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Research Paper

A comparative spatial analysis on the healthcare between taiwan and czech republic based on different cultural habits

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ABSTRACT

This study aims to explore the complex interplay between cultural influences and healthcare systems by conducting a comparative analysis of Taiwan and the Czech Republic. Focusing on the intersection between sociocultural values and public health structures, the research investigates three key dimensions: healthcare accessibility, cultural approaches to health and wellness, and dominant dietary habits. To assess spatial aspects of healthcare access, the study employs open-source data in combination with geospatial analysis tools, including QGIS, GEODA, and SuperGIS. These tools are used to evaluate and compare hospital accessibility within the capital cities of Taipei and Prague, with particular attention to variations in travel time, distribution of medical facilities, and urban population density.
Beyond spatial considerations, the study examines how differing cultural orientations—specifically collectivist tendencies in Taiwan and more individualist patterns in the Czech Republic-shape public attitudes toward health prevention programs, medical decision-making, and everyday healthcare practices. This includes an analysis of culturally influenced behaviors such as the perceived obligation to visit family members during illness, trust in traditional versus modern medical systems, and participation in community-based health initiatives. Additionally, the research considers how dietary customs rooted in cultural history influence long-term health outcomes and lifestyle-related diseases in both regions. By integrating spatial, cultural, and behavioral perspectives, the study provides a nuanced understanding of how culture and healthcare systems interact to produce distinct public health experiences in Taiwan and the Czech Republic.

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1. INTRODUCTION

Overall health is largely determined by influenceable factors, primarily lifestyle and environment, as shown in Figure 1 the stated percentages are only very approximate, In different situations for individual people they can affect health completely differently [1].

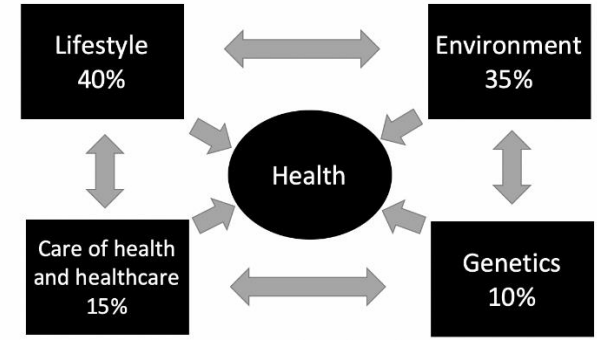


Figure 1. Health Influenceable Factors

In this study the aim of the analysis is lifestyle (dietary habits) (40%) and care of health and healthcare (accessibility and preventive measures) (15%). This research aims to examine various factor influencing healthcare of a population in different cultural settings. As such, this research aims by comparative analysis between Taiwan and Czech Republic examine different approaches to healthcare of the respective society. Different cultural settings stem mainly from individualized (Czech Republic) and collectivist (Taiwan) societies. This impacts the assumptions about individualized and socialized medicine. As shown in Figure 2, there are different cultural dimensions outlined by Hofstede and we can see a stark difference between both cultures in this dimension [2].

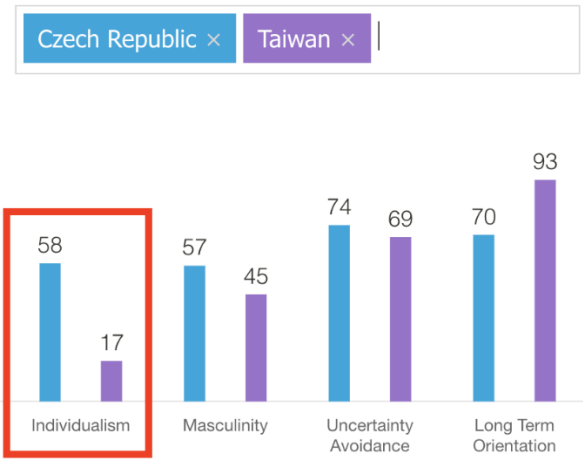


Figure 2. Cultural Dimensions by Hofstede

The purpose of this study is to ascertain if culture predicts health. This study wants to draw a comparison between Taiwan and Czech Republic population "healthcare consumption" and examine following three areas.

First, whether or not the population has easy access to healthcare. In both countries the analysis of both capital cities will be inspected. This will be showcased by using spatial dimensions using

geographical software (QGIS, GEODA and Super GIS) to assess the accessibility of healthcare in both countries. For this purpose, Open Data about hospitals information in respective countries from the government are used. In considerations are taken only hospital units, not clinics. The size of hospital was not challenged as long as it is being considered by the government as a hospital.

Second, it will stress the individualistic and collectivistic approach towards healthcare. Mainly the existence of various health prevention programs and the culture of visiting health practitioners. Health practitioners in the text below are family doctors who are treating general illnesses. The analysis does not examine any specialist (such as dentist, dermatologist) which are to be visited in special circumstances. Last, the research will conduct analysis on the different cultural dietary habits to draw conclusion on the "healthiness" of the population.

2. RELATED WORK

A wide range of studies has explored particular elements of healthcare on their own. Yet only a relatively small number investigate cultural dimensions, healthcare accessibility, and health-related behaviors as interconnected components. This leaves an incomplete picture of how these dimensions interact and mutually affect health outcomes. Furthermore, current research does not specifically examine Taiwan or the Czech Republic, resulting in a noticeable gap within comparative studies of healthcare systems. As a consequence, this paper tries to fill in the gap.

