



## The Influence of the Silk Road on Dunhuang's Economic Development Stephanie Nie

### Abstract

Major cities are often located near water as coastlines allow for trade and transportation to be effective, assisting the economic growth of that city and its nearby region. It is commonly believed that cities and/or areas far from a major water source, like lakes, rivers, or oceans, are not adequate enough to allow for significant developments. Yet, there is an inland city in northwestern China that seems to defy this supposition: Dunhuang. Being at the intersection of what was an important Silk Road trade route that was established in 130 B.C. and remained in use until 1453 A.D. when trade shifted from land to water has helped this city thrive in the arid desert region. Therefore, a question is raised: how does the legacy of this ancient trade route shape a modern regional economy? Through analyzing past research done by experts, conducting surveys and field experiments to obtain first-hand data, and compiling lists of data traced both online and from books in Dunhuang Academy's libraries, this paper aims to explore the economic development of Dunhuang through Trade, Cultural Exchange, and Tourism. Of which, trade and cultural exchange focus solely on the past, while tourism focuses on the trend of the number of visitors before and after a milestone. Survey findings show that Dunhuang's visitors are mostly Mainland Chinese adults over 22, and its economy relies heavily on domestic tourism. In response to Dunhuang's growing popularity, digital exhibitions should be used to preserve and promote Dunhuang's cultural heritage for future generations.

Key words: Dunhuang, Silk Road, Mogao Grottoes, Economics, Development

### I. Introduction

The Silk Road was an ancient web of trade routes that stretched across Asia, the Middle East, and parts of Europe, playing a crucial role in linking various cultures from the East and the West and enabling the exchange of goods, ideas, and technologies. It all began in China during the Han Dynasty (around the 2nd century BCE.) This extensive and intricate system not only allowed for the transport of valuable and tangible items like silk, spices, tea, and precious metals but also served as a bridge for cultural and economic development that came later, encouraging interactions among different civilizations. The sharing of religious beliefs, artistic styles, and scientific knowledge was just as important as the trade itself, leaving a lasting impact on the societies it connected. One of the most notable examples of the cultural exchanges along the Silk Road is the Dunhuang Mogao Grottoes in northwestern China. Discovered in the early 20th century, these ancient Buddhist cave temples are famous for their detailed wall paintings, sculptures, and manuscripts, which showcase over a thousand years of artistic and religious history. Carved into the cliffs along the ancient route, the grottoes were a key center for Buddhist worship, pilgrimage, and scholarship, reflecting the region's rich cultural and spiritual diversity.



As a site of great historical significance, the Mogao Grottoes offer invaluable insights into the interplay of trade, religion, and art. This essay aims to explore which factors influenced Dunhuang's economy, and at which times. By looking at the economic development of the Silk Road through the lens of cultural heritage, like the Mogao Grottoes, we gain a unique perspective on how commerce and culture are intertwined. Studying the ways in which art and cultural exchange spurred economic growth helps scholars better grasp the broader dynamics of trade, identity, and power. This interdisciplinary approach enhances both economic and art history, providing a more holistic view of the past and its enduring impact on global development. The paper is organized in the following manner. Section 2 reviews the literature; section 3 is on the influence of trade, which is the main driver of the earliest economic development of Dunhuang due to the existence and flourishing of the Silk Road; section 4 explores the influence of cultural exchange; section 5 looks at how tourism influences the economic development of Dunhuang nowadays; section 6 displays and analyzes the first-hand results obtained from the surveys; finally, section 7 summarizes the findings and conclusions.

## II. Literature Review

Various scholars have identified that the cultural and artistic transaction that occurred on the Silk Road played a large part in Dunhuang's economic development, largely shaping the ancient city into a modern tourist destination and world heritage.

