

# Ritsumeikan Journal of Asia Pacific Studies

Volume 39  
March 2021



Ritsumeikan Center for Asia Pacific Studies  
Ritsumeikan Asia Pacific University  
Beppu, Oita, Japan

ISSN 1344-4204

**Ritsumeikan Journal of Asia Pacific Studies**

Volume 39, March 2021

---

**Articles**

International Climbers' Behaviour towards the Payment of Mount Fuji's Conservation Donation

**Raphaelle DELMAS and Robin ARGUEYROLLES** ..... **1**

Exploring the Determinants of Cyberloafing in the Workplace: A Conservation of Resources (COR) Perspective

**Tsz Chit YUI, Wu Chiung-Ying WU and Chien-Chung KAO** ..... **28**

The Uncanny and the Superflat in Macabre Representations: Iconographic Analysis of a Kawanabe Kyosai Blockprint

**José Rodolfo AVILÉS ERNULT** ..... **58**

India's COVID-19 Strategy and implications for its relations in the Indian Ocean

**Astha CHADHA** ..... **81**

From Imitation to Innovation: Examining Global Drivers of Innovation in an Open Model of Technological Change

**Dominique Hannah A. SY** ..... **105**

## **International climbers' behaviour towards the payment of Mount Fuji's Conservation Donation<sup>†</sup>**

**Raphaelle Delmas<sup>1</sup> and Robin Argueyrolles<sup>2</sup>**

### **Abstract**

235,646 climbers were recorded on Mount Fuji's trail in July and August 2019. While this represents an opportunity for tourism and economic growth, it is also a challenge for the government whose role is to protect Mount Fuji from the by-products of tourism such as litter and environmental degradation, and to ensure the safety of climbers along the trail. With that goal in mind, a voluntary conservation donation system was set up in 2013. This paper investigates how international climber's compliance impacts the collection of the donation. A questionnaire with international climbers was designed using the contingent valuation method and conducted in August 2019. Data was analyzed using descriptive analysis and frequencies as well as a linear regression and non-parametric tests using Stata software. The results suggest that the relatively low payment rate of 60% can be explained by low awareness. Indeed, prior awareness increased compliance with the conservation donation by as much as 19 percent points, pointing to the need of reaching out to international climbers. Furthermore, when the purpose of the donation was explained, the climbers' willingness to pay for a mandatory entrance fee combining the donation and toilet tip was ¥1,544, with 78% of respondents agreeing that entrance should be charged.

**Keywords:** entrance fee; donation; willingness to pay; compliance; mountain tourism

### **1. Introduction**

The tourism industry, along with the number of outbound tourists, has experienced sustained growth over the last decades, becoming one of the biggest economic sectors in the world. Tourism represents an opportunity for developing as well as developed countries to increase their GDP and attract foreign attention, and many governments have integrated it in their policies. Japan had previously set a

---

<sup>†</sup> This paper was granted the Best Paper Award for Graduate Students at the 18th Asia Pacific Conference (2020).

<sup>1</sup> Graduate School of Asia Pacific Studies, Ritsumeikan Asia Pacific University

<sup>2</sup> Independent Researcher

target to receive 40 million tourists by 2020 and the Tokyo Olympics (Japan Times, 2018), representing a 25% increase compared to 2018 (JTB Tourism Research & Consulting Co, 2019). National Parks and natural areas are popular tourist destinations, such as Fuji-Hakone-Izu National Park that received 2.58 million foreign visitors in 2017 alone (MoE, 2017, cited in Tanaka, 2017). Mount Fuji, as the most famous mountain in Japan, has been climbed by 235,646 people in 2019 (Kanto Regional Environment Office, 2019). Accordingly, a large body of literature exist on this mountain in relation to the topic of garbage and human waste, restrictions on mountain entry, and cost recovery (Sayama and Nishida, 2001; Kobayashi et al., 2001; Watanabe et al., 2008; Kasai, 2009; Kasai et al., 2009; Ito, 2009; Kitagawa & Watanabe, 2010; Yamamoto & Akiha, 2011).

Mount Fuji is increasingly attracting not only sport mountaineers but rather occasional and even first-time hikers. Other mountains have experience similar trends, such as the mount blanc which sees an increasing number of inexperienced climbers (Kari, 2014). Accordingly, Mount Fuji embodies the trend of increasing popularity of famous summits across the world and its study offers a great potential for research and lessons learned applicable to mountains already in a similar situation or likely to attract many visitors in the future. Focusing on Mount Fuji most popular route, namely the Yoshida trail that concentrated 72% of climbers in 2018, the article seeks to understand how the perception and awareness of international climbers influences their payment of the conservation donation. Based on these results, the ideal price for an entrance fee is determined, as well as the demographic variables affecting willingness to pay.



**FIGURE 1. MAP OF TECTONIC PLATES IN JAPAN. (FUJISAN NETWORK, N/D, ONLINE)**

## 2. Literature Review

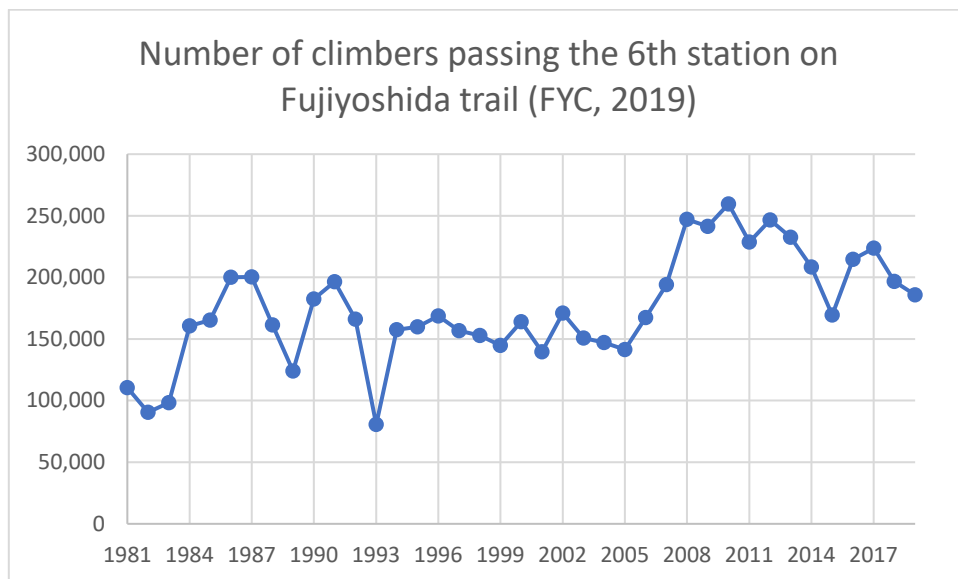
### 2.1. Case study presentation

Mount Fuji, the tallest mountain in Japan (3,776 m), stands in between Shizuoka and Yamanashi prefectures. It reached its current shape relatively recently for a volcano, approximately 10,000 years ago. The last eruption recorded was in 1707. Mount Fuji sits on three tectonic plates: the Amurian plate, the Okhotsk plate and the Filipino plate (Fujisan network, n.d.) (see Figure 1). Mount Fuji is situated some 100 km southwest of Tokyo, and easily accessible from the capital by train or bus. Every year it draws many Japanese and foreign climbers or visitors. Mount Fuji is also a sacred site of the Shinto religion and since the introduction of Buddhism in the

sixth century, an important place of worship. Climbing culture emerged in the fourteenth century as Buddhist worshippers established pilgrimage trails leading to the summit. Still to this day, because of its history intertwined with Japanese customs and religions, Fuji is worshipped and an important spiritual symbol in Japan (Polidor, 2007).

Since the fourteenth century and up to today, a consequent number of roads, mountain huts and shops were built on Mount Fuji. Accompanied by safer and well-defined climbing trails, as well governmental coordination and mountain rescue centres, the increasing commodification of the mountain has made it easily accessible for a non-technical day or overnight climb. Notably, the construction of the Fuji-Subaru toll road in 1964, made the 5<sup>th</sup> station (2300 m) accessible directly by vehicle, reducing the round-trip climbing time (Jones, 2018). Yoshida trail, the most popular of the four trails leading to the summit, has seen its number of climbers multiplied by 2.3 from 1982 to the climbing peak in 2012 (Fujisan Net, 2019).

Counting around 300,000 climbers every year (Kanto Regional Environment Office, 2019), Mount Fuji is one of the most climbed mountains in the world. In recent years, while access to the trail became easier and safer, the climbing profile diversified to include middle-aged and the elderly. Women, who were officially banned from attempting to reach the summit until 1868, also represent a relatively new and developing segment of climbers, as well as foreigners (Kasai, 2009).



**FIGURE 2. NUMBER OF CLIMBERS PASSING THE 6<sup>TH</sup> STATION COUNTER ON FUJI-YOSHIDA TRAIL, FROM 1981 TO 2019. (FUJIYOSHIDA CITY, 2019, ONLINE)**

## **2.2. Management structure of Mount Fuji**

Hiwasaki (2005) explains that in Japan, Natural Parks are managed through a system of zoning and regulation under the Natural Parks Law of 1957. On the contrary to US national parks, where a patch of land is set aside and dedicated to nature conservation, in Japan “natural areas of outstanding scenic beauty in Japan are designated as natural parks” (Nature Conservation Bureau, 2001, p.16), regardless of land ownership or land use. The wording demonstrates the aim for the creation of early natural parks in Japan, that is, recreation and tourism rather than conservation. In Japanese National Parks, private companies own and operate transportation systems and other tourism services, while park management has to compose with private ownership rights and coordination of development. This national park system has been criticized for its lack of effectiveness in conserving biodiversity, its lack of coordination among different government stakeholders and its top-down approach. The amendments made to the Natural Parks Law in 2002 shifted the park management's focus towards the conservation of biodiversity. This resulted in four additional regulations for the conservation of wildlife, namely: the establishment of Utilization Regulation Zones (which limits the number of visitors and their length of stay, by requiring prior reservations and charging a fee up to 1000 Japanese yen), further agreements with landowners, and delegation of park management to local non-profit organisations.

Mount Fuji is a good example of this complex management structure. Designated as a National Park in 1936 and as a special scenic spot in 1952, it is among the first National Parks in Japan, and its ownership is divided between private and national land. Some of its principal landowners are a Buddhist temple complex and the mountain hut association. For this reason, administration by the Ministry of the Environment of Japan is limited with regard to compliance by the many stakeholders involved.

Mount Fuji was one of the first candidates to be enlisted as a Natural World Heritage site in 1992 after Japan ratified the World Heritage convention. However, in 1995 after a visit from UNESCO, the application was aborted at least until Japan would solve the pollution problems degrading Mount Fuji's environment and implement tourism and climbing management strategies. According to Suzuki (2015) and Watanabe et. al (2008), the landscape alteration triggered by the increase in number of climbers and the mismanagement of their wastes was a major factor for the failure of the application. IUCN's feedback also suggested that the geological heritage of Mount Fuji was not exceptional enough to be enlisted as a Natural World Heritage site. The proposal was aborted in 2003, before IUCN's committee could give its final decision. After its withdrawal, the application was revisited to emphasize Fuji's cultural heritage aspects instead (Noguchi, 2014), and was inscribed on the tentative list for Cultural World Heritage Site in 2007. During the same period, citizens and organisations such as the Fujisan Club took action to tackle environmental problems at Mount Fuji through clean-up and

awareness campaigns (Polidor, 2007). The national and prefectural governments also organized joint tourism management plans, such as holistic trail management plans and new trail signs (Jones et al., 2018). Mount Fuji finally became enlisted as a Cultural World Heritage Site in 2013.

After Mount Fuji was inscribed as Cultural Heritage Site in 2013, a conservation donation system was implemented so that climbers can contribute on a voluntary basis a donation with a suggested amount of ¥1000. The donation is received at the entrance of the trail (5<sup>th</sup> or 6<sup>th</sup> station) where small stations are set up to call hikers to donate. It is also possible to donate via convenience stores in Japan and internet. According to the Council for the Promotion of the Proper Use of Mt. Fuji (2019), the donation contributes to “help efforts for environmental conservation and enhance climber safety.” The various uses of the money collected are detailed in Annex 1. In their study of factors influencing the payment of the conservation donations, Jones, Yamamoto & Kobayashi (2016) found that 71% of international climbers were unaware of such a donation, compared to 8% of Japanese climbers. The willingness-to-pay of Japanese climbers was 88% while only 50% of international climbers were willing-to-pay, this number climbing to 72% when only considering those who had prior awareness of the donation system. They concluded that prior awareness was a crucial factor for compliance with the donation.

### **3. Method**

This research uses quantitative method to analyse primary data collected by the author from in August and September 2019 at K's House Kawaguchiko (see annex 2), a hostel in Kawaguchiko, Japan, mostly frequented by US and EU's climbers. Kawaguchiko is a city located at the feet of Mount Fuji, main base camp for tourists and climbers seeking to reach the mountain. There are many accommodation options around this area, which is why it was chosen to conduct the survey. The questionnaire in English was available freely at the reception desk and in the lounge where hostel guests filled it out. It was on occasions followed by discussions between the respondents and the researcher to allow for the collection of additional qualitative data and follow-up comments made during the survey. A total of 89 responses were collected. The data collected consists of the respondents' socioeconomic profile; use of the services available at Mount Fuji; payment of the park and toilet fees; and their willingness-to-pay to visit Mount Fuji. The data was entered informatically into Excel and analysed using the latter as well as Stata software.

Prior to a series 'yes' or 'no' iterative bidding questions that concluded on the respondents' final willingness-to-pay at the end of the questionnaire, the climbers were informed in a methodical manner on the ecological problems triggered by tourism and the purpose of preservation at Mount Fuji.

This type of iterative bidding question was used because respondents were inclined to act strategically as they previously had to justify their behaviour regarding the payment of the donation. The following questions were asked to the respondents:

**'If there was a NEW entrance fee of ¥1000 per person per day to enter Mt Fuji, replacing the current donation system, would you be willing to pay this fee? Circle Yes or No on the figure below:'**

Then either, if answered yes:

**'If there was a NEW entrance fee of ¥1500 per person per day to enter Mt Fuji, replacing the current donation system, would you be willing to pay this fee? Circle Yes or No on the figure below:'**

Or, if answered no:

**'If there was a NEW entrance fee of ¥500 per person per day to enter Mt Fuji, replacing the current donation system, would you be willing to pay this fee? Circle Yes or No on the figure below:'**

Then all the respondents were asked this final question:

**'What is the highest price you would be willing to pay?'**

Following the contingent valuation method question, a control question was asked to all the respondents:

**'What is the main / most important REASON that influenced your decision for the HIGHEST price acceptable in Q22?'**

It should be noted that similar studies were conducted by Japanese researchers and published in Japanese. They focused mostly on Japanese climbers as questionnaires were distributed in Japanese. If some authors did translate their questionnaires in English, it was a marginal practice, and authors could not speak English and collect valuable data from international climbers. However, international climbers represent a growing segment of climbers at Mount Fuji. This trend of internationalization is not only specific to Mount Fuji but to the overall Japanese tourism sector as well as mountains in other parts of



the world. Thus, we deemed appropriate and important to study international climber's behaviour towards payment of environmental and tourism services.

Many economic valuation techniques exist that measure the value of environmental good and services which do not have a market value which are commonly referred to as non-market valuation methods. Economic valuation techniques help to identify the economic benefits or costs relating to environmental resources and externalities. Hence, the revealed value reflects the price that people are willing to pay in order to obtain a good or service (Nuva et al, 2009). There are indirect pricing methods such the hedonic pricing method, or direct methods also called stated preferences methods. The later consists of a questionnaire approach and includes two main techniques: The contingent valuation method or the choice experiments.

The contingent valuation method first used by Ciriacy-Wantrup in 1947, that includes a set of well-established good practices (OECD, 2018) and which is commonly used when investigating the entrance fee pricing for natural attraction is favoured here in the present study. In addition to simple tabulation and average value calculation, an attempt is made to understand the factors that determine climber's payments patterns by conducting a linear regression and non-parametric tests using Stata. In particular, the explanatory variables explored are awareness of the system (prior to climbing) and the socio-economic profile of the climber.

The fundamental assumption behind the contingent valuation method is that individuals can translate a wide range of environmental criteria into a single monetary amount reflecting the total value of an environmental goods or service. Accordingly, the larger the perceived value for the good is, the higher the willingness to pay for it (White & Lovett, 1999). There exist two approaches for the contingent valuation method. The first relies on asking a willingness-to-pay (WTP) question while the second uses a willingness-to-accept (WTA) question instead. Theoretically, each should produce similar results, but good practice has it that WTP questions should be asked (Arrow et al., 1993), because willingness-to-accept generally gives a more conservative estimate and yields more protest bids. Kahneman et al. (1990) compared willingness to pay and willingness to accept by studying trading behaviour when people participated in a standard market experiment using value tokens, and when the same people participated in market experiment using coffee mugs worth \$6 each. They found that individuals have a strong tendency to remain at the status quo, meaning that the disadvantages of giving up something are larger than the advantages. They also found that giving up something requires a larger compensation than the agent is willing to pay to purchase it, so willingness to accept implies status quo bias and a loss aversion.

The very nature of the contingent valuation method, which is to put a value on a good or service for which the market is not real, has been criticized by researchers to induce a hypothetical bias (Maxwell, 1994). Various other biases and pitfalls have been noted and described in the literature on the topic. By strictly disclosing the same information to all respondents as well as anticipating and monitor the effect of this information on responses, the authors worked to minimize the potential respondents' information bias that stems from the survey-based data gathering strategy used in the present study (Maxwell, 1994). Furthermore, due to the hypothetic nature of the experiment, there is a risk of mental account bias where respondents might fail to consider every variable in their answer such as external financial constraints (Schkade and Payne, 1994) as well as the 'warm glow' effect where can also occur, as stated answers does not compel respondents to actually pay. In other words, climbers might state a higher price that they would in fact be willing to pay for their own moral satisfaction (Kahneman and Knetsch, 1992). Due to these various criticisms, there have been attempts to identify guidelines for the proper design and use of such surveys (e.g. Arrow *et al.*, 1993). To limit as much as possible the effects of these various biases on the present study, the recommendations of the NOAA panel were followed wherever possible in the design of the surveys.

It is also often pointed out by policy makers that there is a discrepancy between the willingness to pay obtained based on hypothetical scenarios compared to real world donation. Moreover, while the rate of collection is almost 100% when passing through a place where the donation is physically enforced, it has been found from actual measurements that the collection rate is only about 30 to 50% when calling for donations, and almost 0% when simply installing a donation box (Yoshida, 2015). In order to eliminate the risks of contesting the results of this research based on the assumption that climbers will adopt a freeloading behaviour, the willingness to pay question was based on a hypothetical mandatory entrance fee for Mount Fuji that would replace both the conservation donation and the toilet tip.

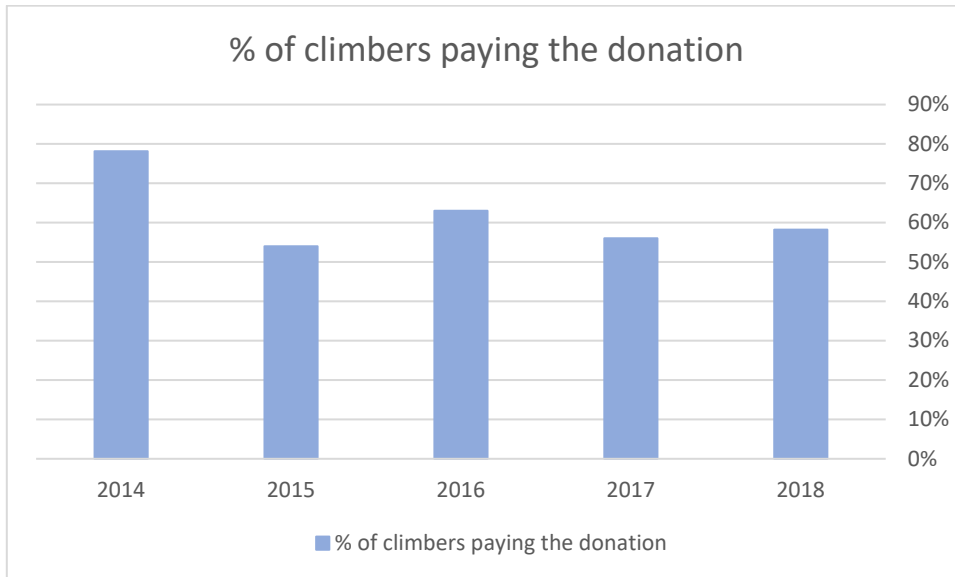
Another shortcoming of this study is that when conducting statistical analysis, the sample size for a study needs to be large enough to provide statistical power. However, mainly due to time and financial constraints, the interviewer could only collect 89 responses for their climber questionnaire. While this number is not extremely significant statistically, it was still considered sufficient to conduct an analysis. To mitigate this limitation, the researcher used both a linear regression analysis and non-parametric tests to allow comparison. Further research based on a larger sample could lead to contrasting findings, as suggested by the results obtained when using a linear regression. It should be noted as well that the questionnaire to the climbers was filled exclusively by international climbers, and that the collection place was a hostel frequented mostly by young travellers (20-30 years old), or families or

older travellers who prefer a hostel environment to that of a more expensive hotel. If other categories of people were included (by requesting to fill surveys on the trail directly for example, or by comparing with climbers sleeping in a more expensive hotel), the trends observed by analysing the questionnaire could yield different results.

#### 4. Results

Since Mount Fuji became a World Heritage Site, a voluntary entrance fee system named “conservation donation” was implemented. A trial was first conducted in 2013 in Yamanashi prefecture to set up a conservation donation on Mt Fuji, and the project was implemented in 2014. According to Yamanashi prefecture (2019), the donation is used to provide information on the value of Mt Fuji as a source of religion and art and to provide environmental protection measures such the construction and renovation of toilets, the expansion of rescue facilities, etc.

Figure 3 displays the payment rate of the conservation donation on Yoshida trail from 2014 to 2018. In 2018, the payment rate of the conservation donation by climbers using the Yoshida trail was around 60%. This number is calculated using the data available on Yamanashi’s prefecture website (2019) crossed with the climbing data retrieved from the Ministry of the Environment of Japan’s website (2019). Hence, the primary data gathered by the author is further validated as the payment rate of 66% closely matches the one derived using the data from Japanese Ministry of Environment. It remains that this payment rate could be much lower considering the findings of Jones, Yang and Yamamoto (2018), that shows that the number of climbers recorded by the Ministry of the Environment of Japan is an underestimate. Nevertheless, this implies that the payment rate considered in the study is an upper bound resulting in conservative estimates of the potential gains from an increase in donations volume. Figure 3. Payment rate of the conservation donation in Yamanashi prefecture from 2014 to 2018 (in %) (Yamanashi prefecture, 2019, online)



**FIGURE 3. PAYMENT RATE OF THE CONSERVATION DONATION IN YAMANASHI PREFECTURE FROM 2014 TO 2018 (IN %). (YAMANASHI PREFECTURE, 2019, ONLINE)**

Once again, this is a relatively low payment rate, with 40% of climbers refusing to pay the conservation donation. It is noteworthy to mention once again that most respondents of our questionnaire were from Europe or the US. In the US, there is a mandatory entrance fee to all national parks, which is set from USD7 to USD20, so US visitors should be used to pay to access protected areas (National Park Service, 2020). However, in Europe, the history and processes behind setting protected areas is different than in the US, and entrance fees are much rarer. Most national parks are free to access, although there are recent discussions about setting up entry fees, for example in France (Connexion France, 2020). The reasons why respondents did or did not pay the donation were therefore explored. Each respondent was asked to answer a multiple-choice question exploring reasons why they did or did not give a donation, if applicable. Figure 4 and 5 display all reasons that represented at least 5% of cases. In more than 30% of cases, respondents who paid the donation indicated that they paid because they didn't want to contribute to damaging Mount Fuji and/or because Mount Fuji is World Heritage Site. We can thus argue that the World Heritage label adds perceived value to Mount Fuji, and people become more inclined to pay because they know and trust the World Heritage Site brand. When looking into reasons for people refusal to pay, in almost 25% of cases, the climbers reported not paying because they did not know what the money would be used for. Based on that answer, it can be argued that if they knew about the donation beforehand, or in more details, they would be more willing to accept the payment, which corroborates Jones, Yamamoto and Kobayashi (2016) findings that prior knowledge increases the

payment rate by 22 percent points (from 50% to 72%). Indeed, when comparing the percentage of people that paid the conservation donation amongst people who had prior knowledge of it with the percentage of people that paid the conservation donation amongst people who had no prior knowledge of it, we can see that payment rate increases by 19 percent points (see figure 6).

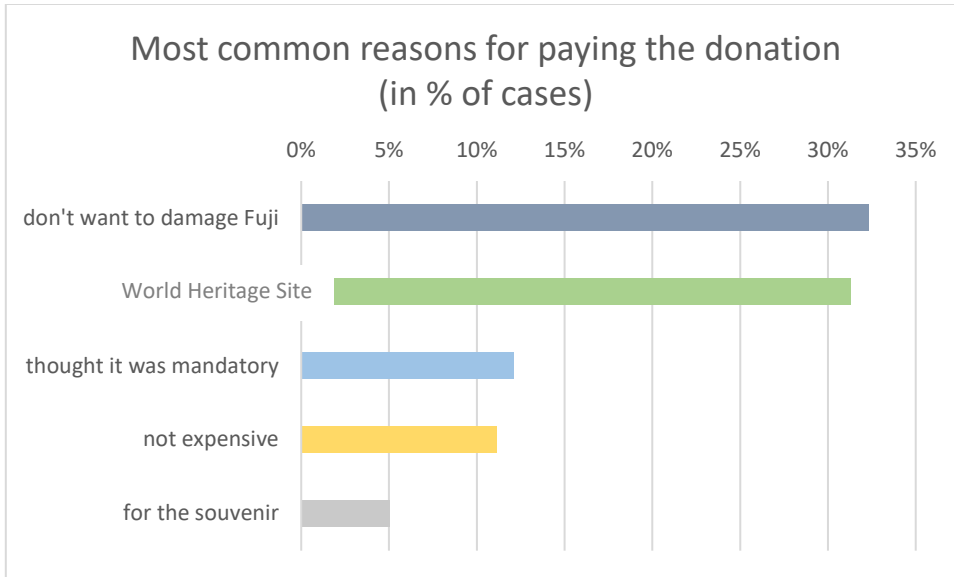


FIGURE 4. REASONS FOR PAYING THE CONSERVATION DONATION (IN % OF CASES).

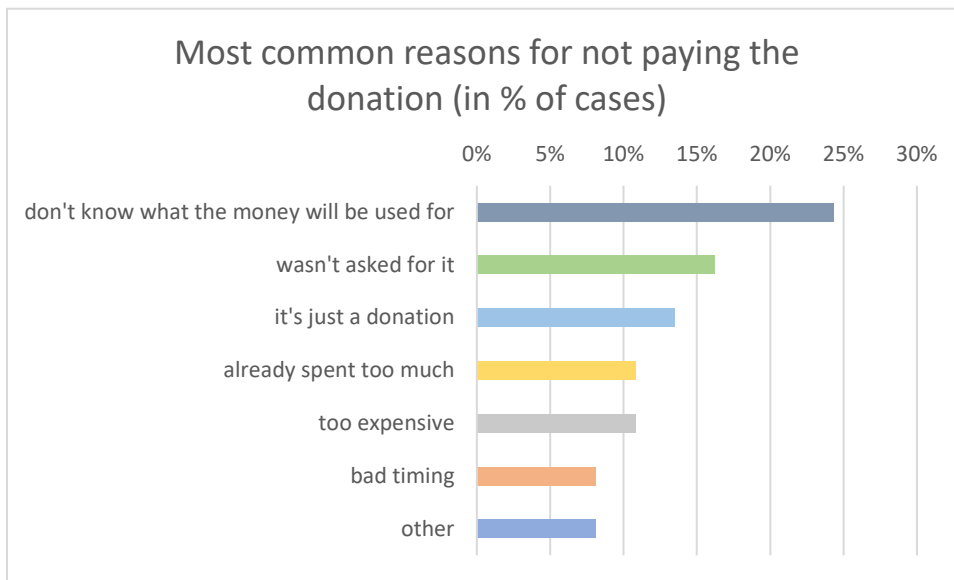
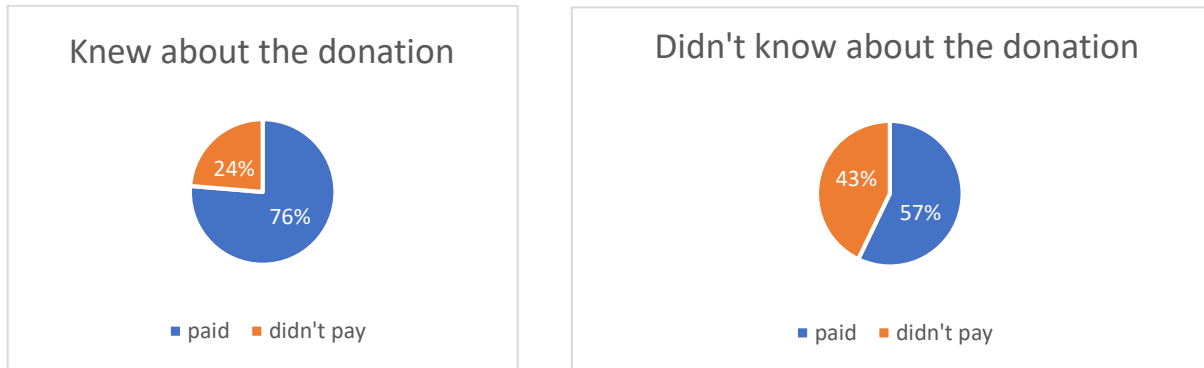


FIGURE 5. REASONS FOR NOT PAYING THE CONSERVATION DONATION (IN % OF CASES).



**FIGURE 6. PAYMENT RATE OF THE CONSERVATION DONATION ACCORDING TO PRIOR KNOWLEDGE ABOUT THIS PAYMENT SYSTEM.**

To evaluate willingness-to-pay of climbers and explore factors influencing their response, we used the economic valuation method as described in the methodology section and ran parametric and non-parametric tests using Stata software. As shown by Figure 7, with a mean willingness to pay of ¥1,544 and a standard deviation of ¥879 the data displays a considerable spread. While a variation in the sample data comes to no surprise considering the size of the variation, what variables have a statistically significant impact on respondent's willingness to pay? In other words, what independent variables hold a significant impact on respondent's willingness to pay (our dependent variable)?

WTP	Freq.
0	1
500	7
700	1
750	1
800	1
1000	27
1100	1
1200	1
1300	1
1500	13
1700	1
1800	1
2000	20
2500	3
3000	4
4000	1
5000	2
TOTAL	86

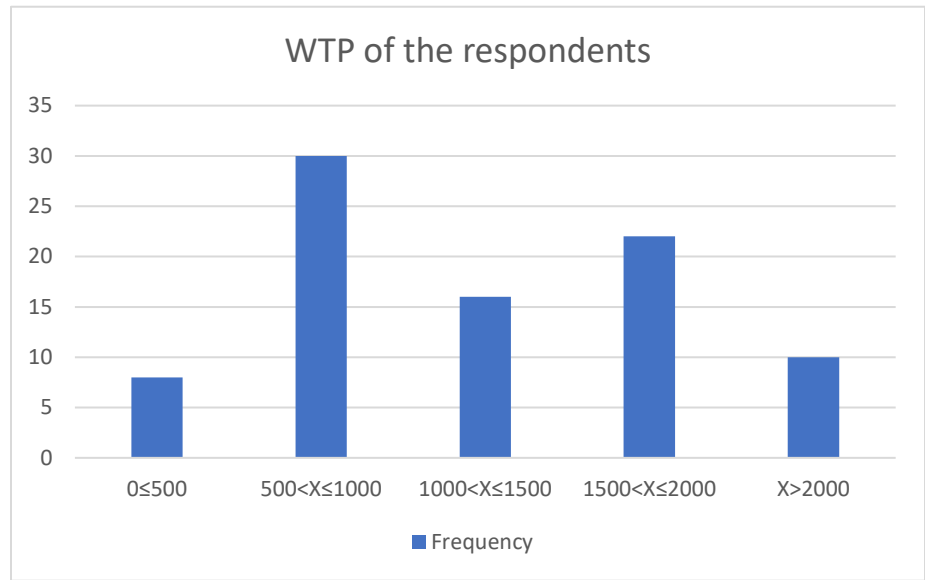


FIGURE 8. SUMMARY OF THE DATA ON RESPONDENT’S WILLINGNESS TO PAY.

Let us consider age, gender, occupation, and income category as our independent variables (see Annex 2 for categories). Based on the linear regression (see Table 1 below or Figure 2 of Annex 3 for more detailed information), we find that at a 5% confidence level, gender ( $p=0.015^{**}$ ) and income category ( $p=0.021^{**}$ ) have a statistically significant effect on the respondents’ willingness to pay. More precisely, it appears that female respondents’ willingness to pay was about ¥500 higher on average. Furthermore, an increase by one income category results on average in an increase of close to ¥200 in the respondent’s willingness to pay. However, noting the regression low R-square, the low number of observations, and the unknown sample distribution, these results must be viewed with skepticism.

**TABLE 1. RESULTS OF THE LINEAR REGRESSION.**

Dependent Variable	Coefficients
Gender	511.17 ** (0.015)
Income Category	196.72 ** (0.021)
Age	-20.95 (0.116)
Occupation	-35.721 (0.597)
Observations	80

Note: \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$

Taking the statistical significant of the above coefficients and the sample size limitation into consideration, the following investigation focuses on an analysis of genders' impact on WTP using non-parametric tests which need fewer observations and usually make no basic assumptions on the distribution of the data<sup>3</sup>. Based on the Mann-Whitney U test (Table 2) and its resulting p-value of 0.0247\*\*, we find that with a 5% confidence level we can reject the null hypothesis that the willingness to pay of female and male respondents are the same (or equal). Knowing that the Mann-Whitney U test ranks observations to assess whether two samples are similar (have a similar distribution) by considering the average ranks of the variable observed in the two samples (i.e. correcting for number of observations), we can conclude that the willingness to pay of female and male have a statistically significantly different means. This result is further established by the one-sided Mann-Whitney U test which shows that there exists a larger probability for the female median WTP (0.638) to be greater than that of male respondent. In fact, a simple observation of the data shows, there exist a consistently higher willingness to pay in the female respondent above the 50<sup>th</sup> percentile (see Figure 1 of Annex 3).

<sup>3</sup> No non-parametric test could provide robust analysis of the income category explanatory variable due to the size, spread and nature of the data.



**TABLE 2. RESULTS OF THE MANN-WHITNEY U TEST.**

Gender	Observations	Rank Sum	Expected
Male	48	1836	2088
Female	38	1905	1653
Combined	86	3741	3741
Adjusted variance	12 595.08		
Z value	-2.245		
Prob >  Z	0.0247		
P {WTP (Female) > WTP (Male)} = 0.638			

## 5. Discussion

The payment rate of the conservation donation is estimated at around 60% both by the primary data gathered as well as the provided by the MoE. This number is similar to the payment rate of 59% found by Yamamoto and Jones (2017). Although Mount Fuji comparatively ranks better than other national parks in Japan where a similar conservation donation is collected, (Yakushima (35-46% collection rate) and Shirakami (30-35% collection rate)), it is still important to investigate the reasons for a low payment rate of both the toilet tip and the conservation donation. To do so, we ought to explore about the motivations of climbers, as well as their understanding of these fees. We found that only 23% of the respondents knew about the conservation donation before starting to climb. However, Jones, Yamamoto & Kobayashi (2016) pointed to the fact that prior awareness was a crucial factor for compliance with the conservation donation. Their finding is corroborated by responses to the author's questionnaire: 24% of respondents who didn't pay the donation declared that one of the reasons was that they didn't know what the money would be used for. Another 22% of respondents mentioned the donation being too expensive or having already spent too much money. This justification shows here again a lack of awareness on the true cost of climbing, and the use made of this money. Furthermore, we found that prior knowledge about the conservation donation increased payment by 19 percent points in our respondents, from 57% to 76%. These findings point toward the necessity to educate climbers and find ways to share more information with them, as their understanding and compliance would be enhanced.

However, the low payment rate translates into poor cost recovery. Kuriyama (2015) already wrote regarding the conservation donation that sufficient money is not collected to achieve the purpose

of the system because the cooperation rate is lower than expected. Currently, even in World Heritage sites, sufficient money to cover fund-raising and personnel expenses for conservation projects are not secured.

With that in mind, it is necessary for the management bodies of Mount Fuji to adapt and design a system that allows the collection of sufficient money from climbers. Efficiently avoiding free riders and improving the collection rate without excessive expenses required for collection is a necessary condition for effectively using the entrance fee of the area (Yoshida, 2015). A solution that has been adopted in national parks across the world, such as the USA, Taiwan, Indonesia etc. is the payment for ecosystem services method. The principle is to charge a fixed amount entrance fee to users or climbers. From the perspective of environmental economics, entry fee collection is expected to have the same effect as the policy mix of environmental taxes and subsidies. In other words, it is possible to both ease congestion by controlling the number of visitors and securing policy costs by increasing income. Although this method is widespread around the world, there are very few cases where an entry fee is collected in Japan (Yoshida, 2015). Examples in Japan include a similar donation to the one at Mount Fuji that is collected in Yakushima and Shirakami because they are both World Heritage Sites, and an environmental conservation tax that is charged in Gifu prefecture. The conservation donation collected at Yakushima was investigated by a few researchers. Yakushima island was designated as a World Heritage site in 1993 and attracts many visitors in May and during the summer vacation in August. Similar to Mount Fuji, the concentrated usage and large number of visitors in Yakushima triggers environmental impacts and the rapid deterioration of mountain trails. Kuriyama and Shoji (2008) studied the impact on visitation when entrance prices are raised. They found that an increase of the entrance price from ¥300 to ¥500 triggers a decrease of 5% of visitors, while an increase of ¥1,000 decreases visitation by 20%. Furthermore, younger visitors and locals (living in the vicinity of the island) are more severely affected by the price increase. A similar study should be conducted for Mount Fuji, but if similar results are found, measures to reduce the weight on younger visitors and locals such as a reduced price or free entrance should be adopted.