The study conducted by Handtke et al. (2019) [3] establishes a basis for researchers who study healthcare systems across various cultural environments. The authors gather particular elements and approaches from their assessed programs which deliver culturally appropriate medical services to patients who speak different languages and hold diverse cultural backgrounds to assess their impact on predefined results. The work of M. Hernandez and J.K Gibb (2020) [4] titled Culture, behavior and health demonstrates how cultural values and social customs determine the Way people access medical services. The research applies Hofstede's cultural dimensions framework which enables researchers to examine how different societies view individualism compared to collectivism. The research presents an organized approach which enables researchers to examine how cultural factors affect health behavior patterns. J. Matus (2021) [5] examines how Hofstede's six cultural dimensions function as independent variables to forecast population health outcomes which include life expectancy and healthcare expenditures. The study applies regression analysis to data from 60 countries which shows culture has moderate predictive value yet all cultural dimensions together do not create any strong relationship. The research identifies study limitations which include restricted sample size and external elements that stem from geographical and political factors while recommending that future studies should investigate how individualism and socialized medicine affect health results. The research promotes extensive cross-cultural investigations which help researchers discover how various factors influence different healthcare systems.

3. METHODOLOGY

The data analysis section will perform a full quantitative statistical assessment which evaluates and compares health accessibility conditions between Taiwan and the Czech Republic using open-source data. The study will use spatial analysis methods to create geographic maps which display healthcare facilities in order to extend its comparative research scope. The study will use Geographic Information System (GIS) tools to create visual representations of healthcare accessibility differences that exist because of distance and population distribution and city development patterns. The spatial data will allow researchers to study how city infrastructure and design choices affect public health results across different urban environments. The study will assess hospital distribution and accessibility in Taipei and Prague which represent the two capital cities of Taiwan and the Czech Republic. The study presents a comparative overview which helps understand health accessibility across both countries by showing existing patterns and differences between the two nations.

The researchers will conduct a qualitative study which will evaluate the healthcare systems of different nations and focus specifically on their health prevention programs. The qualitative study will examine dietary patterns of various populations which will help understand their cultural and behavioral aspects. The analysis will assess how different factors create obstacles to achieving fair healthcare distribution. The combined indicators will create a complete picture which shows how education affects health results while creating economic gender gaps in the Czech Republic and Taiwan.

The study aims to show how public health, education, and socioeconomic elements intersect between the two different national contexts through its combined research methods. The approach will generate practical information which will show policymakers the areas where they need to improve their health and education systems to address the existing deficiencies.

Taiwan and the Culture of Healthcare

In 2021 Taiwan has a population of about 24 million people. In 1995 the population age structure was quite the opposite of today's structure. In the 90s the age structure of Taiwan of 65+ years constituted only 6.1% whereas currently it is more than 16%, as shown in Table 1 for more details [6].

Table 1. Population age structure

AGE RANGE	1990	2000	2010	2020
0-14	27%	21%	16%	13%
15-64	67%	70%	73%	71%
65 Years and over	6%	9%	11%	16%

Taiwan as many countries in South East Asia is experiencing an aging of its population. Taiwan became an aged population by the 2018 and by 2026 it is forecasted that more than 20 % of its population will be in the group of 65+ years.

Aging of population is attributed to the improvement of public healthcare and low fertility rates. Additionally, following factors were identified contributing to the rapid decline in Taiwan's birth rates, including (1) a decreasing marriage rate, (2) delayed marriage, (3) shifting attitudes toward childbearing, (4) the growing burdens associated with childcare, and (5) rising female labor force participation [7].
In 2021 the fertility rate in Taiwan fell to 0.98, see detail of the fertility rate development since 1950 comparing the world data average with Taiwan and Czech Republic, as shown in Figure 3 [8]. Lower fertility rate, increased age of mothers also has an indirect impact of increased cesarean section rates, which further impacts the country's which further influences the country's healthcare costs [9].

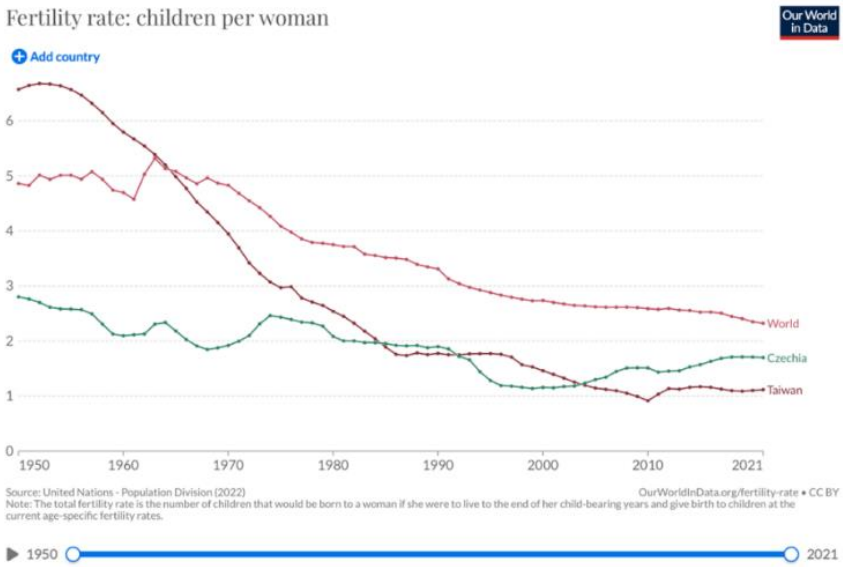


Figure 3. Fertility Rate: Children per Woman

Aging of population raises a number of public issues. The demand of medical services increases and the medical expenditures raises. Taiwan has implemented a national health insurance program since 1995. It is widespread insurance coverage which entitles everybody for an affordable healthcare procedure. It is affordable as the total premium to be paid is only 826 NTD per month [10]. Further, the national health insurance offers the convenience of seeking different health facilities based on personal convenience. This in fact enables a patient to seek health professional according to one's choice and easy access.