### 2.1 Economic History of the Silk Road

Research has highlighted how the caravan routes of the Silk Road facilitated not only the movement of goods but also the dissemination of cultural and religious influences across Asia, the Middle East, and Europe. According to historian and author Alfred Andrea, the Silk Road's significance lay in its role as a conduit for trade, allowing merchants to transport valuable commodities<sup>1</sup>. However, the flow of goods was just one aspect of the exchange. Professor Peter Frankopan of Oxford University noted in the preface of his book *The Silk Roads: A New History of the World*, that "[t]he Silk Roads functioned as the world's central nervous system, hidden beneath the skin of continents," visualizing the scale of the importance of the Silk Road<sup>2</sup>. This legendary trade route also enabled the spread of religions such as Buddhism, Islam, and Christianity, along with art, language, and scientific knowledge. Merchants, often acting as intermediaries between different civilizations, were central to this exchange. They facilitated trade and introduced new economic practices and commodities to distant lands, helping establish rudimentary economic linkages that would later grow many times in scale. The economic networks created along the Silk Road were foundational to the development of urban centers that flourished due to their strategic positions along the routes. The movement of goods and people created economic interdependence, as well as opportunities for local economies to engage in cross-cultural commerce. These economic linkages were instrumental in shaping the prosperity of regions such as Dunhuang, which lay at a critical crossroad between the Eastern and Western parts of the Silk Road.

## 2.2 Art History of Dunhuang Mogao Grottoes and Western Expansion

As a UNESCO World Heritage site — since 1987 — and one of the most significant artistic and cultural monuments on the Silk Road, a great deal of in-depth research has been done on murals, sculptures, and manuscripts well-preserved in the Dunhuang Mogao Grottoes. All those murals, sculptures, and manuscripts illustrate the rich cultural exchanges between East and West. The importance of Dunhuang as a trading post and cultural hub for art to flourish is established by its great capacity, hosting “735 caves, over 50,000 square meters of murals, and approximately 2,415 colorful sculptures”<sup>3</sup>. These works, which document the fusion of different art traditions, including Indian, Persian, and Chinese influences, not only provide spiritual and aesthetic nourishment but also reflect the cultural exchanges that occurred on the Silk Road. According to the book *Studies of the Silk Road and the Societies and Economy of Northwest China*, out of all the grottoes, twelve caves hold a total of fifteen murals that directly show the scenes of commerce<sup>4</sup>. But the true dimensions of Dunhuang’s economic and historical importance did not receive a complete appreciation in the West until the early 20th century, largely at the hands of pioneering archaeologists and explorers like Sir Aurel Stein and Paul Pelliot. Stein’s expeditions (in the years 1907 and 1914), in particular, brought global focus to the Mogao Caves after he bought thousands of scriptures, documents and paintings for cheap from local Taoist Wang Yuanlu using “the accurate record of travel left by the Chinese Buddhist Pilgrim Hsu’an-tsang.”<sup>5</sup>. In the same way, Paul Pelliot’s 1908 research, such as the identification of major texts and artifacts, served to bring attention to the position of Dunhuang as a cultural and economic crossroads. These efforts not only expanded Western knowledge of the region but also reinforced Dunhuang’s significance as a thriving Silk Road center.

## 2.3 Influences on Development

### 2.3.1 The Influence of Trade

Economically, Dunhuang thrived as a vital node in the Silk Road’s network. Its position between the Gobi Desert and the Taklamakan Desert forced caravans to pass through the city, making it a center for businesses. Goods such as silk, coral, spices, jade, paper, glass, textiles, Mongolian weapons, and Korean cotton, recorded in the book *Jiuquan Commerce History*, flowed through Dunhuang, enriching local merchants and attracting traders to and from Central Asia, Persia, India, and beyond<sup>6</sup>. Yet, the Silk Road was not only a trade route, it was the foundation for the earliest wave of globalization in human history. This vast network of commercial exchange brought unprecedented levels of interaction between East and West. Trade transformed the city from a remote frontier settlement into a prosperous economic center by fostering cross-regional exchange of goods, capital, and commercial practices. The wealth generated by trade funded infrastructure projects, including caravansary, temples, and water management systems, ensuring the city’s prosperity and ability to house tens of thousands of people’s businesses. The book *Jiuquan Commerce History* also details trade activities in the Dunhuang region; author Sun et al. stated that there were approximately 20 caravansaries

scattered around Dunhuang at around 750 A.D., which was when the Tang dynasty was at its peak<sup>6</sup>. Historian Valerie Hansen notes that Dunhuang's markets "served as cultural clearinghouses where people bartered not only goods but also languages, religions, and technologies"<sup>7</sup>. This economic vitality also attracted imperial patronage; during the Han (206 BCE–220 CE) and Tang (618–907 CE) dynasties, Dunhuang was fortified and administered as a military outpost, securing its role in China's territorial expansion westward. The military's settlement meant that transportation and infrastructure projects were taken into action, ensuring that traveling in the desert becomes more convenient and accessible. As a result, "Dunhuang was [also] a town of military importance." Apart from acting as a critical trading point, China's control over the Hexi Corridor, a narrow passage linking China to Central Asia, allowed successive Chinese dynasties to levy taxes on passing merchants. Hansen says that the Han Dynasty fortified Dunhuang as part of its "frontier defense strategy," transforming it into an administrative and commercial hub.