To explore the feasibility of such a solution at Mount Fuji, the author asked a willingness-to-pay question to climbers. The entrance fee suggested would include both the conservation donation and toilet tip. The results show that the respondent's mean willingness to pay is greater than the current requested conservation donation fee but that a significant deviation from the mean exist. This suggest that a higher fee could be apply when the use for the donation is salient. Considering that 100% of climbers would have to pay the entrance fee, instead of the 60% currently estimated, the money collected would increase by approximately ¥60,000,000 if the number of climbers stay constant compared to 2018 and the

climbing fee stay fixed at ¥1,000. This figure could be even higher if the climbing fee was above ¥1,000. Furthermore, 78% of respondents think that there should be an entrance fee to Mount Fuji, which shows a considerable understanding towards this solution. Reasons for disagreement mostly pointed towards the fact that “*decreasing accessibility to a natural wonder is [probably not] a morally great idea*” (respondent 20). However, many climbers mentioned that 1000 yen “*is similar to the price of other attractions*” (respondent 17) or mentioned a similar price for national parks in their country, such as respondent 21: “*[it] is around the price to enter national parks in [the] USA and the money goes a long way. People generally don't mind paying.*”. Furthermore, Suzuki (2015) suggested in his research on Mount Fuji's World Heritage Site application that if the registration does not involve entry restriction or entry fees, the number of climbers will exceed the capacity of the mountain.

When looking into factors that influence willingness to pay by conducting a statistical analysis, we found that gender seemed to influence WTP, with females being willing to pay ¥500 more yen on average. Income category is also a factor that influences WTP, with an increase of ¥200 on average for each income category. Although income is a factor that influences WTP, its influence on the latter is limited as ¥200 is a quite low increase, when compared to the difference measured between males and females. These findings corroborate previous research using the same method to understand willingness to pay an entrance fee for a national park in India where the authors found that an increase in income translated into an increase in willingness to pay. Furthermore, they also found that female respondents were statistically willing to pay more than male respondents (Bal and Mohanty, 2014). A factor that could explain the discrepancy between stated willingness to pay and actual payment of the conservation donation is the fact that before answering the willingness to pay question, respondents were informed about environmental problems at Mount Fuji and what their money would be used for.

While the contingent valuation method is not without biases (see section 2.4), it was selected for its methodological fit with the analysis topic, and its use is well recognized in scientific literature. As a commonly used method in the literature of the topic, clear guidelines have been established in order to avoid biases and so that the results obtained through willingness to pay questions can be generalized. To yield an accurate approximate of respondents willingness-to-pay, the questionnaire was conducted once climbers were back from climbing and resting in the hostel, giving them plenty of time to think about their answer. A control question was added to have them justify the amount they wrote down. Furthermore, when interviews were conducted, they took place after the respondents filled the questionnaire in order to disclose the same information to all respondents. A critic could be that respondents had already climbed and their answer didn't engage them to pay the amount they wrote down. In fact, while approximately 40% of respondents didn't pay the conservation donation, only 1

respondent said they would not pay for an entrance fee. A way to ensure that respondents are not overestimating their willingness to pay would be to distribute the same questionnaire at the place where the donation is collected and compare the result with their actual payment, but this could be seen as a breach of ethical standards and procedures.

## **6. Conclusion**

In conclusion, there is a low compliance from international climbers that translates into a low payment rate. Their awareness of the conservation donation is low, as well their understanding of what the money is used for. Considering that in recent years the climbing profile has changed to include more and more international climbers, it is going to be a necessity to review management policies based on their behaviour. Indeed, our study shows that climbers aware of the systems prior to the climb tend to have a higher compliance, pointing to the need of making more information available to the public. Similarly, when explained where the money would go, 78% of climbers agree that there should be a mandatory entrance fee, and their mean willingness to pay is ¥1,544. If a higher income seems to yield a higher willingness to pay, the influence is still quite limited. However, gender seems to have an influence, as women tend to be willing to pay ¥500 more on average.

This study thereby recommends that the implementation of a mandatory entrance fee that would combine both the conservation donation and the toilet tip be further investigated. Yoshida (2015) suggested that the collection rate was almost 100% when using a park & ride system, and our interview with M. from the Ministry of the Environment of Japan confirmed that fact for the Minami Alps National Park in Japan where a park & ride system is set up. In this national park, a conservation donation of ¥100-200 is included in the price of the bus ticket, and the collection rate is about 99%. Furthermore, considering that the park & ride system is already in place at Mount Fuji, labour and collection costs would be significantly decreased, allowing a bigger proportion of the money collected to be used for conservation, toilets or safety. Whether it is implemented as a park & ride system, as a mandatory internet registration with online payment, or any other automated system, a single entrance fee will yield higher revenue than cash payments and call for donations, and will increase transparency and access to information for all climbers. It is easy to imagine an official website with information accessible in many languages where people can buy their entrance ticket to Mount Fuji. It is also an opportunity to display climbing safety and manners recommendations. The ideal entrance price can be established at ¥1,400 (¥1000 of conservation donation and ¥400 of toilets). Considering that the mean willingness to pay of international climbers for climbing Mount Fuji is ¥1,544, an entrance fee of ¥1,400-¥1,544 would also be accepted by most climbers. Kasai, Saizen and Kobayashi (2009) also found using the same contingent

valuation method that the willingness to pay of Japanese climbers was ¥1,569, confirming our suggested price.

The author used the contingent valuation method to complement the research already conducted by Kasai, Saizen and Kobayashi (2009), and both studies showed to obtain a similar willingness to pay regardless of the nationality of climbers. While this method has limitations, this comparison allows us to consider the results as accurate. We hope that this study can help realize the importance of integrating climbers feedback into management policies and help set a correct price for climbing. Stakeholder interviews however highlighted that the main barrier to the implementation of an entrance fee came from the lack of cooperation between all the actors involved at Mount Fuji. For the adequate implementation of the fee recommended in this article, further research on stakeholder coordination is therefore essential.

Even though this research focuses on Japan and particularly Mount Fuji, the methodology used in this paper can be replicated anywhere in the world, and there are in fact many researchers already using the contingent valuation method to evaluate the willingness to pay of users of national parks around the world (Kamri, 2013 ; Nuva et al., 2009 ; Samdin, 2008). It is interesting to use this methodology not only for national parks, but for climbing specific mountains, as the overcrowding issues are becoming prevalent not only on Mount Fuji, but also on other summits, such as Mount Everest (Man Singh et al., 2019) or Mont Blanc (Jones, 2019).

## References

- Arrow, K., Solow, R., Portney, P., Leamer, E., Radner, R. and Schuman, H. (1993). Report of the NOAA panel on contingent valuation. *Federal Register*, 58, 4601–4614
- Bal, D. P., Mohanty, S. (2014). Determination of Willingness to Pay for Entrance fee to National Park: An Empirical Investigation. *International Journal of Ecological Economics & Statistics (IJEES)*, 35(4)
- Bateman, I. J., Langford, I. H., Turner, R. K., Willis, K. G. and Garrod, G. D. (1995). Elicitation and truncation effects in contingent valuation studies. *Ecological Economics*, 12, 161–179.
- Connexion France. (2020, February 14). *French national parks may start charging entry fees*. Connexion France. <https://www.connexionfrance.com/French-news/French-national-parks-may-start-charging-entry-fees-due-to-lack-of-funding>
- Council for the Promotion of the Proper Use of Mt. Fuji. (2019, June 28). *Fujisan Conservation Donation Campaign*. Ministry of the Environment of Japan. [http://www.fujisan-climb.jp/en/manner/conservation\\_donation.html](http://www.fujisan-climb.jp/en/manner/conservation_donation.html)
- Fujisan Network. (n.d). *Mt. Fuji's Nature*. [http://www.fujisan-net.gr.jp/english/4\\_04.htm](http://www.fujisan-net.gr.jp/english/4_04.htm)
- Fujisan Net. (2019, October 6). *Number of climbers during the Mt. Fuji summer mountain season*. [https://www.fujisan-net.jp/post\\_detail/2001038](https://www.fujisan-net.jp/post_detail/2001038) [*in Japanese*].

- Hiwasaki, L. (2005). Toward Sustainable Management of National Parks in Japan: Securing Local Community and Stakeholder Participation. *Environmental Management*, 35(6), 753-764.
- Ito, T. (2009): The trail and climber management and its cost recovery from the climbers at Mt. Fuji in Edo Period. *Journal of the Japanese Forestry Society*, 91, 125-135. [in Japanese with English abstract]
- Japan Times. (2018, August 31). *Abe vows further efforts to reach 40 million tourism goal by 2020*. Japan Times. <https://www.japantimes.co.jp/news/2018/08/31/national/politics-diplomacy/abe-vows-efforts-reach-40-million-tourism-goal-2020/>
- Jones, T. (2019, June 1). *France restricts access to Mont Blanc to combat overcrowding*. Deutsche Welle. <https://www.dw.com/en/france-restricts-access-to-mont-blanc-to-combat-overcrowding/a-48998298>
- Jones, T., Beeton, S and Cooper, M. (2018). World heritage listing as a catalyst for collaboration: can Mount Fuji's trail signs point the way for Japan's multi-purpose national parks?. *Journal of Ecotourism*, 17:3, 220-238
- Jones, T., Yang, Y. and Yamamoto, K. (2018). Comparing Automated and Manual Visitor Monitoring Methods: Integrating Parallel Datasets on Mount Fuji's North Face. *Journal of Park and Recreation Administration*, 36(1), pp.22-38.
- Jones, T., Yamamoto, K. and Kobayashi, A. (2016). Investigating Climber's Awareness and Willingness to Pay a Donation: a Comparative Survey of Domestic and International Climbers Segments at Mount Fuji. *Journal of Environmental Information Science*, 44.
- Kahneman, D. and Knetsch, J. L. (1992). Valuing public goods: the purchase of moral satisfaction. *Journal of Environmental Economics and Management* 22, 57–70.
- Kahneman, D., Knetsch, J. and Thaler, R. (1990). Experimental Tests of the Endowment Effect and the Coase Theorem. *Journal of Political Economy*, 98(6), 1325-1348.
- Kamri, T. (2013). Willingness to Pay for Conservation of Natural Resources in the Gunung Gading National Park, Sarawak, *Procedia - Social and Behavioral Sciences*, 101, 506-515.
- Kanto Regional Environment Office. (2019). *Survey results on the number of climbers on Mt. Fuji*. Ministry of the Environment of Japan. [http://www.env.go.jp/park/fujihakone/data/fuji\\_tozansha.html](http://www.env.go.jp/park/fujihakone/data/fuji_tozansha.html) [in Japanese].
- Kari, P. (2014). *The Deadly Mountains: Why More Inexperienced Climbers Are Dying*. Mashable. <https://mashable.com/2014/08/28/inexperienced-climber-deaths/?europa=true>
- Kasai, K. (2009). Research on night soil management in Mt. Fuji. *Munich Personal RePEc Archive Paper*, 52227, 2-74. [in Japanese with English abstract]
- Kasai, K., Saizen, I. and Kobayashi, S. (2009): Securing operation and maintenance funds of self-disposal toilets of mountain huts in Mt. Fuji: Investigation of comprehensive performance evaluations for selection method of self-disposal toilets and WTP of entrance fee for Mt. Fuji using CVM. *Munich Personal RePEc Archive Paper*, 52165, [in Japanese with English abstract]
- Kitagawa, S. and Watanabe, S. (2010): National trust at the foot of Mt. Fuji: Significance and perspective. *Mount Fuji Research*, 4, 1-8. [in Japanese]
- Kobayashi, M., Miura, S., Ishizaki, K., Oohaba, M. and Mizoguchi, O. (2001): User evaluations of the bio-toilets: Proof experiment in Mount Fuji. *Proceedings of the Japan Society of Civil Engineers (Doboku Gakkai Gakujutsu Koenkai 56)*, VII-093, 186-187. [in Japanese]

- Kuriyama, K. (2015). Multi-faceted analysis of Mt. Fuji entrance fee based on data. *Tourism culture*, 226, 15-18. [in Japanese]
- Kuriyama, K. and Shoji, Y. (2008). An Economic Assessment of impacts on visitors by cooperative funding: A case study applying CVM in Yakushima Island, Kagoshima, Japan. *Environmental Science Journal*, 21 (4), 307-316 [in Japanese]
- Maxwell, S. (1994). Valuation of rural environmental improvements using contingent valuation methodology: a case study of the Marston Vale Community Forest Project. *Journal of Environmental Management*, 41, 385–399
- Nature Conservation Bureau. (2001). *For coexistence of people and nature*. Ministry of the Environment of the Government of Japan. <https://www.env.go.jp/en/nature/npr/fcpn/index.html>
- National Park Service. (2020). *Entrance Fees by Park*. United States Department of the Interior. <https://www.nps.gov/aboutus/entrance-fee-prices.htm>
- Noguchi, K. (2014): Mount Fuji is Crying, Being Made a World Heritage Site. *PHP Kenkyusho*. [in Japanese]
- OECD. (2018). Chapter 4: Contingent Valuation Method. in: OECD, *Cost-Benefit Analysis and the Environment. Further Developments and Policy Use*. <https://www.oecd.org/governance/cost-benefit-analysis-and-the-environment-9789264085169-en.htm>
- Man Singh, U., Gurubacharya, B., Schmall, E. (2019, May 28). *Overcrowding on Mount Everest contributes to rise in deaths*. PBS News Hour. [https://www.pbs.org/newshour/world/overcrowding-on-mount-everest-contributes-to-rise-in-deaths#:~:text=NAMCHE%2C%20Nepal%20\(AP\)%20%E2%80%94,deadly%20delays%2C%20seasoned%20mountaineers%20said](https://www.pbs.org/newshour/world/overcrowding-on-mount-everest-contributes-to-rise-in-deaths#:~:text=NAMCHE%2C%20Nepal%20(AP)%20%E2%80%94,deadly%20delays%2C%20seasoned%20mountaineers%20said).
- Polidor, A. (2007). Sacred Site Reports. <http://www.sacredland.org/mount-fuji>.
- Samdin, Z. (2008). Willingness to Pay in Taman Negara: A Contingent Valuation Method, *Journal of Economics and Management*, 2(1), 81-94.
- Sayama, H. and Nishida, M. (2001): Transition of the beautification and cleaning activities in Mt. Fuji area after World War II. *Landscape Research Japan Online*, 64, 485-488. [in Japanese]
- Suzuki, K. (2015). Understanding Recommendations to be Implemented for the Better Management of Mt. Fuji as a World Cultural Heritage, *Journal of Geography (Chigaku Zasshi)*, 124(6), 995-1014. [in Japanese]
- Nuva, R., Shamsudin, M., Radam, A. and Shuib, A. (2009). Willingness to Pay towards the Conservation of Ecotourism Resources at Gunung Gede Pangrango National Park, West Java, Indonesia. *Journal Of Sustainable Development*, 2(2). doi: 10.5539/jsd.v2n2p173
- Schkade, D. A. and Payne, J. W. (1994). How people respond to contingent valuation questions: a verbal protocol analysis of willingness to pay for an environmental regulation. *Journal of Environmental Economics and Management* 26, 88–109
- Watanabe, T., Kaidu, Y., Kachi, N., Terasaki, T., Noguchi, K. and Yoshida, M. (2008): World natural heritage from the perspective on tourism. *Global Environmental Research*, 13, 123-132. [in Japanese]
- White, P. and Lovett, J. (1999). Public preferences and willingness-to-pay for nature conservation in the North York Moors National Park, UK. *Journal Of Environmental Management*, 55(1), 1-13. doi: 10.1006/jema.1998.0250

- Yamamoto, K. and Akiba, K. (2011). Image and agreement for environmental conservation fee of visitors to Aokigahara Jukai Forest. *Mount Fuji Research*, 5, 7-13. [in Japanese]
- Yamamoto, K. and Jones, T. (2017). Factors Determining Behaviour to Pay for the Mount Fuji Conservation Donation. *Journal of Environmental Information Science*, 31. [in Japanese]
- Yamanashi Prefecture (2019). *About Mount Fuji cooperation donation*.  
<https://www.pref.yamanashi.jp/fujisan/kyouryokukinkekka.html>. [in Japanese]
- Yoshida, K. (2015). Determinants of WTP for the Entrance Fee of World Heritage Sites in Japan and Mount Fuji. *Journal of Environmental Information Science*, 29. [in Japanese]

## Annexes

### **Annex 1 (Council for the Promotion of the Proper Use of Mt. Fuji (2019). Fujisan Conservation Donation Campaign. Retrieved on: [http://www.fujisan-climb.jp/en/manner/conservation\\_donation.html](http://www.fujisan-climb.jp/en/manner/conservation_donation.html))**

#### The use of collected donation

Collected donations will be used to introduce and enhance activities and services for environmental conservation, climber safety and information provision related to climbing Mt. Fuji at and above the 5th Stations. Please have a look at listed projects below that will be covered by this donation.

#### 1. **Environmental conservation**

- Installing temporary toilet facilities
- Research and examination of new technologies to be introduced into toilet system for mountain huts
- Installing signage to raise awareness of climbing etiquette and rules

“Fujisan Conservation Donation” WILL NOT be used to maintain toilet facilities, including those installed in mountain huts. To support the maintenance of these facilities, climbers are asked to pay a small fee(200-300yen) when using the toilet.

#### 2. **Climber safety**

- Increasing the safety of the down trails. (e.g. Repair of protective fences, Installing a voice guidance system at a junction)
- Assigning guides to provide safety and route directions
- Setting up first-aid centers
- Operation of the Safety Guidance Center
- Conducting climber trend surveys



3. **Information provision**

- Setting up information centers
- Improvement of the General Administration Center
- Operation of on-site safety headquarters

Annex 2 – Climber's questionnaire

<b>Survey : help us make a cleaner Mt. Fuji</b>		Time: ____ : ____ .
Hello! I'm a Masters student from Ritsumeikan APU in Beppu, Oita. Please help with my research		2019 AUG/SEPT ____ .
<b>Part 1. Please tell us about yourself</b>		
1) AGE: _____ years		2) GENDER: _____
3) NATIONALITY: _____		4) CURRENT RESIDENCE: _____ / _____ ※ (country/city)
5) What is your current EMPLOYMENT status?		
<input type="checkbox"/> employed full time (40 or more hours per week) <input type="checkbox"/> employed part time (up to 39 hours per week) <input type="checkbox"/> unemployed <input type="checkbox"/> student <input type="checkbox"/> retired <input type="checkbox"/> homemaker <input type="checkbox"/> self-employed <input type="checkbox"/> unable to work <input type="checkbox"/> other: _____		
6) Which of these best describes your PERSONAL INCOME last year? ※ (¥100 ≈ \$1US ≈ €0.90 euro)		
<input type="checkbox"/> <\$4,000 <input type="checkbox"/> \$4,000-\$9,999 <input type="checkbox"/> \$10,000-\$24,999 <input type="checkbox"/> \$25,000-\$49,999 <input type="checkbox"/> \$50,000-\$79,999 <input type="checkbox"/> ≥\$80,000		
7) Are you living in Japan LONG-TERM (≥3 months) or staying here SHORT-TERM (≤3 months)?		
<input type="checkbox"/> long-term: I've lived in Japan for ____ years ____ months <input type="checkbox"/> short-term: I'm staying in Japan for ____ months ____ days		
<b>Part 2. About your Mt Fuji climbing trip</b>		
8a) How did you travel to/from Mt Fuji? <input type="checkbox"/> private car <input type="checkbox"/> rentacar <input type="checkbox"/> train <input type="checkbox"/> bus <input type="checkbox"/> other:		
8b) Did you arrange the Fuji trip INDEPENDENTLY or did you join an organized TOUR? How much did it cost (※per person)?		
<input type="checkbox"/> I arranged the trip independently → altogether it cost ¥ _____ (※total inc. transport/mtn hut etc) <input type="checkbox"/> I joined an organized tour → the tour cost ¥ _____ (※per person)?		
8c) How about other costs/money spent while climbing? (※only include money spent at/above the 5 <sup>th</sup> station)		
Food & drinks cost ¥ _____                    Souvenir/gifts cost ¥ _____                    Other things bought cost ¥ _____		
9) How many people are in your GROUP? _____ ※ (including yourself but NOT including guide/climbers not travelling with you)		
10) How many people are in your group by GENDER? No. of Male: ____ Female: ____ Other: ____		
11) Who are your COMPANIONS? (※check ALL appropriate answers) <input type="checkbox"/> travelling alone <input type="checkbox"/> husband/wife/ <input type="checkbox"/> partner <input type="checkbox"/> family <input type="checkbox"/> friend(s) <input type="checkbox"/> co-worker(s) <input type="checkbox"/> other: _____		
12) WHY did you decide to climb Mt Fuji? Why did you climb with these COMPANIONS? _____ _____ _____		
13a) Did you stay in a mountain hut? <input type="checkbox"/> Yes, I stayed in a hut <input type="checkbox"/> Yes, I paid to rest in a hut <input type="checkbox"/> No, I didn't use the huts		
13b) Did you climb to the TOP of Mt. Fuji? <input type="checkbox"/> Yes, I reached the top → what time did you arrive on top? ____ : ____ <input type="checkbox"/> No, I turned around/abandoned climbing at the ____ station because _____ e.g. bad weather ; I was cold /tired etc.		
14) What is your overall SATISFACTION with the climbing experience? (please circle ONE number to indicate satisfaction) ※ (1 = unsatisfied ⇔ 5 = very satisfied) -> Comment/REASON for (dis)/satisfaction (e.g. : toilets, sunrise, crowding, trail...) 1 - 2 - 3 - 4 - 5    _____		
15) Would you be likely to RECOMMEND climbing Fuji to a friend? 1 - 2 - 3 - 4 - 5 (1 = v. unlikely ⇔ 5 = v. likely)		
<b>Part 3. About Mt Fuji's toilets</b>		
16) Did you use the TOILETS when you climbed Mt Fuji? ※ (NOT including the toilets below the 5 <sup>th</sup> station)		
<input type="checkbox"/> Yes, I used the toilets ____ times <input type="checkbox"/> No, I didn't use the toilets because _____ -> go to Q19)		
<b>IF YES</b>	17) Did you use the toilet situated on the descending trail at the 7th station? ※ please see the Map	
	<input type="checkbox"/> Yes, I used that toilet on the way down <input type="checkbox"/> No, I did not use that toilet on the way down -> go to 19)	
	18a) Did you pay a TIP to use the toilets?	
	<input type="checkbox"/> Yes, I paid ¥ _____ -> go to 19) <input type="checkbox"/> No, I did not pay a tip	
<b>IF NO (did not pay tip)</b>	18b) Why did you NOT pay? I did not pay a tip for the toilet because... ※ choose all relevant answers	
	<input type="checkbox"/> ... I don't know what the money will be used for <input type="checkbox"/> ... because it's just a tip <input type="checkbox"/> ... it's too expensive <input type="checkbox"/> ... the toilets were not clean <input type="checkbox"/> ... I didn't have cash/exact change <input type="checkbox"/> ...other: _____	
	19) Did you know that there are BIO-TOILETS that decompose human excreta on Mt Fuji? <input type="checkbox"/> No, I didn't know about the	
	<input type="checkbox"/> Yes, I knew -> from? <input type="checkbox"/> official website <input type="checkbox"/> travel website <input type="checkbox"/> poster <input type="checkbox"/> friends/word of mouth <input type="checkbox"/> other: _____	
	20) During your climb, did you ever urinate outside (i.e. open air, not in the toilet)?	
	<input type="checkbox"/> Yes, because _____ <input type="checkbox"/> No, never	
		<b>NOW PLEASE TURN OVER →</b>

**PART 4. About conservation of Mt Fuji**

Since 2013, a ¥1000 donation is asked from all climbers at the 5th station to contribute to the conservation of Mt Fuji.

20) Did you already know about the ¥1000 donation BEFORE climbing Mt Fuji?  No, I didn't know about it before climbing  
 Yes, I already knew about the donation -> from?  website  friends/word of mouth  other: \_\_\_\_\_

21a) Did you pay the donation on this climb?  Yes, I paid the ¥1000 donation  No, I didn't pay the ¥1000 donation

<b>IF YES</b>	21b) Why did you pay? I paid the ¥1000 donation because... ※ choose all relevant answers <input type="checkbox"/> ... I don't want to damage Mt Fuji <input type="checkbox"/> ... Mt Fuji is a world heritage site <input type="checkbox"/> ... it's not expensive <input type="checkbox"/> ... I thought it was mandatory/must pay <input type="checkbox"/> ... other reason: _____
<b>IF NO</b>	21c) Why did you NOT pay? I did NOT pay the ¥1000 donation because... ※ choose all relevant answers <input type="checkbox"/> ... I don't know what the money will be used for <input type="checkbox"/> ... it's just a donation <input type="checkbox"/> ... it's too expensive <input type="checkbox"/> ... because I didn't have cash /exact money <input type="checkbox"/> ...other reason: _____

**READ CAREFULLY THE FOLLOWING TEXT:**

Mount Fuji provides not only beautiful landscape but is also important for other reasons:

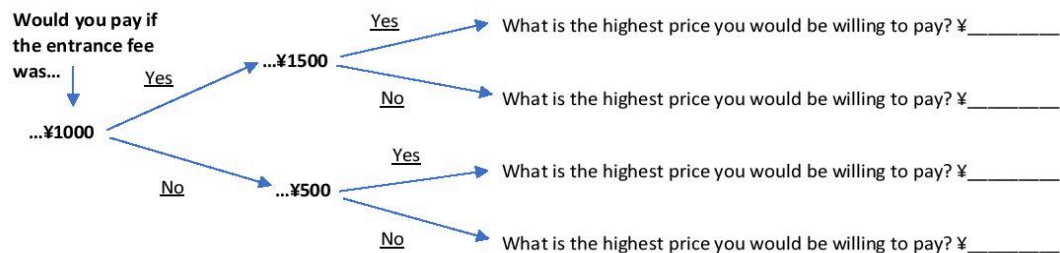
- provides protection for plants & animals • clear water • forest which helps maintain soils quality and sequesters CO2
- important cultural landmark listed as UNESCO world cultural heritage site in 2013 • generates income from tourism

However, it was not managed carefully due to a lack of financial resources, e.g. quantities of **trash** could be found on/around Mt Fuji; everyday **bulldozers** climb up and down; **excreta & toilet paper** called "white rivers" were directly flushed down the side of the mountain.

In 2002, the Ministry of Environment subsidized a new program to install **toilets** (including bio-toilets) on Mt Fuji. They are effective in reducing environmental impacts such as contamination of soil and contamination of groundwater. However, due to high maintenance costs, some of them are not used anymore and it is likely that in a few years they will be discontinued.

In order to protect Mt Fuji, one solution is to set up an **entrance fee**. The money will be used **for conservation of Mt Fuji only**: cleaning up the trash; maintenance of the bio-toilets; holding environmental education programs for visitors and climbers. The fee would be collected from all climbers at the 5<sup>th</sup> station. The fee would be **mandatory**, replacing the current system (optional donation). All toilets will also become **free** of charge.

22) If there was a NEW entrance fee of ¥1000 per person per day to enter Mt Fuji, replacing the current donation system, would you be willing to pay this fee? Circle Yes or No on the figure below:-



23) Do you agree that Mt Fuji should have an entrance fee or a limit on the maximum number of climbers? ※ choose ONE!

- Yes, Mt Fuji should have an entrance fee
- Yes, Mt Fuji should have a limit on the maximum number of climbers
- Yes, Mt Fuji should have an entrance fee AND a limit on the maximum number of climbers
- No, Mt Fuji should NOT have an entrance fee OR a limit on the maximum number of climbers

24) What is the main / most important REASON that influenced your decision for the HIGHEST price acceptable in Q22?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

▲ ===== End of the survey. Thank you for your help. We will use for research purposes only. Have a safe trip ===== ▲

**Annex 3 – Statistical tests made on Stata**

WTP					
Percentiles		Smallest			
1%	0	0			
5%	500	500			
10%	700	500	Obs		86
25%	1000	500	Sum of Wgt.		86
50%	1500		Mean		1544.767
		Largest	Std. Dev.		879.1048
75%	2000	3000			
90%	2500	4000	Variance		772825.2
95%	3000	5000	Skewness		1.680039
99%	5000	5000	Kurtosis		7.182346

ANNEX FIGURE 1. SUMMARY OF THE DATA ON RESPONDENT'S WTP.

Source	SS	df	MS			
Model	7447823.61	4	1861955.9	Number of obs =	80	
Residual	56120645.1	75	748275.269	F( 4, 75) =	2.49	
Total	63568468.8	79	804664.161	Prob > F =	0.0504	
				R-squared =	0.1172	
				Adj R-squared =	0.0701	
				Root MSE =	865.03	

wtp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
age	-20.95265	13.18992	-1.59	0.116	-47.22831	5.323017
gender	511.1733	204.6617	2.50	0.015	103.4663	918.8802
occu	-35.72352	67.30954	-0.53	0.597	-169.811	98.36395
inccat	196.7013	83.10151	2.37	0.021	31.15464	362.248
_cons	878.6381	383.2783	2.29	0.025	115.1085	1642.168

ANNEX FIGURE 2. LINEAR REGRESSION.

Variable	Observations	Mean	Std. Dev.	Min	Max
Male WTP	48	1369.79	808.44	0	5000
Female WTP	38	1765.78	924.81	500	5000

ANNEX FIGURE 3. SUMMARY OF THE DATA ON GENDER AND WTP.

Panel A. Males

	Percentiles	Smallest		
1%	0	0		
5%	500	500		
10%	500	500	Obs	48
25%	1000	500	Sum of Wgt.	48
50%	1000		Mean	1369.792
		Largest	Std. Dev.	808.4487
75%	1850	2500		
90%	2000	2500	Variance	653589.3
95%	2500	3000	Skewness	2.02774
99%	5000	5000	Kurtosis	9.78312

Panel B. Females

WTP				
	Percentiles	Smallest		
1%	500	500		
5%	500	500		
10%	1000	800	Obs	38
25%	1000	1000	Sum of Wgt.	38
50%	1650		Mean	1765.789
		Largest	Std. Dev.	924.8159
75%	2000	3000		
90%	3000	3000	Variance	855284.5
95%	4000	4000	Skewness	1.440939
99%	5000	5000	Kurtosis	5.73325

ANNEX FIGURE 4. DISTRIBUTION OF WTP BY GENDER.

## Exploring the Determinants of Cyberloafing in the Workplace: A Conservation of Resources (COR) Perspective<sup>†</sup>

Tsz Chit Yui<sup>1</sup>, Chiung-Ying Wu<sup>2</sup> and Chien-Chung Kao<sup>3</sup>

### Abstract

Over the decade, several researchers have proposed different models for explaining the cyberloafing behaviours. It includes perceived justice (Lim, 2002), ego-depletion model of self-regulation (Baumeister, Muraven, & Tice, 2000; Wagner, Barnes, Lim, & Ferris, 2012), personal impulsivity traits (Everton, Mastrangelo, & Jolton, 2005) and self-control management (Restubog et al., 2011). In this study, we will adopt the conservation of resource theory (COR; Hobfoll, Halbesleben, Neveu, & Westman, 2018) to examine the determinants of cyberloafing. We have collected from 210 full-time working adults aged over 18 years old who have access to the internet in their workplace. The data was collected through an online survey from Taiwan using the snowballing method (Streeton, Cooke, & Campbell, 2004) in various industries. Our result reveals that job burnout, psychological well-being and work-life balance may be the potential determinants for the employee to cyberloaf their work. This study further reviews the company policy for reducing the work burnout rather than restricting the behaviour of cyberloafing in the workplace according to the COR theory (Hobfoll, 1989; Hobfoll, Halbesleben, Neveu, & Westman, 2018; Hobfoll, Lilly, & Jackson, 1991).

**Keywords:** job burnout, psychological well-being, work-life balance, cyberloafing

---

<sup>†</sup> This paper was granted the Best Paper Award for Graduate Students at the 18th Asia Pacific Conference (2020).

<sup>1</sup> PhD Student, Institute of Human Resource Management, National Sun Yat-sen University, Kaohsiung, Taiwan (Address: No. 70, Lienhai Rd., Kaohsiung 80424, Taiwan, ROC; E-mail: D094050005@student.nsysu.edu.tw)

<sup>2</sup> PhD Student, Institute of Human Resource Management, National Sun Yat-sen University, Kaohsiung, Taiwan (Address: No. 70, Lienhai Rd., Kaohsiung 80424, Taiwan, ROC; E-mail: a0931800738a@gmail.com)

<sup>3</sup> PhD Student, Institute of Human Resource Management, National Sun Yat-sen University, Kaohsiung, Taiwan (Address: No. 70, Lienhai Rd., Kaohsiung 80424, Taiwan, ROC; E-mail: keckcccc074050102@gmail.com) \*Corresponding author information: Wu, Chiung-Ying, Institute of Human Resource Management, National Sun Yat-sen University, No. 70, Lienhai Rd., Kaohsiung 80424, Taiwan, ROC, (E-mail: a0931800738a@gmail.com)

## 1. Introduction

Due to the advancement of technology, the use of the internet in the workplace is increasing. This increment of internet usage rises the concerns of senior management of the organisation when employee using their working hour to do personal stuff in which their immediate supervisor would classify this task as “non-work related”, which is called “cyberloafing” (Askew et al., 2014; Henle et al., 2009). Previous literature point both positive and negative consequence of cyberloafing. For example, Pindek, Krajcevska, and Spector (2018) found that participants engage in cyberloafing to cope with workplace boredom. In contrast, Spector and Jex (1988) suggest that cyberloafing is harmful to organisation and organisation stakeholders by improperly using their company resources. Among those consequences of cyberloafing in the workplace, either it has positive or negative, the determinants of cyberloafing are still unknown (Henle & Blanchard, 2008; Hussain, Thurasamy, & Malik, 2017; Koay, Soh, & Chew, 2017; Vitak, Crouse, & LaRose, 2011). Therefore, our study aims to explore if there is any potential determinants lead to cyberloafing development in the workplace. Cyberloafing behaviour can be impacted by cultural factor (Ugrin, Pearson, & Nickle, 2018). Therefore, we will explore these determinants using the working adults in Taiwan, representing the Asian/ Taiwan culture.

Meanwhile, job burnout refers to the individuals “proceed with a feeling of energy exhaustion, by increasing mental distance from the job (negativism or cynicism) and reducing professional efficacy.” (World Health Organization, 2019). Previous studies have made a valuable contribution by using conservation of resources (COR) theory to explore the antecedents and outcomes of stress and job burnout in an organisation (Hobfoll et al., 2018). According to the conservation of resource (COR) theory, it is suggested that employee is more likely to receive adverse outcome adversely is “an actual resources loss, a perceived threat of resources less, or a situation”. When the resources are perceived as inadequate to meet work demand or not obtained on investment (Hochwarter, Perrewé, Meurs, & Kacmar, 2007), hence, this paper aims to propose and examine two mediators are adopted in the relationship between job burnout and cyberloafing: psychological well-being and work-life balance. Our study explored the sequential mediating effect of psychological well-being at work-life balance in the relationship between job burnout and cyberloafing.

In this study, we attempt to contribute to the COR model, burnout, and cyberloafing literature in several ways. First, we attempt to view the determinants of cyberloafing using the conceptualisation of COR in the Taiwan population. It extends recent findings on the antecedents’ factors about cyberloafing. Second, we argue that two mediators exist in the pathway from job burnout to cyberloafing: psychological well-being and work-life balance in the Taiwan population.

## **2. Theoretical Framework**

### **2.1. The conservation of resources (COR) theory**

The COR theory is defined as “objects, personal characteristics, conditions, or energies that are valued by the individual or that serve as a means for attaining these objects” (Hobfoll et al., 2018). To begin with, the fundamental principle of the COR theory states that people strive to maintain, protect, and build resource because eustress depends on gaining value in the own right and serve as a means to an end and distress on their loss (Hobfoll, 1989; Hobfoll et al., 2018; Hobfoll et al., 1991). It is commonly referred to the stress, such as negative response to stressors, negative affectivity and more. In other words, eustress is defined as the positive response to adversity and is reflected in the presence of positive affect and well-being (McGowan, Gardner, & Fletcher, 2006; Watson, Clark, & Tellegen, 1988). Hobfoll et al. (2018) suggest four basic principles for the COR theory. First, the resource loss is out of proportion to be more notable than resource gain, referred to as “primacy of loss principle”. Second, people are more willing to invest resources to protect from resources loss, recover from losses and gain resource, which can be referred to as “resources investment principle”. Third, the “gain paradox principle” refers to the condition that resource gain increases in salience in the context of resources loss. Finally, when people’s resources are overstretched or exhausted, they enter a defensive mode to preserve the self which is often defensive, aggressive and maybe irrational, called “desperation principle” (Hobfoll et al., 2018).

Hence, under the COR theory, we argue that job burnout can lead to a loss of physiological and psychological depletion (i.e., “primacy of loss principle”), in which the failures of resource in that depletion is faster than that of gaining resources (Wright & Hobfoll, 2004). In other words, job burnout is most likely to occur in situations where there is an existing resources loss, perceived threat of resources loss, or when the anticipated returns are not obtained on investment of resources (Hobfoll & Wells, 1998; Lee & Ashforth, 1996). Therefore, people under job burnout are likely to go through principle two (i.e., the “resources investment principle”), it can be done by a direct replacement of resources and indirect replacement of resources (Hobfoll et al., 2018). In this study, we argue that cyberloafing is a direct replacement of resource since people can gain some resources, such as social support from others outside the organisation, learning new things by the indirect investment of resources (Gökçearslan, Uluyol, & Şahin, 2018).

In principle three, it appeals more dominant for resource gain than resource loss. We argue that it encourages employees cyberloafing during the workplace since it helps them gain resource back in a more prevalent way (Pindek et al., 2018). According to principle four of COR theory, individuals feel



more challenging to reserve their resource and be more defensive and irrational if the resource depletion goes to a more extreme and intense level (Hobfoll et al., 2018). We posit that cyberloafing leads to adverse effects for the individual (Ozler & Polat, 2012). We also argue that such defensive and irrational thinking modes can increase the likelihood of cyberloafing of employees more frequently and seriously. People are so irrational that cyberloafing harms psychological well-being and work-life balance.

## **2.2. Cyberloafing**

The use of internet resources in organisations is increasing; they are now integrated as part of the job context of the employee, which it can enhance the working efficiency, make communication more efficient and increase the productivity of employees (Anadarajan, Simmers, & Igbaria, 2000; Baturay & Toker, 2015). However, some scholars hold different views on cyberloafing. Some employees also grab this chance to take a break in their work by cyberloafing at work. Therefore, Askew et al. (2014) define cyberloafing as a set of behaviour. An employee engages in the electronically-mediated activities, particularly through the use of the internet, that their immediate supervisor would not consider job-related (Askew et al., 2014). Besides, the issue of cyberloafing is controversial, whether it is beneficial or harmful to individual and organisations (Betts, Setterstrom, Pearson, & Totty, 2014; Kidwell, 2010; Qiaolei, 2014). Some scholars suggest that employees can attenuate job stress and anxiety and stimulate creativity (Beugré & Kim, 2006; Oravec, 2002). Contrastively, other scholars argue a negative association between cyberloafing and work productivity (Zakrzewski, 2016). Research has linked the antecedent of cyberloafing to problematic internet use as a form of internet addiction (Kim & Byrne, 2011; Ozler & Polat, 2012). Instead of taking a psychopathological approach, we argue that the COR theory can explain the antecedents (i.e., cyberloafing behaviour).