Access to healthcare in Taiwan

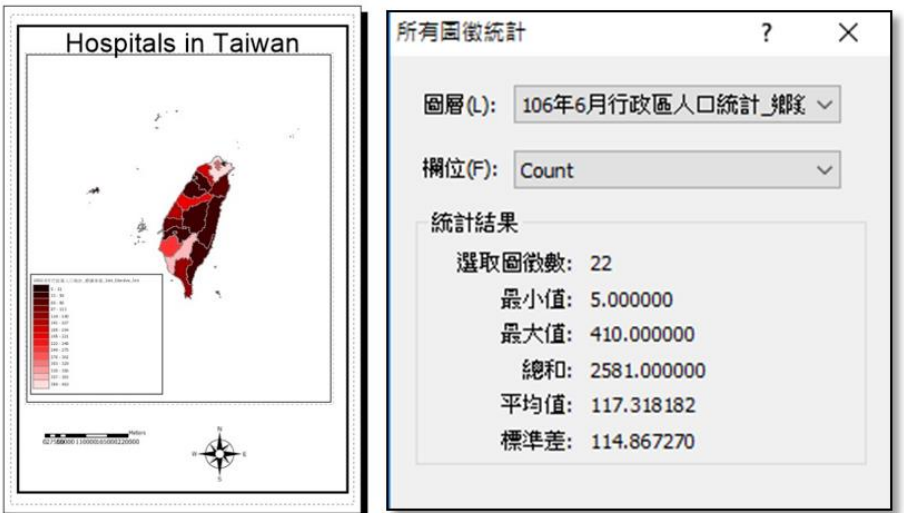


Figure 4. Density of Hospitals in Taiwan

In Taiwan there is a total of 2581 hospitals. With the majority of them in the West coast dominated by the north (capital city) and the south (second biggest city) as shown in Figure 4, Figure 5 below gives a detailed information about the number of hospitals in Taiwan. Around the capital city there is the highest concentration of hospitals as there is also the highest population density. In Taipei City and New Taipei City there are a total amount of about 700 hospitals.

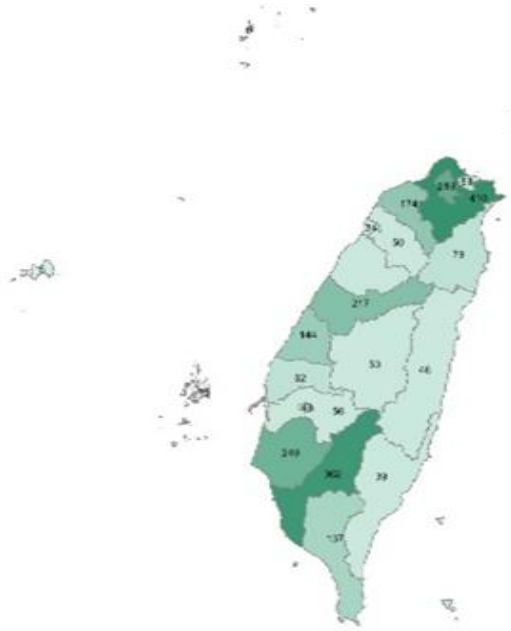


Figure 5. Number of hospitals in Taiwan

Figure 6 below shows the density of hospitals in Taiwan. The highest concentration of hospitals as mentioned before is in the West, South and Nord. This is given by the geography of the Island as in the East there are high mountains with no major city and scarce population. The vast majority of the population lives in big cities just as the concentration of the hospitals in the map below showcases.

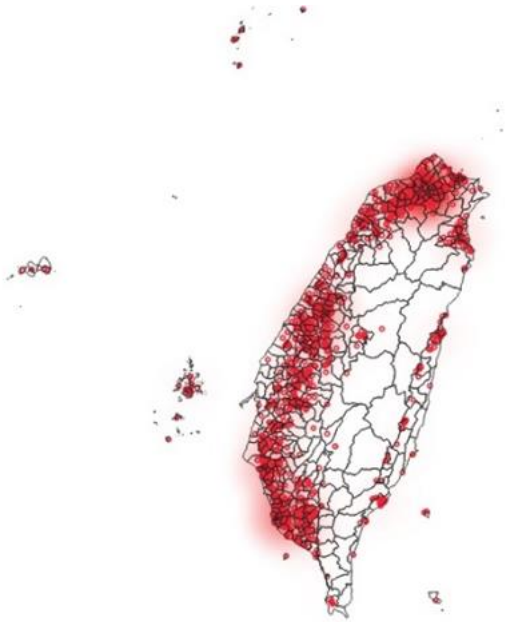


Figure 6. Concentration of population

It can be concluded that there are six clusters of hospitals with the highest density in Taiwan as shown in Figure 7 the highlighted clusters indicate areas of higher concentration, suggesting spatial heterogeneity in the observed phenomenon. These clusters are primarily aligned with coastal and near-coastal zones, reflecting the influence of geographical and environmental factors. The variation in cluster size and density demonstrates regional differences in intensity and spatial interaction.



Figure 7. Six Clusters in the West Coast

Figure 8, Figure 9 below shows detail of the density of hospital care in the Northern part of Taiwan, High-density zones are clearly observed in central and eastern parts, indicating a strong concentration of healthcare facilities. Moderate to low-density areas appear toward the western and peripheral regions, reflecting uneven distribution. The density of hospital care in Taipei area (Taipei city districts highlighted in green), High-density clusters are prominently concentrated in the central urban core, indicating intensive availability of healthcare services. Surrounding suburban zones show moderate density, reflecting a gradual decline away from the city center.

