., Huang, W. L., & Liao, C. N. (2020). The selection model for horizontal alliances between hotels and airlines: An integrated application of NGT, Fuzzy TOPSIS and MCGP methods. Tourism Review, 75(4), 681–698. https://doi.org/10.1108/TR-06-2019-0214
Fu, Y. K., & Wang, Y. J. (2020). Experiential value influences authentic happiness and behavioural intention: Lessons from Taiwan’s tourism accommodation sector. Tourism Review. https://doi.org/10.1108/TR-06-2019-0228
Ihtiyar, A., Barut, M., & Ihtiyar, H. G. (2019). Experiential marketing, social judgements, and customer shopping experience in emerging markets. Asia Pacific Journal of Marketing and Logistics, 31(2), 499–515. https://doi.org/10.1108/APJML-02-2018-0081
Johns Hopkins University (JHU). (2020). COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at JHU. https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48ea95ecf6
Jung, S. M., Akhmetzhanov, A. R., Haysahi, K., Linton, N. M., Yang, Y., Yuan, B., Kobayashi, T., Kinoshita, R., & Nishiura, H. (2020). Real-time estimation of the risk of death from Novel Coronavirus (COVID-19) infection: Inference using exported cases. Journal of Clinical Medicine, 9(2), S23. https://doi.org/10.3390/jcm9020253
Kobayashi, S., Ali, F., Choi, H., Joosten, H., & Lu, C. (2019). Smart service experience in hospitality and tourism services: A conceptualization and future research agenda. Journal of Service Management, 30(3), 326–348. https://doi.org/10.1108/JOSM-11-2018-0377
Leung, R. (2019). Smart hospitality: Taiwan hotel stakeholder perspectives. Tourism Review, 74(1), 50–62. https://doi.org/10.1108/TR-09-2017-0149
Lin, Q., Zhao, S., Gao, D., Lou, Y., Yang, S., Musa, S. S., Wang, M. H., Cai, Y., Wang, W., Yang, L., & He, D. (2020). A conceptual model for the Coronavirus disease 2019 (COVID-19) outbreak in Wuhan, China with individual reaction and governmental action. International Journal of Infectious Diseases, 93, 211–216. https://doi.org/10.1016/j.ijid.2020.02.058
Lu, H., Stratton, C. W., & Tong, Y. (2020). Outbreak of pneumonia of unknown etiology in Wuhan, China: The mystery and the miracle. Journal of Medical Virology, 92(4), 401–402. https://doi.org/10.1002/jmv.25678
Mariani, M. M., Borghi, M., & Kazakov, S. (2019). The role of language in the online evaluation of hospitality service encounters: An empirical study. International Journal of Hospitality Management, 78, 50–58. https://doi.org/10.1016/j.ijhm.2018.11.012
Mohanty, K. (2021). Trends in Digital Technology Platform. Retrieved April 25, 2017, from https://www.tutorialspoint.com/articles/trends-in-digital-technology-platform
Now News. (2020). https://onepage.nownews.com/world/taiwan-hotel-shutdown
Pen, F., Ye, T., Sun, P., Gui, S., Liang, B., Li, L., Zheng, D., Wang, J., Hesketh, R., Yang, L., & Zheng, C. (2020). Time Course of Lung Changes at Chest CT during Recovery from Coronavirus Disease 2019 (COVID-19). Radiology, 295(3), 715–721. https://doi.org/10.1148/radiol.2020200370
The Reports. (2020). https://twreporter.org/ar/2019-ncovw-epidemic
Sohrabi, C., Alceti, Z., O’Neill, N., Khan, M., Kerwan, A., Al-Jobair, A., Iosifidis, C., & Agha, R. (2020). World Health Organization declares Global Emergency: A review of the 2019 novel coronavirus (COVID-19). International Journal of Surgery, 76, 71–76. https://doi.org/10.1016/j.ijsu.2020.02.034
Taiwan Centers for Disease Control, M.O.H.W. Republic of China (Taiwan). (2020). https://misdcs.cdc.gov.tw/chi/misc_query.aspx?d=death_fluxid&amp;position=5
Tourism Bureau, M.O.T.C. Republic of China (Taiwan). (2020). https://admin.taiwan.net.tw/FileUploadCategoryList000330.aspx?CategoryId=0dfc358f-bf75-452d-8d14-2b715d02ab1a&app name=FileUploadCategoryList000330
Wuendrich, N. V., Heinonen, K., Ostrom, A. L., Patricio, L., Sousa, R., Voss, C., & Lemmink, J. G. (2015). Futurizing′ smart service: Implications for service researchers and managers. Journal of Services Marketing, 29(6/7), 442–447. https://doi.org/10.1108/JSM-01-2015-0060
Yoshino, M. Y., & Rangan, U. S. (1995). Strategic alliances: An entrepreneurial approach to globalization. Harvard Business School Press.
Yue, X.-G., Zhao, X.-F., Li, R. Y.-M., Crabbe, M. J. C., Mi, L., Hu, S., Baker, J. S., & Liang, G. (2020). Risk management analysis for novel coronavirus in Wuhan, China. Journal of Risk and Financial Management, 13(2), 22. https://doi.org/10.3390/jrfm13020022