## **3. Hypothesis Development**

### **3.1. Job burnout and cyberloafing**

The negative consequence of job burnout has been identified in many OB researchers (Burke & Deszca, 1986; Cordes & Dougherty, 1993; Halbesleben & Buckley, 2004; Maslach & Leiter, 2016). Defined by the World Health Organization, job burnout is characterised by unmanaged chronic workplace stress (World Health Organization, 2019). Accordingly, Maslach and Jackson (1984) categorised burnout into three dimensions – emotional exhaustion, depersonalisation, and diminished personal accomplishment.

According to COR theory, individuals strive to obtain and maintain what they prize or value – resources. It recognises the importance of individual motivation in the burnout process. To be more specific, a key motivational decision involves how employees acquire, maintain, and foster the necessary resource to meet their current work demand and help guard against further resources depletion (Wright & Hobfoll, 2004). Therefore, emotional exhaustion happens when employees feel that they no longer have the necessary emotion, personality, social or status resources to predict, understand and control the stress confronting them (Hobfoll, 1989; Lee & Ashforth, 1996; Sutton & Kahn, 1986; Tetrick & LaRocco, 1987; Wright & Hobfoll, 2004). Similarly, depersonalisation and diminished personal accomplishment can also be viewed as an attempt to minimise the emotional resource loss that results from the constant need to solve intense work situations (Wright & Hobfoll, 2004). Furthermore, once these loss cycles are initiated, it makes the loss of individual decreasingly resilient resources to confront the inevitable continuation of demands (Hobfoll & Wells, 1998). Hence, we argue that once the loss cycle is started, individuals would seek an external resource to invest or recover from resource loss, and therefore, cyberloafing can be one of the ways for doing this.

By definition, cyberloafing refers to workplace behaviour's deviance, whereas "employees intentionally waste time and resources on non-work-related tasks". (Lim, 2002). Therefore, we argue that cyberloafing behaviour is an interaction of company resource and environment factors, impacting psychological well-being and work-life balance (Goh, Ilies, & Wilson, 2015; Mandeville, Halbesleben, & Whitman, 2016; Rofcanin, Heras, & Bakker, 2017). Cyberloafing is a dynamic behaviour (Halbesleben, Neveu, Paustian-Underdahl, & Westman, 2014). According to the "gain paradox principle", it is much easier for employees to gain or invest their resources (Hobfoll et al., 2018). We argue a positive relationship between all three dimensions of job burnout (i.e., emotional exhaustion, depersonalisation and reduced person accomplishment) and cyberloafing.

Putting all of these together, we can summarise that, for emotional exhaustion, the COR theory suggests that the loss of resource leads to a negative emotion of an individual (Wright & Hobfoll, 2004). It is because the individual would be able to restore their resources by gaining or investing other resources from resources lost (Hobfoll et al., 2018). Besides, they would seek for resources recovery so that cyberloafing would be a way to prevent resources depletion and allow people to escape from reality to the digital world under the COR theory. The case is very similar in depersonalisation, where the COR theory suggests that depersonalisation involves the recognition to survive, and the individual must wisely choose strategies to conserve the available resources (Wright & Hobfoll, 2004). Again, cyberloafing would be a way for an individual to conserve the available resources suggested by the COR theory.

Furthermore, several scholars suggest that reduced personal accomplishment can result in a negative emotion similar to emotional exhaustion (Bandura, 1989; Buunk & Schaufeli, 1993; Maslach, 1993). Hence, we argue that individuals who reduce personal accomplishment would follow the same pathway as emotional exhaustion to restore or recover their resources under the COR theory. Hence, we propose,

*Hypothesis 1a (H1a). Emotional exhaustion is positively related to cyberloafing.*

*Hypothesis 1b (H1b). Depersonalisation is positively related to cyberloafing.*

*Hypothesis 1c (H1c). Reduced personal accomplishment is positively related to cyberloafing.*

### **3.2. The mediating role of psychological well-being between job burnout and cyberloafing**

Proposed by Ryff (1985), there are six components of being psychologically well – “[maintain] a positive relationship with others, environmental mastery, autonomy, self-acceptance and purpose in life, and personal growth and development” (Ryff, 1985). For fulfilling basic psychological needs, people strive for a life of affiliation, intimacy, and contributing to one’s community. (Renner & Birren, 1980; Ryff, 1985; Ryff & Keyes, 1995). Several researchers point out that job burnout has been linked to poor mental health, such as depression and anxiety (Abdi, Kaviani, Khaghanizadeh, & Momeni, 2007; Peterson et al., 2008; Tokuda et al., 2009), making a resource depletion and individuals’ psychosocial resource depletion. Therefore, we expect a negative relationship exists between job burnout and psychological well-being.

According to the COR theory, job burnout causes a loss of resources, which lowers the level of psychological well-being (Hobfoll & Wells, 1998). Therefore, we hypothesise that employees with job burnout are more likely to motivate themselves to prevent further depletion of their psychosocial resources using cyberloafing. An employee with a higher level of job burnout is more likely to manifest their negative attribute towards the source of their job burnout, so that they are more emotionally and cognitively eager for resources recovery from the job burnout (Leiter & Maslach, 1988; Maslach, Schaufeli, & Leiter, 2001) with six different dimensions of psychological well-being.

First, people who proceed with a positive relationship with others has “warm, satisfying, trusting relationships with others” (Ryff & Keyes, 1995). It helps mediate the loss of the resource by gaining support from others to maintain their resource under the COR theory and reduced the likelihood of cyberloafing. Second, people who proceed with environmental mastery can have a sense of mastery and competence in managing the environment (Ryff & Keyes, 1995). It facilitates to mediate the loss of

the resource by gaining support by gaining external support from others under the COR theory and reduced the likelihood of cyberloafing. Third, autonomy refers to an individual who is self-determining and independent and can resist social pressures (Ryff & Keyes, 1995). Under COR theory, these people proceed with more internal resources who are more likely to reserve more resources under the resource's investment principle. It helps mediate the loss of the resource by reserving more resources and reduces the likelihood of cyberloafing.

Fourth, individual with high self-acceptance, the purpose of life and personal growth, a positive attitude toward the self and feels positive for everything around them, feeling of continued development and being open to a new experience. They have goals in life and a sense of directedness (Ryff & Keyes, 1995). Under COR theory, these people proceed with these personality traits to persist in resource loss and help them maintain and invest more resources using the resource's investment principle. It helps mediate the loss of the resource by their personality traits and reduces the likelihood of cyberloafing. Hence,

*Hypothesis 2a (H2a). Maintaining a positive relationship with others mediates the relationship between job burnout and cyberloafing.*

*Hypothesis 2b (H2b). Environmental mastery mediates the relationship between job burnout and cyberloafing.*

*Hypothesis 2c (H2c). Autonomy mediates the relationship between job burnout and cyberloafing.*

*Hypothesis 2d (H2d). Self-acceptance mediates the relationship between job burnout and cyberloafing.*

*Hypothesis 2e (H2e). Purpose in life mediates the relationship between job burnout and cyberloafing.*

*Hypothesis 2f (H2f). Personal growth and development mediate the relationship between job burnout and cyberloafing.*

### **3.3. The mediating role of work-life balance between job burnout and cyberloafing**

Work-life balance is a state of “balance between one's demands of both a person's job and personal life are equal” (Kanwar, Singh, & Kodwani, 2009). Several studies argue that high engagement, high workloads, and increased work responsibilities can lead to difficulty balancing life and work (Aziz & Cunningham, 2008; Aziz & Zickar, 2006; Bonebright, Clay, & Ankenmann, 2000). Hayman (2009) has classified work-life balance into three categories – work interference with personal

life (WIPL), personal life interference with work (PLIW) and work / personal life enhancement (WPLE).

Under the COR theory, both work-life balance and job burnout are physiological and psychological depletion of work resources; therefore, a negative relationship is expected under this model (Hobfoll et al., 2018). Increasing of work-life imbalance, an individual has a psychosocial depletion in their support. Again, cyberloafing can facilitate the resources recovery process using the “gain paradox principle” (Hobfoll et al., 2018). Therefore, we proposed that an individual who is work-life balance can have a clear separation of their work-life engagement, involvement and embeddedness (Hallberg & Schaufeli, 2006; Maslach & Leiter, 2006; Meyer & Allen, 1997). It helps establish a clear boundary between work and person life. Hence, we expected a negative relationship exists between work/ life balance and cyberloafing. Besides, according to the desperation principle of COR theory, a higher level of job burnout can lead to a greater level of resources lost. Using this principle, we can assume that an individual’s behaviour would be more irrational and aggressive, facilitating the diffusion of work-personal life boundary. Thus, we expected a negative relationship between job burnout and work-life balance. Hence, we propose,

*Hypothesis 3a (H3a). Work interference with personal life (WIPL) mediates the relationship between job burnout and cyberloafing.*

*Hypothesis 3b (H3b). Personal life interference with work (PLIW) mediates the relationship between job burnout and cyberloafing.*

*Hypothesis 3c (H3c). Work/ personal life enhancement (WPLE) mediates the relationship between job burnout and cyberloafing.*

### **3.4. Sequential mediation of psychological well-being and work-life balance**

Many organisations, nowadays, expect employees to use remote-based technology, such as instant message, intranet or e-mail communication, to keep in touch during office and non-office hours (Vernon, 2005). However, such a negative impact on such policy has been reported in a previous study from Hilbrecht, Shaw, Johnson, & Andrey (2008). Also, Kossek, Lautsch, and Eaton (2006) suggest that a separated boundary between work and the non-work environment is essential for the employee to develop a more positive psychological well-being. Besides, employees would find it difficult to manage the boundaries between work and family. People with a high level of psychological well-being are more willing to get involved in their work during non-office hours (Kossek, Ruderman, Braddy, & Hanum,

2012). Such behaviour makes the boundaries between work and non-work diffuse, and it would lead to work-life imbalance.

Besides, psychological well-being can facilitate personal autonomy and establish a positive relationship with others (Renner & Birren, 1980; Ryff, 1985; Ryff & Keyes, 1995). It also helps to make the individual a higher autonomy for themselves. People with these personality traits are more capable of striking a balance between work and non-work-life (Kowalski & Swanson, 2005). Therefore, the following hypotheses are drawn.

*Hypothesis 4 (H4). Job burnout partially affect cyberloafing, through exists psychological well-being and work-life balance to cyberloafing.*

The proposed model is illustrated below.

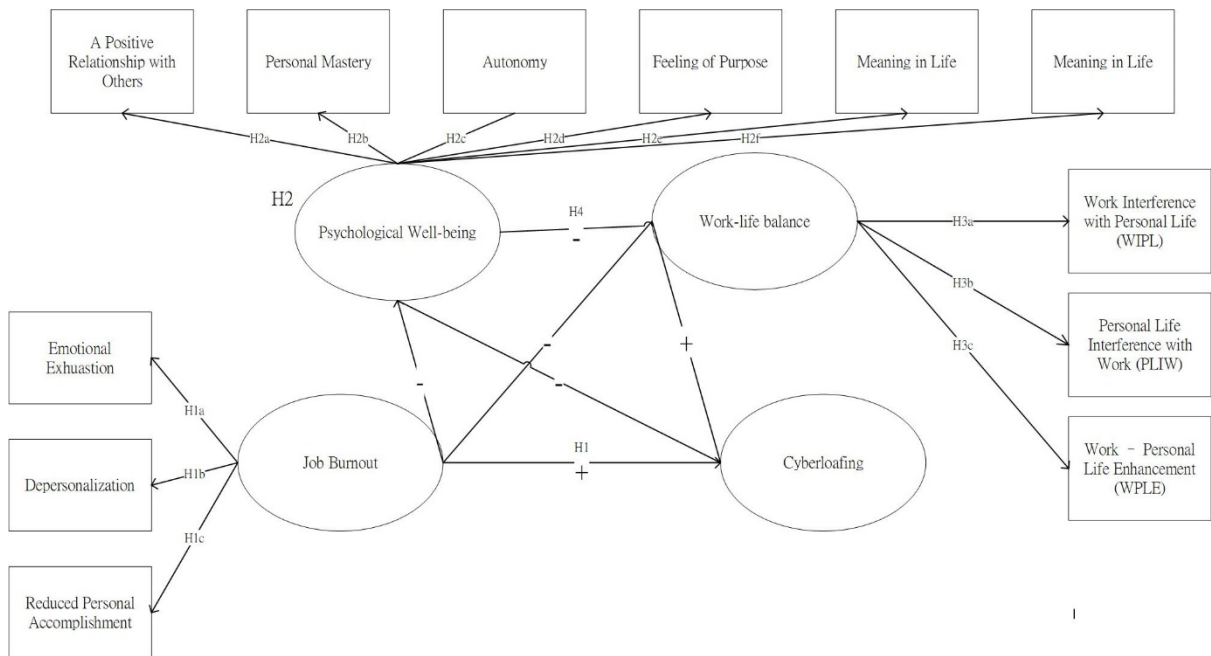


Figure 1 The Proposed Model

## 4. Method

### 4.1. Sampling

Data were collected from full-time working adults aged over 18 years old with access at work to the internet through an online survey from Taiwan via the snowballing method (Streeton, Cooke, & Campbell, 2004). Before the administration, the participants indicated their age and job duration that involved working with a computer. Any missing response upon completion of the survey was discarded to avoid wrong values. There are 213 participants completed the survey, and three was taken out due to missing data. In total, 210 participants were collected from the survey, and the characteristics of the participant were reported in Table 1. In summary, 210 working adults participated in this study with 41 male ( $M_{age} = 43.95$ ,  $SD_{age} = 10.53$ ) and 169 females ( $M_{age} = 46.6$ ,  $SD_{age} = 10.56$ ).

Table 1 Demographic statistics of the sample

<b>Variable</b>	<b>Item</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Gender</b>	Male	169	80%
	Female	41	20%
<b>Age</b>	18 – 30	36	17%
	31 – 40	39	19%
	41 – 50	50	24%
	51 – 60	71	34%
	> 61	14	6%
<b>Education Level</b>	Primary	2	1%
	Secondary	29	14%
	Bachelor	141	67%
	Master	37	18%

### 4.2. Measures

#### *Cyberloafing*

Cyberloafing was measured using a 22-item scale developed from (Henle & Blanchard, 2008). We assessed on a five-pointed scale from (1) Rarely to (5) Always. We followed the scaling procedure from Henle & Blanchard's (2008), they eliminated the items by frequency of how they engaged in cyberloafing. Finally, we selected the 11 item, which is the highest frequency, and the reliability is

acceptable. Sample questions include “e.g., Received non-work-related e-mail” and “e.g., Shopped online for personal good”. The scale has shown adequate levels of internal consistency ( $\alpha = .91$ )<sup>4</sup>.

### *Job Burnout*

Maslach Burnout Inventory was a 22-item scale, consisting of three subscales: Emotional exhaustion (e.g., “I feel emotionally drained from my work.”), Depersonalisation (e.g., “I worry that this job is hardening me emotionally.”) and Reduced in personal accomplishment (e.g., “I feel very energetic.”). It is a 7-point Likert-scale from 1 (a few times a year) to 6 (every day). A place is provided for the respondent to check “never,” if the feeling or attitude described is never experienced (Maslach & Jackson, 1981). The subscale has shown adequate internal consistency levels ( $\alpha = .77\sim.84$ ) (Lee, Chien, & Yen, 2013). The internal consistency was high ( $\alpha = .90$ ).

### *Work-life balance*

The Quality of Work-life developed by Hayman (2009) was used in this study. It is a 15-item scale with a 5 point Likert-scale to measure the frequency of experience certain feelings (e.g., “I lost the balance between work and non-work”) from 1 (never) to 5 (always). Hayman’s (2005) ’s three-factor analysis was adopted: work interference with personal life (WIPL), personal life interference with work (PLIW), and work-personal life enhancement (WPLE). Each subscale has excellent internal consistency from  $\alpha = .79\sim.86$ . The reliability was acceptable ( $\alpha = .83$ ).

### *Psychological Well-being*

Ryff (1989) ’s 18-item for psychological well-being with a 7-pointed Likert-scale from 1 (extremely agree) to 7 (extremely disagree) was used on the description of personal feelings (e.g., When I look at the story of my life, I am pleased with how things have turned out.). There are six subscales with Psychological well-being (Ryff, 1989). The reliability of our sample was between  $\alpha = .60$  and  $\alpha = .87$ . Since Ryff and Keyes (1995) and Li and Chung (2006) concluded that the Cronbach’s alpha with a score higher than .60 could be considered acceptable, we considered that this scale’s reliability was acceptable.

---

<sup>4</sup> Cronbach's alpha ( $\alpha$ ) is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability. A “high” value for alpha does not imply that the measure is unidimensional.



### 4.3. Control Variables

The control variables were gender (Blanchard & Henle, 2008), age group (Betts et al., 2014) and education level (Akbulut, Dönmez, & Dursun, 2017) to prevent potential confounding effect in the analysis. The coding for gender was female = 2, male = 1; age was 18 -30 = 1, 30 – 40 = 2, 41 – 50 = 3, 51 – 60 = 4, over 65 = 5. For time spent on cyberloafing in work, the coding was 0% – 10% = 1, 11 – 20% = 2, ..., 91% - 100% = 10. For education level, coding was 1 = primary level, 2 = secondary level, 3 = Bachelor Degree, 4 = Master Degree, and 5 = Doctorate Degree.

### 4.4. Common method variance

Since all data collected was self-report measurement tools using the survey conducted in a specific period, the validity of common method variance was examined (Podsakoff & Organ, 1986). First, Harmon's single-factor test was used to investigate the possible influence of common method variance (Podsakoff, MacKenzie, & Podsakoff, 2012). A principal axis functioning with no rotation was performed to examine if a single method factor explained most of the variance. There were six factors with eigenvalues greater than 1.00 observed explaining 79.1% of cumulative variance. Besides, the first factor accounted for 15.3% of the variance. It was concluded that the common method variance did not pose a validity threat.

### 4.5. Reliability and validity

The Cronbach alphas measurement was adopted to measure the reliability of the multi-item scale for each dimension. All variables were above the recommended minimum standard of .70 (Nunnally, 1978). It was summarised in Table 2.

Besides, the construct validity was tested using Mplus 7.4 (Muthén, Muthén, & Asparouhov, 2017). A four-factor model (cyberloafing, burnout, psychological well-being and work-life balance) with all item loading on the respective factor with an alternative model. The discriminant validity of the four variables was tested by contrasting the baseline model against alternative models. We have tested the  $\chi^2$  difference ( $\Delta\chi^2$ ) test (Bagozzi, Yi, & Phillips, 1991; Bentler & Bonett, 1980). The result showed that the four-factor model had the best fit than other models (i.e., from one-factor model to three-factor model),  $\chi^2 = 377.293$ ,  $df = 201$ , Comparative Fit Index (CFI) = .921, Tucker-Lewis Index (TLI) = .910, Root Mean Square Error of Approximation (RMSEA) = .065, Standardized Root Mean Square Residual (SRMSR) = .070, and fit the data better than alternative models. These figures were reported in Table 3. Overall, this Confirmatory Factor Analysis (CFA) confirmed that all measures refer to distinct constructs.

Table 2 Measurement dimension and Cronbach alpha

<b>Construct</b>	<b>Dimension</b>	<b>No. of items</b>	<b>Cronbach's alpha (Dimension)</b>	<b>Cronbach's alpha(Construct)</b>
<b>Cyberloafing Burnout</b>	Emotional exhaustion	9	.91	.90
	Depersonalization	5	.89	
	Reduced personal accomplishment	8	.87	
<b>Psychological Well-being</b>	Self-acceptance	3	.84	.93
	Purpose in life	3	.87	
	Environmental mastery	3	.70	
	Positive relations with others	3	.73	
	Personal growth	3	.81	
<b>Work-life Balance</b>	Autonomy	2	.60	.83
	WIPL	6	.79	
	PLIW	4	.79	
	WPLE	4	.86	

Table 3 Results of confirmatory factor analysis

	$\chi^2$	df	CFI	TLI	SRMR	RMSEA
<b>Models</b>						
<b>4-Factor Model</b>	377.293	201	0.921	0.910	0.070	0.065
<b>3-Factor Model</b>	455.492	204	0.888	0.873	0.088	0.077
<b>2-Factor Model</b>	1025.452	206	0.634	0.590	0.150	0.138
<b>1-Factor Model</b>	1108.806	207	0.598	0.551	0.154	0.144

Note: N = 210.  $\chi^2$  = chi-square CFI = Comparative Fit Index ; TLI = Tucker-Lewis Index ; SRMR = Standardized Root Mean Square Residual; RMSEA= Root Mean Square Error of Approximation.

## **5. Result**

The Correlations of each subscale are reported in Table 4. These figures indicated that a significant positive correlation between cyberloafing and job burnout was observed. The Correlations between the study variables were in the expected direction, although some of the variables were not statistically significant.

Table 4 Descriptive statistics and correlation (N = 210)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Gender															
2	Age	-.145*														
3	Education Level	-.115	-.056													
4	Cyberloafing	-.204**	-.049	.025												
5	Emotional Exhaustions	.006	-.037	-.026	.173*											
6	Depersonalisation	-.118	-.005	-.039	.168	.801**										
7	Reduced Personal Accomplishment	-.055	.052	.205**	.133	.085	.002									
8	Self-Acceptance	-.032	-.206**	-.126	-.157*	-.034	0.54	-.416**								
9	Purpose in Life	-.094	-.221**	-.139*	-.071	-.078	.096	-.490**	.728**							
10	Environmental Mastery	-.082	-.143*	-.089	-.022	-.098	-.010	-.365**	.645**	.679**						
11	Positive Relation with Others	-.052	-.102	-.010	-.103	-.063	.076	-.260**	.494**	.491**	.522**					
12	Personal Growth	-.134	-.048	-.145*	-.063	0.27	.184**	-.363**	.612**	.674**	.615**	.578**				
13	Autonomy	-.073	-.017	-.026	-.136*	-.050	.008	-.229**	.485**	.437**	.551**	.496**	.466**			
14	Work Interference with Personal Life (WIPL)	-.070	-.004	-.070	.220**	.328**	.209**	-.010	.008	.014	.141*	-.019	.032	.030		
15	Personal Life Interference with Work (PLIW)	-.040	.119	-.073	.190**	.321**	.262**	-.073	.068	-.090	.054	-.027	.030	.025	.505**	
16	Work/ Personal Life Enhancement (WPLE)	-.015	.065	.042	.126	-.211**	-.253**	.253**	-.214**	-.267**	-.176*	-.227**	-.269**	-.040	.256**	.141*

Note: \*\*. Correlation is significant at the 0.01 level (2-tailed). \*. Correlation is significant at the 0.05 level (2 tailed).

For control variables, the gender had a relationship with cyberloafing in the correlation ( $r = -.204$ ); therefore, it was taken out as a control variable. The finding demonstrated that men are more likely to cyberloafing their work than that for women. It demonstrated that cyberloafing is relatively gender-specific (Blanchard & Henle, 2008). It would be discussed in the later section. Contrasting with previous studies about age and education (Betts et al., 2014; Akbulut, Dönmez, & Dursun, 2017), our result reveals that an non-significant relationship between age and education level and cyberloafing ( $r = -.049$ ,  $r = .025$ ,  $p = ns$  respectively). It showed that age and education level has no significant impact on cyberloafing, so that level of education and age have set to be the control variable of this study.

### *Hypothesis testing*

We have performed a three-step analysis for testing the hypothesis using both IBM SPSS 24 PROCSS Marco (Hayes, 2017) and MPlus 7.4 (Muthén, Muthén, & Asparouhov, 2017). In step 1, we tested the relationship of three different job burnout dimensions (Maslach et al., 2001) using structural equation modelling (SEM) in MPlus 7.4 (Muthén et al., 2017). From hypothesis H1a to H1c, we expected a positive relationship between emotional exhaustion (H1a), depersonalisation (H1b), and reduced in personal accomplishment (H1c) and cyberloafing. The SEM result showed that relationship among emotional exhaustion, Depersonalization, and concentrated personal accomplishment were  $\beta = .0683, p < .05$ ,  $\beta = .0766, p < 0.05$  and  $\beta = .0309, p = n. s.$  respectively<sup>5</sup>. From the result, we could conclude that H1a and H1b were supported. For H1c, although the p-value was not significant, the work reflected a positive relationship. Thus, we concluded that H1c was not supported. The overall SEM model of our proposed model was shown on Figure 2.

---

<sup>5</sup>  $\beta$  refers to regression coefficient.

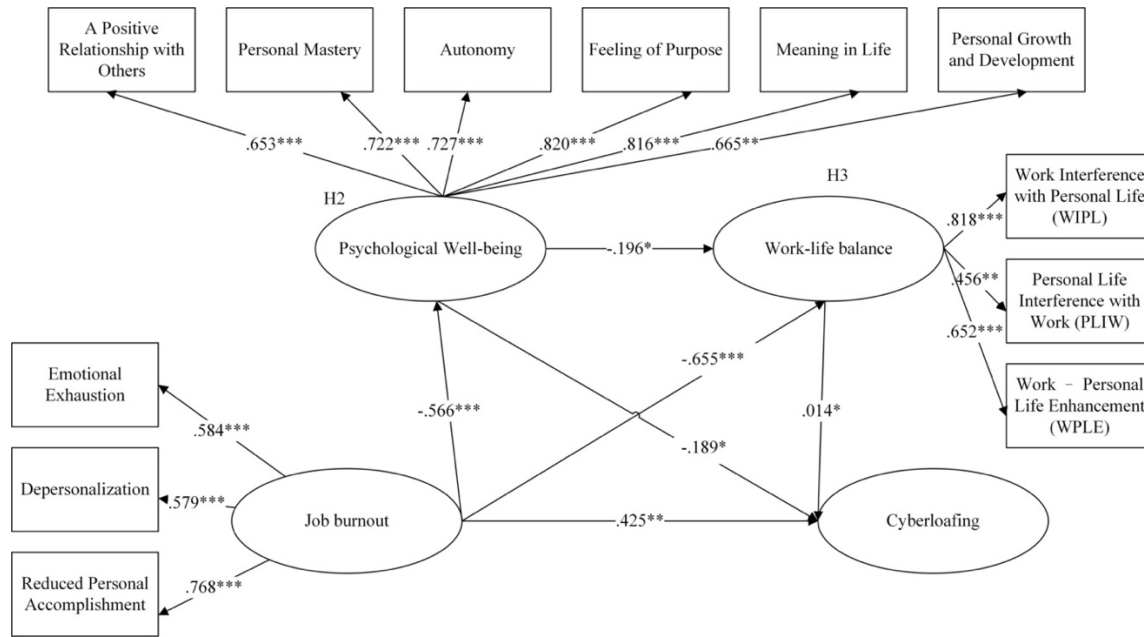


Figure 2 The results of structural equal modelling of the proposed model.

Note: \*\*\*.  $p < 0.001$ , \*\*.  $p < 0.05$ , \*.  $p < 0.1$ .

In step 2, we followed the Hayes PROCESS macro (Hayes, 2017). We applied to bootstrap to test the bias-corrected confidence interval (CI) to test our model’s direct and indirect relationship from hypothesis H2a to H2f and from H3a to H3c. Similarly, we hypothesised six different psychological well-being dimensions proposed by Ryff and Keyes (1995) had a mediating role between job burnout and cyberloafing. We also hypothesised the three dimensions of work-life balance (Hayman, 2009) had a mediating role between job burnout and cyberloafing. The result of a formal two-tailed significant test showed in Table 5. From hypothesis H2a to H2f, our work showed that the beta value among positive relationship with others, environmental mastery, autonomy, self-acceptance, purpose in life and person growth lied between .1099 and .1283,  $p < 0.05$ , showing a significant direct effect between job burnout and psychological well-being. The indirect effect of psychological well-being between job burnout and cyberloafing was not significant ( $B = .0095$ , 95% *LLCI* =  $-.0108$ , 95% *ULCL* =  $.0350$ ; *contain zero*). Form the result, we could conclude that a partial mediation (Loeys, Moerkerke, & Vansteelandt, 2015) existed in psychological well-being between job burnout and cyberloafing. Hence, we concluded that H2a – H2f were supported with a partial mediation effect existed (Maxwell, Cole, & Mitchell, 2011).

Similarly, our result showed that the beta value among the three sub-scale of work-life balance varied between .1004 and .1471 with a p-value less than 0.05. The result confirmed that the direct effect was significant. When exploring the indirect effect, a full mediation relationship (Loeys et al., 2015) existed ( $B = .0246$ , 95% *LLCI* =  $.0004$ , 95% *ULCL* =  $.0534$ ; *did not contain zero*). Therefore, we concluded that H3a to H3c were supported.

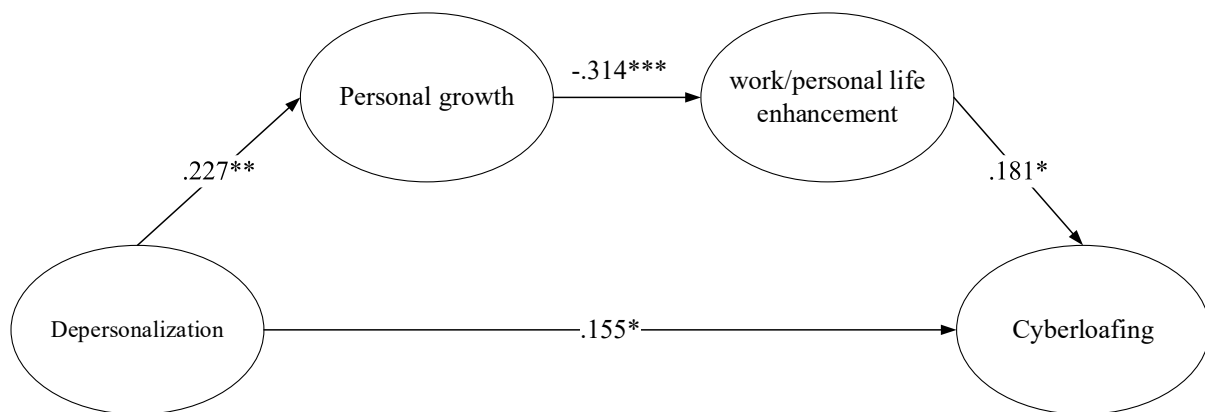
Table 5 Mediated regression analysis result

		<i>B</i>	<i>SE</i>	<i>T</i>	<i>P</i>	<i>LLCI</i>	<i>ULCI</i>
<b>1</b>	<b>Direct effect of job burnout and psychological well-being</b>						
H2a	Positive Relationship	.1185	.0485	2.444	.0154	.0384	.1986
H2b	Environmental Mastery	.1282	.0484	2.652	.0086	.0483	.2081
H2c	Autonomy	.1153	.0479	2.406	.0170	.0361	.1944
H2d	Self-Acceptance	.1120	.0474	2.365	.0190	.0338	.1903
H2e	Purpose in Life	.1099	.0493	2.232	.0267	.0285	.1913
H2f	Personal Growth	.1233	.0477	2.583	.0105	.0444	.2022
<b>2</b>	<b>Direct effect of job burnout and work-life balance</b>						
H3a	Work Interference with Personal Life (WIPL)	.1004	.0496	2.308	.0441	.0185	.1823
H3b	Person Life Interference with Work (PLIW)	.1141	.0494	2.308	.0220	.0324	.1958
H3c	Work/ Personal Life Enhancement (WPLE)	.1471	.0490	3.002	.0030	.0661	.2280
<b>3</b>	<b>Bootstrap results for the indirect effect</b>						
				<i>B</i>	<i>SE</i>	<i>LL95% CI</i>	<i>UL95%CI</i>
	Job burnout → Psychological well-being → Cyberloafing			.0095	.0140	-.0108	.0350
	Job burnout → Work-life balance → Cyberloafing			.0246	.0166	.0004	.0534

N = 210. Bootstrap sample size = 10,000

In step 3, we tested hypothesis 4 using the Structural Equation Modelling (SEM) by Mplus 7.4 (Muthén et al., 2017) to examine the indirect effect of the proposed model. We used subscale to examine the different indirect effect. There were 30 types of the direct effect of burnout subscale relative to psychological well-being subscale, work-life balance subscale and cyberloafing. There were 81 types of mediation model. Making the reporting precise, we decided to report the significant result only.

From the analysis, we found out that self-acceptance to cyberloafing mediated reduced personal accomplishment ( $IND = .07, p < .05$ )<sup>6</sup>. Given the effect of sequential, our result showed that the indirect effect between emotional exhaustion and cyberloafing via work interference with personal life (WIPL) ( $IND = .08, p < .05$ ) and personal life interference with work (PLIW) ( $IND = .07, p < .05$ ). Meanwhile, such indirect relationship could also be found between depersonalisation and cyberloafing via work interference with personal life (WIPL) ( $IND = .05, p < .05$ ) and personal life interference with work (PLIW) ( $IND = .07, p < .05$ ). Besides, the negative indirect effect included that work/ personal life enhancement (WPLE) mediated the cyberloafing with emotional exhausting ( $IND = -.04, p < .10$ ) and depersonalization ( $IND = -.05, p < .05$ ). The result of sequential mediation was shown below with indirect effect coefficient ( $IND = -.013, p < .10$ )



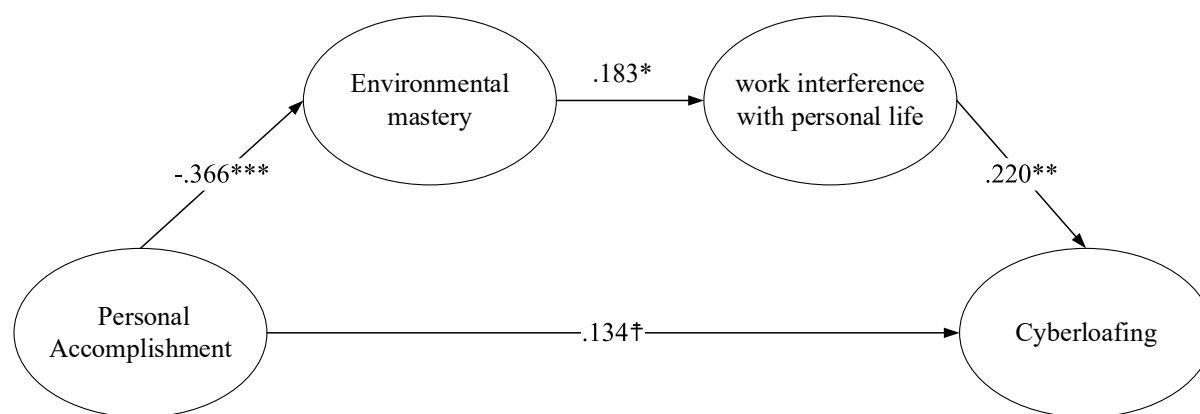
Note: N =210, \* =  $p < .05$ , \*\* =  $p < .01$ , \*\*\* =  $p < .001$ , Estimate coefficients are standardization, only reveal significant result

Figure 3 Sequential mediation between Depersonalization and cyberloafing via personal growth and work/personal life enhancement

In the examination of personal accomplishment, environment mastery, work interference with personal life, and cyberloafing, we found those there was an indirect effect in these variables ( $IND = .015, p < .10$ ). We concluded that the mediation effect existed.

<sup>6</sup> IND refers to indirect effect of the mediation.





Note: N =210, † = p<.10, \* = p<.05, \*\* = p<.01, \*\*\* = p<.001, Estimate coefficients are standardization, only reveal significant result

Figure 4 Sequential mediation between personal accomplishment and cyberloafing via environment mastery and work interference with personal life

## 6. Discussion

First, the result of this study showed that age and gender could not be a control variable for examining the effect of cyberloafing in the workplace. It was found that men were more likely to cyberloafing their work than work. Besides, younger people were more likely to cyberloafing the work as well. Such a finding could be explained by gender difference in personality. It was suggested that men were more likely to display autonomous personality traits than women (Beck, 1983; McBride, Bacchiochi, & Bagby, 2005). It would be explained that men have shown more autonomy in their personality so that they demonstrated a higher degree of job autonomy to cyberloafing to invest resources to protect against resources loss (Hobfoll et al., 2018). For the age difference, it could be explained that younger generation had more opportunity to get in touch of information technology, creating a more favourable environment for time to invest their resources when there was burnout in their work (Hobfoll et al., 2018). These findings are consistent with other previous studies (Blanchard & Henle, 2008; Lim & Chen, 2012; Ono & Zavodny, 2003; Teo & Lim, 2000). This result could help explain COR theory by adding the consideration of gender difference and age difference.

Besides, previous scholars showed that there was a positive relationship between job burnout and cyberloafing (Aghaz & Sheikh, 2016; Durak & Saritepeci, 2019). However, our study demonstrated that only emotional exhausting was positively related to cyberloafing, neither reduced in personal accomplishment nor depersonalisation has the relationship to cyberloafing. Our explanation was, in the COR theory, these two components were not a significant resource depletion (Halbesleben et al., 2014; Hobfoll et al., 2018). Therefore, emotional exhaustion was the major source of resource depletion which triggered the cyberloafing to gain a resource for individuals.

Our findings have demonstrated that only “reduced in personal accomplishment” has not statistically supported hypothesis H1c. We explained that reduced in personal accomplishment impacted

the ability to be well psychologically. Consisting of COR theory, individual treats personal achievement as a resource in the company (Wright & Cropanzano, 1998). It was because people would strike for the best to gain and invest more on this resource. As stated with COR theory, losing resource was much easier than that of gaining resources (Halbesleben et al., 2014; Hobfoll et al., 2018). It was the reason why only “reduced personal accomplishment” had a more significant impact on psychological well-being. Besides, both depersonalisation and emotion exhausted more relied on individuals’ personality resources (Wright & Staw, 1999). Besides, a positive relationship was observed between Depersonalization and personal growth. We suspected that it was related to the individual’s coping strategy (Ding Zhang, & Yang, 2018).

According to COR theory, both emotional exhaustion and reduced personal accomplishment trigger a resource loss, making individuals move vulnerable to aggressive and defensive (Halbesleben et al., 2014; Hobfoll et al., 2018). Besides, the relationship between job burnout and work-life balance was positively related to career satisfaction, impacting the work-life balance of individual (Keeton, Fenner, Johnson, & Hayward, 2007).

According to COR theory, people with reduced personal accomplishment was viewed as having a loss in the investment principle because they have invested their resources but in vain. According to the investment principle of COR theory, their investment of the practical resource was lost so that they had to find another way to “re-invest” the resource to restore their cognitive resource. To seek alternative pleasurable feelings, self-acceptance is a required personality trait for individuals for cognitive resource recovery (Krishnan, Lim, & Teo, 2010).