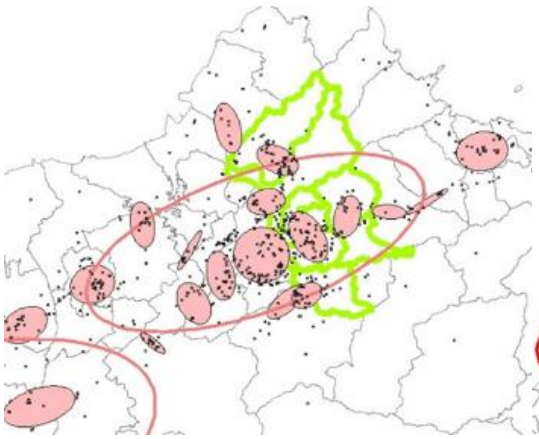


Figure 8. Density of hospitals in the Northern part

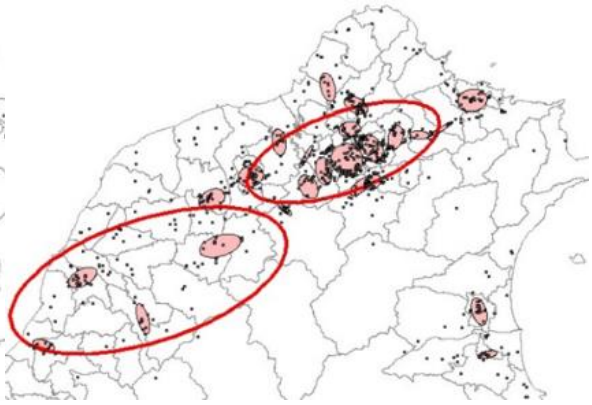


Figure 9. Density of hospital care in Taipei area.

Figure 10 below shows the detail of Taipei City. As mentioned at the beginning there are 289 hospitals in Taipei, Healthcare facilities are densely concentrated in the central and western districts of the city. A relatively moderate distribution is observed in the northern and southern zones. The pattern reflects the influence of urban density, road networks, and population demand.

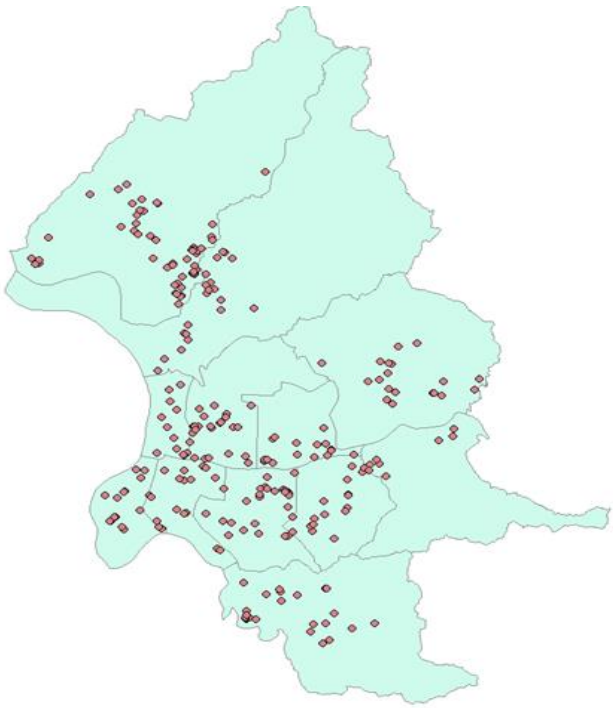


Figure 10. Detail of hospitals in Taipei City

As shown in the Figure 11 below, the yellow lines indicate major road or transportation routes connecting different parts of Taipei City. This pattern suggests a strong association between hospital location and transportation accessibility, with fewer hospital located in more remote or less connected

areas. Overall, the map highlights how infrastructure networks influence the spatial clustering and accessibility of hospitals within the city.

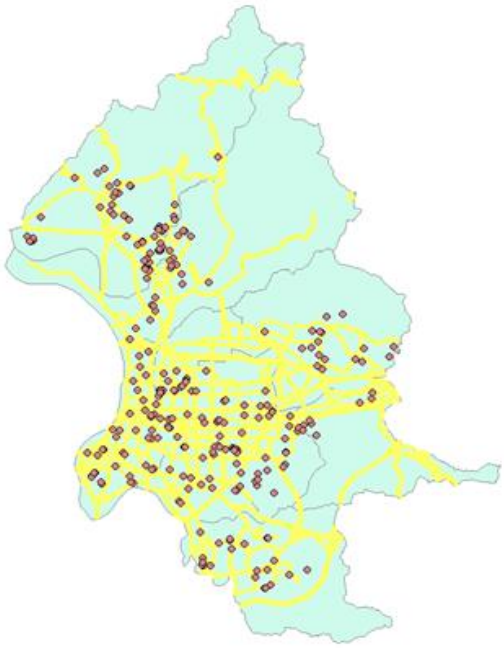


Figure 11. Roads and Hospitals in Taipei City

The accessibility to a hospital in the capital is therefore easy to be reached. Taken into account the population density and the number of hospitals it is interesting to see, that there are many hospitals which are located in less densely populated area, as shown in Figure 12, however given the importance of the road communication as above we can conclude that the location is strategically aligned as there is a high density of roads going through, Below in Figure 13, Morans I measure of spatial autocorrelation shows us independent data sets.