Furthermore, our result showed that both emotional exhaustion and Depersonalisation would positively impact work in personal life and personal influence work. Using the COR theory, the desperation principle implied that individuals with a loss in their resource would undergo aggressive, defensive, and irrational behaviour under stressful situation (Halbesleben et al., 2014; Hobfoll et al., 2018). Thus, a positive effect was expected from the data. Using gain paradox principle, resource loss’s magnitude and time were much slower than that of resource gain. Since emotion exhaustion and Depersonalisation was not an organisation resources, we expected that there was a negative relationship between these factors with work personal life enhancement (Hobfoll, 1989; Hobfoll et al., 2018; Hobfoll et al., 1991). To explain the rationale for the mediation of work-life balance between the relationship of job burnout and cyberloafing, the primacy of loss principle is adopted. Loss of resources was faster than the gain of resources; therefore, work-life balance was unable to mediate the relationship between job burnout and cyberloafing (Halbesleben et al., 2014; Hobfoll et al., 2018).

Further, from our result, we found that the sequential relationship between job burnout and cyberloafing existed via the sequential mediating role of psychological well-being and work-life balance. However, when we tried to explore the further every factor structure of job burnout, psychological well-being and work-life balance, we found that not all the factors could formulate the sequential mediating relationship. For example, environmental mastery and work interference with

personal life sequentially mediated the relationship between reduced personal accomplishment and cyberloafing. Using investment principle, individual with reduced personal accomplishment had to seek for investing new resources, such as environmental mastery as a coping strategy. When this approach was not successful, it would lead to a work interference with personal life due to the primacy of loss principle. Finally, using desperation principle, individuals felt and behaved negatively for cyberloafing (Halbesleben et al., 2014; Hobfoll et al., 2018).

Another example, personal growth and work and personal life enhancement sequentially mediated the relationship between the depersonalisation and cyberloafing. Using investment principle, the individual with depersonalisation had to seek for investing new resources, such as personal growth as a coping strategy. When this approach was not successful, it would lead to work and personal life enhancement due to desperation principle. Finally, using investment principle, individuals seek a new resource, such as cyberloafing (Halbesleben et al., 2014; Hobfoll et al., 2018).

### *Theoretical Implication*

Our study examined the sequential mediating effect of psychological well-being and work-life balance in the relationship between job burnout and cyberloafing. Our empirical study showed that two pathways were using the COR theory to explain the sequential mediation effect of the relationship between job burnout and cyberloafing. Therefore, the individual who has a higher level of job burnout might have more psychological resources to deal with resources depletion to facilitate the resources recovery so that they can be able to utilise the resources in work and complete the work task during the work. (Hobfoll et al., 2018).

Besides, our result has shown that gender demonstrated a difference in cyberloafing behaviour. It would be explained that men have shown more autonomy in their personality to demonstrate a higher degree of job autonomy to cyberloafing to invest resources to protect resources loss (Hobfoll et al., 2018) again. These findings are consistent with other previous studies (Blanchard & Henle, 2008; Lim & Chen, 2012; Ono & Zavodny, 2003; Teo & Lim, 2000). This result could help explain the COR theory by adding the consideration of gender difference.

### *Practical Implications*

A study on the impact of cyberloafing and its internet policy across different cultures and its impact on Psychological well-being and work-life balance is highly recommended. First., this study contributed to the management field that job burnout was necessary when the employees cyberloafing their work. According to the COR theory, further reviewing the company policy for reducing the work burnout was required rather than restricting the behaviour of cyberloafing in the workplace (Hobfoll, 1989; Hobfoll et al., 2018; Hobfoll et al., 1991). Besides, the employee's psychological well-being needs should be considered by management. By increasing the level of psychological well-being via company policies, such as reducing the nature of social isolation of work, increasing the face-to-face contract can help the employee gain a sufficient psychosocial resource during their work. Hence, they

can be more focused on their present work, making cyberloafing less likely to happen (Grant & Polak, 2013).

Finally, the importance of work-life balance was stressed here, since cyberloafing create a diffused boundary between work and non-work time (Kowalski & Swanson, 2005). Hence, a review of company internet policy was recommended to prevent employee cyberloafing during their work on one hand. On the other hand, they can be “free” out of work time by stopping granting access to the company’s e-mails, intranet.

## **7. Limitation and Future Research**

The studies are subject to several limitations that can be addressed in future research. The first limitation was that the cross-sectional data collected in our study did not provide evidence for the construct’s temporal relations, and the data used in our study was self-reported. Also, it might affect the observed relationship between the measurement of our four variables. Future research needs to study each variable over a more extended period of longitudinal data can be adopted to assess the temporal effects of our study. Besides, our research design did not allow us to investigate the possibility of reverse causality among the study variables for job burnout and cyberloafing. However, our study's independent variable is a dispositional and stable construct. Thus, it is less reasonable to argue that the temporal state of burnout will influence employees’ ability to manage resources. As such, reverse causality is less reasonable in our study. However, future research needs to study each variable over a longer period, or longitudinal data can be adopted to assess our study's temporal effects. Future research is suggested to investigate the reverse causality of the independent variables and dependent variables.

The second limitation was that our study’s research design involved data collected from a single source. The standard method variance could not be ruled out as a possible explanation for the relationships among psychological well-being, work-life balance, job burnout and cyberloafing. Our study has arranged the variable randomly; some of our items from our variables’ measurement are reversed. The purpose of this practice was to mitigate the concerns about the common method variance. Future research with data collected from different sources, or temporal separation is needed to rule out the possibilities of common method variance (Peng, Kao and Lin, 2006). Furthermore, the results of Harman’s one-factor test suggests that CMV did not pose a validity threat. Future research with data collected from different sources or temporal separation is needed to rule out common method variance (Johnson & Indvik, 2004).

The third limitation of our research was that we did not control a few factors related to cyberloafing and job burnout. Although controlling for several demographic and background variables did not change our results, we could not control for situational factors such as time spent on the cyberloafing.

## References

- Abdi, M. F., Kaviani, H., Khaghanizadeh, M., & Momeni, A. (2007). The relationship between burnout and mental health among nurses. *Tehran University Medical Journal*, 65(6), 65-75.
- Aghaz, A., & Sheikh, A. (2016). Cyberloafing and job burnout: An investigation in the knowledge-intensive sector. *Computers in Human Behavior*, 62, 51-60.
- Akbulut, Y., Dönmez, O., & Dursun, Ö. Ö. (2017). Cyberloafing and social desirability bias among students and employees. *Computers in Human Behavior*, 72, 87-95.
- Anadarajan, M., Simmers, C., & Igbaria, M. (2000). An exploratory investigation of the antecedents and impact of internet usage: an individual perspective. *Behavioural Information Technology*, 19(3), 69-85.
- Askew, K., Buckner, J. E., Taing, M. U., Ilie, A., Bauer, J. A., & Coover, M. D. (2014). Explaining cyberloafing: the role of theory of planned behaviour. *Computers in Human Behaviour*, 36, 510-519.
- Aziz, S., & Cunningham, J. (2008). Workaholism, work stress, work-life imbalance: exploring gender's role. *Gender in Management: An International Journal*, 23(8), 553-566.
- Aziz, S., & Zickar, M. J. (2006). A cluster analysis investigation of workaholism as a syndrome. *Journal of Occupational Health Psychology*, 11(1), 52-62.
- Bagozzi, R. P., Yi, Y., & Phillips, L. W. (1991). Assessing construct validity in organisational research. *Administrative Science Quarterly*, 36 (3), 421-458.
- Bandura, A. (1989). Regulation of cognitive processes through perceived self-efficacy. *Developmental Psychology*, 25(5), 729.
- Baturay, M. H., & Toker, S. (2015). An investigation of the impact of demographics on cyberloafing from an educational setting angle. *Computers in Human Behavior*, 50, 358-366.
- Baumeister, R. F., Muraven, M., & Tice, D. M. (2000). Ego depletion: A resource model of volition, self-regulation and controlled processing. *Social Cognition*, 18(2), 130-150.
- Beck, A. T. (1983). *Cognitive therapy of depression: New perspectives*. New York: Raven Press.
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88(3), 588.
- Betts, T. K., Setterstrom, A., Pearson, J. M., & Totty, S. (2014). Explaining cyberloafing through a theoretical integration theory of interpersonal behaviour and theory of organisational justice. *Journal of Organizational and End Use Computer (JOEUC)*, 26(4), 23-42.
- Beugré, C. D., & Kim, D. (2006). Cyberloafing: vice or virtue? In C. D. Beugré & D. Kim (Eds.), *Emerging Trends and Challenges in Information Technology Management* (pp. 1-2): Information Resources Management Association.
- Blanchard, A. L., & Henle, C. A. (2008). Correlates of different forms of cyberloafing: The role of norms and external locus of control. *Computers in Human Behavior*, 24(3), 1067-1084.
- Bonebright, C. A., Clay, D. L., & Ankenmann, R. D. (2000). The relationship of workaholism with work-life conflict, life satisfaction, and purpose in life. *Journal of Counseling Psychology*, 47(4), 469.

- Burke, R. J., & Deszca, E. (1986). Correlates of psychological burnout phases among police officers. *Human Relations*, 39(6), 487-501.
- Buunk, B. P., & Schaufeli, W. B. (1993). Burnout: A perspective from social comparison theory. In W. B. Schaufeli, C. Maslach, & T. Marek (Eds.), *Professional Burnout: Recent Developments in Theory and Research* (pp. 53-69): Washington, DC: Taylor & Francis.
- Cordes, C. L., & Dougherty, T. W. (1993). A review and an integration of research on job burnout. *Academy of Management Review*, 18(4), 621-656.
- Durak, H. Y., & Saritepeci, M. (2019). Occupational burnout and cyberloafing among teachers: Analysis of personality traits, individual and occupational status variables as predictors. *The Social Science Journal*, 56(1), 69-87.
- Everton, W. J., Mastrangelo, P. M., & Jolton, J. A. (2005). Personality correlates of employee's personal use of work computer. *CyberPsychology & Behaviour*, 8(2), 143-153.
- Goh, Z., Ilies, R., & Wilson, K. S. (2015). Supportive supervisors improve employees' daily live: The role supervisors play in the impact of daily workload on life satisfaction vai work-family conflict. *Journal of Vocational Behaviour*, 89, 65-73.
- Gökçearslan, Ş., Uluyol, Ç., & Şahin, S. (2018). Smartphone addiction, cyberloafing, stress and social support among university students: A path analysis. *Children and Youth Services Review*, 91, 47-54.
- Grant, S., & Polak, B. (2013). Mean-dispersion preferences and constant absolute uncertainty aversion. *Journal of Economic Theory*, 148(4), 1361-1398.
- Halbesleben, J. R., & Buckley, M. R. (2004). Burnout in organization life. *Journal of Management*, 30(6), 859-879.
- Halbesleben, J. R., Neveu, J. P., Paustian-Underdahl, S. C., & Westman, M. (2014). Getting to the "COR" understanding the role of resources in conservation of resources theory. *Journal of Management*, 40(5), 1334-1364.
- Hallberg, U. E., & Schaufeli, W. B. (2006). "Same same" but different? Can work engagement be discriminated from job involvement and organisational commitment? *European Psychologist*, 11(2), 119-127.
- Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*: Guilford publications.
- Hayman, J. R. (2009). Flexible work arrangements: Exploring the linkages between perceived usability of flexible work schedules and work/life balance. *Community, Work & Family*, 12(3), 327-338.
- Henle, C. A., & Blanchard, A. L. (2008). The interaction of work stressors and organisational sanctions on cyberloafing. *Journal of Managerial Issue*, 20(3), 383-400.
- Hilbrecht, M., Shaw, S. M., Johnson, L. C., & Andrey, J. (2008). I'm alone for the kids: contradictory implications for work-life balance of teleworking mothers. *Gender, Work and Organizaiton*, 5(15), 455-471.

- Hobfoll, S. E. (1989). Conservation of Resources: A New Attempt at Conceptualising Stress. *American Psychologist*, 44(3), 513-524.
- Hobfoll, S. E. (2002). Social and psychological resources and adaptation. *Review of General Psychology*, 6(4), 307-324.
- Hobfoll, S. E. (2011). Conservation of resource caravans and engaged settings. *Journal of Occupational and Organisational Psychology*, 84(1), 116-122.
- Hobfoll, S. E., Halbesleben, J., Neveu, J. P., & Westman, M. (2018). Conservation of Resources in the Organisational Context: The Reality of Resources and Their Consequences *Annual Review of Organizational Psychology and Organizational Behavior*, 5(1), 103-128.
- Hobfoll, S. E., Lilly, R. S., & Jackson, A. P. (1991). Conservation of social resources and the self. In U. B. E. H. O. F. Veiel (Ed.), *The Meaning and Measurement of Social Support: Taking Stock of 20 Years of Research* (pp. 125-141): Washington, DC: Hemisphere.
- Hobfoll, S. E., & Wells, J. D. (1998). Conservation of resources, stress, and aging. In N. Hantke, A. Etkin & R. O'Hara (Eds.), *Handbook of Mental Health and Aging* (pp. 121-134): Academic Press.
- Hochwarter, W. A., Perrewé, P. L., Meurs, J. A., & Kacmar, C. (2007). The interactive effects of work-induced guilt and ability to manage resources on job and life satisfaction. *Journal of Occupational Health Psychology*, 12(2), 125.
- Hussain, S., Thurasamy, R., & Malik, M. I. (2017). Determinants of cyberloafing: a comparative study of a public and private sector organisation. *Internet Research*, 27(1), 97-113.
- Johnson, P. R., & Indvik, J. (2004). The organizational benefits of reducing cyberslacking in the workplace. *Journal of Organizational Culture, Communications and Conflict*, 8(2), 55-62.
- Kanwar, Y., Singh, A., & Kodwani, A. (2009). Work—life balance and burnout as predictors of job satisfaction in the IT-ITES industry. *Vision*, 13(2), 1-12.
- Keeton, K., Fenner, D. E., Johnson, T. R., & Hayward, R. A. (2007). Predictors of physician career satisfaction, work–life balance, and burnout. *Obstetrics & Gynecology*, 109(4), 949-955.
- Kidwell, R. E. (2010). Loafing in the 21st century: enhanced opportunities- and remedies-for withholding job effort in the new workplace. *Business Horizons*, 53(6), 543-552.
- Kim, S. J., & Byrne, S. (2011). Conceptualising personal web usage in work contexts: A preliminary framework. *Computers in Human Behavior*, 27(6), 2271-2283.
- Koay, K. Y., Soh, P. C. H., & Chew, K. W. (2017). Antecedents and consequences of cyberloafing evidence from the Malaysian ICT industry. *First Monday*, 22(3). <https://firstmonday.org/ojs/index.php/fm/article/view/7302/5968>
- Kossek, E. E., Lautsch, B. A., & Eaton, S. C. (2006). Telecommuting, control, and boundary management: correlates of policy use and practice, job control, and work-family effectiveness. *Journal of Vocational Behaviour*, 68(2), 347-367.
- Kossek, E. E., Ruderman, M. N., Braddy, P. W., & Hanum, K. M. (2012). Work-nonwork boundary management profiles: a person centred approach. *Journal of Vocational Behaviour*, 81(1), 112-128.

- Kowalski, B. K., & Swanson, J. A. (2005). Critical success factors in developing teleworking programme. *Benchmarking: An International Journal* 12(3), 236-246.
- Krishnan, S., Lim, V. K., & Teo, T. S. (2010). *How Does Personality Matter? Investigating the Impact of Big-Five Personality Traits on Cyberloafing*. Paper presented at the ICIS.
- Lee, H. F., Chien, T. W., & Yen, M. (2013). Examining factor structure of Maslach burnout inventory among nurses in Taiwan. *Journal of Nursing Management*, 21(4), 648-656.
- Lee, R. T., & Ashforth, B. E. (1996). A meta-analytic examination of the correlates of the three dimensions of job burnout. *Journal of Applied Psychology*, 81(2), 123.
- Leiter, M., & Maslach, C. (1988). The impact of interpersonal environment and burnout and organisation commitment. *Journal of Organization Behaviour*, 9(4), 297-308.
- Li, S. M., & Chung, T. M. (2006). Internet function and internet addictive behaviour. *Computer in Human Behaviour*, 22(6), 1067-1071.
- Lim, V. K. (2002). The IT way of loafing on the job: Cyberloafing, neutralising and organisational justice. *Organisational Psychology and Behavior*, 23(5), 675-694.
- Lim, V. K. G., & Chen, D. J. Q. (2012). Cyberloafing at the workplace: gain or drain on work?., *Behaviour & Information Technology*, 31(4), 343-353.
- Loeys, T., Moerkerke, B., & Vansteelandt, S. (2015). A cautionary note on the power of the test for the indirect effect in mediation analysis. *Frontiers in Psychology*, 5, 1549.
- Mandeville, A., Halbesleben, J., & Whitman, M. (2016). Misalignment and misperception in preferences to utilise family-friendly benefits: Implications for benefit utilisation and work-family conflict. *Personal Psychology*, 69(4), 895-929.
- Maslach, C. (1993). Burnout: A multidimensional perspective. In W. B. Schaufeli, C. Maslach, & T. Marek (Eds.), *Professional Burnout: Recent Developments in Theory and Research* (pp. 19-32): Washington, DC: Taylor & Francis.
- Maslach, C., B..Schaufeeli, W., & Leiter, M. P. (2001). Job burrnout. *Annual Review of Psychology*, 52, 397-422.
- Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. *Journal of Organisational Behavior*, 2(2), 99-113.
- Maslach, C., & Jackson, S. E. (1984). Burnout in organisational settings. *Applied Social Psychology Annual*, 5, 133-153.
- Maslach, C., & Leiter, M. (2006). Burnout. In A. M. Ross, L. Pamela L, P. Steven & L Sauter (Eds.), *Stress and Quality of Working Life: Current Perspectives in Occupational Health* (pp. 42-49): Charlotte: Information Age Publishing.
- Maslach, C., & Leiter, M. P. (2016). Understanding the burnout experience: recent research and its implications for psychiatry. *World Psychiatry*, 15(3), 103-111.
- Maxwell, S. E., Cole, D. A., & Mitchell, M. A. (2011). Bias in cross-sectional analyses of longitudinal mediation: Partial and complete mediation under an autoregressive model. *Multivariate Behavioral Research*, 46(5), 816-841.



- McBride, C., Bacchiochi, J. R., & Bagby, R. M. (2005). Gender differences in the manifestation of sociotropy and autonomy personality traits. *Personality and Individual Differences*, 38, 129-136.
- McGowan, J., Gardner, D., & Fletcher, R. (2006). Positive and negative affective outcomes of occupational stress. *New Zealand Journal of Psychology*, 35(2), 92.
- Meyer, J. P., & Allen, N. J. (1997). *Commitment in the workplace: Theory, research, and application*: Sage publications.
- Muthén, B. O., Muthén, L. K., & Asparouhov, T. (2017). *Regression and mediation analysis using Mplus*: Los Angeles, CA: Muthén & Muthén.
- Nunnally, J. C. (1978). An overview of psychological measurement. In B. B. Wolman (Ed.), *Clinical Diagnosis of Mental Disorders* (pp. 97-146): Boston: Springer.
- Ono, H., & Zavodny, M. (2003). Gender and the Internet. *Social Science Quarterly*, 84(1), 111-121.
- Oravec, J. A. (2002). Constructive approaches to internet recreation in the workplace. *Communications of the ACM*, 45(1), 60-63.
- Ozler, D. E., & Polat, G. (2012). Cyberloafing phenomenon in organisations: Determinants and impacts. *International Journal of eBusiness and eGovernment Studies*, 4(2), 1-15.
- Peterson, U., Demerouti, E., Bergström, G., Samuelsson, M., Åsberg, M., & Nygren, Å. (2008). Burnout and physical and mental health among Swedish healthcare workers. *Journal of Advanced Nursing*, 62(1), 84-95.
- Pindek, S., Krajcsevka, A., & Spector, P. E. (2018). Cyberloafing as a coping mechanism: Dealing with workplace boredom. *Computers in Human Behavior*, 86, 147-152.
- Podaskoff, P. M., MacKenzie, S. B., & Podakoff, N. P. (2012). Sources of Method Bias in Social Science Research and Recommendations on How to Control It. *Annual Review of Psychology*, 63, 539-569.
- Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organisation research: problems and prospects. *Journal of Management*, 12(4), 531-544.
- Qiaolei, J. (2014). Internet addiction among young people in China. *Internet Reserach*, 24, 2-20.
- Renner, V. J., & Birren, J. E. (1980). Stress: Physiological and psychological mechanisms. In N. Hantke, A. Etkin & R. O'Hara (Eds.) *Handbook of Mental Health and Aging* (pp. 310-336): Academic Press.
- Restubog, S. L. D., Garcia, P. R. J. M., Toledano, L. S., Amarnani, R. K., Tolention, L. R., & Tang, R. L. (2011). Yielding to (cyber)-temptation: Exploring the buffering role of self-control in the relationship between organisation justice and cyberloafing behaviour in the workplace. *Journal of Reserach in Personality*, 45, 247-251.
- Rofcanin, Y., Heras, M. L., & Bakker, A. B. (2017). Family supportive supervisor behaviors and organisational culture: Effects on work engagement and performance. *Journal of Occupational Health Psychology*, 22(2), 1-11.
- Ryff, C. D. (1985). Adult personality development and the motivation for personal growth. *Advances in Motivation and Achievement*, 4, 55-92.
- Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, 57(6), 1069.

- Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology*, 69(4), 719-727.
- Spector, P. E., & Jex, S. M. (1988). Development of four self-report measures of job stressors and strain: Interpersonal conflict at work scale, organisational constraints scale, quantitative workload inventory, and physical symptoms inventory. *Journal of Occupational Health Psychology*, 3(4), 356-367.
- Streeton, R., Cooke, M., & Campbell, J. (2004). Researching the researchers: using a snowballing technique. *Nurse Researcher*, 12(1), 35-47.
- Sutton, R. I. (1987). Prediction, understanding, and control as antidotes to organizational stress. In J. W. Lorsch (Ed.), *Handbook of Organizational Behavior* (pp. 272-285): Prentice Hall.
- Teo, T. S. H., & Lim, V. K. G. (2000). Gender differences in Internet usage and task preferences. *Behaviour and Information Technology*, 19(4), 283-295.
- Tetrick, L. E., & LaRocco, J. M. (1987). Understanding, prediction, and control as moderators of the relationships between perceived stress, satisfaction, and psychological well-being. *Journal of Applied Psychology*, 72(4), 538.
- Tokuda, Y., Hayano, K., Ozaki, M., Bito, S., Yanai, H., & Koizumi, S. (2009). The relationships between working conditions, job satisfaction, burnout and mental health among hospital physician in Japan: a path analysis. *Industrial Health*, 42(2), 166-172.
- Ugrin, J. C., Pearson, J. M., & Nickle, S. M. (2018). An examination of the relationship between culture and cyberloafing using the hofstede model. *Journal of Internet Commerce*, 17(1), 46-63.
- Vernon, M. (2005). The changing face of the workplace. *Management Today*, 1 September, 62-67.
- Vitak, J., Crouse, J., & LaRose, R. (2011). Personal Internet use at work: Understanding cyberslacking. *Computers in Human Behavior*, 27(5), 1751-1759.
- Wagner, D. T., Barnes, C. M., Lim, V. K. G., & Ferris, D. F. (2012). Lost of sleep and cyberloafing: Evidence from the laboratory and a daylight saving the quasi-experiment. *Journal of Applied Psychology*, 97, 1068-1076.
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063.
- World Health Organization. (2019). Burnout an “occupational phenomenon”: International Classification of Diseases. Retrieved from [https://www.who.int/mental\\_health/evidence/burn-out/en/](https://www.who.int/mental_health/evidence/burn-out/en/).
- Wright, T. A., & Cropanzano, R. (1998). Emotional exhaustion as a predictor of job performance and voluntary turnover. *Journal of Applied Psychology*, 83(3), 486.
- Wright, T. A., & Hobfoll, S. E. (2004). Commitment, psychological well-being and job performance: An examination of conservation of resources (COR) theory and job burnout. *Journal of Business & Management*, 9(4), 389-406.
- Wright, T. A., & Staw, B. M. (1999). Affect and favorable work outcomes: Two longitudinal tests of the happy-productive worker thesis. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organisational Psychology and Behavior*, 20(1), 1-23.

Zakrzewski, C. (2016). The key to getting workers to stop wasting time online. *Wall Street Journal*, 13 March. Retrieved from [www.wsj.com/articles/the-key-to-getting-workers-to-stop-wasting-time-online-1457921545](http://www.wsj.com/articles/the-key-to-getting-workers-to-stop-wasting-time-online-1457921545).

## **The uncanny and the superflat in macabre representations: Iconographic analysis of a Kawanabe Kyosai blockprint**

**José Rodolfo Avilés Ernult<sup>1</sup>**

### **Abstract**

The experience of the uncanny has been loosely codified in the fields of aesthetics, psychology, and visual arts as phenomena that give rise to feelings of uncertainty, eeriness, anxiety, and creepiness; however, no academic consensus has been achieved in articulating a unified and coherent theoretical account of the uncanny as an epistemological concept since Ernst Jentsch's *On the Psychology of the Uncanny* (1906) and Sigmund Freud's (1919) take on E. T. A. Hoffmann's *Sandman* (1816). Keeping in center the development of a theory of the uncanny, this paper delineates and clarifies theoretical uses of the 'uncanny' in aesthetics and reformulates it as an ambivalence of space which creates anxiety and makes the understanding of space both challenging and discomfoting. Using Edwin Panofsky's three-level approach, the paper looks at the Japanese painter and printmaker Kyosai Kawanabe's *Jigoku Dayu* (1874). Through iconographic analysis determines how Kyosai found inspiration in macabre folklore, depictions of death, and his era's social and cultural changes to develop an aesthetic proposal underpinned by the uncanny comprising liminal, macabre and satirical imagery. It employs Jentsch's and Freud's concept of the 'uncanny' (1906), and Murakami Takeshi's theory of superflat which describes the loss of centrality of suffered by any subject depicted in flattened forms of Japanese visual arts. The paper argues that the properties of superflat and *ukiyo-e* give rise to the uncanny by breaking down perception of subject centrality and creating an emerging film in which all the subjects exist in a flattened space. The paper also states that this, coupled with the other distortions in construction of space and saturation of figures, when added to the symbolism of the subjects--skulls, monsters, reversal of religious Buddhist values--serve as catalysts for anxiety, eeriness, and the uncanny. The paper, thus, shows the uncanny presence in the analyzed visual text.

**Keywords:** Uncanny, Superflat, Aesthetics, Kawanabe Kyosai

---

<sup>1</sup>PhD student, Ritsumeikan Asia Pacific University, Japan.  
Email: jr.ernult@gmail.com

## 1. Introduction to the uncanny presence in Japanese visual arts: superflat and ukiyo-e

The term uncanny is a generic term used by philosophers and literary critics to denote a theoretical and broad assessment of the phenomena of the strange, eerie, unsettling, ambiguous, and ambivalent (Trigg, 2012). However, no consensus has been achieved in formulating the uncanny as an analytical concept useful in approaching contemporary aesthetics manifestations of the mentioned phenomena. Moreover, most studies of the uncanny have been founded on a descriptive mode in which they have sought to identify its principal characteristics with relation to specific media production, built to describe the different projects of its various artists and their culturally bound experiences (Masschelein, 2012).

This paper seeks to answer the question- how can uncanny be used to analyze the effect of superflat on *ukiyo-e* compositions. This paper proposes that the uncanny is an aesthetic concept that can be codified as the disruption of cognitive identification via ambivalence and use it to analyze the effect of decentralization occurring in flattened forms of Japanese visual arts, which creates anxiety in the spectator and makes the understanding of space both challenging and discomforting. Superflat applied in *ukiyo-e* suggests the possibility of a visual field devoid of perspective and devoid of hierarchy, in which all subjects exist equally and simultaneously; *ukiyo-e* aesthetics make assigning of centrality via form, space, line or color to the subject matter an ambivalent process (Steinberg, 2004). Thus, I intend to extend this concept of flattening to *ukiyo-e* painting, by providing an iconographic analysis of Kawanabe Kyosai's blockprint, *Jigoku Dayu No.9 (1874)*, where a self-organizational process of perception occurs when the loss of perspective and centrality happens in such a way that there is no identifiable central theme of the artwork; decentralization gives rise to uncertainty, eeriness, and anxiety. The paper examines the concept of uncanny as discussed by Freud and Jentsch in the section below, along with the superflat as proposed by Takeshi Murakami and Azuma Hiroki, followed by the iconographic analysis of Kawanabe Kyosai's blockprint (Figure 1) titled *Jigoku Dayu No.9 (1874)*.

The paper begins with an exploration of the concept of the uncanny and its properties drawn from Freud's work. The next sections then delve into Jentsch's work to talk about the uncanny as an intellectual uncertainty, followed by Turner's liminality as well as Murakami's superflat as well as superflat and *ukiyo-e*. The paper then describes the methodology and offers the analysis of liminal imagery in the selected artwork, i.e., Kawanabe Kyosai's *Hell Courtesan (Jigoku Dayu) no.9* (Figure 1), post which, the final section presents the findings and conclusion.

## 2. The concept of the uncanny and its properties

The concept of uncanny was first explored and elaborated, as is mostly understood today, by the Austrian psychoanalyst Sigmund Freud (1919) in his famous essay *The Uncanny*, as a theoretical device created to explain the recurrence and re-iterations of traumatic experiences (Masschelein, 2012, p. 33). Throughout his essay, Freud gives several definitions of the term in the intent of relating it to his general theory of repression, particularly in association with the interpretation of E. T. A. Hoffman's *Sandman* (1816). However, Freud (1919) primarily defines the uncanny as something, which ought to have been kept concealed but which has nevertheless intruded into the consciousness a way to relate the concept to his theory of anxiety.

In the first place, if psycho-analytic theory is correct in maintaining that every effect belonging to an emotional impulse, whatever its kind, is transformed, if it is repressed into anxiety, then among instances of frightening things, there must be one class in which the frightening element can be shown to be something repressed which recurs. This class of frightening things would then constitute the uncanny; and it must be a matter of indifference whether what is uncanny was originally frightening or whether it carried some other effect (S. Freud et al., 1955, p. 241).

If an individual experiences a traumatic event, the mind stores it as a memory and represses it from coming out into the conscience. If an analog or similar experience triggers the individual, it leads to the return of the repressed. According to Freud (1919), the experience of anxiety is the underlying cause of repression. Repression here is the mechanism by which traumatic experiences are stored and relived in the mind to protect the ego. This process, however, is also mentally harmful since it is cyclical: the repetition of fixed traumatic content manifests itself as an anxiety attack (fight or flight response) which further reinforces the trauma.

This process causes a segmentation of the self, which is divided and split as a result of the conditions and content of repression and its reiteration. It blocks the complete recollection of the traumatic experience, which relieves the mind from the complete burden of reliving the trauma (in that sense is a defense mechanism, which protects the self). The uncanny, Freud argues, appears when the emotional affects generated by repression turn into morbid anxiety, following the same defensive mechanism.

Freud in *The Uncanny* (1919) says that the compulsion of reliving one's traumatic past comes from a reiteration of familiar experience, which is both provider of solace and cause of neurosis. "Everything that is called *unheimlich* that should have remained buried and hidden but has come to light" (S. Freud et al., 1955, p. 225); thus the uncanny event implies a return to time and space of

profound recollection, a repressed terror that entraps the conscious processes of the mind into a cycle of the unfamiliar becoming the familiar.

However, in certain instances, the experience of the uncanny does not come out of the hidden, familiar thing that has undergone repression and then emerged from it. In the essay, Freud says that uncanny has two possible definitions: a psychoanalytical one (uncanny is caused by anxiety and the return of the repressed), and the other one (related to non-personal experiences of eerie, macabre, and unsettle fictions). The former definition of anxiety and return of repressed does not fully explain how the uncanny works in fiction where there is no previous traumatic experience by the reader of a tale or the reader of a black novel, for instance.

In the case of the latter, Freud says there are two possible explanations- first is a phylogenetic explanation meaning that as a species humans share the same traumatic experiences as the Oedipus complex or the mother-child separation. Those are universal experiences of all human beings and hence are universally shared trauma. In the fiction, any setting in which the author employs description of the trauma of childbirth, for example, or erotic fantasies dealing with paternal or maternal figures, for instance, can trigger the uncanny as a return of the repressed separation or sexual taboo.

The second one is an ontogenetic explanation that deals with the mental development of an individual, which is the surmounting of irrational and magical beliefs such as monsters, fairy tales, and superstitions. For example, it is common for children to be afraid of the dark in the belief that dangerous creatures are populating dark corners. With age and psychic maturity, an individual surmounts these previously held beliefs. Writers of fiction use these previously held beliefs and present them as real and probable in their settings, which creates the effect of the return of the repressed memory. In the case of fiction, an individual can experience the uncanny in an impersonal manner (without a traumatic memory), when the primitive beliefs we have surmounted seem once more to be confirmed, which causes the sublimation of macabre and unsettling settings and lets the individual find pleasure in the recurrence.

### ***The Uncanny as intellectual uncertainty***

Perhaps the most synthetic formulation of the uncanny can be found on the essays and dissertations of the German psychiatrist Ernst Anton Jentsch (1867-1919) whose theories about the uncanny and the processes behind its emergence in modern society predate the Freudian framework. In his famous essay *On the Psychology of the Uncanny (1906)*, (Jentsch, 1997) presents confusion and intellectual uncertainty as the condition that produces the feelings of dread and fear in the spectator:

Among all the physical uncertainties that can become a cause of the uncanny feeling to arise, there is one particular that can develop a fairly regular, powerful a very general effect: namely, doubt as to whether an apparently living being is really animate and, conversely, doubts as to whether a lifeless object may not be in fact animate. (Jentsch, 1997, p. 15)

Jentsch's central thesis is that the uncanny essentially involves an experience of 'psychical uncertainty' which leads to intellectual uncertainty. Jentsch affirms that secondary doubts are repeated compulsively when confronted with human representations which are not actually human.

The inability of recognizing a perception as a particular entity or object would trigger a sensation of danger and thus create dread, eeriness, and the uncanny. Two conditions are described by Jentsch that lead an individual to experience the uncanny: 'lack of orientation' and 'intellectual uncertainty'. Lack of orientation is defined by Jentsch (1997) as a certain limitation on the intellectual capacity, such as a deficient education, faulty cognitive abilities, or youth (as a lack of experience) which would lead to perceive the external world as 'new, foreign and hostile' opposed to 'old, known and familiar.' As affirmed by Jentsch (1997) in the same essay, intellectual uncertainty is a negative affect: the inability to apprehend what is given to the senses. This mechanism is driven by the mental necessity of safety and control over the environment and presupposes a defensive, reactionary conception of the human mind battling the chaotic nature of the world.

The human desire for the intellectual mastery of one's environment is a strong one. Intellectual certainty provides psychical shelter in the struggle for existence. However, it came to be, it signifies a defensive position against the assault of hostile forces, and the lack of such certainty is equivalent to lack of cover in the episodes of that never-ending war of the human and organic world for the sake of which the strongest and most impregnable bastions of science were erected (Jentsch, 1997, p. 16).

Put plainly, for Jentsch the relation of a person with their surroundings and their inner mental fortitude determines the level of neurosis and apprehension that one may experience when confronted with new objects or situations. For whom the feeling of danger, due to the lack of intellectual certainty, leads to the experience of the uncanny.

Another important component of Jentsch's uncanny is the representation and perception of nature and order. For Jentsch (1997), another explanation for the feeling of dread and uncertainty is a breach in the usual understanding of reality, which may be caused by confusion, and it is closely related to anxiety about one's safety:

One can read now and then in old accounts of journeys that someone sat down in an ancient forest on a tree trunk and that, to the horror of the traveler, this trunk suddenly began to move and showed



itself to be a giant snake. If the doubt as to the nature of the perceived movement lasts, and with it, the obscurity of its cause, a feeling of terror persists in the person concerned (p.8).

In his account, this disruption in the process of perception causes confusion and the suspension of the capacity to properly categorize. 'Nature and order' and the regularities of reality assimilated in the mind are what constitute a human intellectual mastery and are directly related to physical certainty. Jentsch argues that a disruption in the processes of cognition, of representation, implies a disruption in the subject-object relation and the most inner conception of identity. A transgression or disruption of the order of nature, where we confirm the progression of events or constituents of normality, unsettles basic assumptions that are hardly questioned. This experience is akin to be robbed in the safety of our own home, after which the value of safe and unsafe is inverted; home becomes unhomely.

For Jentsch, the experience of the uncanny is a negative affection which is manifest insofar as the conditions of intellectual uncertainty are present, which are undesirable altogether. However, art and artistic intention are viable outlets to create a representation that breaches the normal cognitive assumptions. Instances of those breaches can be usually found in fantastic fiction, *noir* fiction, and especially in horror fiction. In these narrative texts, the uncanny is often associated with themes of madness and delusion, and an ambiguous suggestion of the supernatural. Arthur Machen, Welsh author, and his mystic offers an endless supply of narrations that invokes the uncanny via the disruption of nature and order. A celebrated passage of Machen's short story *The White People*, first published in 1904 perfectly illustrates how the uncanny emerges from the disruption of the natural order:

What would your feelings be, seriously, if your cat or your dog began to talk to you, and to dispute with you in human accents? You would be overwhelmed with horror. I am sure of it.

And if the roses in your garden sang a weird song, you would go mad. And suppose the stones in the road began to swell and grow before your eyes, and if the pebble that you noticed at night had shot out stony blossoms in the morning? (Machen, 2011, p. 76).

More than being the result of past, recurring trauma or memories, this illustration of the uncanny draws from the confusion and grotesque spectacle of the subversion of the normal order of nature; all beyond our control. The uncanny arises in those moments of liminal cognition, where the mind is in a state of cognitive indetermination.

The limitation of Jentsch is that the definition of uncanny for him is that – uncanny is the intellectual uncertainty derived from the desire to avoid physical danger. He argues that physical mastery of our environment is a phylogenetic drive that we share as a species. Extending this argument, he says that intellectual control is also a necessity of the species in the same way as the physical control to avoid danger and to survive. So intellectual uncertainty generates the same kind of fight or flight response as

uncertainty about our surroundings or our environment. A physical danger, for example, the presence of a predator triggers this fight or flight response. Intellectual uncertainty comes under two sets of conditions- in a transient way when an individual misidentifies a perception such as confusing a branch on the ground to be a snake or a shadow or silhouette to be a person. This dissolves as soon as the individual gains control or understanding of his perception with clarity. However, in cognitive-compromised individuals or cognitively underdeveloped individuals (such as children) who cannot easily gain control of their perceptions about their surroundings, the effect of cognitive uncertainty is long-lasting and stronger. The uncanny arises in those moments of liminal cognition, where the mind is in a state of cognitive indetermination.

The main limitation of Jentsch's account of uncanny is noted by him- that he does not offer a definition of uncanny as a theory or as a conceptual construct. He only provides exclusively psychological examples in which the uncanny probably or commonly arises. His essay is only a general description of conditions and processes in which the affect of the uncanny arises with sufficient regularity.

Given that the psychoanalytical framework used by Freud and Jentsch is predicated as a phylogenetic structure of the mind, the uncanny as an affect is a felt emotion--a conscious effect of an unconscious mechanism--embedded in the process of perception and representation. Freud's postulation of the trauma of maternal separation at childbirth makes the concept of the uncanny a regressive experience that takes the individual back to the origin of its psychosexual development, which predates the ontogeny of the supernatural and superstition. Jentsch, similarly, conceptualizes the uncanny in two main forms which are tied to the imperative needs of a subject in a changing, and potentially hostile, environment. The universality of the uncanny as a psychoanalytical concept is given by the theoretical framework. Yet, the manifestation which the uncanny takes in *ukiyo-e* compositions, and specifically in the work of master Kyosai is context-specific to the cultural and historical conjuncture of Edo Japan and in this case determined by the stipulative argument of categorizing the analyzed work as superflat, is relevant and points to material conditions and practices which influence artistic production; however, an historical analysis of the mentioned conditions would shift the focus of this paper away from this paper focus, which is the how properties of superflat give rise to the experience of the uncanny.

### 3. Liminality

One of the properties of the uncanny very central to this analysis is liminality as in Victor Turner's *Liminality and Communitas* (Turner, 1969). Liminality is a concept that belongs to the field sociology to refer to a middle phase of a ritual process in which an ontic change occurs – a change of

nature or status alters the fundamental properties of an entity. The process of a ritual in which such a change happens can be analytically divided into three phases: a) separation, b) liminality, and c) incorporation. The middle stage of phase is where a moment and space of indeterminacy arises for the entity subject of the ritual; no longer having the properties of the previous phase but not yet acquired the properties of the next phase. In the words of Turner ‘neither here nor there; they are betwixt and between the positions assigned and arrayed by law, custom, convention, and ceremonial’ (Turner, 1969, p. 95).

Liminal entities have one foot on the immediate plane, dimension or *topos*, and another in an unrecognizable plane; as such, they escape law, ritual, and conventions and are neither subject of cognition nor determination. The most usual examples given by sociologists are the rituals of the passage of children into adulthood. However, the epistemic flexibility of liminality in dealing with states of ambiguity, and the in-between has enabled and extended use by disciplines such as literary analysis, art, and even medicine. For instance, in art analysis, the study of subjects such as death, unborn children, darkness, opaque bicolor, non-visible colors of the spectrum, eclipses and invisibility, the conceptualization of liminality is useful in describing a spectrum of attributes of ambivalence. Liminal entities may be portrayed as devoid of material possession, which their lack of foothold on the community’ shared space implies; ghosts, monsters, and all sorts of liminal beings are usually represented without any insignia, emblem, or heraldic coat, which implies their ‘outcast’ status from any ontological order. This representation is so since liminal beings are reduced and stripped down of any power; they are in a ‘waiting room,’ a phase or transition space that precludes them from participating from any hierarchy or kinship system.

#### **4. Superflat and *ukiyo-e*: space and composition**

Murakami Takeshi’s theory of superflat talks about the diversification of themes and inclusion of a variety of interpretations into a painting or piece of art, such that there is a loss of centrality (Lamarre, 2004). The theory continues to explain that this diversification tends to flatten out the various dimensions projected by the perspective in a composition and/or decentralized in its subject matter, thus creating an emergency field that functions as a database from where stock design and visual patterns can be obtained by any observer in order to create a personalized aesthetic experience (Azuma, 2004). ‘Basically, they all see a radical break with definable subject positions... In other words, the distributive visual field involves a breakdown in perceptual distance, which results in a purely affective relation to the image’ (Lamarre, 2004, p. 161). In effect, a marginal subject can become a prima subject; since there is a rupture in the organization of a composition centrality and marginality become redefined by viewers. This is the result of a non-hierarchical visual field of forms and shapes. What Azuma calls ‘over-

visualized world' or 'database structure' is the new structure of reading and scanning a visual piece (Azuma, 2001, p. 51). Azuma (2001) proposes parallels between *ukiyo-e* and superflat compositions, which implies that the visual emergence field arises when reading *ukiyo-e* artwork.

*Ukiyo-e* are Japanese woodblock prints that depicted the Edo Period upper class in leisure activities, dream-like situations engulfed by an aura of sensuality and tranquility (Kaempfer, 1978, pp. 57–59). This style of painting depicted worldly pleasures in the backdrop of the Yoshiwara district. In this style flatness of surfaces or shapes of color arranged across the space of a composition, as well as the use of empty background spaces, helped to create the illusion of buoyancy that the subjects depicted in the *ukiyo-e* are famous for. These two characteristics of the style, flatness of the subjects, and empty background spaces, allowed for ambiguity in the identification of the relative distance between subjects; even the relative size of subjects does not convey most of the time a clear idea of distance and space. Accordingly, *ukiyo-e* compositions present, as described by the superflat theory, an elimination of details through flattening of perspective and the subject represented.

*Ukiyo-e*'s arrangement of subjects usually sized many objects and characters hierarchically according to their spiritual or thematic importance, without regard for distance from the viewer, points of fugue, or amount of detail. The central figures are often depicted at the top of compositions along vertical lines. This is most probably intended, due to the nature of human vision, since the human eye sees all plumb lines as vertical lines parallel with each other. This was known long before perspective was invented: artists have not always known how to render volume, they used of verticality to create oblique and inverted perspective (Águila, 2007, p. 130). Accordingly, in *ukiyo-e*, the only method to indicate the relative position of elements in the composition was by overlapping of subjects in a plane through juxtaposition. In that context, juxtaposition creates the illusion of different planes, background, foreground by locating the subjects and figures in an arranged overlapping pattern; however, it does not provide perspective or information of relative distance between subjects. In this way, juxtaposition is widely used in *ukiyo-e* to overcome the limitations of its block-printing technique.

Though not clearly conceived as a catalyst for subjective construction or appropriation of the composition process, *ukiyo-e*'s aesthetics allow for a personal and subjective interpretation of the subject's hierarchy and space; ambiguity and liminal spaces seem to arise from such situation.

Though superflat is a postmodern concept, created from a culturally specific reading and interpretation of Japanese visual culture, this paper defines superflat as an a-historical concept for the following reasons: a) since the uncanny affect is produced by the visual ambiguity and the non-hierarchical visual field contained in the definition of superflat, any visual composition which acts as a catalyst the uncanny by ambiguity in the identification of the prima subject, the perception of an

emerging field and the rapture of marginality and centrality within the composition, can be categorized as superflat. An implication of coupling uncanny and superflat is proposing the uncanny as one necessary attribute of the style.

A rebuttal of the universality of the superflat aesthetics is present in James Nobis' (2014) paper *Modal Analysis of Superflat Aesthetics* where he argues that how superflat aesthetic features enable us to better emphasize the importance of Japanese cultural and historic context has in the understanding of images. He affirms that modal markers – namely, color saturation, color differentiation, color modulation, contextualization, representation, depth, illumination, and brightness – can be used to infer historical patterns and trends on Edo visual media and contemporary superflat images and goes to show how Murakami Takeshi is using *ukiyo-e* and Edo images to create coherence in the form of a national visuality, originating in Edo and culminating in the flat aesthetics of anime and manga; a social construction real for the intended audience because of Murakami's deliberate use and manipulation of modal markers in his work (Nobis, 2014, p. 23). In this sense, Murakami is referencing Edo's visual culture, its specificity as a historical conjuncture. This contrasts with criteria of modernity (in the west) where the evaluation of art depended on the adequation of the composition and subjects to abstract parameters of beauty, above the technique (Volk, 2010).

##### **5. Employing iconographical analysis: three functions of the uncanny.**

This paper aims to provide an iconographical analysis and interpretation of *Hell Courtesan* (*Jigoku Dayu*) no.9 (1874) by Kawanabe Kyosai, illustrated in Figure 1. Also, because the analytical methods used (iconographic analysis) require addressing a visual context that demands to be reconstructed by examining similar composition from the same period and depicting similar subjects, the pieces *Hell Courtesan*, *Ikkyu and Skeleketons* (1880) (Figure 2) and *Skeleketons seducing a beauty* (1875) (Figure 3) are also discussed. This study employs Erwin Panofsky (1972) 'three levels of iconographic approach' (1972, pp. 5–8) as the iconographic method of analysis in this thesis for analyzing the following visual texts Panofsky's first level consists of a basic physical description of the form and figures; the second level interprets and identifies symbols and motifs and describes them narrowly and independently; the third level interprets the totality of the composition and explains it as a coherent unity.

The first two levels are used in the thesis to describe and examine the selected artwork, as well as to refer the discussion to the framework proposed in the previous sections. The paper then utilizes the third level to identify certain functions that are hidden in the works of Kyosai. These uncanny devices, namely, satire, *yokai*, and memento mori correspond to 'the use of humor or exaggeration to criticize,' 'a

change in perspective to defamiliarize,' and 'symbolism of death' as will be taken as a function of visual analysis for the chapters:

a) Satire: the coupling of dissonant and contrasting images and symbols with the purpose of comedy, mockery, or irony, to create social commentary.

b) *Yokai* or the supernatural: the depiction of monsters, apparitions, or entities that defy categorization or identification because they exist in liminal spaces defined as binary oppositions; sacred and impious, day and night, life and death.

c) Memento Mori: the confrontation with the idea of death and mortality.



Figure 1. *Hell Courtesan no.9, 1874*. Kawanabe Kyosai. Color woodblock print; 34.4 x 23 cm. Tokyo Metropolitan Library. Image from the series '*Drawing for pleasure is by Kyosai*' published by Sawamura Seikichi (1874).



Figure 2. *Hell Courtesan, Ikkyu, and Skeletons*, 1880. Kawanabe Kyosai. Hanging scroll, ink, color and gold on silk; 137.1 x 69.3 cm. Israel Goldman Collection, London, Photo: Art Research Center, Ritsumeikan University.





Figure 3. *Skeletons seducing a beauty*, 1875. Kawanabe Kyosai. Ink and color on paper; 78.1 x 45 cm. Stadtmuseum Hornmoldhaus, Bietigheim-Bissingen, Germany.

## 6. Analysis: liminal imagery in Kawanabe Kyosai's *Hell Courtesan (Jigoku Dayu) no.9*

The *Hell Courtesan (Jigoku Dayu) no.9* (Kawanabe Kyosai Memorial Museum) from the series *Drawing for pleasure is by Kyosai (Kyosai Rakuga)*, a color woodblock print of 34.4 cm of height and 23 cm of width composed by Kawanabe Kyosai (1831-1889) and published by Sawamura Seikichi in 1874, depicts a beautiful courtesan seated in a priest's chair clad in a red cloak, dozing off, serenely propping her head up, letting fall from her hand a Buddhist whisk, amid a macabre visage of cavorting skeletons (Figure 1). The cavorting skeletons depicted are enjoying a dance, romping with their musical instruments, playing *go*, drinking *sake*, escaping their graves, dancing on top of headstones, and creating mischief.

Hidden under the woman's red cloak the figure of King Emma, the judge of the Japanese underworld is depicted as sneaking a peak from within the inner clothing of the woman. At the feet of the woman clad in red, an apprentice is kneeling showing her back, similarly dozing off and oblivious of the cavorting skeletons. Written on top of the woman there is an inscription that reads: picture of her dreaming of playful skeletons (*Gaikotsu no yuugi wo yume ni miruzu*). The interplay of all the imagery suggests this woman clad in red is the enlightened *Jigoku Dayu* after her encounter with the monk *Ikkyu* (1394-1481) (Figure 2).

The composition is set up in a cemetery, on a diffuse grey leaning blue background subject that evokes an ephemeral and otherworldly topos. While the composition summons nightmarish and macabre apparitions, the expression of the subjects added to the blissfulness of the procession conveys tranquility; a beatific aura that is in contrast with the macabre setting. The piece composition is arranged in a way that there is no resting place for the gaze of the spectator; the whole space is filled with figures either in depicted in action resting. This contraposition creates anxiety since its use of juxtaposition and overlapping of the subjects, paired with foreshortening, makes the understanding of space challenging and discomforting.

The distribution of subjects and space implies a breakdown of perceptual distance due to the mentioned use, or lack thereof, of linear perspective and the rendering of the subjects' size. Skeletons, the woman in red, King Emma all the subjects are overlapping in the same plane, with neither clear support of a *topos* in the background nor clear differentiation through size or detail that proper hierarchical use of perspective would require since all subjects except the woman in red share the same relative size. Moreover, master Kyosai applied pigment in clearly and precisely defined shapes of flat color, disposed along the lines of shapes to create a center of visual gravity in all planes of this piece, thus decentralizing the perception of space using shape and color (Clark, 1993, p. 31). This composition

begs the question of the central figure in the image or a prima subject and the secondary ones, and thus, creates a non-perspectival field with no clear main subject position.

The figure of the *Jigoku Dayu* formed part of the iconographic and literary repertoire of Edo Japan, usually a stylized feminine figure dressed in the garments of a courtesan (Clark, 1993, p. 101). Symbols which denote the identity of this subject (Figure 1) are the priest whisk, an *uchikake* kimono blazoning the likeness of King Emma or hell imagery, patterns of lotus flowers and leaves, auspicious imaginary of jewels together with the Gods of Luck, Bodhisattvas, and the presence of dancing skeletons (Kuroda, 2017, p. 225). The mentioned symbols conjure a sacred and impious imagery: *Jigoku Dayu* clad in red suggesting the figure of Bodhidharma, Emma or king of hell, the priest's whisk alluding the story of *Otoboshi* and the monk *Ikkyu* (Figure 2), the fortune god Hotei, and a variety of frolicking skeletons.

*Dayu* the designation for the highest rank of a courtesan, forms part of the iconographic catalog of Japan, bestowed in it the stylization of a feminine figure characterized as 'pleasurable women;' courtesans at leisure and promoted the entertainments to be found in the pleasure districts (Avilés Ernult, 2020). These women, differently to Geishas, were expected to provide dance, music, and conversation, as well as sexual intercourse (Buckland, 2006, p. 28). However, the title of master Kyosai's paint *Jigoku Dayu* plays an inversion of meaning, or perhaps a satire, since *Jigoku* denotes both hell and the lowest streetwalker prostitute in the Edo period (Kuroda, 2017, p. 230). The sublimation of sin through the syncretism of the figures of the monk and the high courtesan is remarkable. The allusion to *Otoboshi* and *Jigoku Dayu*, *Ikkyu*, and Bodhidharma is not gratuitous. The high courtesan is, therefore, a symbol of the instrumentalization of love, and generally susceptible to a spiritual transposition, which finds their foil in the figure of a monk or a priest (Chevalier & Gheerbrant, 2009, p. 398) resulting in an image which partakes both realms, a liminal representation: the enlightened prostitute.

The image of the skeleton, in a similar way, symbolizes a dark potency and preeminent sovereignty of death. In alchemy, the skeleton is a symbol of black, putrefaction, decay and decomposition, colors, and operations that prelude transmutations (Chevalier & Gheerbrant, 1986, p. 731). This is not a static death or a permanent state, but a dynamic death, fluid, herald of a new shape, and or form of life. The depicted skeletons mirror the woman clad in red, creating a play of jolly irony and thoughtfulness: the symbol of the knowledge of who has crossed to the other side, the unknown, of those who have penetrated via death, the secret of the otherworld. The skeleton also indicates, during dreams the immanence of a life-changing event, breaking up with traditions, which the individual forebodes with anguish, without knowing what will happen (Chevalier & Gheerbrant, 1986, p. 481). This thematic connection with the skeletons in the piece above, suggests a tentative symbolic

identification between the deceased and the divinity, so there is an implied fluidity between life and death. However, this connection is not explored as much as the general allusion of death and the brevity of life, such as the frolicking skeletons tempt the viewer to do: enjoy ephemeral moments of life; which given the inversion of values and the consubstantiation of the images of skeletons, skulls, and death, it may indicate either an exhortation to reflect on the vanity of desire and earthly pleasures, or an invitation to enjoy the time we are alive.

The King Emma is a divinity that in his most basic function, a judge symbolizes justice. The figure of King Emma is of consciousness in the most elevated way (Clark, 1993, p. 86). Again, contrasting with the dilapidated world of pleasures, full of sensuality and sin, there is measure and justice in the figure of King Emma. There are the harshness and domination which balance morality and conduct. The courtesan and King Emma suggest a liminal cooperation between divinities: the blessed equality of Bodhidharma, and the ruthless justice of King Emma.

This type of synthesis of sacred and impious imagery was not a device exclusive to Kyosai. In literature, the earliest account of the *Jigoku Dayu* came to light in an anonymous anthology of stories titled *Ikkyu Kanto Banashi* (1672). (Buckland, 2006). In it is described the first poetry exchange of *Ikkyu* and a courtesan working at Sakai who will later become a disciple of the eccentric monk. Kuroda Kazushi (2017) argues that the mayor dramatizations of the *Jigoku Dayu* narrative were introduced to the Edo audience later by the *Honchou suibodai Zenden* (1809), in which the Sakai prostitute, after admitting *Ikkyu* inside of the Tamanaya house and her personal quarters, witnesses how the monk joins in a dance with countless skeleton shadows appearing in the room's paper doors. This miracle awakens the prostitute to the illusory nature of the world, she comes to see the impermanence of life and understands who *Ikkyu* is, and from that day on wears an over kimono with images of hell (Kaempfer, 1978, pp. 57–67). Under *Ikkyu*'s tutelage, she repents her sins as a courtesan and achieves enlightenment. and completes the transformation of the sinful woman into a spiritual being (Kaempfer, 1978, pp. 57–67). Thus, the liminal figure of the enlightened courtesan, the *Jigoku Dayu*, is developed as an identification of the properties of both the figure of a monk and a sinner.

However, even though this the synthesis of sacred and impious imagery was not a device exclusive to Kyosai, he was known for this fascination with the *Jigoku Dayu* narrative and produced several paintings depicting different scenes of the legend (Kuroda, 2017, p. 227); Timothy Clark (1993) alone counts seven different pieces depicting the subject, each one of them with spawning its own variations.

Kyosai's corpus emphasizes an interplay of themes such memento mori, satire, the depiction of *yokai* and death as the great leveler of humans; through compositions achieved with a combination of

hellish apparitions and mirages blended into traditional Buddhist narratives, in order to lampoon the new era of ‘civilization and enlightenment’ (*Bunmei Kaika*) which kick-started the process of transformation from Edo to Tokyo (Figal, 1999, p. 12). This Japan Kyosai experienced was undergoing a process of change, the arrival of the black ships to the Edo bay and the end of the policy of isolation (the Sakoku period), the instability of the shogunate and the Meiji restoration deeply impressed in the people of Japan a dynamic of rupture and continuity; westernization opposed to tradition (Lane, 1978, pp. 10–11). In response to this historical conjuncture, Kyosai produced profoundly satirical paintings and woodblock prints which made fun of the mentioned contradictions of modern life, as well as embracing the *Zeitgeist* of the times. Consequently, he made use of *yokai*, animals, corpses, deities, and demons to convey his criticism of the new burgeoning life of the Japanese (Clark, 1993, p. 17). Being himself quite knowledgeable about the life of sordid Yoshiwara district ‘the floating world’ (*ukiyo*) (Clark, 1993, p. 18), he invoked and imagined a universe of wit, stylishness, and extravagance--with overtones of naughtiness, hedonism, and transgression--out of the necessity of awareness of the impermanence of the world; a theme ever-present in the Japanese Buddhist tradition. This aesthetic motivation, to disharmonize and create dissonance in stagnant cultural representations underpins Kyosai art as an expression of the uncanniness of human life: horrifying distortions and caricatured forms; a confrontation of reality through fantastic irrationality.

It is noteworthy that Kyosai stands in a class of his own regarding the use of the uncanny imagery. If uncanny is, as previously stated, a category defined by liminality as a result of the disruption in the process of representation (cognition), and employed with the distinctive intention of unsettling the viewer via the depiction of unsent corpses (*yurei* and *yokai*), motifs of *memento mori* and ‘death as the great leveler’, satire, and the overall idea of death and life in a continuum; then Kyosai is the most prolific exponent of the uncanny of all *ukiyo-e* masters.

For instance, even though the images of *Ikkyu* and the *Jigoku Dayu* flourished during the Edo period – *Ikkyu* is usually depicted holding a staff (*shakujo*) adorned with a human skull clad in austere black monk robes – he is almost invariably shown presenting a skull to *Jigoku Dayu* or her, standing alone, performing in a play (Clark 1993, pp. 101-102). The triumvirate of *Ikkyu*, dancing skeletons, and *Jigoku Dayu*, conversely, is absent from depictions of the same period, such as Utagawa Kuniyoshi’s *Priest Ikkyu and Jigoku Dayu* (1852) or Hiroshige’s *Tokaidou gojusan tsui seki* (1845) (Kuroda, 2017, p. 225).

Another painting which depicts *Jigoku Dayu*, *Ikkyu* and frolicking skeletons, *Ikkyu and Skeletons* (1880), Kawanabe Kyosai (1831-1889), includes the same basic elements *sans* the absence of the monk, the beautiful woman stands behind a folding screen, inviting, she opens her *uchikake* robe

which is decorated with scenes of the gods of luck, fiery coral, lotus flowers, auspicious symbols of longevity and riches contraposing demons, the King of Hell Emma and Bodhisattvas – Bodhisattvas are associated with the circle of life and death. A troupe of dancing skeletons accompanies *Ikkyu* – painted in a dynamic *kyoga* style. There is a double play on meaning with the whole scene of the macabre hosts engaged in lively human activities, implying they have forgotten their death.

Issues of life and death are treated similarly in other of Kyosai paintings, thematically and conceptually connected to *Hell Courtesan no.9* (Figure 1), without depicting the three mentioned subjects. In *Skeletons seducing a beauty* (1875), this connection is evident by the interplay of a beautiful woman in kimono, four skeletons who are flirting with her, and, in the background a funerary procession of skeletons who carry a lantern which reads ‘gone anticipatedly’ (*sakimawari*) (Figure 3). The composition appears to convey that the woman is expected ahead in the realm of the dead. Meanwhile, the four flirting skeletons try to make the woman pay attention to them, to death itself. The previously mentioned tension experienced by the Japanese during the modernization of their country is again indicated by the top hat sporting skeleton and another one holding the carcass of a Japanese fan. Two takeaways are clear: firstly, human life is all the same, beautiful or ugly, western or eastern, everybody dies; secondly, the world is an illusion, there is fluidity between life and death.

Regarding the uncanny and its function, Kyosai’s amalgamation of the satire, *yokai*, and *memento mori* functions are present throughout this composition:

a) *Yokai* function: Kyosai uses skeletons as a symbol of the transmutation of human consciousness; from life to death. The skeleton in this role signifies the fluid connection between two realms which find their threshold in the liminal human figure ripped of all flesh. This uncanny function proposes the supernatural a device to depict and implicitly accept the contradictions of the modern life of Edo and the traditional world left behind but nonetheless spiritually potent. Similarly, skeletons, monsters, and *yokai* express the transition stage of binary concepts: sacred and secular, life and death, modern and medieval, known and unknown, etc.

b) satire function: this uncanny function is the most used by Kyosai in his *Jigoku Dayu* more so when we consider how the reversal of the natural and social order is a recurrence throughout his oeuvre. For all the humor and whimsy in which Kyosai revealed, there is a serious intention in his satire; most patent when we look at the converging of sacred and impious figures of the monk and the prostitute melded together. The marginal images are also indicative of satire directed to the decadent life of the upper classes which frequented the Yoshiwara district; the skeletons exhorting the viewer to remember their own mortality. In this sense, the Kyosai’s *Jigoku Dayu* is a satirical space which openly ridicules and chastises the society of Edo Japan.

c) *memento mori* function: The consubstantiality of the skeleton, skulls, and death works in tandem with the satire and *yokai* function, as it reminds the viewer of the fluidity of life and death. The skeletons and skulls dance, play, and exist in a liminal space which has become an extension of their life. Kyosai appears to be indicating that death permeates all life and reality; in our life, we are dying.

## 7. Conclusion

The presence of the uncanny in the world of *ukiyo-e* may appear as an anachronism in a framework, which is not indigenous to Japanese art and aesthetics. However, the phenomenon of intellectual uncertainty tied to the decentralization of *prima* subjects in a composition and the emergence of a decentralized database has its correlation in psychoanalysis, literary aesthetics, and Japanese pre-modern art. In the latter case, Japanese art, specifically *ukiyo-e* the uncanny as cognitive uncertainty has no formal precedent but, as an experience or phenomenon as derived from the composition, it is present, nevertheless. The viewer of *Hell Courtesan no.9* may experience feelings of anxiety, creepiness eeriness ambiguity, in sum, the uncanny. This is a result of the interplay between satire and the encounter with one's own mortality in a message carefully layered with circular allusions which can play back on the viewer as cognitive dissonance. A crucial aspect of the uncanny imagery employed in this piece is the systematic incoherence of marginal art placed within and against conventional depictions commonplace in the early Edo period; the reversal that upsets and satirizes the existing social and natural order.

An image with no clear *prima* subject is, therefore, an image where all subjects exist in a decentralized non-hierarchical database. The analyzed work of Kyosai Kawanabe *Jigoku Daiyuu* presents characteristics of superflat due to the lack of linear perspective, hierarchical perspective in favor of flatness, and clearly differentiated planes where the subjects are located, decentralizes all the subjects in the composition. This effect is created by the breakdown of perceptual distance due to the lack of the use of differentiated sizes as well as foreshortening. This contraposition, through the employment of juxtaposition and overlapping of the subjects, and paired with the lack of foreshortening, creates anxiety and makes the understanding of space both challenging and discomfoting, thus bringing out the uncanny as an experience of cognitive dissonance rather in line with the conception of uncanny of Ernst Jentsch. The decentralization is akin to ambivalence which is reinforced by the symbolic themes of synthesis and syncretism of the sacred and the impious expressed in the three uncanny functions found in the analysis.

These images--similar of which exist in *shunga*--seem inconceivable in a pious context and create a liminal representation, which suggests a reversal imagery. The conflagration of life and death is expressed as a counterpoint of life but also offered as a warming of the illusion of reality. And among the

bones and corpses, the courtesan slumbers peacefully, given the appearance of knowing all too well the façade of reality. This is one of Kyosai's main motifs, that underneath the appearances, beyond social status or power, we are all nothing but skeletons; a *memento mori*. Even though this study considers only one case, and given the prolific production of Kawanabe Kyosai, further analysis of other works with similar properties of decentralization of subjects would consolidate the thesis of this study.

## References

- Águila, F. Z. (2007). *Philosophy of the image: language, image and representation [Filosofía de la imagen: lenguaje, imagen y representación]* (1st ed.). Universidad Nacional Autónoma de México.
- Avilés Ernult, J. R. (2020). *The Aesthetics of the Uncanny: Comparative Study of Kyosai Kawanabe and Jose Guadalupe Posada's Liminal Imagery* [Ritsumeikan Asia Pacific University].  
[https://ritsumei.repo.nii.ac.jp/?action=pages\\_view\\_main&active\\_action=repository\\_view\\_main\\_item\\_detail&item\\_id=13857&item\\_no=1&page\\_id=13&block\\_id=21](https://ritsumei.repo.nii.ac.jp/?action=pages_view_main&active_action=repository_view_main_item_detail&item_id=13857&item_no=1&page_id=13&block_id=21)
- Azuma, H. (2001). *Otaku: Japan's Database Animals*. University of Minnesota Press.
- Azuma, H. (2004). *Superflat Japanese Postmodernity*. Hirokiazuma.Com.  
[https://web.archive.org/web/20040223082912/http://www.hirokiazuma.com/en/texts/superflat\\_en1.html](https://web.archive.org/web/20040223082912/http://www.hirokiazuma.com/en/texts/superflat_en1.html)
- Buckland, R. (2006). *A Japanese Menagerie: Animal Pictures by Kawanabe Kyosai*. British Museum.
- Chevalier, J., & Gheerbrant, A. (2009). *Dictionary of the Symbols [Diccionario de los símbolos]* (2nd ed.). Herder.
- Clark, T. (1993). *Demon of Painting: Art of Kawanabe Kyosai*. British Museum Press.
- Figal, G. A. (1999). *Civilization and Monsters: Spirits of Modernity in Meiji Japan*. Duke University Press.
- Freud, S., Strachey, J., Freud, A., Rothgeb, C. L., Richards, A., & Scientific Literature Corporation. (1955). *The Complete Psychological Works of Sigmund Freud*. Hogarth Press.
- Freud, Sigmund. (1919). *The Uncanny*. Hogarth Press.
- Jentsch, E. (1997). On the psychology of the uncanny (1906). *Angelaki - Journal of the Theoretical Humanities*, 2(1), 7–16. <https://doi.org/10.1080/09697259708571910>
- Jordan, B. G. (1993). *Strange fancies and fresh conceptions: Kyosai in an age of conflict*. University of Kansas.
- Kaempfer, H. M. (1978). *Ukiyo-e Studies and Pleasures, A Collection of Essays on the Art of Japanese Prints*. Society for Japanese Arts and Crafts.



- Kuroda, K. (2017). Jigoku Dayū and Ikkyū – A Tale About Lively Skeletons. In *This is Kyosai! : the Israel Goldman collection [Korezo Kyōsai! : Gōrudoman korekushon]* (pp. 225–231). Tokyo Shimbun.
- Lamarre, T. (2004). An introduction to otaku movement. *EnterText*, 4(1), 151–187. [moz-extension://4caa342b-353e-4c34-9b63-e825155b9551/enhanced-reader.html?openApp&pdf=http%3A%2F%2Fwww.lamarre-mediaken.com%2Fsite%2FOtaku\\_Movement\\_files%2FOtaku%2520Movement.pdf](http://moz-extension://4caa342b-353e-4c34-9b63-e825155b9551/enhanced-reader.html?openApp&pdf=http%3A%2F%2Fwww.lamarre-mediaken.com%2Fsite%2FOtaku_Movement_files%2FOtaku%2520Movement.pdf)
- Lane, R. J. (1978). *Images from the Floating World: The Japanese Print*. Konecky & Konecky.
- Linhart, S. (2007). A Japanese Menagerie. Animal Pictures by Kawanabe Kyōsai. Edited by Rosina Buckland, Timothy Clark and Shigeru Oikawa. With a foreword by Israel Goldman. pp. 112, 16 figs, 67 plates. London, The British Museum Press, 2006. *Journal of the Royal Asiatic Society of Great Britain & Ireland*, 17(2), 225–226. <https://doi.org/10.1017/s1356186307007079>
- Machen, A. (2011). *The White People and Other Weird Stories* (S. T. Joshi (ed.); 1st ed.). Penguin Classics.
- Masschelein, A. (2012). *The Unconcept: The Freudian Uncanny in Late-Twentieth-Century Theory*. State University of New York Press.
- Nakamura, M. (2015). *Monstrous bodies : the rise of the uncanny in modern Japan*. Harvard University Asia Center.
- Nobis, J. G. (2014). Modal Analysis of Superflat Aesthetics. *Multimodal Communication*, 3(1), 13–24. <https://doi.org/10.1515/mc-2014-0002>
- Panofsky, E. (1972). *Studies in Iconology: Humanistic Themes in the Art of Renaissance* (Icon editi). Harper & Row.
- Steinberg, M. (2004). Otaku consumption, superflat art and the return to Edo. *Japan Forum*, 16(3), 449–471. <https://doi.org/10.1080/0955580042000257927>
- Szakolczai, A. (2009). Liminality and Experience: Structuring transitory situations and transformative events. *International Political Anthropology*, 2(1), 141–172. [https://d1wqtxts1xzle7.cloudfront.net/34746291/ipa\\_journal\\_1\\_2009\\_szakolczai.pdf?1410834809=&response-content-disposition=inline%3B+filename%3DLiminality\\_and\\_Experience\\_Structuring\\_tr.pdf&Expires=1614932779&Signature=KCK~vSbXSYcqiuXUvYvP7PpmWMMM1ao96hdkm](https://d1wqtxts1xzle7.cloudfront.net/34746291/ipa_journal_1_2009_szakolczai.pdf?1410834809=&response-content-disposition=inline%3B+filename%3DLiminality_and_Experience_Structuring_tr.pdf&Expires=1614932779&Signature=KCK~vSbXSYcqiuXUvYvP7PpmWMMM1ao96hdkm)
- Trigg, D. (2012). *The Memory of Place: A Phenomenology of the Uncanny* (1st ed.). Ohio University Press.
- Turner, V. (1969). *The Ritual Process: Structure and Anti-Structure*. Aldine Publishing Company.

- Turner, V. (1974). Liminal to Liminoid, in Play, Flow, and Ritual: An Essay in Comparative Symbology. *Rice Institute Pamphlet-Rice University Studies*, 60(3), 53–92.  
<https://scholarship.rice.edu/handle/1911/63159>
- Volk, A. (2010). *In Pursuit of Universalism: Yorozu Tetsugoro and Japanese Modern Art*. University of California Press.
- Wels, H., van der Waal, K., Spiegel, A., & Kamsteeg, F. (2011). Victor Turner and liminality: An introduction. *Anthropology Southern Africa*, 34(1–2), 1–4.  
<https://doi.org/10.1080/23323256.2011.11500002>
- Windsor, M. (2019). What is the Uncanny? *The British Journal of Aesthetics*, 59(1), 51–65.  
<https://doi.org/10.1093/aesthj/ayy028>

## India's COVID-19 Strategy and implications for its relations in the Indian Ocean

Astha Chadha<sup>1</sup>

### Abstract

The COVID-19 pandemic has swept the world with a state of medical emergency, economic slowdown and health infrastructures challenged by multiple wave sand strains of the mutating virus. Despite a good recovery rate from the COVID-19 infections, India is among the worst affected nations by the pandemic economically and from a security perspective. While New Delhi witnessed worsening relations with its neighbors like China, it introduced several policies to tackle the COVID-19, while handling its international relations with its neighbors in the Indian Ocean and beyond. The paper raises the question of how the COVID-19 pandemic affected the strategic environment for India. How did India respond to the regional challenges under this strategic environment through its COVID-19 strategy and/or diplomacy? The study uses the neoclassical realist concept of permissive/restrictive strategic environment and the role of foreign policy executive (FPE) in shaping foreign policy. The paper argues that COVID-19 proved to be a catalyst for shaping the strategic environment for India as that of imminent threat, leading to a more restrictive strategic environment for the nation, giving it narrower window of options to exercise its COVID-19 diplomacy and build security partnerships. It discusses how India's COVID-19 strategies were catalyst in shaping India's security policies and initiatives in the Indian Ocean region. The paper states that since India faced a restrictive strategic environment internationally, its foreign policy elite remained key actors that influenced India's foreign policy in the Indian Ocean to balance Chinese influence in the region through its COVID-19 diplomacy and strategy for regional engagement.

**Keywords:** COVID-19, pandemic, India, China, medical diplomacy, vaccine diplomacy

---

<sup>1</sup> PhD student, Ritsumeikan Asia Pacific University, Japan.  
Email: astha2602@gmail.com

## 1. Introduction

The COVID-19 pandemic has swept the world with a state of medical emergency, economic slowdown and health infrastructures challenged by multiple wave sand strains of the mutating virus. Despite a good recovery rate from the COVID-19 infections, India is among the worst affected nations by the pandemic economically and from a security perspective. The power friction in the Indian Ocean existed before the pandemic hit and continued after the world was engulfed in the COVID-19 health crisis. For India, the pandemic hit at the time when it was facing border security issues with China and Pakistan in the north, maritime challenges in the seas. However, as the pandemic engulfed the world, several states resorted to introducing complete or partial lockdowns and restriction on movement of people and goods for minimizing exposure to the virus, as well as prioritizing domestic consumption needs. While nations like China and India received assistance from other states, they soon entered into a contest of developing their own domestic capabilities- military and health infrastructure. COVID-19 diplomacy emerged as a contest among major powers competing for influence regionally and globally through medical assistance, medical equipment, vaccine rollout etc.

The paper raises the question of how the COVID-19 pandemic affected the strategic environment for India. How did India respond to the regional challenges under this strategic environment, through its COVID-19 strategy and/or diplomacy? This paper uses the neoclassical realist concept of permissive/restrictive strategic environment and the role of foreign policy executive (FPE) in shaping foreign policy. The scope of this paper is limited to India's COVID-19 strategy/diplomacy in year 2020. The paper states that the restrictive strategic environment was created by high opportunities and threats for India during the pandemic. The paper argues that India's COVID-19 strategies were catalyst in shaping India's security policies and initiatives in the Indian Ocean region. The paper employs qualitative examination of India's policies against the coronavirus pandemic as well as its implications for India's foreign policy towards Indian Ocean region.

The paper is divided into six sections- the next one presents the brief theoretical framework of the study, and the third section discusses the impact of the COVID-19 pandemic on the strategic environment for India. The following two sections discuss how India's COVID-19 diplomacy influenced the nation's policy towards development partnerships and how India's COVID-19 strategy influenced India's policy towards building the nation's capabilities, respectively, followed by the conclusion in the last section. The paper uses the term diplomacy for the dialogue and negotiations held between the foreign policy elite of India and other states; and the term strategy as the act or plan by the foreign policy elite towards the state's security and its interactions with the other states and actors.

## 2. Theoretical framework

Classical realism dates back to 1939 with *The Twenty Years' Crisis: 1919-1939* written by E. H. Carr and *Politics among Nations: The Struggle for Power and Peace* in 1948 by Hans Morgenthau, which became the key for political realism post-1950s (Carr, 2016; Morgenthau, 2005). Classical realism assumed the flawed nature of humanity which is power hungry and constant struggle among states to increase capabilities due to the anarchic nature of states. The last three decades before the twenty first century saw the emergence of Neorealism (Waltz, 1979) which brought the focus of international relations on the states as the center point rather than individuals.

Within the realist thought, the balance of power theory is based on works of Thucydides, Hobbes and Rousseau, and have been extended into classical realist theory by Carr (1964) and Morgenthau (1963). The theory suggests that possession and concentration of military and material capabilities with the great powers is kept in check and balanced out due to major powers trying to survive and maintain their supremacy in the international system, thus restoring equilibrium. According to Waltz (1979), the international system is under a recurring balancing phenomenon due to shifts in relative distribution of capabilities. The theory, however, fails to accommodate why and how states could choose not to balance against certain powers in the anarchic international system.

Neo classical realism, on the other hand, examines divides power into components to examine whether they challenge strategic national interests, i.e. whether the change in components of power affect the strategic environment for a nation. Opposed to the balance of power theory, the neoclassical realism allows for the possibility of no counterbalancing behavior in the face of rising power if the component of power is not perceived as a threat to immediate national interest.

This paper hypothesizes COVID-19 diplomacy as one such component of power in the face of the pandemic, and evaluates India's foreign policy towards Indian Ocean through the lens of its competition with China for COVID-19 diplomacy in its immediate neighborhood. The neoclassical realism framework enables looking at India's COVID-19 strategy as an outcome of its foreign policy executive's (FPE) perception of the security environment, where a high (low) security competition relates to restrictive (permissive) international environment. The foreign policy executive's perception of security environment during the pandemic is taken as an intervening variable between the distribution of power in the international system and India's Indian Ocean policy in general.