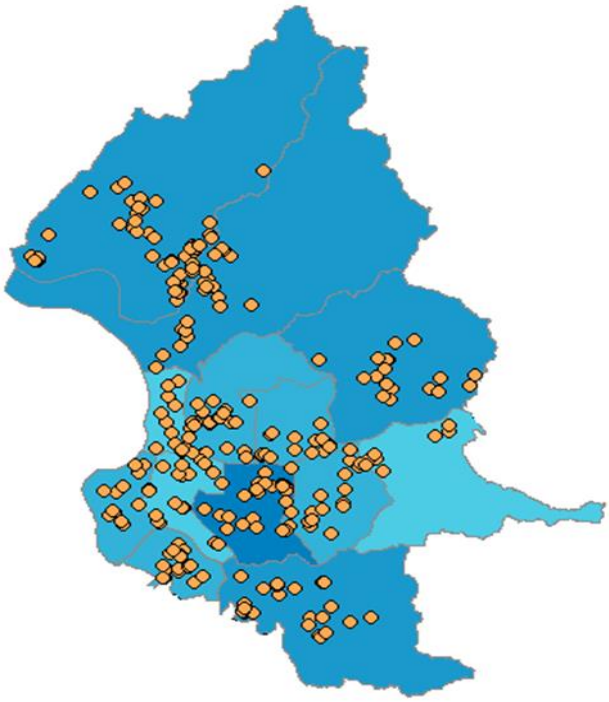


Figure 12. Population Density and Hospitals in Taipei City

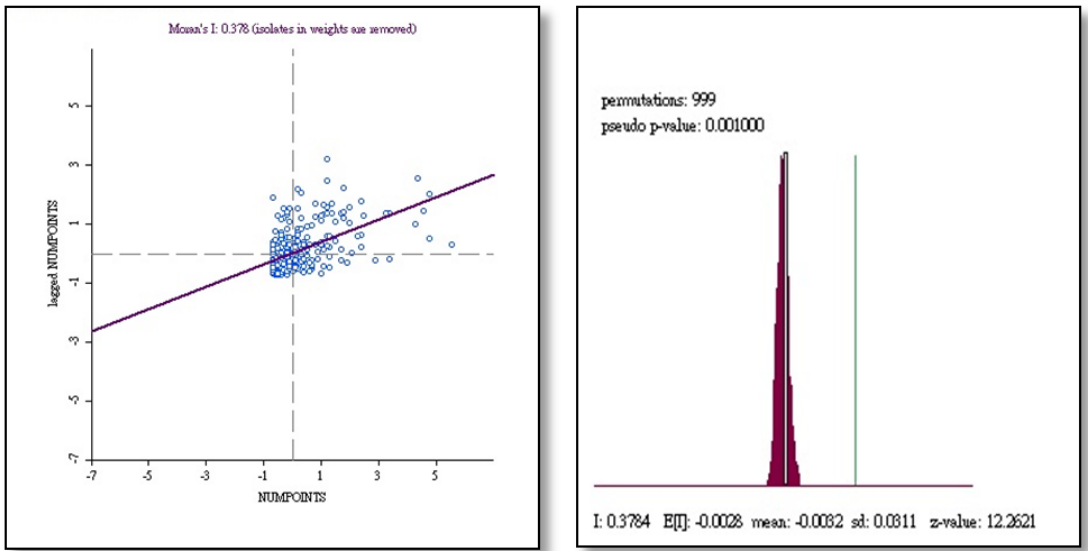


Figure 13. Spatial autocorrelation

While LISA (local indicator of spatial association), as shown below in Figure 14, indicated that there are certain locations with higher significance, Regions are classified into five levels (0–4), illustrating clear geographical differences in intensity. Higher-category areas are mainly concentrated in the northern and selected southern regions.

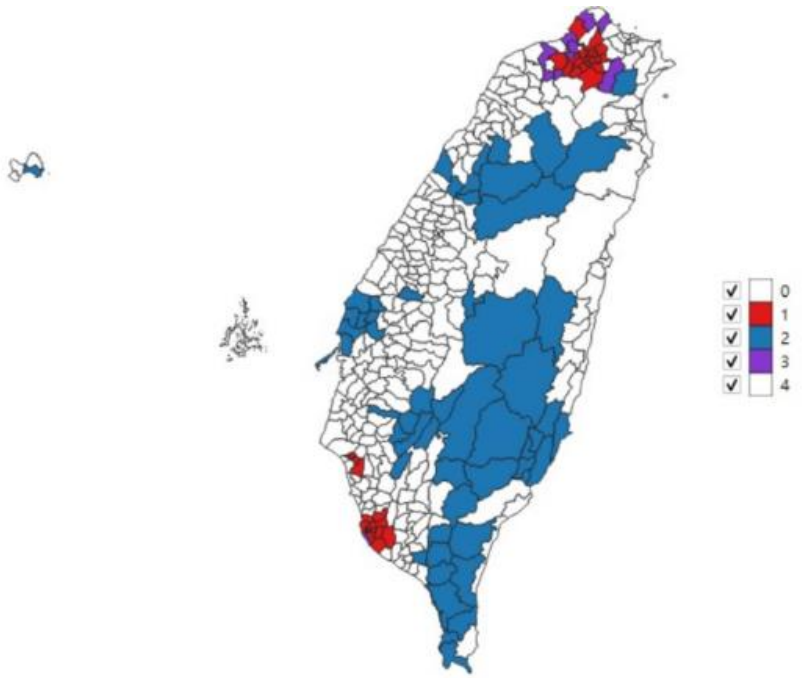


Figure 14. Local Indicator of Spatial Association (Taiwan)

Mandatory Health Preventive Examinations

The society encourages the system (state) to be taken care of in a collective way. This stems also from the culture where individual needs are suppressed in the name of collectivism. Therefore, in Taiwan there are mandatory health preventive examinations which are enforced when reached the necessity. However, it was found out that mostly higher income and education are positively associated with preventive behaviors, while health status, healthcare utilization, and regional factors also play significant roles [11].

There are mandatory health preventive examinations at schools (elementary, high school) which are done in collective way rather on an individual basis there is also freshman university health examination as well as entry employment health examination. These examinations can include also Chest-X-Ray examination for tuberculosis, Serological test for syphilis, Physical examination and proof of positive measles and rubella antibody or vaccination certifications as stipulated by the law [12]. The visits of physicians, especially a visit to hospital is encouraged, rather to pay visit to pharmacy to treat mild conditions by oneself. Further, there is no existing referral program on seeking medical professional as such patients are able to visit any level of hospital directly as they wish. They have unlimited rights of choice of physicians and health care facilities [13].

Dietary habits

Taiwan is a fast-consuming country. Food is everywhere and easily accessible. Needless to say, a lot of apartment do not have a kitchen. Junk food is easily available and this lifestyle leads to a higher fat and protein intake rather than consumption of fiber and vitamins. This leads to the fact, that Taiwanese are getting fatter as outlined by several research [14].