The assumptions for the foreign policy executive are the same as in Taliaferro et al. (2012, p. 154), i.e. the FPE is the key decision maker, the FPE's key aim is to advance and secure nation's

security or power, FPE's assessments of power (and the subsequent foreign policies) hold significance, and, FPE being the sole foreign policy maker has monopolistic access to strategic intelligence.

The neoclassical realist model here also assumes that FPE have greater clarity about the international system, enemies and the trajectory of power in the long-run, under high security competition (restrictive strategic environment). The implication is that FPE can choose to balance against certain components of another state's power, which are perceived as a greater geostrategic threat as opposed to other non-urgent but possible threats (Taliaferro et al., 2012, p. 196). With this redirection and reallocation of resources to address threat to geostrategic interests by balancing specific power components opposed to relatively less threatened interests, the FPE's foreign policy choices allow it to address geostrategic challenges by adjusting capacities like industrial production.

The pandemic became a local as well as a global issue, and began being tackled like a political and security threat in several nations, as seen is the US-China conflict over the origin of the pandemic (Verma, 2020). The neoclassical realist sees the structures capable of only pushing and shaping state behavior but not determining them or specifying outcomes (Taliaferro et al., 2012, p. 197). Here 'shoving and shaping' implies interaction of structure and (unit-level) states which can resist the 'shoves'. Keeping that in the background, the paper contends that the pandemic also affected the international power structures to a certain extent, but the response to the 'shoves' of these structures varied according to the state policies regarding the pandemic and their foreign policies.

This paper, tests whether and how COVID-19 posed a threat to India's geostrategic interests and evaluates India's foreign policy response such as through medical diplomacy, development-based engagements, economic and territorial sovereignty. The paper evaluates if India's foreign policy became more balancing in nature and expressive of India's ambition to be a greater and more significant power in the world's geopolitical calculations. With China becoming aggressive in seas and borders around India, and the US policy becoming more anti-China, it has instilled security threat for India amid the pandemic aimed at preventing China from achieving regional hegemony even if it includes counterbalancing by allying with the US.

The neoclassical realist approach transcends the limitation of balance of power theory to allow for examination of 'components of power' in a permissive/restrictive strategic environment, given the role of FPE in shaping the foreign policy. The theory could be helpful in explaining how China's direct competitor, India is striving to mark its presence especially in the Indian Ocean region, through diplomatic measures including medical diplomacy, development partnerships and expanding its influence to safeguard its economy, health and security.

### 3. Effect of the pandemic on the nature of strategic environment for India

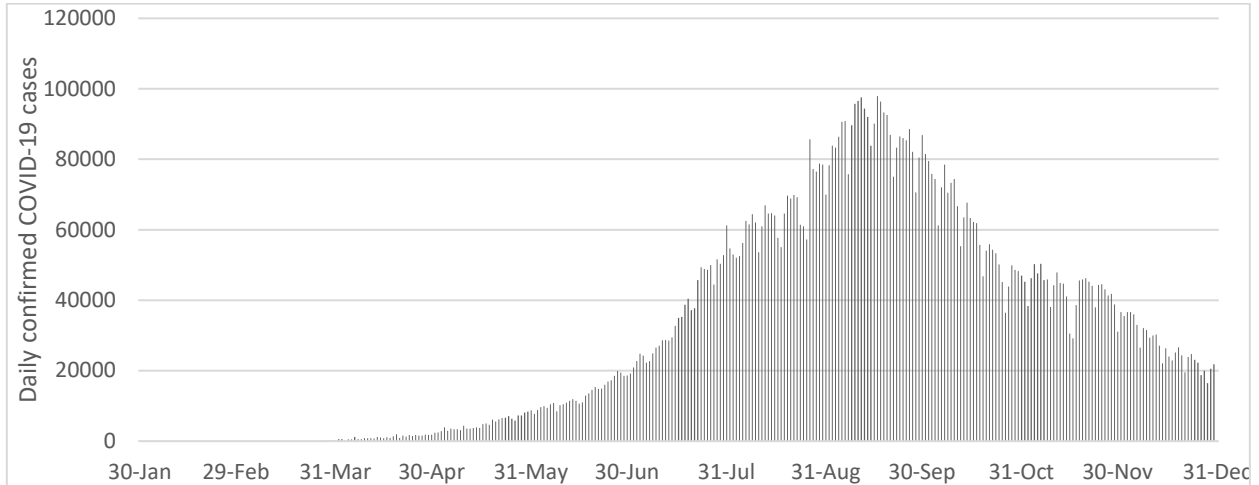
The strategic environment for South Asia towards the end of 2019 saw several international security challenges. India and China, with unsettled border issues and border clashes in the past years, were engaged in diplomatic talks and competition over influence in South Asian small nations. Having rejected the China-led Belt and Road initiative over the China-Pakistan Economic Corridor (CPEC) passing through the disputed territory of Jammu and Kashmir (J&K), India and Japan were collaborating over infrastructure building projects in other Indian Ocean nations like Bangladesh, Sri Lanka, African nations etc. with varying degrees of success. Indian Ocean nations were receiving infrastructure loans from China as well (Hambantota port in Sri Lanka, Gwadar port in Pakistan, Maldives reclaimed island project etc.) with other Asian powers alleging Beijing's debt-trap policy amid Hambantota port's 99-year lease to China over non-payment of loans.

China had deployed surveillance ships and submarines in the Indian Ocean and heavily militarized South China Sea where it had territorial disputes with ASEAN nations, beside East China Sea dispute with Japan. The US was engaged in trade war with China and its presence had been gradually diminishing before it came joined in with India, Japan and Australia to form the Quadrilateral (Quad) under the Free and Open Indo-Pacific (FOIP) vision for free movement in maritime routes between the Pacific and Indian Ocean. India, in line with its multi-alignment policy, avoided antagonizing China directly, engaged in Quad and FOIP on one hand, and collaborated with China through the Russia-India-China (RIC) trilateral and Shanghai Cooperation Organization (SCO) on the other hand.

**Table 1: India's (nationwide) Lockdowns during COVID-19 Pandemic**

<b>Policies</b>	<b>Duration</b>
Lockdown 1.0	25 March To 14 April, 2020
Lockdown 2.0	Extended Till 03 May
Lockdown 3.0	Extended Till 17 May
Lockdown 4.0	Extended Till 31 May
Lockdown 5.0	Extended Till 30 June In Containment Zones
Repatriation of Indian Citizens	10,98,000 People Brought Back To India Under Vande Bharat Mission (06 May- 17 August)

Source: Prepared by author from World Health Organization data.



**Figure 1: India's confirmed daily COVID-19 cases (Jan-Dec 2020)**

Source: Prepared by author from World Health Organization data

COVID-19 outbreak was declared a public health emergency by the World Health Organization after mid-January 2020, months after infections had spread from Wuhan, China to other parts of the world (WHO, 2020). India got its first coronavirus case in late January, but the infection began rising only at the end of March (Table 1 and Figure 1), before which one of the strictest lockdowns had already been implemented in the country along with strictest guidelines for social distancing (Rahman, 2020). Besides the lockdown and shutting down of the economy which suffered its first contraction of 23.9% in four decades, India faced a migrant crisis with restriction of movement in the nations, shutting down of international and domestic travel and a rise in unemployment rates (M. Chaudhary et al., 2020; The Economic Times, 2020).

On the international level, within six months of being hit by the pandemic, the world saw a rising rate of infections owing to inadequate health infrastructures. The pandemic necessitated the states to secure their own health sector and medical capabilities, besides managing their borders. The strategic environment became more restrictive after the pandemic, concentrating more power in the hands of the Foreign Policy Elite (FPE) who were obliged to respond in a timely manner to building national capabilities- defense equipment, technological support to track infections, and health infrastructure for its troops and people. In that aspect, the pandemic provided opportunities for states to be first responders diplomatically and assist other states in building capacities.



China suffered a trust deficit internationally and was being scrutinized for being the epicenter of the outbreak. As the China-US trade conflict intensified, more world leaders began employing measures to shut down their borders to international travelers. While states struggled to cope with the pandemic, China began COVID-19 assistance to nations through supply of masks, medical equipment, while also pushing for the Belt and Road Initiative (BRI) and vaccine trials. COVID-19 diplomacy became a major tool in the hands of big and medium powers to not just assert influence over other states, but also project themselves as responsible powers in the face of a crisis. India took early steps to mark an international presence through its medical diplomacy alongside China, who was already engaged in supplying masks, medicines as well as medical equipment to various nations. India took the lead in the SAARC (South Asian Association for Regional Cooperation) as well as in the G-20 nations as the supplier of key medicines to countries that were depending on COVID-19 medical support amid looming medical and economic crisis (Chaudhury, 2020a).

Thus due to the restrictive strategic environment for India internationally, the FPE since remained key actors that influenced India's foreign policy in the Indian Ocean to respond to regional security and other challenges amid rising Chinese influence. For the Indian FPE, the restrictive strategic environment made the security competition more urgent, intensified by the pandemic. The FPE in India, thus perceiving greater clarity about their position in the regional power dynamics, and about the threats and opportunities in this environment, pursued certain balancing strategies through specific components of power, such as COVID-19 assistance, infrastructure development for economic growth, medical equipment, vaccines etc. The next sections discuss the balancing strategies pursued by India amid the pandemic through its COVID-19 diplomacy and strategies.

#### **4. India's COVID-19 diplomacy's influence on foreign policy and development partnerships**

In an address in Singapore in 2015, India's then foreign secretary and present Minister of External Affairs, Dr. S. Jaishankar, had said that India's "foreign policy dimension is to aspire to be a leading power, rather than just a balancing power." It was the beginning of India openly expressing its aim to not just be a nation hedging against risks posed by great powers, the US and China, but the ambition of being a power large enough to balance the power conflict and geopolitical challenges by playing a larger visible role in the region and world. India also showed the alacrity to take up more responsibility in the region as it figures in the power calculations as an indispensable power in regional and international politics. The COVID-19 is one such crisis seeing clashes between great powers, but

also offered an opportunity for India to commit to regional and global health, strategic development and play a leading role at collective action against health security issue.

India's COVID-19 diplomacy draws from its role as the pharmacy of the world that produces around sixty percent of world's vaccines. While sending consignments of paracetamol as well as hydroxychloroquine to SAARC nations in March including Afghanistan, Bangladesh, Bhutan, Nepal, Sri Lanka and Mauritius, India also sent supplies to Myanmar, Seychelles, and African nations. A SAARC Emergency fund of \$10mn aid was setup by the Indian Prime Minister Narendra Modi during his high level virtual emergency meeting with SAARC leaders, except Pakistan, which sent its Health Minister to attend the meet in March 2020 (Chaudhury, 2020c; Gupta, 2020b). After sending medical team to Maldives, New Delhi assigned Indian Army to prepare rapid response teams to be dispatched to Afghanistan, Bangladesh, Bhutan and Sri Lanka (excluding Pakistan and Nepal). A stay on export of hydroxychloroquine was lifted and the drug was allowed for supply to US, European nations as well as countries in Latin America (Arora & Khanna, 2020; Gupta, 2020a). India's medical diplomacy was also aimed at assisting Indian diaspora which is concentrated in East and Southern Africa. India supplied key medicines like HCQ, Paracetamol and ibuprofen along with various antibiotics and drugs related to diabetes, cancer, asthma and cardiovascular conditions, since comorbidity has worsened the impacts of COVID-19 globally (Sanyaolu et al., 2020). India also supplied injections, medical devices, and thermometers alongside holding telemedicine and ITEC training programme for the region.

India reported the most infections in South Asia, which posed a risk for nations like Nepal that share open borders with the nation. While several Nepali workers migrated back to Nepal after March 2020, Nepalese leader KP Sharma Oli faced domestic protests over economic slump and corruption of 10 billion in Nepali currency nation out of the pandemic fund in June (Chalise, 2020; Chaudhury, 2020d). After his election to power in 2018, Prime Minister Oli agreed to participate in China-led BRI including Trans-Himalayan Multi-Dimensional Connectivity Network, saw Chinese leader Xi Jinping's visit that promised multi-million dollar hydropower projects in the country and received ninety percent of its FDI from China alone in 2019. The same year in November Nepalese leader KP Sharma Oli released a map of Nepal labelling Kalapani-Limpiyadhura-Lipulekh under its territory following a similar map earlier by India. Nepal had been carefully balancing between India and China diplomatically, however, escalation of India-Nepal border dispute and anxiety by New Delhi over reports of Chinese incursions into Nepalese territory (denied by Nepal) had further deteriorated New Delhi's ties with the Himalayan neighbor (Nayak, 2020).

India's increased efforts towards normalizing the tensions between India and Nepal were evident in the high-level visits from the former to the latter within three months. After the Chief of India's Research and Analysis Wing Samant Goel visited Nepal in October to discuss map and Kalapani-Limpiyadhura-Lipulekh dispute, Indian Chief of Army Staff, M.M. Naravane visited Kathmandu in November with medical equipment for COVID-19 pandemic as presents, in turn being conferred 'Maharathi' title from the Nepalese Army (Nayak, 2020). The visit was closely followed in November by Chinese Defense Minister Wei Fenghe, post which India's Foreign Secretary Harshvardhan Shringla visited Nepal to provide COVID-19 assistance in the form of prioritization for vaccine supply and 2000 vials of Remdesivir injections (Press Trust of India, 2020b). Finalizing Nepalese Foreign Minister Gyawali's visit to India in January 2021, Indisn FS Shringla assured its commitment to its neighborhood saying, "Once the vaccine is ready, Nepal's requirement would be a priority for us" (Asian News International, 2020c). The aim of India's recently active COVID-19 diplomacy has been resolving tensions with neighboring nation, pushing for infrastructure projects like Pancheshwar Multipurpose Project, and allow air travel between nations and tourists visas for Nepal for greater people-to-people connectivity (Nepali Times, 2020; Siddiqui, 2020).

With the pandemic bringing Prime Minister Modi's focus back to Neighborhood First policy to strengthen India's economic and security relations particularly with the nations surrounding it, New Delhi and Dhaka took another step in the direction by signing agreement for development of railways close to port in Bangladesh to limit the negative impact of COVID-19 in the country which has forced the nation to shut all trade through land borders (Press Trust of India, 2020e). As the two nations celebrate 50 years of their diplomatic relations in 2020, the online inauguration ceremony of railway project saw the nations committing to mutual development. This came in backdrop of China's \$1 billion irrigation project over Teesta river in Bangladesh, rendering its water treaty negotiation over the river with India null and irrelevant. Prime Minister Modi sent 10 broad gauge diesel locomotives to Bangladesh after sending 50 containers with consumer goods and fabrics through recently constructed Benapole-Petrapole rail link with Indian assistance. While China has been in talks for other development projects in the country, India sent COVID-19 medical assistance to Bangladesh's Institute of Epidemiological Disease Control and Research. Bangladesh actively participated in the Prime Minister Modi-led SAARC emergency fund, and was provided training programs for medical personnel in Bangla language in New Delhi (Press Trust of India, 2020a).

COVID-19 vaccine was another diplomatic tool between the India-China contests for regional influence. Bangladesh Medical Research Council (BMRC) had allowed China to send medical personnel in June and carry out the third phase of its COVID-19 vaccine by China's Sinovac Biotech (Gupta,

2020a). India sent its foreign secretary to Bangladesh on an unannounced visit in August 2020 to discuss the pandemic situation and further the Neighborhood First policy which is key to Prime Minister Modi's Act East Policy of strengthening ties with the ASEAN states, Japan and South Korea. Bangladesh's foreign secretary Bin Momen informed of his talks with Indian counterpart in July and August, "The vaccine will not be limited to India. We have been assured that India will provide the COVID-19 vaccine to us on a priority basis and the pharmaceutical companies of our country will be able to collaborate on this" (Gupta, 2020c). The Executive Committee of the National Economic Council under Bangladesh's Prime Minister Hasina also agreed for India to lead a highly strategic highway project to connect Baraiyarhat-Heyanko and Ramgarh of northern Chittagong near India's North-East borders (Bhattacharjee, 2020). India also began process for creating air travel bubble with Dhaka to allow medical, business and IT professionals to travel by air between the two nations freely. In response Bangladesh Prime Minister Hasina assured New Delhi that it would not allow any party hostile to India to use Bangladesh for any anti-India terror activities, in a boost to Modi's Neighborhood First policy (Gupta, 2020c)

To further enhance cooperation through development projects, India launched eITEC programmes for all SAARC as well as non-SAARC nations in the world in March 2020 (Table 2). While India's development cooperation in an international context is also supported by its training assistance program launched on September 15, 1964 called The Indian Technical and Economic Cooperation (ITEC) Programme<sup>2</sup>. April also saw an 'Africa-focus working day' for the Ministry of External Affairs in India, where the MEA Minister S. Jaishankar held a series of conversations with his counterparts of some African countries, including Nigeria, Niger, Burkina Faso, Uganda and Mali (Chaudhury, 2020c). China has been actively supplying medical equipment, sending medical personnel and engaging in debt-relief discussion in Africa since March (Bone & Cinotto, 2020). Beijing's active assistance in Africa has been noticeable while other major powers like the US and Europe have been less successful in coordinating and channelizing their efforts in Africa at multiple levels of local governments like China. In this backdrop, India's focus towards Africa's management of the pandemic came at a time when China was facing a domestic backlash in Africa due to emergence of videos on the internet highlighting racism against Africans in China amid the COVID-19 pandemic (Albert, 2020).

---

<sup>2</sup> ITEC is a fully-funded program by Indian Government to foster technical and economic cooperation as part of more comprehensive and creative foreign policy. ITEC programmes are held in bilateral and multilateral formats such as Group of 77, G-15, Economic Commission for Africa, Commonwealth Secretariat, UNIDO etc. It has trained technical and medical professionals from ASEAN, BIMSTEC, AU, IOR-ARC, India-Africa Forum Summit etc. in over 160 nations.

**Table 2: e-ITEC programmes (training) by India for other nations regarding COVID-19**

Training Programme	Month	Participants	Participant Nations
Covid-19 Prevention And Management	Apr	Healthcare Professionals	ITEC Countries
Covid-19 Best Practices Of India	Apr	Medical Professionals	ITEC Countries
Covid-19: An Update	May	Healthcare Professionals	SAARC
Covid-19 Best Practices Of India	May	Healthcare Professionals	Latin/South America,
Covid-19 Management	May	Bangladesh medical staff	Bangladesh
Covid-19 Best Practices Of India	May	Healthcare Administrators	ITEC Countries
Covid-19: Good Governance Practices	Jun	Administrative heads	ITEC Countries
Covid-19 Managing Human Resource	Jun	Hospital Administrators	ITEC Countries
Covid Infection Prevention, Control, Biomedical Waste Management	Jun	Doctors, Nursing Officers	ITEC Countries
Mental Healthcare During Covid-19	Jun	Counsellors, Doctors	ITEC Countries
Covid-19: Good Governance Practices	Aug	Administrative heads	ITEC Countries
Policing During Pandemic Times	Aug	Department Officials	ITEC Countries
Basic Adult Hepatology	Oct	Healthcare Professionals	ITEC Countries
Housing For Sustainable Habitats- Policy, Planning, Design, Technologies	Nov	Housing and Construction Department, Brunei	Brunei Darussalam
Buddhist teachings, Vipasana meditation	Nov	Buddhist scholars	Latin America
Legislative Drafting For Law Officers	Nov	Law Officers (Swaziland)	Kingdom of Eswatini
Buddhist teachings, Vipasana meditation	Nov	Buddhist scholars	East Asia
Ayurveda	Nov	Health Personnel	ITEC Countries
Gender Inclusive Governance	Nov	Senior Officials	ITEC Countries
Online Education and Learning	Nov	Education administrators	Maldives
Democracy and Election Management	Nov	Executive Officials	ITEC Countries
Buddhist teachings, Vipasana meditation	Nov	Psychologist, Psychiatrist	ITEC Countries
Securities Markets and Policies	Nov	Banking official, scholars	Bhutan
Technical training	Dec	Ministry Officials	Kingdom of Eswatini
Online Education and Learning	Dec	Education administrators	Maldives
International Commercial Arbitration	Dec	Judges, Judicial Officers	Bhutan
COVID-19 Capacity Building	Dec	Drug Regulatory Officers	ITEC Countries

Source: ITEC, Ministry of External Affairs, Government of India (MEA India, 2020b)

COVID-19 put forth an opportunity for India, which was battling with rising number of cases at home, to act as a responsible power in the region and extend humanitarian assistance to African nations as well (Table 3). Under the Mission Sagar (SAGAR- Security and Growth for All in the Region) doctrine of Prime Minister Modi, medical supplies were made available to the African nations in the Indian Ocean as well as to West African countries in April 2020. Indian External Affairs minister, S. Jaishankar tweeted “A SAGAR friendship reaffirmed. Wonderful talking to FM Mohamed El Amine

Souef of Comoros. Our health cooperation and development partnership will surely grow further.”  
(Ministry of External Affairs, 2020b)

**Table 3: India's COVID-19 Medical Assistance to Africa**

<b>Medical Aid</b>	<b>Recipient African Nations</b>
Medicines: HCQ	Burkina Faso, Niger, Mali, Congo, Egypt, Mauritius, Seychelles, Madagascar, Zambia, Uganda, And Comoros.
Medicines: Paracetamol	Zambia, Uganda, Burkina Faso, Niger, Mali, Congo, Egypt, Eswatini, Chad, Republic Of Congo, Senegal, Sierra Leone And Zimbabwe
Indian Navy Ship Ins Kesari With Medical Consignment, Indian Traditional Medicinal Remedies And Food Grain	The Maldives, Mauritius, Seychelles, Madagascar And Comoros

Source: Prepared by author with data from Financial Express, 2020.

India's growing ties with Mauritius reflected in the two separate consignments sent to Mauritius at the request of their government to receive Indian traditional medicine (Table 4). This came after e-inauguration of an ENT Hospital in Mauritius with latest facilities which assisted health authorities in Mauritius to combat the COVID-19 pandemic. After an oil spill by Japanese bulk-carrier *Wakashio* in biodiverse maritime area in Mauritius, there was protest by people whose livelihood depends on marine biodiversity, after the pandemic hit the tourism-dependent island nation (Hindustan Times, 2020). India sent its technical team with the Indian Air Force to tackle the spill, after sending shipments of COVID-19 assistance and Ayurvedic medicine to the island nation under its (Nikkei Asia, 2020). With foreign pharmaceutical companies' Indian counterparts engaged in mass production of vaccines, India also finalized the India-Mauritius Comprehensive Economic Cooperation and Partnership Agreement for eliminating duties on trade wherein India exports petroleum products, pharmaceuticals, cereals, cotton etc. to Mauritius (Press Trust of India, 2020h).

**Table 4: India's Medical assistance to its development partner Mauritius**

Mode	Contents of Medical Assistance
Air India Flight	13 Tonnes Of Essential Medicines From India Including 0.5m Tablets Of Hydroxychloroquine.
Navy Ship INS Kesari	Medicines Including 10 Tonnes Of Ayurvedic Medicines. Indian Medical Assistance Team (Including A Community Medicine Specialist, Pulmonologist And Anesthesiologist) To Assist Mauritius Health Authorities And Share Experience & Expertise.

Source: Prepared by author with data from Source: (Chaudhury, 2020b).

India announced Maldives's largest bilateral COVID-19 assistance package of \$250 million on Maldivian President Ibrahim Solih's request for pandemic assistance to Indian Prime Minister Modi in September 2020 (Ministry of Foreign Affairs of Maldives, 2020). The request came right after India secured the largest civilian infrastructure project in Maldives in August 2020 connecting Male with neighboring islands of Villingili, Gulhifahu and Thilafushi. It was the election promise by the President Solih in the previous year's election (Press Trust of India, 2020d). The high-visibility Greater Male Connectivity project through \$500mn investment by India, much larger than the previous investment made by China in the island nation. The move came after China asked Maldivian government to pay back \$10mn loan granted under China-led development project, which could push Maldives into trade and foreign exchange crisis. Indian Foreign Minister S. Jaishankar also promised Maldives supply of essential food items and construction material to maintain price stability during the pandemic. On the domestic level, August 2020 also saw India extending optic fiber network to the Andaman and Nicobar Islands in order to extend COVID-19 assistance and information-sharing to the strategic islands in the Indian Ocean, to enable greater control over its seas and neighborhood.

## 5. India's COVID-19 strategy and building national capabilities

India's COVID strategy showed assertion of territorial and economic sovereignty when Prime Minister Modi declared a \$267 billion economic stimulus package (approximately 10% of India's GDP) in May, before announcing the nation's fourth phase of lockdown. Prime Minister Modi spelled out *Atmanirbhar Bharat Abhiyan* (Self-Reliant India policy). The policy seeks to combat adverse economic impacts of COVID-19 to pave the way for India's greater integration in the world economy as well as bigger role in geoeconomics in the region by supplying essential medical assistance. China was the key supplier of medical equipment and testing kits globally in March but several reports of faulty test kits

and equipment posed a challenge for nations struggling under the first wave of the pandemic (Asian News International, 2020a). In response, India's personal protective equipment (PPE) industry growing from zero in March to \$980mn in May 2020, second only to China. India produced over 60 million PPEs and 150 million N-95 masks till October 2020, from 0 production capacity in March 2020. Between April-December 2020, India exported over 20 million PPE and more than 40 million N-95 masks globally.

Through its *Atmanirbhar Bharat* policy or Self-Reliant India Initiative, India became the second largest manufacturer of PPE and PCR kits amid the COVID-19 crisis- a sharp increase in three months in production capacity from zero in March 2020 to 1 billion in July 2020. India announced permits to export the equipment and gear under its Medical Diplomacy and Extended Neighborhood policy, to Latin America, East Asia, Africa and Eastern Europe. India estimated global COVID detection kits market at \$5.2bn by the end of 2020. India set the export limit of 23.8mn VTM kits and 10mn PCR kits for the month of August as it opened trade in the month for medical gear, receiving bulk orders from Latin American and East European countries alongside 2mn kits order from Nigeria in August 2020 (Rajagopal, 2020). With India's daily testing capacity rising to 600,000 tests, and its successful control of virus spread in Asia's largest slum, Dharavi in Mumbai, Philippines announced in April 2020 that it would follow India's chase the virus tactic to control COVID-19 in its slums.

While the past few years have seen several border clashes between New Delhi and Beijing, such as at Depsang (2013), Chumar (2014), Doklam (2017), the recent clash in the Galwan Valley of Ladakh led to a manifold rise in the anti-Beijing sentiment in the nation with the martyrdom of 20 Indian soldiers in a fight with their Chinese counterparts (Times Now, 2020). Thereafter, citing cybersecurity and data-leak concerns amid the COVID-19 pandemic, Indian government banned several Chinese apps. Chinese investment into key IT and financial companies had been blocked by a new law in early 2020 that put severe restrictions on companies originating in India's neighbors that shared borders with India.

India's former national security advisor (2005-2010) M. K. Narayanan, stated, "We're not enemies, but I think there's always a problem about being friends," Narayanan said. "There is a competition between the two civilizations." (Choudhury, 2020). India also announced 5G network in July 2020 supported only by domestic technologies. India also announced plan to stop import of defense equipment and increase foreign direct investment in production of defense equipment. India disallowed Chinese companies from Indian highway projects, Ministry of Communication terminated 4G upgradation for state-run telecoms by Chinese firms, and banned Chinese firms with Indian joint ventures from participating in road and infrastructure development projects in India, in a bid to counter



China for border attacks, and support Prime Minister Modi's Self-Reliant India initiative for domestic companies. Chinese investments were blocked into key infrastructure projects in India. The Chinese FDI and FII was also blocked by the law of the government in early 2020.

India shares Shanghai Cooperation Organization's (SCO) platform with China and Pakistan. While the online SCO meeting was attended by India amid the pandemic, New Delhi refused to participate in the Kavkaz-2020 military exercise for the first time, where it had planned to send its 200 military personnel alongside the Chinese People's Liberation Army (Ministry of External Affairs, 2020a; Philip, 2020). Though the COVID-19 pandemic was quoted as one of the reasons, India's decision was clearly a signal of prioritizing its territorial sovereignty where Indian and Chinese forces had engaged in several clashes in 2020 at LAC, while India-Pakistan clashes have been an ongoing phenomenon across LoC (Peri, 2020; Philip, 2020). India also postponed its annual summit meeting even in online format between Prime Minister Modi and President Putin in December 2020 citing the pandemic as the reason, while in fact Russia has articulated its unease over the Indo-Pacific and Russia's Ambassador to India Nikolay Kudashev overlooked India-China conflict and stated Indo-Pacific "has no common vision" and Quad is "detrimental to the security and stability of the region" (Basu, 2020).

India's complex relationship with Iran was further strained during the pandemic when in March Iran was among the worst affected nations including the death of its top cleric due to COVID-19 infection (New Strait Times, 2020; Parpiani & Sawhney, 2020). India, which has invested heavily in Iran's only deep-water port Chabahar, has much less to offer to Iran in terms of resources, where it cannot compete with China. The port allows India to counter the China-built Gwadar port in Pakistan and direct access Central Asia (Amirthan, 2017; Chakma, 2019). The pandemic drove India closer to the US which had imposed heavy sanctions on Iran, killed Iranian general and commander of Quds forces, Qasem Soleimani in drone attack and pressurized India to stop all oil import from Tehran (Mohan, 2020). Chabahar port, didn't produce enough economic support during the pandemic and Iran partnered with China for the construction of the key railway link project connecting the Chabahar port (built by India) to Zahedan, although it was a project India was to work on with Iran (Amirthan, 2017; Chadha, 2020a; Mohan, 2020; Ramana, 2012; Teja, 2015).

Right after the border clash with India in Galwan Valley, China attended a virtual meeting on July 27 with Nepal, Pakistan and Afghanistan to discuss cooperation amid the pandemic (Patranobis, 2020). India has been striving to utilize the pandemic as an opportunity to enhance military and security partnerships with nations that are engaged in territorial disputes with China. In December 2020, Indian Prime Minister Modi and Vietnamese leader Nguyen Xuan Phuc held a virtual summit to discuss post-

pandemic maritime security ties. Though Vietnam had been performing better than India in terms of the COVID-19 infections, occurrence of crisis due to floods in Vietnam was responded to by India that sent its ship INS Kiltan to Nha Rhang port of Ho Chi Minh with 15 tonnes of relief material under Mission SAGAR, for people in central Vietnam (Press Trust of India, 2020f). The same ship before returning, then participated in a passage exercise with Vietnamese Navy (December 26-27) An Indian Navy warship will undertake a “passage exercise” with the Vietnamese Navy in the South China Sea from December 26 to 27 for maritime cooperation against Chinese heavy military presence in South China Sea (Asian News International, 2020b).

The strategic environment became even more restrictive with India and China competing for defense equipment assistance to South Asian and Indian Ocean nations amid the increased securitization of the Indian Ocean. Before the first Malabar exercise by the four Quad nations in November 2020, several Indian FPE visited the region almost simultaneously to assert Indian commitment to post COVID-19 bilateral ties enhancement as well as secure key defense pacts with the small nations that find themselves constantly balancing and hedging between India and China (Nayak, 2020). After Indian Army Chief M. M. Naravane was conferred the honorary title “General of Nepali Army” in November by Nepal’s President B.D. Bhandari, Indian Foreign Secretary Shringla followed with the promise of priority access to medicines and vaccines to Nepal alongside key infrastructure investment deal of a dam (A. Chaudhary, 2020; Press Trust of India, 2020c).

Sri Lanka and Seychelles, both had recent elections that upturned the incumbent leaderships over issues of sovereignty and involvement of powers like India and China before and after the pandemic. Indian plans in 2018 to build a naval base on Assumption Island, a supposed counter to Chinese Djibouti base, was stalled after protests over sovereignty led by Indian-origin Wavel Ramkalawan. China has financed construction of Seychellois parliament with a couple of light aircraft warships on the island nation which is strategically located for surveillance of exclusive economic zones in Indian Ocean. After announcing Mission SAGAR towards COVID-19 medical assistance to Indian Ocean nations like Sri Lanka, Seychelles and Maldives, Indian Minister of External Affairs S. Jaishankar visited Seychelles, pledging infrastructure projects worth \$91 million and calling Seychelles as “particular priority” for India’s COVID-19 initiatives (Chadha, 2020b; Press Trust of India, 2020g). India’s new approach of prioritizing economic ties is aimed at deepening military relations in the nation where India has previously provided military training, three naval boats, two surveillance aircrafts and six coastal radar stations (Sinha, 2020).

At the same time after sending consignments under Mission SAGAR for pandemic assistance to Sri Lanka, Indian National Security Advisor Ajit Doval held the first Sri Lanka-India-Maldives trilateral in six years, for maritime security, with Mauritius and Seychelles as observers (Bhaumik, 2020). Sri Lanka, one of the first nations to join Chinese BRI project, had owed China \$4.8 billion in loans under earlier President Mahinda Rajapaksa, and increased its debt by \$1 billion during the pandemic under his newly elected younger brother Gotabaya Rajapaksa instead of borrowing from other sources (Mushtaq, 2020). China had leased Hambantota port in Sri Lanka for 99 years over non-payment of debt and the recent election necessitated India's efforts towards securing Indian Ocean (Chadha, 2020a; Macan-Markar, 2020). Doval's visit was aimed at assuring progress on deal signed to jointly develop and operate Eastern Container Terminal (ECT) in Colombo port by India-Japan-Sri Lanka. However, Sri Lanka continues to be a challenge for India after it received huge COVID-19 medical assistance from China between April-August, and in October expressed doubts over securitization and militarization of the region after the MALABAR exercise in Indian Ocean by all four Quad nations in November (Johnson, 2020; Mitra, 2020).

## 6. Conclusion

The paper examined the impact of COVID-19 pandemic on the strategic environment for India in Indian Ocean region and discussed how it impacted India's foreign policy towards the region, through the lens of neo-classical realism. The paper stated that the pandemic created a restrictive strategic environment and a situation of high opportunities and threats for India. The paper argued that India's COVID-19 strategies were catalyst in shaping India's security policies and initiatives in the Indian Ocean region in 2020. The pandemic posed not only a severe health risk domestically but also became a global issue, in fact treated as a security issue in some states. Thus, COVID-19 provided a restrictive strategic environment for India and necessitated the concentration of decision making power in the hands of the FPE for the crisis management as well as foreign policy initiatives to push for India's greater role in the regional security.

India's COVID-19 diplomacy, i.e., the dialogue and negotiations held between the foreign policy elite of India and other states related to the pandemic influenced the nation's development partnerships regionally. India aimed for greater regional engagement through not just economic infrastructure development but also health infrastructure development in South Asia as well as Indian Ocean nations such as Nepal, Bangladesh, Maldives, Mauritius, Sri Lanka etc. The restrictive strategic environment meant that engaging in its neighborhood was more than a contest for India with China. It

became an urgent challenge for New Delhi to maintain cordial relations and development-based growth stimulating partnerships in Indian Ocean to ensure its presence in helping nations out of the pandemic on path to economic recovery.

The paper also discussed how the restrictive environment for India was taken as an opportunity by the FPE to push for increasing or establishing local production capabilities for dealing with the pandemic, including domestic production of PPE, masks and vaccines. With India-China aggression at the borders and seas increasing despite the COVID-19 crisis, India responded by employing its COVID-19 strategy to be centered on dealing with military aggression at the borders and increasing economic self-reliance to play a larger role regionally in assisting other nations in the Indian Ocean.

Overall, India's foreign policy under the restrictive strategic environment during the pandemic became more focused and streamlined towards building internal capabilities and playing a more significant role as a regional power in the Indian Ocean. Though India's financial capabilities amid the pandemic are much more limited than China's, India's policies were aimed at asserting its position as an influential power in the Indian Ocean, by forging new economic and defense partnerships during and despite the pandemic. In the backdrop of constantly changing relations among states and high geopolitical volatility, a multi-pronged or multi-faceted foreign policy post-pandemic will help India establish a clear visibility and significance in the Indian Ocean region and even beyond.

## References

- Albert, E. (2020). *African Countries Respond to Guangzhou's 'Anti-Epidemic Measures.'* The Diplomat. <https://thediplomat.com/2020/04/african-countries-respond-to-guangzhous-anti-epidemic-measures/>
- Amirthan, S. (2017). What are India, Iran, and Afghanistan's benefits from the Chabahar port agreement? *Strategic Analysis*, 41(1), 87–93. <https://doi.org/10.1080/09700161.2016.1249184>
- Arora, N., & Khanna, S. (2020). *India exports 50 million hydroxychloroquine tablets to U.S. for COVID-19 fight.* Reuters. <https://www.reuters.com/article/us-health-coronavirus-india-hydroxychloridUSKBN22C2LN>
- Asian News International. (2020a). *63,000 PPE kits arrived from China faulty, failed quality test: Health Ministry sources.* The Economic Times. <https://economictimes.indiatimes.com/news/politics-and-nation/63000-ppe-kits-arrived-from-china-are-faulty-and-fail-quality-test-health-ministry-sources/videoshow/75206708.cms>

- Asian News International. (2020b). *India, Vietnam conclude two-day naval exercise in South China Sea*. The Economic Times. <https://economictimes.indiatimes.com/news/defence/india-vietnam-concludes-two-day-naval-exercise-in-south-china-sea/articleshow/79978759.cms?from=mdr>
- Asian News International. (2020c). *India gifts 2,000 vials of Remdesivir, Covid-19 related assistance to Nepal*. The Mint. <https://www.livemint.com/>
- Basu, N. (2020). *India-Russia annual summit postponed for 1st time in two decades amid Moscow's unease with Quad*. The Print. <https://theprint.in/diplomacy/india-russia-annual-summit-postponed-for-1st-time-in-two-decades-amid-moscows-unease-with-quad/572160/>
- Bhattacharjee, K. (2020). *India to offer COVID-19 vaccine to Bangladesh on priority basis*. The Hindu. <https://www.thehindu.com/news/national/india-to-offer-covid-19-vaccine-to-bangladesh-on-priority-basis/article32395700.ece>
- Bhaumik, A. (2020). *S Jaishankar in Seychelles, Doval in Colombo: India ups outreach to Indian Ocean region to counter China*. Deccan Herald. <https://www.deccanherald.com/national/s-jaishankar-in-seychelles-doval-in-colombo-india-ups-outreach-to-indian-ocean-region-to-counter-china-920645.html>
- Bone, R. M., & Cinotto, F. (2020). *China's Multifaceted COVID-19 Diplomacy Across Africa*. The Diplomat. <https://thediplomat.com/2020/11/chinas-multifaceted-covid-19-diplomacy-across-africa/>
- Carr, E. H. (2016). *The Twenty Years' Crisis, 1919-1939* (M. Cox (ed.); 1st ed.). Palgrave Macmillan UK.
- Chadha, A. (2020a). India's Foreign Policy towards Japan: Special Partnership amid Regional Transformation. *Ritsumeikan Journal of Asia-Pacific Studies*, 38(1), 2020. [https://doi.org/10.34409/RJAPS.38.1\\_19](https://doi.org/10.34409/RJAPS.38.1_19)
- Chadha, A. (2020b). *India and the Seychelles: Economics First, Defense Later*. The Diplomat. <https://thediplomat.com/2020/12/india-and-the-seychelles-economics-first-defense-later/>
- Chakma, B. (2019). The BRI and India's Neighbourhood. *Strategic Analysis*, 43(3), 183–186. <https://doi.org/10.1080/09700161.2019.1607030>
- Chalise, H. N. (2020). COVID-19 Situation and Challenges for Nepal. In *Asia-Pacific Journal of Public Health* (Vol. 32, Issue 5, pp. 281–282). SAGE Publications Inc. <https://doi.org/10.1177/1010539520932709>

- Chaudhary, A. (2020). *India Steps Up Efforts to Draw Neighbors Closer to Counter China*. Bloomberg. <https://www.bloomberg.com/news/articles/2020-11-27/india-steps-up-efforts-to-draw-neighbors-closer-to-counter-china>
- Chaudhary, M., Sodani, P. R., & Das, S. (2020). Effect of COVID-19 on Economy in India: Some Reflections for Policy and Programme. *Journal of Health Management*, 22(2), 169–180. <https://doi.org/10.1177/0972063420935541>
- Chaudhury, D. R. (2020a). *Covid diplomacy establishes India as a reliable and responsible global power*. The Economic Times. <https://economictimes.indiatimes.com/news/politics-and-nation/covid-diplomacy-establishes-india-as-a-reliable-and-responsible-global-power/articleshow/75080356.cms>
- Chaudhury, D. R. (2020b). *India continues to support Mauritius to contain Covid*. The Economic Times. <https://economictimes.indiatimes.com/news/politics-and-nation/india-continues-to-support-mauritius-to-contain-covid/articleshow/75920352.cms>
- Chaudhury, D. R. (2020c). *India to despatch key medicines to 25 African states on goodwill mission*. The Economic Times. <https://economictimes.indiatimes.com/news/politics-and-nation/india-to-despatch-key-medicines-to-25-african-states-on-goodwill-mission/articleshow/75422868.cms?from=mdr>
- Chaudhury, D. R. (2020d). *Protests against the Nepal government's handling of Covid pick up pace in Kathmandu*. The Economic Times. <https://economictimes.indiatimes.com/news/international/world-news/protests-against-the-nepal-governments-handling-of-covid-pick-up-pace-in-kathmandu/articleshow/76409521.cms>
- Choudhury, S. R. (2020). *India China tensions: New Delhi cannot fully cut off economic ties with Beijing*. CNBC. <https://www.cnbc.com/2020/08/04/india-china-tensions-new-delhi-cannot-fully-cut-off-economic-ties-with-beijing.html>
- Gupta, S. (2020a). *Covid-19: India steps up medical diplomacy, flies plane loads of medicines to friends*. Hindustan Times. <https://www.hindustantimes.com/india-news/covid-19-india-steps-up-medical-diplomacy-flies-plane-loads-of-medicines-to-friends/story-auOh6soX9mtdLtI1hVrHIJ.html>
- Gupta, S. (2020b). *Imran Khan hits mute on Saarc Covid-19 pledge, India sends \$1.7 mn relief*. Hindustan Times. <https://www.hindustantimes.com/india-news/india-spends-1-7-million-from-saarc-covid-19-fund-imran-khan-is-again-awol/story-A7zuJGOQeRb91uJphN4ESM.html>

- Gupta, S. (2020c). *Sheikh Hasina pushes for infra projects at FS Shringla meet, then makes a promise*. Hindustan Times. <https://www.hindustantimes.com/india-news/sheikh-hasina-pushes-for-infra-projects-at-fs-shringla-meet-then-makes-a-promise/story-mUDpO58D6yDbOGvtZdkiSK.html>
- Hindustan Times. (2020). *India sends equipment, personnel to Mauritius to contain oil spill - india news - Hindustan Times*. Hindustan Times. <https://www.hindustantimes.com/india-news/india-sends-equipment-personnel-to-mauritius-to-contain-oil-spill/story-I3NtjaMPJT1Wso85ljTmlN.html>
- Johnson, J. (2020). *Malabar military exercises with “Quad” nations begin in message to China*. The Japan Times. <https://www.japantimes.co.jp/news/2020/11/04/asia-pacific/malabar-military-exercises-china-quad/>
- Macan-Markar, M. (2020). *Sri Lanka turns to China rather than IMF to avoid default*. Nikkei Asia. <https://asia.nikkei.com/Politics/International-relations/Sri-Lanka-turns-to-China-rather-than-IMF-to-avoid-default>
- Ministry of External Affairs. (2020a). *19th Summit of SCO Council of Heads of Government to be held on 30 November 2020 in video-conference format*. Ministry of External Affairs, India. <https://mea.gov.in/press-releases.htm?dtl/33245/19th+Summit+of+SCO+Council+of+Heads+of+Government+to+be+held+on+30+November+2020+in+videoconference+format>
- Ministry of External Affairs. (2020b). *Mission Sagar: India’s helping hand across the Indian Ocean*. Ministry of External Affairs, India. [https://mea.gov.in/press-releases.htm?dtl/32678/Mission\\_Sagar\\_Indias\\_helping\\_hand\\_across\\_the\\_Indian\\_Ocean](https://mea.gov.in/press-releases.htm?dtl/32678/Mission_Sagar_Indias_helping_hand_across_the_Indian_Ocean)
- Ministry of Foreign Affairs of Maldives. (2020). *Financial Assistance of \$250 million from the Government of India to the Government of Maldives handed over*. Government of Maldives. <https://www.gov.mv/en/news-and-communications/financial-assistance-of-250-million-from-the-government-of-india-to-the-government-of-maldives-handed-over>
- Mitra, D. (2020). *Sri Lanka Worried About Indian Ocean’s Securitisation, Impact of Quad Military Alliance*. The Wire. <https://thewire.in/diplomacy/sri-lanka-worried-about-indian-oceans-securitisation-impact-of-quad-military-alliance>
- Mohan, G. (2020). *Iran President writes to PM Modi for assistance to fight Covid-19*. India Today. <https://www.indiatoday.in/india/story/iran-president-writes-to-pm-modi-for-assistance-to-fight-covid-19-1655680-2020-03-15>

- Morgenthau, H. J. (2005). *Politics Among Nations: The Struggle for Power and Peace* (H. J. Morgenthau, K. Thompson, & D. Clinton (eds.); 7th ed.). McGraw-Hill Education.
- Mushtaq, M. (2020). *Sri Lanka piles on more Chinese loans amid virus and debt crisis*. Nikkei Asia. <https://asia.nikkei.com/Politics/International-relations/Sri-Lanka-piles-on-more-Chinese-loans-amid-virus-and-debt-crisis>
- Nayak, S. (2020). *China and India in Nepal: A new power play?* Observer Research Foundation. <https://www.orfonline.org/expert-speak/china-india-nepal-new-power-play/>
- Nepali Times. (2020). *Tourist visas now open for Nepal*. Nepali Times. <https://www.nepalitimes.com/latest/tourist-visas-now-open-for-nepal/>
- New Strait Times. (2020). *Top Iran cleric dies of Covid-19*. New Strait Times. <https://www.nst.com.my/world/world/2020/03/575089/top-iran-cleric-dies-covid-19>
- Nikkei Asia. (2020). *India sends team to Mauritius to tackle oil spill*. Nikkei Asia. <https://asia.nikkei.com/Spotlight/Environment/India-sends-team-to-Mauritius-to-tackle-oil-spill>
- Parpiani, K., & Sawhney, A. (2020). *Medical diplomacy by India and Europe can restrain Iranian hardliners*.
- Patranobis, S. (2020). *India likely to be key topic at Chinese, Pak FM strategic meet in Hainan*. Hindustan Times. <https://www.hindustantimes.com/world-news/india-likely-to-be-key-topic-at-chinese-pak-fm-strategic-meet-in-hainan/story-rDbd275NgmE68w8chRDCKI.html>
- Peri, D. (2020). *India decides to pull out of Kavkaz 2020 military exercise on Russia due to Chinese participation*. The Hindu. <https://www.thehindu.com/news/national/india-decides-to-pull-out-of-kavkaz-2020-military-exercise-on-russia-due-to-chinese-participation/article32475212.ece>
- Philip, S. A. (2020). *India withdraws from Russia military exercise, participation of China & Pakistan a factor*. The Print. <https://theprint.in/defence/india-withdraws-from-russia-military-exercise-participation-of-china-pakistan-a-factor/491814/>
- Press Trust of India. (2020a). *Bangladesh thanks India for providing 10 broad gauge diesel locomotives*. The Print. <https://theprint.in/diplomacy/bangladesh-thanks-india-for-providing-10-broad-gauge-diesel-locomotives/469210/>
- Press Trust of India. (2020b). *Chinese Defence Minister in Nepal to bolster military cooperation*. The Hindu. <https://www.thehindu.com/news/international/chinese-defence-minister-in-nepal-to-bolster-military-cooperation/article33205715.ece>



- Press Trust of India. (2020c). *Gen. Naravane conferred the honorary rank of General of Nepali Army by President Bhandari*. The Hindu. <https://www.thehindu.com/news/national/gen-naravane-conferred-the-honorary-rank-of-general-of-nepali-army-by-president-bhandari/article33030962.ece>
- Press Trust of India. (2020d). *India announces USD 500 million assistance for major connectivity project in Maldives*. The Economic Times. <https://economictimes.indiatimes.com/news/economy/finance/india-announces-usd-500-million-assistance-for-major-connectivity-project-in-maldives/articleshow/77523675.cms?from=mdr>
- Press Trust of India. (2020e). *India donates Bangladesh 30,000 COVID-19 testing kits*. Business Standard. [https://www.business-standard.com/article/pti-stories/india-donates-bangladesh-30-000-covid-19-testing-kits-120050601638\\_1.html](https://www.business-standard.com/article/pti-stories/india-donates-bangladesh-30-000-covid-19-testing-kits-120050601638_1.html)
- Press Trust of India. (2020f). *Indian naval ship conducts “passage exercise” with Vietnamese Navy in South China Sea*. Times of India. <https://timesofindia.indiatimes.com/india/indian-naval-ship-conducts-passage-exercise-with-vietnamese-navy-in-south-china-sea/articleshow/79980628.cms>
- Press Trust of India. (2020g). *Seychelles holds “particular priority” for India in fight against the Covid-19: S Jaishankar*. Times of India. <https://timesofindia.indiatimes.com/india/seychelles-holds-particular-priority-for-india-in-fight-against-the-covid-19-s-jaishankar/articleshow/79447030.cms>
- Press Trust of India. (2020h). *Three US firms currently engaged with domestic companies for mass production of Covid-19 vaccines: Govt*. Times of India. <https://timesofindia.indiatimes.com/business/india-business/three-us-firms-currently-engaged-with-domestic-companies-for-mass-production-of-covid-19-vaccines-govt/articleshow/80030127.cms>
- Rahman, S. Y. (2020). ‘Social distancing’ during COVID-19: the metaphors and politics of pandemic response in India. *Health Sociology Review*, 1–9. <https://doi.org/10.1080/14461242.2020.1790404>
- Rajagopal, D. (2020). *Indian companies ready to export coronavirus test kits, target Latin America, Eastern Europe markets*. The Economic Times. <https://health.economictimes.indiatimes.com/news/medical-devices/indian-companies-ready-to-export-coronavirus-test-kits-target-latin-america-eastern-europe-markets/77454329>
- Ramana, S. (2012). The Pakistan factor in the India-Iran relationship. *Strategic Analysis*, 36(6), 941–956. <https://doi.org/10.1080/09700161.2012.728863>

- Sanyaolu, A., Okorie, C., Marinkovic, A., Patidar, R., Younis, K., Desai, P., Hosein, Z., Padda, I., Mangat, J., & Altaf, M. (2020). Comorbidity and its Impact on Patients with COVID-19. *SN Comprehensive Clinical Medicine*, 2(8), 1069–1076. <https://doi.org/10.1007/s42399-020-00363-4>
- Siddiqui, H. (2020). *Neighbourhood First: India-Nepal open flights under 'Bubble Arrangement*. The Financial Express. <https://www.financialexpress.com/lifestyle/travel-tourism/india-nepal-decide-to-resume-flight-services-under-air-bubble-arrangement/2147217/>
- Sinha, S. (2020). *EAM Jaishankar begins Seycelles visit, to focus on security, development cooperation*. Hindustan Times. <https://www.hindustantimes.com/india-news/eam-jaishankar-begins-seycelles-visit-to-focus-on-security-development-cooperation/story-VoTRa5VYfeumUyCIKIFIDI.html>
- Taliaferro, J. W., Ripsman, N. M., & Lobell, S. E. (2012). The challenge of grand strategy: The great powers and the broken balance between the world wars. In *The Challenge of Grand Strategy: The Great Powers and the Broken Balance between the World Wars*. Cambridge University Press. <https://doi.org/10.1017/CBO9781139136808>
- Teja, J. (2015). India–Iran Relations in a New Context. *American Foreign Policy Interests*, 37(2), 87–94. <https://doi.org/10.1080/10803920.2015.1038922>
- The Economic Times. (2020). *India gdp growth rate: GDP growth at -23.9% in Q1; first contraction in more than 40 years*. The Economic Times. <https://economictimes.indiatimes.com/news/economy/indicators/gdp-growth-at-23-9-in-q1-worst-economic-contraction-on-record/articleshow/77851891.cms?from=mdr>
- Times Now. (2020). *India-China working mechanism meet likely on Aug 20 as PLA refuses to disengage in Finger areas, Depsang*. Times Now. [https://www.timesnownews.com/india/article/india-china-working-mechanism-meet-likely-on-aug-20-as-pla-refuses-to-disengage-in-finger-areas-depsang/638632?utm\\_source=relatedarticles&utm\\_medium=widget&utm\\_campaign=related](https://www.timesnownews.com/india/article/india-china-working-mechanism-meet-likely-on-aug-20-as-pla-refuses-to-disengage-in-finger-areas-depsang/638632?utm_source=relatedarticles&utm_medium=widget&utm_campaign=related)
- Verma, R. (2020). China's diplomacy and changing the COVID-19 narrative. *International Journal: Canada's Journal of Global Policy Analysis*, 75(2), 248–258. <https://doi.org/10.1177/0020702020930054>
- WHO. (2020). *Timeline of WHO's response to COVID-19*. World Health Organization. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/interactive-timeline>

## **From Imitation to Innovation: Examining Global Drivers of Innovation in an Open Model of Technological Change**

**Dominique Hannah A. Sy<sup>1</sup>**

### **Abstract**

The global COVID-19 pandemic has highlighted the importance of inclusive technological innovation in the 4<sup>th</sup> Industrial Revolution. With the increasing premium placed on technological capacity, it is imperative for laggard economies to improve national innovative capabilities. Contrary to the assumption of linearity in neoclassical economics, complexity economics has demonstrated that countries do not progress linearly along their paths of industrial development, but instead evolve in a multiplex manner. Previous research in technological complexity regarded innovative capacity as a comparatively closed system while neglecting the role of transnational linkages. This paper marks a departure from previous works in its analysis of the multinational patterns of technological specialization using a Neo-Schumpeterian approach – namely, with the common innovation infrastructure framework, cluster-specific innovation environment framework, and the open model of technological innovation. Moreover, it accounts for the spillover effects generated by a nation's inward foreign direct investment (FDI) as well as the legal institutions surrounding innovation such as the intellectual property regime (IPR) and rule of law.

Very few studies have empirically examined the national innovation systems that spur new-to-the-world technologies in an integrated framework, one which considers the complexity of industrial clusters, international trade openness, and the nexus of institutional factors that are conducive to innovation. As such, there is no clear evidence on the effect of cross-cutting policy measures and the national politico-legal environment on innovative capacity. Moreover, previous literature relied on basic panel regression methods such as the FEM and REM, which are not ideal considering that the dependent variable, patent counts, is a count variable. Hence, this study incorporates Poisson regression in addition to the baseline panel regression to extract key findings on the determinants of innovative capacity for each innovation class. The study finds that there is a significant relationship between technological innovation and FDI

---

<sup>1</sup> School of Economics, De La Salle University, Manila, Philippines;  
Consultant, Economic Research and Regional Cooperation Department, Asian Development Bank  
Email: dominique\_sy@dlsu.edu.ph

inflows, a permissive IPR regime, a strong rule of law, and excellent university-industry collaboration, particularly for leading innovators. Based on the results of this study, the researcher recommends suitable policies for each group of nations.

**Keywords:** Technological change, innovation policy, innovation system, intellectual property

## **Introduction**

Technological innovation is indubitably the primary driver of sustained economic progress (Solow, 1956; Abramowitz, 1956; Romer, 1996). The emergence of international conduits of technological transfers and trade, as well as the advent of the Fourth Industrial Revolution, have jointly increased the incentives for nations to adapt to global technologies for national advancement. Furthermore, as individuals shift their lives to the digital realm in the midst of the global COVID-19 pandemic, the importance of harnessing digital technologies for institutional progress is more apparent than ever. From being regarded mainly as platforms for convenience and consumption, disruptive technologies now take center stage in battling the global health crisis. Innovation and research are of key importance in the development of the vaccine, in disseminating vital health information to the public, and in keeping the economy afloat at an age when physical connectivity has all but halted (UNESCO, 2020).

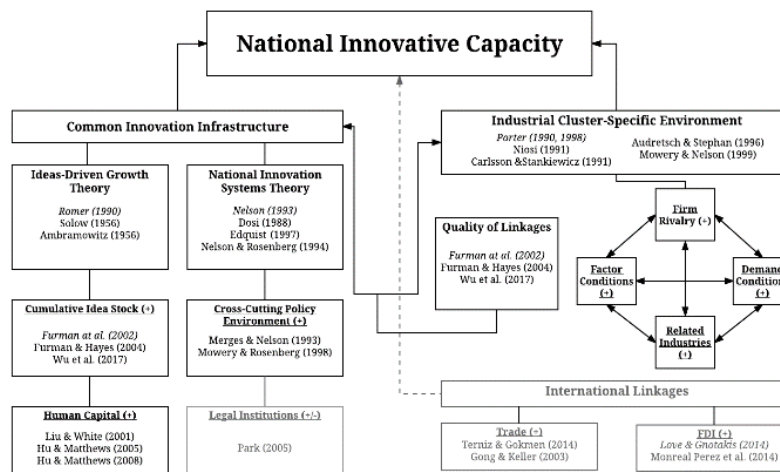
Corollary to this is the increased premium placed on a nation's capacity to contribute to the growing body of global technological innovations. Empirical testing reveals that innovative capacity, much like economic development, varies widely across countries. The bulk of technological advancements are concentrated in a handful of nations that reap the lion's share of value-added, leading to an overreliance on these nations to drive global technological growth. In fact, according to the Global Innovation Index, leading innovator countries generate tenfold the innovative output that laggard nations generate (Cornell University, INSEAD, & WIPO, 2019). Moreover, the convergence in national innovative capacity between emerging and leading innovators has plateaued for the past few years (Petralia, Balland, & Morrison, 2017). As such, the underlying drivers of innovative growth remain a perennial problem in economic literature.

Hence, this study aims to accomplish the following objectives: (1) to characterize the relationship between innovative capacity and drivers of growth under the common national innovation infrastructure framework, the industrial cluster-specific environment, and transnational linkages across a

global panel; (2) to introduce a novel model that considers international spillovers and legal institutions undercutting national innovation systems; (3) to determine which explanatory variables have the most apparent effect on national innovative output using panel regression and subsequently juxtaposing these results to that of the Poisson regression method for count variables, a method which previous works failed to consider; and (4) to propose policies that are relevant for each subset of countries, namely: leading innovator countries, emerging innovator countries, and laggard nations.

The significance of this study lies in its characterization of technological development as a complex process that ties into classical models of endogenous growth as well as industrial clustering, moreover, it includes a holistic consideration of foreign direct investment and strong institutions in influencing innovation regimes. This paper is novel in its attempt to accelerate discourse and policy on technological diffusion, an area in which the boundaries between industrial and innovation policy are slim or non-existent, as both play an important role. It is imperative to comprehensively examine how each nation can come to par with the most innovative countries, especially in this era of unrestrained technological innovation and economic advancement.

### 1. Literature review



Source: *National Innovative Capacity*.

Figure 1. Literature on national innovative capacity.

The term *national innovative capacity* was coined by Furman, Porter, and Stern (2002) in their seminal work, which marked the inception of an integrated framework surrounding technological innovation. Their research incorporated and extended traditional models of technological growth such as

endogenous growth theory (Romer, 1996; Solow, 1956) and Porter's diamond of competitive advantage (1998). As such, much of the literature on national innovative capacity revolves around the common innovation infrastructure, industrial cluster-specific environment, and the quality of linkages between the two. It is a measure of the ability of a country to generate and commercialize new-to-the-world technologies at a given period.

### *Common Innovation Infrastructure*

The common innovation infrastructure, which includes the classic ideas-driven growth theory (Abramowitz, 1956; Romer, 1996; Solow, 1956) and national innovation systems (Nelson, 1993), encompasses the cumulative idea stock, human capital investments, cross-cutting policy considerations that undercut the macroenvironment for innovation. This integrated framework comprises ideas-driven growth and national innovation systems. Notably, Wu et al. (2017) used the stepwise hierarchical estimation method on OECD nations to parse out the interlinkages of the different theories under this integrated framework. They found a significant positive effect on patent stock and research expenditures on innovative capacity.

*Ideas-driven growth.* Under the common innovation infrastructure, ideas-driven growth depends on the stock of accumulated knowledge capital (intertemporal spillovers) as well as the pool of human talent and energy directed towards the generation of new technologies (human capital). Using either OLS or basic panel regression analysis, previous works found a positive and significant relationship between these indicators and national innovative capacity (Romer, 1996; Benhabib & Spiegel, 1994; Wu et al., 2017; Petralia, Balland, & Morrison, 2017).

*National innovation systems.* Nelson (1993) posited that a nation's cross-cutting policy environment and the institutional framework work jointly to improve national innovative capacity. He explored these facets through theoretical examination as well as qualitative case studies of countries. This was further corroborated by Reichardt et al. (2017), who explored the intricate nexus between public policy and the innovation environment in highly developed nations. However, there is a noticeable dearth in the literature that examines legal institutions and innovation. This arose due to the lack of empirical measures of the quality of a nation's IPR regime and rule of law. Studies that attempted to explore this facet of national innovation were constrained to qualitative case studies in developed nations where such data is available (Talbi, 2017; Park, 2005; Nelson, 1993).

### *National Industrial Clusters and Innovation*

Whereas the common innovation infrastructure marks the context for innovation in a country, the cluster-specific or cluster-based theory of national industrial competitive advantage Porter (1990) introduced a diamond of national competitive advantage, comprising factor conditions, demand conditions, firm rivalry, and the clustering of related industries. Furman et al. (2004) found a positive relationship between these factors and national innovative capacity by using the technological specialization index by Ellison and Glaeser to proxy for the quality of factor conditions. Wu et al. (2017) attempted to use the economic complexity index of Hidalgo and Hausmann (2009) to model the clustering of related industries, and they found a positive and significant relationship for this factor. However, the other aspects of competitive advantage such as firm rivalry and demand conditions were neglected because of the lack of suitable empirical measures for such.

### *Quality of Linkages*

Furman et al. (2002) suggested that the quality of linkages between the common innovation infrastructure and the cluster-specific environment induces a feedback loop between the two that spurs greater heights of innovation. They theorized that the ability of industrial firms to commercialize and propagate their innovative developments depends on the availability of risk capital and university-initiated research and development. However, they were unable to find a significant relationship between these and innovative capacity. Another study by Furman and Hayes (2004) also used venture capital as an indicator of the quality of linkages. In this case, a weakly positive relationship was discovered.

### *Towards an Open and Institutional Model of Imitation and Innovation*

Previous works for national innovative capacity were primarily engaged in studying innovation as a comparatively closed system, without considering international spillover and trade. Conversely, although some works examine the effect of international spillovers in spurring technological innovation, none have done so in an integrated context that considers the common innovation infrastructure and cluster-specific theory. The *imitation to innovation* hypothesis was presented by Jin and Zhang (2016), who examined the patterns of technological diffusion in the energy industry in East Asia. Using basic panel regression analysis, they found a positive and significant relationship between FDI inflows and innovative output. However, in doing so, they neglected to test the joint effects of international

spillovers along with intertemporal spillovers (from the common innovation infrastructure) and localized knowledge spillovers (from the industrial cluster-specific environment). This is a grave oversight, which neglects the impact of a nation's institutions in enabling innovative growth. A similar study by Conconi et al. (2016) examined trade openness and technological diffusion. Again, their study suffers from the same myopia present in previous and more recent works (Filippetti, Frenz, & Ietto-Gillies, G., 2012.; Bento & Fontes, 2015).

### *Research Gap*

The national innovative capacity described by Furman and Hayes (2004), although sufficient to explain idiosyncrasies in complete innovations, is deficient in terms of the broader economic landscape of trade. Hence, it is imperative to introduce a more integrated framework that analyses the national patterns of technological capacity using a more sophisticated and integrated framework, one that considers the spillovers generated by international linkages such as trade and FDI inflows. Incorporating the extant literature in a cohesive manner, this study deviates from previous works in its analysis of the legal and institutional aspects under the national innovation systems theory, which was previously constrained to qualitative case studies. Furthermore, it introduces novel measures for concepts that were previously difficult to quantify, namely, firm rivalry, university-industry collaboration, and industrial clustering.

Furthermore, while the field of study surrounding technological innovation and growth is vast, it is only in recent years that global datasets have emerged as a tool for econometric research. Given the paucity of data before the current century, previous forays into innovation were mostly theoretical. Previous empirical undertakings were often limited to more developed subsets of nations, such as the OECD because those were the countries with adequate metrics and indicators that made them more tractable to study quantitatively. Given this, nations that lag far behind in terms of innovative capacity were neglected. Moreover, the studies that do use a global panel tend to coarsely disaggregate countries as either "leading" or "laggard," with no consideration for the nations that may be "emergent." These studies often prescribe policies that may not be suitable, due to the crude segregation method used.

In conclusion, the novel contributions of this paper are the following: (i) it provides a more comprehensive framework of national innovation systems under the common innovation infrastructure by analyzing the role of institutions; (ii) it introduces novel measures for previously unquantifiable variables that are nonetheless essential to innovative analysis; (iii) it uses a global dataset and further



divides the global panel into three subpanels according to innovative capacity; and (iv) it uses Poisson regression, which considers the nature of patent data as a count variable.

## 2. Framework

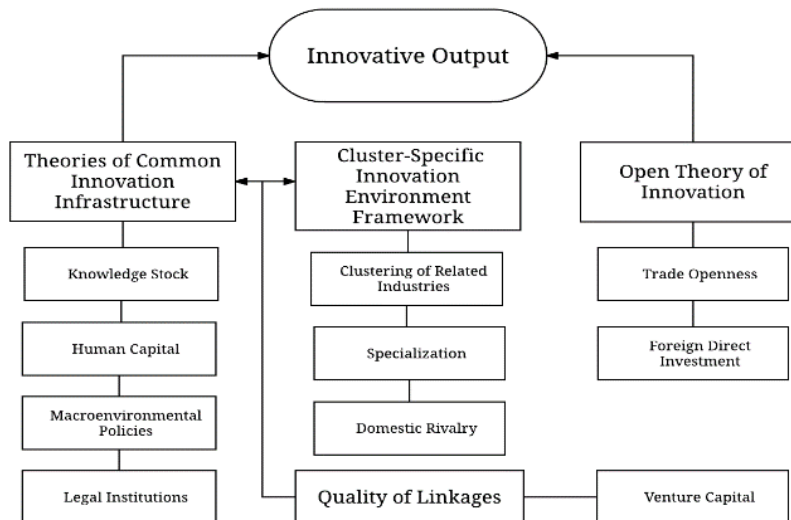
In consideration of the common innovation infrastructure, cluster-specific environment, and the open theory of innovation, the empirical strategy that will be utilized in this study is illustrated in Figure 2.

### *Theories of Common Innovation Infrastructure*

*Endogenous growth theory.* Solow (1956) and later Romer (1990) proposed the following growth model, captured by equation (1). Ideas-driven growth, the most abstract of the frameworks used in this study, focuses on the quantifiable relationship between accumulated idea stock ( $A_t$ ) and human capital ( $H_A$ ) on innovative capacity. This depends on the intertemporal spillovers generated (*standing on shoulders* effect), which are crucial in determining economy-wide innovation.

$$\dot{A}_t = \delta H_{A,t}^\lambda A_t^\phi \quad (1)$$

Figure 2. Empirical strategy diagram



*Industrial cluster-based innovation environment.* Under this theory, the flow of innovation is determined by specialized inputs and knowledge, demand-side pressures, competitive dynamics, and

clustering across related firms and industries (Furman & Hayes, 2004; Porter & Stern, 2002). While the common innovation infrastructure sets the general context for innovation in an economy, it is ultimately firms, influenced by their microeconomic environment, that develop and commercialize innovation. Thus, national innovative capacity depends upon the microeconomic environment present in a nation's industrial clusters. The macroeconomic environment, captured by the common innovation infrastructure, can amplify the beneficial effects of the industrial cluster-specific environment. Petralia et al. (2016), following Hidalgo and Hausmann (2009) examined the complexity of industrial clusters and networks by using the economic complexity index, which is calculated iteratively using the method of reflections.

### *Quality of Linkages Hypothesis*

Wu et al. (2017), extending the model of Furman and Hayes (2004), further introduced the use of venture capital as a proxy for the quality of linkages hypothesis. Under this model, they expect that the availability of risk capital, which may serve to link the macroeconomic and microeconomic environments for innovation by spurring the commercialization of new-to-the-world technologies, will have a positive and reciprocal effect on innovative capacity. This is captured by equation (2) below, where  $X$  is cross-cutting infrastructure (Furman et al., 2002),  $Y$  encompasses the country-specific clusters (Porter, 1990), and  $Z$  indicates the strength of the said linkages.

$$\bar{A}_{j,t} = (X_{j,t}^{INF}, Y_{j,t}^{CLUS}, Z_{j,t}^{LINK}) \quad (2)$$

## **3. Methodology**

### *Sample and Data Collection*

A dataset of patenting activity and its various determinants as specified above is consolidated for a final sample of 80 different countries, spanning the time period 1996-2019. The volume of international patents generated per year by a given country is used as a proxy for innovative capacity, as it is a concrete measure of new-to-the-world innovations generated in an economy. The patterns of such innovative capacity are then examined against the frameworks previously specified: the common innovation infrastructure, cluster-specific environment, quality of linkages, and the open theory. Several sources are used in constructing the data, including World Intellectual Property Office (WIPO), World Development Indicators (WDI) developed by the World Bank, the Global Innovation Index, and the Economic Freedom of the World Index by the Fraser Institute. Moreover, the researcher obtains the

necessary raw historical master-file of patents from the USPTO, which contains necessary patent class information to calculate for the E-G specialization index.

Furthermore, the researcher eliminates the following countries from the sample: (a) countries that any missing observations for patent data from 1996-2019 (b) countries that lack data for the computation of the specialization index (c) countries that do not appear in the Economic Freedom Network database and (d) countries that do not appear in the Global Competitiveness database. Moreover, consistent with the objectives, the remaining countries are further divided into leading (1<sup>st</sup> quartile), emerging (2<sup>nd</sup> quartile), and laggard (3<sup>rd</sup> and 4<sup>th</sup> quartiles) based on their ranking in the Global Innovation Index (2019).

#### *Model Specification and Variable Description*

This paper considers the nature of patent data as a count variable, which may render traditional panel regression methods inefficient. Hence, this study introduces a novel Poisson model to analyze the determinants of innovative capacity, where the predicted mean of the associated distribution is captured in (3) below:

$$E(PATG_{j,t} | x_k) = \exp(\delta^{INF} \ln X_{j,t}^{INF} + \delta^{CLUS} \ln Y_{j,t}^{CLUS} + \delta^{LINK} \ln Z_{j,t}^{LINK} + \delta^{INT} \ln W_{j,t}^{INT} + \delta^C \ln C_{j,t} + \delta_0 + \gamma_j + \eta_t + \epsilon_{j,t}) \quad (3)$$

where  $x_k \in \mathbb{R}$  is the vector of regressor variables. For the basic panel regression method, following Furman and Hayes (2002) and Wu et al. (2017), the double logarithm is used to allow better interpretation of the elasticities of the variables, as well as to account for outliers. Equation (4) operationalizes the basic panel regression. The complete list of variables is detailed in Table A1 in the Appendix.

$$\ln PATG_{j,t} = \delta^{INF} \ln X_{j,t}^{INF} + \delta^{CLUS} \ln Y_{j,t}^{CLUS} + \delta^{LINK} \ln Z_{j,t}^{LINK} + \delta^{INT} \ln W_{j,t}^{INT} + \delta^C \ln C_{j,t} + \delta_0 + \gamma_j + \eta_t + \epsilon_{j,t} \quad (4)$$

where  $j$  indicates country and  $t$  indicates year, let:

$X_{j,t}^{INF}$  = vector of endogenous growth and national innovation system measures such that:

$$X_{j,t}^{INF} = \begin{bmatrix} E_{j,t}^{END} \\ G_{j,t}^{POL} \\ I_{j,t}^{LEG} \end{bmatrix}$$

Further elaborating, we have:

$E_{j,t}^{END}$  = vector of endogenous growth measures such that:

$$E_{j,t}^{END} = \begin{bmatrix} PATS_{j,t} \\ FTESE_{j,t} \\ SCIETECHJ_{j,t} \end{bmatrix}$$

The above follows the practice by Wu et al. (2017), Love and Gnotakis (2014) and Furman and Hayes (2002).

$G_{j,t}^{POL}$  = vector of government policies that influence the national innovation system such that:

$$G_{j,t}^{POL} = \begin{bmatrix} EDUCEXP_{j,t} \\ RNDEXP_{j,t} \end{bmatrix}$$

Again, the above follows the practice by Wu et al. (2017), Love and Gnotakis (2014) and Furman and Hayes (2002).

$I_{j,t}^{LEG}$  = vector of legal institutions that undercut the national innovation system such that:

$$I_{j,t}^{LEG} = \begin{bmatrix} IPR_{j,t} \\ RULE_{j,t} \end{bmatrix}$$

The introduction of  $I_{j,t}^{LEG}$  is the first point of deviation from previous works. The novel introduction of quantitative measures of the IPR regime and the rule of law within a country are key elements of the national innovation system and by extension the common innovation infrastructure. However, because no quantitative methods of evaluating such indicators on a global scale were available beforehand, this is one of the first papers to considers the legal and institutional framework surrounding innovative capacity.

$Y_{j,t}^{CLUS}$  = vector of measures that influence the cluster-specific environment for innovation such that:

$$Y_{j,t}^{CLUS} = \begin{bmatrix} TECHSPEC_{j,t} \\ CLUSTER_{j,t} \\ DOMRIV_{j,t} \end{bmatrix}$$

Again, the above closely follows the practice by Wu et al. (2017), Love and Gnotakis (2014) and Furman and Hayes (2002). However, this paper introduces  $CLUSTER_{j,t}$ , a measure of economic complexity following the method by Hidalgo and Hausman (1990). This is a key element of the cluster-specific environment as it captures the level of clustering among the industries in a nation, which may lead to agglomeration economies and innovative spillovers (Canie & Romjin, 2005).

$Z_{j,t}^{LINK}$  = vector of indicators for the quality of linkages hypothesis such that:

$$Z_{j,t}^{LINK} = \begin{bmatrix} VENTCAP_{j,t} \\ UNINCOL_{j,t} \end{bmatrix}$$

Again, the above closely follows the practice by Wu et al. (2017), Love and Gnotakis (2014) and Furman and Hayes (2002) by using  $VENTCAP_{j,t}$  as a proxy for the quality of linkages between industrial clusters and the national innovation infrastructure. However, this paper introduces  $UNINCOL_{j,t}$ , a novel measure of university-industry collaboration. This was qualitatively explored by Guimon (2013) who found that it was crucial in innovation systems, however, he was not able to quantify the results due to the lack of such data.

$W_{j,t}^{INT}$  = vector of international spillovers such that:

$$W_{j,t}^{INT} = \begin{bmatrix} OPENNESS_{j,t} \\ FDI_{j,t} \end{bmatrix}$$

$W_{j,t}^{INT}$  is a novel introduction that considers the role of international spillovers in influencing innovative output. This follows the theory of international knowledge spillovers of “imitation to innovation” (Krugman et al., 2012).

And finally,  $C_{j,t}$  = the vector of control variables such that:

$$C_{j,t} = \begin{bmatrix} URBAN_{j,t} \\ GDPCAP_{j,t} \end{bmatrix}$$

Finally, the above closely follows the practice by Wu et al. (2017), and Porter and Stern (2000).

### *Model Estimation*

This study will use a stepwise hierarchical regression approach to assess the explanatory power of each set of variables (Aiken & West, 1991). Furthermore, this approach will be applied to the World panel, and the Innovator (1), Emerging (2) and Laggard (3) subsets, respectively. Model 1 includes all of the controls and the common innovation infrastructure variables (without legal institutions). Model 2 contains all of the controls and the complete common innovation infrastructure. Model 3 measures only cluster-specific effects. Model 4 includes the common innovation infrastructure as well as the cluster-specific environment indicators. Model 5 includes all of the above and the quality of linkages as well. Model 6 contains only the common innovation infrastructure variables and the international spillover variables. Model 7 includes cluster-specific variables and international spillover variables. Finally, Model 8 is the full model including all of the variables. This stepwise hierarchical approach is illustrated in Table A2 in the Appendix. Moreover, Table A2 also provides the a priori expectations for each variable, based on previous literature.

To account for the count dependent variable, Poisson regression will be performed on only the global dataset. However, after running the regression on the subpanels, the Poisson was not convergent, owing to the smaller sample size for the subpanels. Hence, one limitation of this study is its inability to disaggregate the results into the subpanels for the Poisson regression, given that it does not converge for smaller sample sizes. Because of this, the researcher had to result to basic Fixed-effects and Random-effects panel regression methods, using the Hausman test to determine the appropriate model. However, it must be noted that the results for the Poisson regression and the basic panel regression are similar for the global dataset.

## **4. Results and discussion**

### *Descriptive Statistics*

Notably, the average patent count data per year is a little below 10,000. However, there is a very large standard deviation of more than 30,000, indicating much variation from the mean. Likewise, the average patent stock is above 70,000, with again, much deviation and diversity within the sample.

Because of the nature of the sample, these may be attributed to the presence of outliers. On the other hand, the log-transformed variables show much smaller variation relative to the mean. Natural logarithms may be interpreted as the growth rates of variables in economic studies and may be useful for analyzing data with an abundance of outliers. Indeed, transforming the variables with the natural logarithms has made the standard deviations more tractable across the sample.