In fact, food consumption is considered a common social activity. All the main holidays do include food, either as a giveaway present or as part of a family gathering. One of the most important gathering in the year is the Lunar New Year, where whole family gathers and enjoys food for many days in a row. Further, there is Dragon boat festival, with the tradition of Zongzi (粽子) and Mid-Autumn Festival during which consumption of mooncakes is common. Taiwanese are well known for their warmth and hospitality [15].

Czech Republic and the Culture of Healthcare

In 2021 Czech Republic had a population of about 10.7 million people. In 1991 the proportion of economically active person was similar to the proportion in 2021, 66% respectively 64%. The proportion of person in 65+ group rose from 13% to 20% (see below). Same as in other in developed countries the population in Czech Republic is aging, as shown in Table 2 [16].

Table 2. Population Age Structure

AGE RANGE	1991	2001	2011	2021
0-14	21%	16%	14%	16%
15-64	66%	70%	70%	64%
65 Years and over	13%	14%	16%	20%

In 2021 the fertility rate was 1.83 the highest since 1992 [17]. This is considered to be also one of the highest in comparison with other EU countries. The high fertility rate is attributed to country's good quality of family policy, a stable economy with low unemployment and stagnant maternal age at first child. In Czech Republic there are currently seven insurance companies [17]. It is up to the individual for which insurance company to sign up. It is possible to change between different insurance companies; however, it is an administrative obstacle which requires in person attendance; therefore, most people stick to the insurance company they already applied before. Insurance companies provide different services to their clients and do not cooperate with all doctors and medical facilities. The differed service may be in providing for example vaccination subsidy, different preventive examination premiums and these varies in time. There is strong competition between all seven insurance companies. But they share the responsibility in providing public health services to each of the more than 10 million public health insurance policyholders [17]. With that said, every single person in the country is insured since birth. For children, students (up to 26 years) and retired the insurance premium is paid by the state. For all other people the insurance premium changes every year (13, 5% of the minimum salary) and for 2022 it was 2 898 NTD (according to government site).

Access To Healthcare In Czech Republic

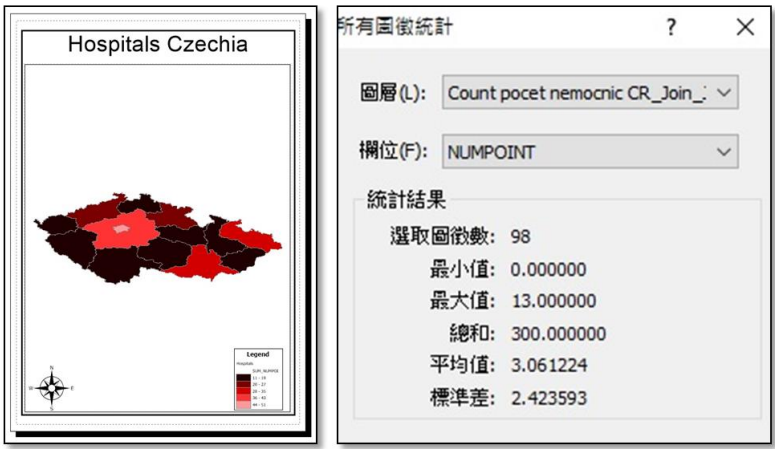


Figure 15. Density of hospitals in Czech Republic

In Czech Republic there is a total of 300 hospitals as shown in Figure 15. Mostly they are concentrated in the regions where there is the highest population density. As such there are 51 hospitals in the capital city Prague and the surrounding district has 38 hospitals. The North-East region comes second with 33 hospitals. Followed by the region with the second biggest city (Brno) where 29 hospitals are placed, as shown in Figure 16.

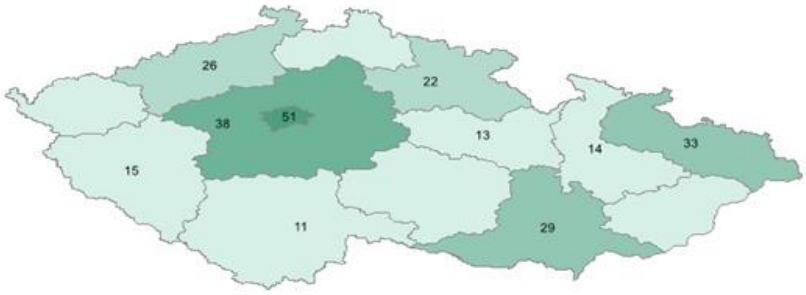


Figure 16. Number of hospitals in Czech Republic

The density map of hospitals below shows the overall distribution of hospitals in Czech Republic. It follows the same trend as mentioned before. The highest density is in the capital city as shown in Figure 17

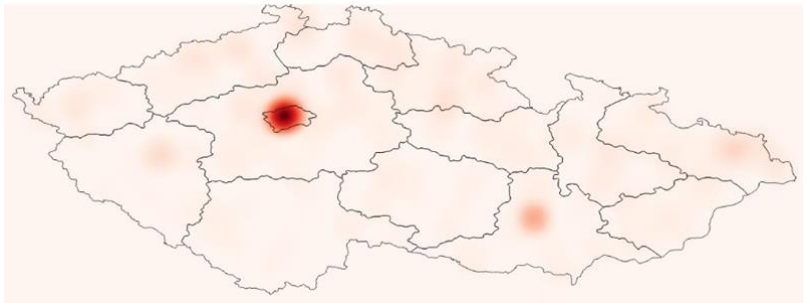


Figure 17. Density Map of Hospitals

By analyzing the distribution of the hospitals in the capital city we can come to a conclusion that the concentration of the hospital is in the very center of the capital city. It does not follow the trend of populous district. As shown in Figure 18, the darker color on the map below the higher population. Not

only in Prague but also in Czech Republic hospitals exist in the city centers in old building dating back to the history. The oldest hospital in Prague is dating back to the 15th century. As such the distribution of the population was different as well as the size of the city.