### Global Panel Analysis

*Poisson regression analysis.* The Poisson regression results are shown in Table 1. The higher log-likelihood values and the smaller Akaike's information criterion (AIC) and the Bayesian information criterion (BIC) in Model 8 also suggest that the full model has improved goodness-of-fit as compared to the restricted models. In general, intertemporal spillovers are most apparent and significant across all datasets. This corroborates previous findings in the literature. Moreover, the inclusion of legal institutions is prudent, seeing that is significant across all models. In particular, given the weakly significant negative value of *IPR*, a weak IPR regime is seen to promote innovation in the global dataset.

Table 1. *Poisson Regression Results*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>LNPATS</i>	0.3229***	0.0873***		0.0708***	0.0704***	0.2845***		0.2702***
<i>LNSCITECHJ</i>	-0.0049**	-0.0049		-0.0026	-0.0004	-0.0044		0.0079
<i>LNFTSE</i>	0.0035	0.0061		0.0045	0.0045	0.0043		0.0081
<i>LNEDUCEXP</i>	0.0426	0.0387		0.0882	0.0839	0.0248		0.6783
<i>LNRNDEXP</i>	-0.0053	-0.0045		-0.0051	-0.0054	-0.0029		-0.0368
<i>LNIPR</i>		-0.0237		-0.0075*	-0.0073*	-0.0073*		-0.2807*
<i>LNRULE</i>		2.2875***		2.2670***	2.2756***	2.5408***		.0205***
<i>LNTECHSPEC</i>			0.8284***	-0.0378	0.0370*		0.0005**	0.2728
<i>LNCLUSTER</i>			0.7878***	-0.0451	0.0872*		0.0326	0.0645
<i>LNDOMRIV</i>			-0.0437	-0.0809	-0.0886		-0.2201	-0.0073
<i>LNVENTCAP</i>					0.005058			-0.2776
<i>LNUNINCOL</i>					0.2488**			0.0286*
<i>LNOPENNESS</i>						0.0034	-0.0304	-0.0284
<i>LNFDI</i>						0.2279***	0.3671***	0.0204**
<i>LNGDPCAP</i>	0.0031	-0.0084	0.0872	0.0026	0.0089	0.0064*	0.0263*	0.0039*
<i>LNURBAN</i>	-0.0431	-0.0331	0.0457	-0.0887	-0.0876	-0.0008	-0.0585	-0.0027
<b>Wald chi-stat</b>	327.62***	324.63***	847.28***	324.83**	324.23***	320.22***	264.10***	248.32***
<b>Log-likelihood</b>	-835.84	-823.56	-768.45	-763.02	-432.47	-405.78	-402.82	-888.8
<b>AIC</b>	2658.60	2647.56	2568.88	2557.43	868.78	848.45	885.63	805.62
<b>BIC</b>	2737.38	2787.87	2643.68	2645.47	727.25	703.78	874.73	875.77
<b>Observations</b>	1920	1920	1920	1920	1920	1920	1920	1920

Notes: The asterisks denote significance levels. \*\*\* at 1%, \*\* at 5%, and \* at 10%.

*Basic panel regression methods.* The basic panel regression results for the global set of countries are displayed in Table 2. For the global set of countries, all models reject the Hausman null hypothesis, thus fixed-effects is preferred in all cases. The results for the world panel regression are seen to be comparable to the Poisson regression analysis. Also, for all cases, the R-squared indicates a good model fit for the data.

Globally, knowledge stock, research and development expenditures, a permissive IPR regime, strong rule of law, excellent university-industry collaboration, and FDI inflows have the most significant effect on innovative capacity. These affirm the theoretical underpinnings of the common innovation infrastructure framework and the open theory of innovation and, to a lesser extent, the quality of linkages hypothesis. The quality of linkages hypothesis is demonstrated by the statistically significant values for university-industry collaboration in models 5 and 8.

Table 2. World Panel Regression Results

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>LNPATS</i>	0.7286***	2.2029***		2.2027***	2.2057***	2.2489***		2.2507***
<i>LNSCITECHJ</i>	-0.0267	0.0284		-0.0088	-0.0025	-0.0237		-0.0033
<i>LNFTSE</i>	-0.0025	0.0288		0.0308	0.0274	0.0288		0.0281
<i>LNEDUCEXP</i>	0.2867**	-0.0879		-0.0755	-0.0779	-0.0575		-0.0473
<i>LNRNDEXP</i>	0.0536	0.0570		0.0579*	0.0579	0.0689**		0.0688**
<i>LNIPR</i>		-0.2848***		-0.2774**	-0.2589**	-0.2064		-0.0880
<i>LNRULE</i>		2.4778***		2.4865***	2.5341***	8.5487***		8.5547***
<i>LNTECHSPEC</i>			2.0576***	-0.8889	0.0259		0.2758***	0.0278
<i>LNCLUSTER</i>			-0.20847	2.2027	-0.3438		-0.2703	-0.3886
<i>LNDOMRIV</i>			-0.50278	0.0088*	-0.3767		-0.3478	-0.3687
<i>LNVENTCAP</i>					0.0854**			-0.0562
<i>LNUNINCOL</i>					0.7704***			0.8288**
<i>LNOPENNESS</i>						-0.0686	0.4282**	-0.0509
<i>LNFDI</i>						0.3666***	0.7746***	0.3628***
<i>LNGDPCAP</i>	0.0842	0.2088	-0.0303	0.2277	0.2883**	0.2048	-0.3642	0.2644*
<i>LNURBAN</i>	0.7881**	0.6389*	3.7038***	0.6745**	0.6653**	0.5843*	2.2378*	0.5588*
R <sup>2</sup> within	0.8776	0.7046	0.2838	0.7048	0.7061	0.7228	0.6382	0.7237
R <sup>2</sup> between	0.7488	0.7457	0.8343	0.7425	0.7302	0.7532	0.8864	0.7846
R <sup>2</sup> overall	0.7828	0.7834	0.3787	0.7378	0.7282	0.7873	0.7586	0.7356
<b>Observations</b>	1920	1920	1920	1920	1920	1920	1920	1920
<b>Model</b>	FEM	FEM	FEM	FEM	FEM	FEM	FEM	FEM

Notes: The asterisks denote significance levels. \*\*\* at 1%, \*\* at 5%, and \* at 10%.

### Leading Innovators

Results for leading innovators are shown in Table 3. For leading innovators, under the common innovation infrastructure, the number of journal articles and technical literature in the economy takes



precedence over international spillovers. This implies that in leading countries, the effect of the imitation to innovation hypothesis is not as apparent as the effect of intertemporal spillovers. This makes intuitive sense, considering that leading innovators have established their infrastructure and production processes, eliminating any residual dependence on international technology spillovers to generate innovative output. Moreover, a strong IPR regime is seen to contribute to innovation, contrary to the results in the global panel (Table 2). This suggests that the impact of the strength of the IPR regime in a country depends on the level of technological development already present in the country. Additionally, of the quality of linkages indicators, university-industry collaboration is seen to be highly significant for both models 5 and 8, implying that the interlinkages between the academe and the industry are crucial in determining innovation for these leading innovators. This is a notable finding, since these nations have already established strong institutions and innovation infrastructure, with adequate knowledge stock and labor to innovate independently, strong collaboration between the academe and the private sector may be the differentiating factor in technological innovation.

Finally, the international spillover theory of imitation to innovation is also demonstrated, with somewhat significant values for the international indicators such as trade openness and FDI inflows. However, the coefficients are notably smaller in magnitude than those present in the global panel, perhaps implying that the leading innovators are not as dependent on the imitation-innovation product cycle for new-to-the-world technologies.

### *Emerging Innovators*

Again, like the leading innovators, idea stock is highly significant in driving innovation for emerging innovators, as seen in Table 4. One key difference in emerging innovators, however, is that while leading innovators are better influenced by journal article or knowledge stock, emerging innovators better reap the benefits of innovation with more labor in the ideas-producing sector given the significance of the number of full-time scientists and engineers. The quality of the rule of law also seems to play a markedly larger role in the innovative capacity for emerging innovators. Furthermore, unlike for leading innovators, quality of linkages indicators such as venture capital and university-industry collaboration do not seem to play as large a role. Notably, university-industry collaboration is significant for model 5, emphasizing its importance in streamlining innovation from the academe to the private sector.

Table 3. *Leading Innovators Panel Regression Results*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>LNPATS</i>	0.8520***	0.7769***		0.8389***	0.8206***	0.6738***		0.7338***
<i>LNSCITECHJ</i>	0.8875***	0.8626***		0.8383***	0.8837***	0.8449***		0.8008***
<i>LNFTESI</i>	-0.2335	-0.2283		-0.2874	-0.2481	-0.0766		-0.2082
<i>LNEDUCEXP</i>	0.2403	0.2045		0.2259	0.0748	0.0043		-0.0274
<i>LNINDEX</i>	0.0867	0.0326		0.0278	0.0278	0.0075		0.0004
<i>LNIPR</i>		0.4709**		0.4364*	0.4409*	0.6332***		0.5737***
<i>LNRULE</i>		0.5776		0.3777	0.8629	3.8787***		3.3885***
<i>LNTECHSPEC</i>			2.7702***	0.2253**	0.0757*		0.6379***	0.0878
<i>LNCLUSTER</i>			0.0288	2.0649***	0.7653***		0.0839	2.3640***
<i>LNOMRIV</i>			2.8673*	0.3509	0.0789		0.2528	0.2535
<i>LNVENTCAP</i>					0.2428			0.2889
<i>LNUNINCOL</i>					2.3779***			2.6086***
<i>LNOPENNESS</i>						-0.0837	0.8774***	-0.2604
<i>LNFDI</i>						0.0774***	0.0869***	0.0355***
<i>LNGDPCAP</i>	-0.5870	-0.8405	3.0508***	-0.2763	0.0457	-0.8787	0.7303	0.2679
<i>LNURBAN</i>	0.7878***	8.7456	5.5767***	0.8564***	0.8372***	0.5359***	0.7875***	0.8776***
within	0.7868	0.7877	0.4677	0.7433	0.7482	0.7426	0.6783	0.7478
R <sup>2</sup> between	0.8873	0.8888	0.0877	0.8563	0.7788	0.8688	0.3487	0.6772
overall	0.7088	0.7036	0.0843	0.8887	0.8388	0.8722	0.8727	0.7784
<b>Observations</b>	1920	1920	1920	1920	1920	1920	1920	1920
<b>Model</b>	FEM	FEM	FEM	FEM	FEM	FEM	FEM	FEM

Notes: The asterisks denote significance levels. \*\*\* at 1%, \*\* at 5%, and \* at 10%.

Interestingly, FDI inflows are highly significant in this model, indicating that the imitation to innovation effect of international spillovers prevails for this subset of nations. This is compelling, given the prevalence of OEM industries in this subpanel, which is based on the designs and specifications of the leading, developed countries. Together with the highly significant evidence for the weak IPR regime, this finding indicates that these nations learn to innovate by imitating the leading countries' technologies, spurring the catch-up effect. This is consistent with economic history, wherein the 3<sup>rd</sup> wave of industrialization in Asia hearkened the rise of OEMs in NIEs like South Korea and Taiwan, who eventually developed their OBM (Jin and Zhang, 2016).

Table 4. *Emerging Innovators Panel Regression Results*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>LNPATS</i>	0.7075***	0.7841***		0.7274***	0.6871***	0.4839***		0.4705***
<i>LNSCITECHJ</i>	0.2608***	0.2503***		0.2878***	0.0764**	0.0327**		-0.0075
<i>LNFTESI</i>	-0.0527	-0.0525		-0.0553	0.2204*	0.0456**		0.0338
<i>LNEDUCEXP</i>	-0.2822	-0.2387		-0.2308	-0.0546	0.0803		0.0866
<i>LNRNDEXP</i>	2.3336	0.7626		0.7768	0.4368	0.2847		-0.0039
<i>LNIPR</i>		0.0874		0.0588	0.0689	-0.0049		0.0288
<i>LNRULE</i>		2.5478**		2.5534**	3.4385***	8.4873***		5.8223***
<i>LNTECHSPEC</i>			0.7277***	0.0755**	0.0675**		0.0882	0.0378***
<i>LNCLUSTER</i>			2.8877***	-0.2825	2.0579***		0.2785*	0.0379
<i>LNDOMRIV</i>			0.6077	-0.0308	0.0607		-0.2658	-0.0348
<i>LNVENTCAP</i>					-0.0655			-0.0277
<i>LNUNINCOL</i>					0.7829***			0.0784
<i>LNOOPENNESS</i>						0.0747*	0.0635	-0.0271
<i>LNFDI</i>						3.7029***	2.8567***	3.7828***
<i>LNGDPCAP</i>	0.3726**	0.3865*	0.3036	0.3303*	0.3728**	0.0772**	-0.7705	0.0583**
<i>LNURBAN</i>	-0.2588	-0.2392	8.0489	-0.0657	-0.4529	-0.5873	0.6244**	0.3887***
R <sup>2</sup> within	0.8758	0.8767	0.3284	0.8777	0.7072	0.7887	0.7577	0.7887
R <sup>2</sup> between	0.2858	0.3723	0.0537	0.8507	0.4247	0.7278	0.7652	0.7757
R <sup>2</sup> overall	0.8067	0.4286	0.0768	0.5083	0.6002	0.7467	0.762	0.7783
<b>Observations</b>	1920	1920	1920	1920	1920	1920	1920	1920
<b>Model</b>	FEM	FEM	FEM	FEM	FEM	FEM	FEM	REM

Notes: The asterisks denote significance levels. \*\*\* at 1%, \*\* at 5%, and \* at 10%.

### *Laggard Nations*

Much like the previous two panels, intertemporal spillovers generated by accumulated knowledge stock are seen to have a highly significant effect on innovative capacity for laggard nations (Table 5). Unlike previous panes, however, educational expenditure is mildly significant in this panel, whereas it was not significant or very weakly significant in previous panels. This suggests that the cross-cutting policy environment of laggard nations plays a role in determining innovative capacity for poor or developing countries. Indeed, this, along with the significance of the full-time equivalent scientists and engineers, is empirical evidence that human capital and the policy environment work jointly to spur innovation (Benhabib and Spiegel, 1994). Moreover, public research expenditure and the rule of law are highly significant in this panel, whereas public research and development was insignificant in previous models. These findings suggest that for laggard nations, the macroenvironment underlying innovation is a crucial enabler of technological progress and may spell either future progress or stagnation.

Table 5. *Laggard Nations Panel Regression Results*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>LNPATS</i>	0.8603***	2.0703***		2.0883***	2.2037***	2.2502***		2.2555***
<i>LNSCITECHJ</i>	0.0769***	0.0805		-0.0837	0.0409**	0.0589***		-0.0285
<i>LNFTESE</i>	0.0875**	0.2279**		0.2288**	0.0487**	-0.0245		0.0838*
<i>LNEDUCEXP</i>	0.0687	0.2887		0.2839	0.2809**	0.2045		0.2548
<i>LNRNDEXP</i>	0.0674**	3.4427*		3.4746*	0.0265	0.0074		8.0223**
<i>LNIPR</i>		-0.8227**		0.8820***	-0.2456	-0.2445*		-0.3372*
<i>LNRULE</i>		2.6483***		2.5663***	2.7283***	4.5082***		4.0450***
<i>LNTECHSPEC</i>			0.8801***	-0.0446	-0.0259		0.0806	-0.0344
<i>LNCLUSTER</i>			0.8479	-0.0779	-0.2674		0.3589	-0.3386
<i>LNDOMRIV</i>			-2.7388	0.2584	0.4043*		-0.8786	0.2857
<i>LNVENTCAP</i>					0.5262***			-0.0228
<i>LNUNINCOL</i>					0.7378*			0.7827
<i>LNOPENNESS</i>						0.2375***	0.2642	0.3046
<i>LNFDI</i>						0.8656***	0.6564***	0.8283***
<i>LNGDPCAP</i>	-0.0857	0.2008	-0.6851	0.2238	-0.0322	0.0704**	0.6578*	-0.0885
<i>LNURBAN</i>	0.2424	-0.8855	7.2687***	-0.8084	0.2828	0.2329	4.3409***	-0.6062
within	0.7206	0.7372	0.2767	0.7378	0.7386	0.7867	0.5823	0.7873
R <sup>2</sup> between	0.7653	0.5643	0.0002	0.5588	0.7848	0.7848	0.2234	0.5236
overall	0.7388	0.5753	0.0074	0.5677	0.7444	0.7537	0.3655	0.5228
<b>Observations</b>	1920	1920	1920	1920	1920	1920	1920	1920
<b>Model</b>	REM	FEM	FEM	FEM	REM	REM	FEM	FEM

Notes: The asterisks denote significance levels. \*\*\* at 1%, \*\* at 5%, and \* at 10%.

## 5. Conclusion and policy recommendations

In conclusion, this study has remained consistent with its objectives by (i) introducing a novel and integrated framework of innovative capacity; (ii) characterizing the relationship between each of the indicators to each subset of countries; and (iii) using a new method of estimation to determine the interplay of the various theories for each subset of nations based on innovative capacity.

While previous studies were overwhelmingly concentrated in the closed-systems approach, this paper proposes and empirically affirms a new open model of technological innovation. The findings under this model suggest that levels of trade openness and foreign direct investment do indeed play important roles in determining national innovative capacity. These factors have explained the rapid technological convergence of nations such as Brazil, China, and India over the past decade.

Under the common innovation infrastructure, it was found that ideas-driven growth is highly dependent on the intertemporal spillovers generated by accumulated patent stock. However, results for the other variables are not as uniform when disaggregated to the different subpanels. For scientific journals and articles, only leading innovators were found to make use of this and transform it into

innovative output. However, emerging and laggard nations are better able to harness the human capital devoted to the ideas-generating sector to produce new technologies. Government policies that affect the macroenvironment for innovation are most effective for laggard nations, who greatly benefit from increased educational and R&D expenditures. On the other hand, for the legal institutions, this paper has empirically proven that the effect of the IPR regime depends on the level of development in a country. For developed, leading innovators, a strong IPR regime leads to long-run technological progress by encouraging innovation. However, for emerging or laggard nations that are more dependent on the imitation to innovation effect, a weak IPR regime may enable them to develop their unique technological capabilities by emulating the developments in more advanced nations through international spillovers.

Moreover, the quality of linkages hypothesis was empirically proven in leading innovators, where the university-industry collaboration index was shown to be highly significant. This bodes well for OECD nations, where efforts have been geared towards improving inter-sectoral collaboration over the past few years (Wu et al., 2017). Moreover, just like previous studies, venture capital was found to be only weakly significant, which implies that the university-industry relationship is better able to capture the relationship between the quality of linkages and innovative output.

This study has shown that it is not prudent to aggregate the effects of various innovation frameworks for all countries. In certain subsets of nations, the common innovation infrastructure might prevail, whereas, for others, the international spillovers of innovation may yield more beneficial outcomes. However, one thing is undeniable: the findings in this study underscore the fact that there is no universal recipe that enables the convergence of innovative capacity. While emerging nations shore up on their technological capabilities with inward FDI, perhaps the same approach would not yield the same benefits for laggard nations. The intricate nexus of policy considerations, microeconomic factors, as well as international alliances, all play off each other and jointly affect a nation's innovative capacity.

To fulfill this study's final objective of proposing policy recommendations for each subset of nations, the following sections are presented.

### *Leading Innovators*

As per Guimón (2013), the strength of university-industry linkages is a key element in the commercialization of new-to-the-world technologies. Unique among all the categories of countries, leading innovators are differentiated by their strong reliance on university-industry linkages to innovate. Thus, to sustain progress without stagnating as they have done for the past few years, these nations must continue to develop institutions to streamline collaboration between the academe and the private sector. Such programs may include research partnerships, technological transfer, or academic entrepreneurship programs or accelerators. Moreover, unlike the other subpanels, a strong IPR regime inhibits piracy and encourages innovation in these countries. Hence, leading innovators must shift to more stringent intellectual property laws, if they have not yet done so.

### *Emerging Innovators*

Just as a strong IPR regime is beneficial for leading innovators, a weak and more flexible IPR regime would be more suitable for emerging innovators. Governments of these nations must ensure that the intellectual property system is tailored to provide domestic firms with adequate incentives for effective learning and emulation. Sufficient incentives must be given to firms for them to engage in capacity-building until they, too, become leading innovators. Once sufficient innovative capacity has been established, these nations can then strengthen their IPR regime. This begs the question, however, of when exactly these nations would benefit from a stringent IPR system rather than a flexible one. Future studies may explore this conundrum with more sophisticated methods.

### *Laggard Nations*

In laggard nations such as the Philippines, the national innovation system is of paramount importance. Rather than introducing heavy-handed and reactionary policies that may lead to unintended consequences, governments of these nations must heed the macro-level enablers of innovation, especially during this global pandemic. For these nations, developing infrastructure and improving national institutions take precedence over fostering domestic rivalry and industrial complexity. At this level of development, factors such as the rule of law, IPR regime, and international alliances must all be geared towards enabling the development of growth rather than forcing progress artificially. To do this, the Philippines and other laggard nations would do well to invest in existing infrastructure and eliminate

existing bottlenecks to growth may have far more impact. In the Philippines, network infrastructure, as well as logistical efficiency, are key areas of improvement, both of which fall under national innovation systems. Once these existing constraints have been lifted, and the national environment has been made conducive for progress, only then can the industrial cluster-specific factors come into play. The burgeoning startup culture in the Philippines is evidence of this, and an environment of minimal red-tape and inclusive institutions would further lead to innovative upgrading in the country. Moreover, the burgeoning OEMs and ODMs in laggard Asian countries such as Vietnam may serve as the key to upgrading the innovative capacity, provided that the national government can take full advantage of these technological spillovers by having a weak IPR regime coupled with a robust rule of law. All of these, together with an excellent educational and public R&D regime, may drastically improve innovative capacity in laggard nations.

## References

- Abramovitz, M. (1956). Resource and output trends in the United States since 1870. In *Resource and output trends in the United States since 1870* (pp. 1-23). National Bureau of Economic Research.
- Balland, P-A, Rigby, D. (2015). The geography and evolution of complex knowledge. *Papers in Evolutionary Economic Geography*, 2(15), 1–24. Retrieved from <http://econ.geo.uu.nl/peeg/peeg1502.pdf>
- Benhabib, J., & Spiegel, M. (1994). The role of human capital in economic development: evidence from aggregate cross-country data. *Journal of Monetary Economics*, 34, 143–173.
- Bose, N., Haque, M. E., & Osborn, D. R. (2007). Public expenditure and economic growth: A disaggregated analysis for developing countries. *The Manchester School*, 75(5), 533–556.
- Canie, M. C. J., & Romijn, H. A. (2005). What drives innovativeness in industrial clusters? Transcending the debate. *Cambridge Journal of Economics*, 29, 497–515. <https://doi.org/10.1093/cje/bei018>
- Conconi, P., Sapir, A., & Zanardi, M. (2016). The internationalization process of firms: From exports to FDI. *Journal of International Economics*, 99, 16–30. <https://doi.org/10.1016/j.jinteco.2015.12.004>
- Cornell University, INSEAD, & WIPO. (2019). *The Global Innovation Index 2019*. Creating Healthy Lives - The Future of Medical Innovation.

- Filippetti, A., Frenz, M., & Ietto-Gillies, G. (2012). The Role of Internationalization as a Determinant of Innovation Performance: An Analysis of 42 Countries. *SSRN Electronic Journal*, 10, 1–31. <https://doi.org/10.2139/ssrn.2114289>
- Frenken, K. (2006). Technological innovation and complexity theory. *Economics of Innovation and New Technology*, 15(2), 137–155. <https://doi.org/10.1080/10438590500141453>
- Furman, J. L., & Hayes, R. (2004). Catching up or standing still? National innovative productivity among “follower” countries, 1978-1999. *Research Policy*, 33(9), 1329–1354.
- Furman, J. L., Porter, M. E., & Stern, S. (2000). Understanding the drivers of national innovative capacity. *Academy of Management Proceedings*, 2000(1), A1–A6. <https://doi.org/10.5465/APBPP.2000.5536001>
- Furman, J. L., Porter, M. E., & Stern, S. (2002). The determinants of national innovative capacity. *Research Policy*, 31, 899–933. <https://doi.org/10.5465/APBPP.2000.5536001>
- Guimón, J. (2013). Promoting university-industry collaboration in developing countries. *Policy Brief. The Innovation Policy Platform*, 1(3), 1-12.
- Hafner, K. A. (2014). Technology spillover effects and economic integration: evidence from integrating EU countries. *Applied Economics*, 46(25), 3021–3036. <https://doi.org/10.1080/00036846.2014.920479>
- Hidalgo, C. A., & Hausmann, R. (2009). The building blocks of economic complexity. *Proceedings of the National Academy of Sciences*, 106(26), 10570–10575.
- Jin, W., & Zhang, Z. X. (2016). On the mechanism of international technology diffusion for energy technological progress. *Resource and Energy Economics*, 46, 39–61. <https://doi.org/10.1016/j.reseneeco.2016.07.004>
- Nelson, R. R. (Ed.). (1993). National innovation systems: a comparative analysis. Oxford University Press on Demand.
- Nelson, R. R., & Nelson, K. (2002). Technology, institutions, and innovation systems. *Research Policy*, 31, 265–272.
- Petralia, S., Balland, P. A., & Morrison, A. (2017). Climbing the ladder of technological development. *Research Policy*, 46(5), 956–969. <https://doi.org/10.1016/j.respol.2017.03.012>
- Porter, M. E. (2001). The competitive advantage of nations. *Harvard Business Review*, 68(2), 73–93.
- Porter, M. E., & Stern, S. (2001). Innovation: Location matters. *MIT Sloan Management Review*, 42(4), 28–36.



- Reichardt, K., Rogge, K. S., & Negro, S. O. (2017). Unpacking policy processes for addressing systemic problems in technological innovation systems: The case of offshore wind in Germany. *Renewable and Sustainable Energy Reviews*, 80, 1217-1226.
- Romer, P. M. (1996). *Why, indeed, in America? Theory, history, and the origins of modern economic growth* (No. w5443). National Bureau of Economic Research.
- Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, 70(1), 65-94.
- Taalbi, J. (2017). What drives innovation? Evidence from economic history. *Research Policy*, 46(8), 1437–1453. <https://doi.org/10.1016/j.respol.2017.06.007>
- UNESCO. (2020). Fighting COVID-19 through digital innovation and transformation. Retrieved from <https://en.unesco.org/covid19/communicationinformationresponse/digitalinnovation>
- Urraca-Ruiz, A. (2013). The “technological” dimension of structural change under market integration. *Structural Change and Economic Dynamics*, 27, 1–18. <https://doi.org/10.1016/j.strueco.2013.07.002>
- World Economic Forum. (2019). *The Global Competitiveness Dataset 1996-2019*. (K. Schwab, Ed.). Geneva: World Economic Forum. Retrieved from [www.weforum.org/gcr](http://www.weforum.org/gcr)
- Wu, J., Ma, Z., & Zhuo, S. (2017). Enhancing national innovative capacity: The impact of high-tech international trade and inward foreign direct investment. *International Business Review*, 26, 502–514. <https://doi.org/10.1016/j.ibusrev.2016.11.001>

## APPENDIX

Table A1. *Variable Descriptions, Labels, and Sources*

Category	Label	Description	Sources
<b>INNOVATIVE OUTPUT (<math>\bar{A}</math>)</b>			
$\bar{A}_{j,t}$	<i>PATG</i>	This is the primary measure of technological innovation. It is the number of international patents awarded by the USPTO to a nation (both direct and PCT national phase entries).	World Intellectual Property Office, United States Patent and Trademark Office
<b>QUALITY OF COMMON INNOVATION INFRASTRUCTURE (<math>X_{j,t}^{INF}</math>)</b>			
$E_{j,t}^{END}$	<i>PATS</i>	This is the cumulative number of patents per million persons from the earliest available date to the year in question.	World Intellectual Property Office and author's calculations
	<i>SCITECHJ</i>	This is the number of scientific journal articles published in a nation in a given year.	World Bank
	<i>FTESE</i>	This is the measure of individuals who are employed in the scientific and idea-generating industry. It is measured by the number of scientists, technicians, and researchers in R&D. It is calculated as:  <i>(Technicians + Researchers in R&amp;D)</i>	World Bank and author's calculations
$G_{j,t}^{POL}$	<i>EDUCEXP</i>	This is a part of the innovation infrastructure under the Porter (1990) school of thought, which characterizes education as part of the microeconomic environment that encourages innovation. It is measured as a percentage (%) of GDP. This is calculated as  $EDUCEXP = \frac{\text{Gross education expenditure for higher education}}{\text{GDP expenditure}} * 100\%$	World Bank
	<i>RNDEXP</i>	This is a part of the innovation infrastructure under the Porter (1990) school of thought, which characterizes research and development expenditure as part of the microeconomic environment that encourages innovation. It is measured as a percentage (%) of GDP. This is calculated as  $RNDEXP = \frac{\text{Private RND expenditure} + \text{Public RND Expenditure}}{\text{GDP}} * 100\%$	World Bank
$I_{j,t}^{LEG}$	<i>IPR</i>	A measure of the intellectual property rights regime in the country. It is a component of the Economic Freedom of the World Index by the Fraser Institute and is a longitudinal and comprehensive evaluation of the IPR regime in a nation. It is measured on a scale of 1-10.	Fraser Institute

<i>RULE</i>	The quality of the legal system and the stringency of government rules and regulations. It is a component of the Economic Freedom of the World Index by the Fraser Institute. It is also measured on a scale of 1-10.	Fraser Institute	
<b>CLUSTER-SPECIFIC INNOVATION ENVIRONMENT (<math>Y^{CLUS}</math>)</b>			
<i>TECHSPEC</i>	This characterizes the patterns of specialization in the system. It is a concentration index of international patents that is calculated with the equation specified (Wu et al., 2017; Ellison & Glaeser, 1997), which is derived from the E-G concentration index of chemical, electrical, and mechanical patents. It is calculated as follows:  $TECHSPEC_{i,j,t} = \frac{PATENTS_{i,j,t}}{PATENTS_{i,j,t-1}} \left( \frac{\sum (s_{i,j,t} - x_i)^2}{1 - \sum x_i^2} - \frac{1}{PATENTS_{i,j,t}} \right)$ <p>where:   <math>PATENTS_{i,j,t}</math> = patents in each technological class (<i>i</i>) for each country (<i>j</i>) in each time period (<i>t</i>) and  <math>x_i</math> = average share of patents class in all country-years</p>	Author's calculations	
<i>CLUSTER</i>	The coefficient of clustering of the industrial firms in a given country. It is calculated using the method of reflections of Hidalgo and Hausman (1990), which yields nonnegative numbers.	Economic Complexity Index	
<i>DOMRIV</i>	A measure of the domestic rivalry in a country. Measured as a Likert scale from 1-10 from reliable survey data.	Global Index	Competitiveness
<b>QUALITY OF LINKAGES (<math>Z_{j,t}^{LINKK}</math>)</b>			
<i>VENTCAP</i>	This is the measure of the strength of linkages within the economy, which is proxied by the availability of venture-backed financing on the Likert Scale from 1-10 from reliable survey data.	Global Index	Competitiveness
<i>UNINCOL</i>	A measure of university-industry linkages using survey data conducted internationally spanning 1996-2019. It is measured on a Likert scale of 1-10 from reliable survey data.	Global Index	Competitiveness
<b>INTERNATIONAL SPILLOVERS (<math>W_{j,t}^{INT}</math>)</b>			
<i>OPENNESS</i>	This is a rough indicator of openness to international trade. It is calculated as:  $OPENNESS_{i,t} = \frac{X_{i,t} + M_{i,t}}{GDP_{i,t}}$ <p>where:  <math>X_{i,t}</math> = exports of goods and services (constant 2010 US\$)  <math>M_{i,t}</math> = imports of goods and services (constant 2010 US\$) and  <math>GDP_{i,t}</math> = national Gross Domestic Product (constant 2010 US\$)</p>	World Bank and Author's calculations	

---

<i>FDI</i>	This is a measure of inward foreign direct investment in the economy. It is measured with net inflow of foreign direct investment (BoP, in millions of US\$, constant 2010 prices)	World Bank
------------	--	------------

---

**CONTROL VARIABLES ( $C_{j,t}$ )**

---

<i>GDPCAP</i>	The GDP per capita is the GDP divided by the country's population. It is used as a control variable to account for differences in the standard of living across countries.	World Bank
---------------	--	------------

---

<i>URBAN</i>	This denotes the percentage (%) of urbanization present in a country. This is calculated as:	World Bank
--------------	--	------------

$$URBAN_{i,t} = \frac{(Population\ living\ in\ urban\ areas)_{i,t}}{Total\ Population_{i,t}}$$


---

Table A2. *A Priori Expectations and Stepwise Hierarchical Method*

<b>Variables</b>	<b>A priori</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>	<b>Model 6</b>	<b>Model 7</b>	<b>Model 8</b>
<i>LNPATS</i>	+	Yes	Yes		Yes	Yes	Yes		Yes
<i>LNSCITECHJ</i>	+	Yes	Yes		Yes	Yes	Yes		Yes
<i>LNFESE</i>	+	Yes	Yes		Yes	Yes	Yes		Yes
<i>LNEDUCEXP</i>	+	Yes	Yes		Yes	Yes	Yes		Yes
<i>LNRNDEXP</i>	+	Yes	Yes		Yes	Yes	Yes		Yes
<i>LNIPR</i>	+/-		Yes		Yes	Yes	Yes		Yes
<i>LNRULE</i>	+		Yes		Yes	Yes	Yes		Yes
<i>LNTECHSPEC</i>	+			Yes	Yes	Yes		Yes	Yes
<i>LNCLUSTER</i>	+			Yes	Yes	Yes		Yes	Yes
<i>LNDOMRIV</i>	+			Yes	Yes	Yes		Yes	Yes
<i>LNVENTCAP</i>	+					Yes			Yes
<i>LNUNINCOL</i>	+					Yes			Yes
<i>LNOPENNESS</i>	+						Yes	Yes	Yes
<i>LNFDI</i>	+						Yes	Yes	Yes
<i>LNGDPCAP</i>	+	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>LNURBAN</i>	+	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

## **Ritsumeikan Journal of Asia Pacific Studies**

The Ritsumeikan Journal of Asia Pacific Studies (RCAPS Journal) is an academic journal of the Ritsumeikan Center for Asia Pacific Studies (RCAPS), Ritsumeikan Asia Pacific University (APU). Articles published in the journal are reviewed by anonymous referees. Established in 1998, it aims to publish high quality, theoretical, and empirical papers which covers the societies, cultures and institutions relating to the Asia Pacific region. The journal accepts contributions from affiliates of the members of the Ritsumeikan Trust and scholars in the world.

### **Publishing Guidelines**

#### **Editorial Policies**

In line with the objectives of the RCAPS Journals, we invite the following research work for submission and peer review:

*Theoretical research* are studies that define, validate or falsify theories and provide deeper insights on theory building.

*Empirical research* are pioneering facts-finding studies with examinations of data and those with new experimental designs.

*Case studies* illustrate single best practices, cross-comparative, and or multiple case studies that test or set theoretical propositions.

*Policy research* involves studies to examine effects of policies on communities, economies, countries, and regions.

*Methodological research* presents new approaches to analyze modern day research problems.

*Review articles* critically revisit articles, journals, books, academic theories, and other pertinent academic literature with value adding contributions that qualify as research.

With general themes on the Asia Pacific region, the RCAPS Journal accepts multi-disciplinary works as well as multiple and mixed research methods that support hypotheses. Research papers, critiques, short notes, or comments on previously published articles and consequently rejoinders from the authors of these articles are also acceptable. Short articles which are not full-length research papers, but the contents of which adds new insights into or knowledge to their respective fields, may be considered.

### **Peer Review Process**

Our double blind peer-review process is composed of faculty members from Ritsumeikan Asia Pacific University and worldwide experts. The editors determine the peer reviewers based on their expertise on the topic.

Presenters at the Asia Pacific Conference of the RCAPS are encouraged to submit the article to this journal. Outstanding papers presented by graduate students at the AP Conference may be invited for submission to the peer review process.

Papers are initially reviewed by the editors. Short listed works are then sent to peer reviewers who are experts in their fields of research. These are graded as clean pass, moderate pass with minor revisions, resubmit after major revisions, or cannot be published in its current form. Authors will be notified in writing of the status and decision on the paper submitted.

### **Manuscript Submission**

Submitted manuscript should have never been published or accepted for publication in other journals. Authors may e-mail their works to the editor at [rjaps@apu.ac.jp](mailto:rjaps@apu.ac.jp).

Send manuscripts in MS Word format, A4 sized document, double-spaced and APA style compliant. Include all figures and tables in gray scale, a 300 word abstract and 4 to 6 keywords. Papers should be written in English. As a general guide, the manuscript must be around 8,000 words in length. Please prepare your manuscript in a concise manner. Footnotes should be kept to a minimum and observe and use a sequential order with superscript numbers at the bottom of the page. Only cited works should be completely included in the references section.

Authors are responsible for preparing any figures, diagrams, tables, etc. in a form that is ready to be printed. Non-native English writers are required to have their work professionally edited before submission. The RCAPS journal also accepts a limited number of Japanese works.

After the peer review and upon acceptance of the manuscript that is ready for publication, we will document the publishing agreement and copyright permission.

### **Publishing Agreement**

A publishing agreement will be signed and submitted by the authors with the following salient provisions:

- The RCAPS Journal reserves the right to make editorial changes suitable to publication.
- The author(s) attest to the originality of their work and take full responsibility for inquiries, complaints or disputes. Multiple co-authorships, contributors and research assistants are clarified in the order of contributions (first author, co-authors, and the research assistants in the acknowledgement)

**RCAPS Journal Editors**

Tatsufumi Yamagata (Chief Editor)  
Michael Angelo Cortez (Managing Editor)

**RCAPS Journal Editorial Committee**

Munim Kumar Barai (Ritsumeikan Asia Pacific University)  
James Blackwell (Ritsumeikan Asia Pacific University)  
Michael Angelo Cortez (Ritsumeikan Asia Pacific University)  
Renato Cruz De Castro (De La Salle University)  
Luisa Chua Delayco (Asian Institute of Management)  
Oscar Gomez (Ritsumeikan Asia Pacific University)  
Yuko Kamishima (Ritsumeikan University)  
Yasushi Kosugi (Ritsumeikan University)  
Faezeh Mahichi (Ritsumeikan Asia Pacific University)  
Hideo Sasagawa (Ritsumeikan Asia Pacific University)  
Kimie Shin (Ritsumeikan Asia Pacific University)  
Jan Sýkora (Charles University)  
Tatsufumi Yamagata (Ritsumeikan Asia Pacific University)  
Kenji Yokoyama (Ritsumeikan Asia Pacific University)