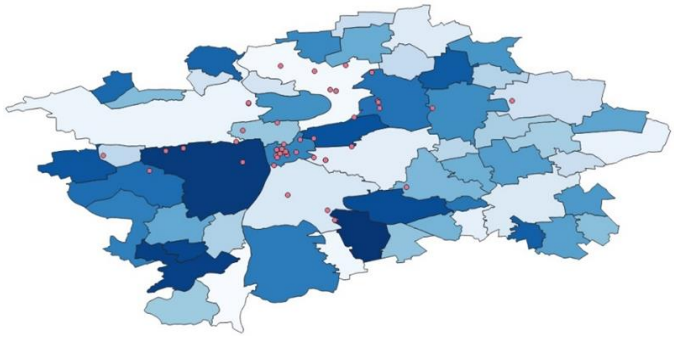


Figure 18. Population Density and Hospitals in Prague

Figure 19 below shows, Morans I measure of spatial autocorrelation shows us independent data sets. While LISA (local indicator of spatial association), as shown in Figure 20, indicated that there are certain locations with higher significance.

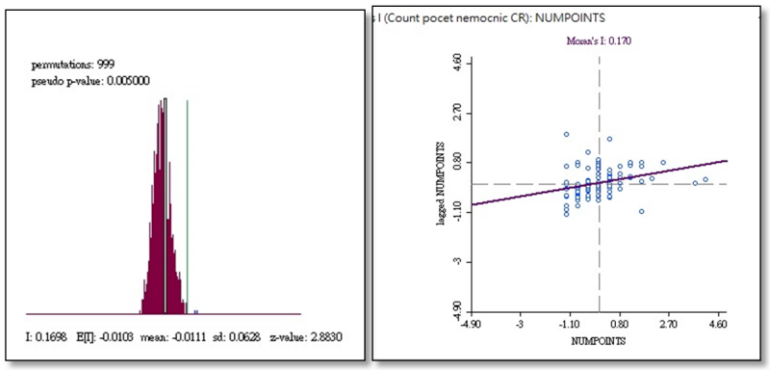


Figure 19. Spatial autocorrelation



Figure 20. Local indicator of spatial association (Czech Republic)

Mandatory Health Examination

In Czech Republic there are mandatory health examinations, just like vaccinations but they are not legally enforceable if the patient does not attend them, they are voluntary and not punishable. At the same time the insurance company cannot force the clients to attend any of the preventive health examinations. There are mandatory preventive health examinations when starting a new employment. These include all employees, also those undertaking administrative jobs as well as jobs connected to the risky type of employment (i.e. concerning public health). Since the beginning of 2022 there has been a proposal, that the mandatory health examination concerning administrative type of work should be eliminated. This is part of the efforts of the government towards a less bureaucratic state. Following this government proposal,

there will be no mandatory health examination for most ordinary people as part of entry employment examination. The care of one own's health will be put on the individuals themselves. To eliminate the mandatory health examination is well received from the society as it is a good step towards less bureaucratical state as well as a more of an individual choice to seek a health professional.

In Czech Republic people have mostly their own registered health practitioner (general clinic doctor) who they go to when they need help. Previously, these health practitioners where bound to the permanent resident address of the individual. Currently, people can choose according to their preference, however the health practitioner needs to agree if he is able to take that patient into his care. Only in special circumstances and in emergency situation one can go seek a different health practitioner, but that is not the rule. If there is a life-threatening

Emergency one can go seek help to the hospital (emergency unit). This system of one own registered health practitioner leads to the fact, that the relationship between patient and doctor is well established. Further, the abuse of the system occurs minimally as people do not seek medical health with minor health conditions (cough, running nose, fever etc.) as they cannot randomly go and visit a different health practitioner. The health practitioner knows exactly the history, the amount and reasons of visits every time and the doctor also prescribes any referrals to see other specialized units. This gives the health practitioner enough time and care to focus on every patient as well as focus on more severe cases who need special attention. According to statistics, there are on average eleven visits of a health practitioner in a year. For example, the average by Czech Republic's neighbor Austria there are on average only seven visits a year [18]. People can however see as many specialists as they wish, there is no limitation on seeking different specialists like dermatologists. In Czech Republic there is no digital system card with all information about the patients all information about the patient health condition and history are on paper based in the computer of the health practitioner. That is why the system needs a person to register to their own health practitioner who has all information about past health history.

4. RESULTS AND DISCUSSION

Dietary Habits

Czech Republic is not such a fast-consuming country as Taiwan. Going to restaurant is very costly in comparison to cooking by oneself. Especially for a family restaurant visit is limited for special occasions. The awareness of a quality food is also increasing and people do consider the importance of knowing what the food has been prepared from. Social structures shape individual perceptions and practices through habits [19]. However, Czech is among the top European countries suffering from obesity. As outlined in Figure 21 Czech Republic together with eastern countries suffer obesity in comparison with Western Europe the most [20].

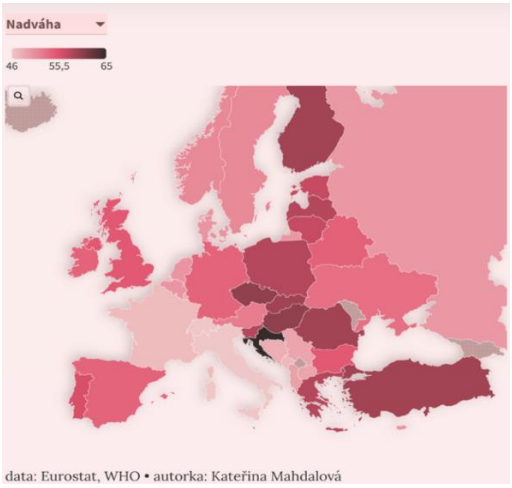


Figure 21. Obesity in Europe

Men more than women do suffer from obesity. This is given the different focus of both sexes on the healthiness of food. For Czech population the main holiday remains to be Christmas celebration. During this holiday, the average citizen prepares baked confectionery in advance and for the Christmas dinner plenty dishes are prepared and served by the household. Easter holidays are also considered as very important holiday with plenty of traditional food with family gathering. The study demonstrates major differences and common traits between the healthcare systems and accessibility options and cultural elements and dietary patterns of Taiwan and the Czech Republic, which provides essential information about how demographic and geographic and cultural factors influence public health strategy development. Both nations face challenges related to aging populations, though the pace and demographic dynamics differ. The rapidly increasing elderly population in Taiwan has created additional pressures on medical facilities which results in greater need for healthcare services and medical spending. In contrast to the Czech Republic, which experiences slower population growth combined with rising birth rates, the country will experience less urgent demands on its medical system. Taiwan and the Czech Republic differ in their methods for healthcare access yet both countries provide their citizens with healthcare access. In Taiwan, all educational institutions and workplaces require preventive health examinations because the society follows a collective cultural norm. The complete health examinations, which include chest X-rays and serological tests, assist in discovering health problems at an early stage but they create a situation where healthcare workers must handle excessive patient loads. The Czech Republic requires its citizens to undergo optional preventive health examinations. The current effort to decrease bureaucracy through the removal of compulsory health assessments for all administrative positions which do not involve health risks shows that people must take responsibility for their own health. The decentralized system differs from Taiwan's collective health system because it creates missing links for early sickness detection. The two nations' health outcomes depend on their citizens' dietary practices. The fast-paced urban lifestyle in Taiwan has resulted in increased obesity rates because people choose to eat from restaurants and fast food establishments. Urban areas face a food consumption problem because traditional festivals encourage people to eat too much food and many residents lack cooking facilities. The Czech Republic depends less on restaurants for food but it experiences the same difficulties as other countries do. The country maintains a high obesity rate which ranks among the highest in Europe despite increased public knowledge about proper nutrition. Christmas and Easter holiday meals continue to promote dietary habits that consume excessive calories. People in the United States prefer to prepare food at home yet they tend to make comfort food which creates obstacles for controlling their weight.

Comparative Strengths and Weaknesses

The healthcare system in Taiwan provides medical services to all citizens at affordable prices. The system operates with inefficient processes because it lacks a referral system which results in heightened physician stress. The Czech Republic's gatekeeper system restricts fast patient access yet it creates equal work distribution for doctors while building better connections between patients and their doctors. People protect their health through preventive medical methods which depend on their cultural background. The system in Taiwan which promotes health check participation through its collectivist approach creates efficiency problems through its operational structure. The Czech Republic promotes personal responsibility because that approach matches its need for less government intervention although this method decreases public health screening participation. You're eating patterns show the cultural distinctions which exist between different ways people interact and consume food. Taiwan and the Czech Republic face obesity problems because their urban lifestyle is different from the Czech Republic's tradition of preparing meals at home. The existing dietary issues require specific public health initiatives which will encourage people to adopt better eating habits while combating the increasing obesity health crisis.

5. CONCLUSION

This paper analysis gave insight about the healthcare between Taiwan and Czech Republic based on different cultural habits. Four dimensions have been analyzed in both countries. The accessibility,

Difference between individualistic and collectivistic approach seeking of healthcare and food culture.

Healthcare is widely accessible in Taiwan. The hospital care is available in the most densely populated areas, in the North, West and South. The hospitals in Taipei city are situated on the main communication rounds giving a good accessibility for the citizen to approach hospitals when needed. Taiwan as a collectivistic society has many mandatory examinations which are to be consumed in a collectivistic manner, such as at schools and during employment. With no existing referral program on seeking medical professional patients are giving the necessary freedom in choosing their own health professional which gives a pressure on already stretched medical health professionals. Food culture in Taiwan is widespread as food is considered as a social activity with many gatherings involved. The main holiday includes the Lunar New Year, Dragon Boat Festival and Mid-Autumn Festival.

The healthcare in Czech Republic is accessible for the population. The density of hospital care follows the density of population within the country. Most of the hospitals are concentrated in the capital city, followed by the North-East region and the South region. By analyzing the hospitals in the capital city there is a difference in distribution of hospital care compared to Taiwan.

The hospitals are mostly concentrated in the middle of the city, whereas the population is concentrated on the outskirt. This leads to the fact that the hospitals are accessible but are concentrated further away from densely populated areas. The location of hospitals goes back to the history with the oldest one as far as 15th century. Given, that hospitals offer limited outpatients service the accessibility of hospitals is sufficient for serious cases. In Czech Republic there are mandatory examinations, but it is up to the individual to seek them by themselves. The mandatory employment examinations for most of the ordinary citizens are also to be eliminated to lessen the bureaucracy of the state. The main holidays for Czech Republic are Christmas and Easter holidays.

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Author Contributions Statement

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Nicole Engelbrechtova	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	

C: **C**onceptualization
M: **M**ethodology
So: **So**ftware
Va: **Va**lidation
Fo: **Fo**rmal analysis
I: **I**nvestigation
R: Resources
D: Data Curation
O: Writing- **O**riginal Draft
E: Writing- Review& **E**diting
Vi: **Vi**sualization
Su: **Su**pervision
P: **P**roject administration
Fu: Funding acquisition

Conflict of Interest Statement

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Informed Consent

All participants were informed about the purpose of the study, and their voluntary consent was obtained prior to data collection.

Ethical Approval

The study was conducted in compliance with the ethical principles outlined in the Declaration of Helsinki and approved by the relevant institutional authorities.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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