### **2.3.2 The Influence of Cultural Exchange**

For Dunhuang, the Silk Road was not just a trade route, but an engine of culture and economic accretion. The Mogao Caves became a magnet that attracted religious travelers and patrons. This cultural dynamism also contributed to Dunhuang's significance in regional and international trade. The ability of local elites and traders to communicate in multiple languages and navigate various religious and cultural norms made Dunhuang an ideal place for mediating trade between different countries and continents. Cultural fluency thus translated directly into economic advantage. The city became a repository of multilingual texts, a center for translation, and a model of cultural pluralism—all of which reinforced its importance along the Silk Road and attracted further economic investment. Silk, spices, precious stones, and foods were just the tangible objects brought to Dunhuang. Concepts and ideas like religion, technologies, artistic traditions, and languages were also introduced to Asia by traders, merchants, and pilgrims. Multilingual manuscripts, which hold the knowledge and intelligence of scholars from both the East and the West, were found in several languages including Chinese, Tibetan, Sogdian, Khotan, Uighur and even Hebrew<sup>8</sup>. This phenomenon not only "served as the lifeblood of the ancient Silk Road, establishing it as an extremely influential network of cross-continental trade," but also provided the basis for the city's future development into the tourism site that it has become<sup>9</sup>. Dunhuang's economic rise was primarily a result of the development of Buddhist culture, which was made possible by the circulation of intellectuals through the rest of the world along the Silk Road.

### **2.3.3 The Influence of Tourism**

Over the years, Dunhuang has transformed from a trading point to one of the most popular tourism sites in China as the modern world discovers the city's rich culture and value, making it a magnet for domestic and international tourists. In December 1987, the Mogao Caves were officially inscribed as a UNESCO World Heritage Site, which served as a milestone that

increased revenues, elevated Dunhuang's global profile, and attracted both domestic and international tourists. Between 1998 and 2004, three renowned institutes devised a "Master Plan for the Conservation of the Mogao Caves at Dunhuang (2006-2025)." This plan included binding conditions of efforts to conserve the caves and their surrounding environment with daily maintenance work<sup>10</sup>. Given the remote position of the city, the Chinese government has been prioritizing the restoration of Mogao Caves since the 1960s. Key actions include reinforcing collapsing cliff faces, repairing murals, and stabilizing cave structure, ensuring the safety of tourists and scholars. 354 caves and 576 meters of cliffs were reinforced using advanced engineering techniques<sup>11</sup>. Later, in 2006, other Silk Road sites near Dunhuang, such as the Yumen Pass, Suoyang City, Xuanquan Posthouse, were added to UNESCO's list, creating a cohesive "Silk Road corridor" for tourism. Apart from preserving the caves to ensure the safety of visitors and the artifacts, foreign tourism promotion of Dunhuang was established by the Foreign Affairs Office and International Travel Agency in 1980 to cater to foreign tourists and researchers, who dominated early visitor demographics<sup>12</sup>. These promotions align with China's broader strategy to develop year-round tourism in Gansu province, leveraging Dunhuang's historical significance to stimulate local businesses, hospitality, and artisanal markets. Recent initiatives, such as free entry to major attractions (e.g., Mingsha Mountain and Yumen Pass) and discounts on Mogao Caves' tickets during winter (Dec 2024-Feb 2025), have significantly boosted visitor numbers and revenue<sup>13</sup>. In addition, Dunhuang's tourism revival has positioned it as a global cultural hub. Events such as the 2024 Dunhuang Forum emphasize the preservation of intangible heritage and attract scholars, artists, and diplomats. The 2025 Dunhuang Expo in Shanghai promoted partnerships to advance the "Greater Dunhuang Cultural and Tourism Economic Zone", blending ancient Silk Road history with modern innovation. Yet, today's bustling tourist attractions, like the Singing Sand Dunes, Crescent Moon Spring, and most importantly the Mogao Caves which house up to 2415 sculptures, are set on the foundation of past efforts done to spur local tourism<sup>14</sup>. Apart from boosting the local economy and increasing popularity to northwestern China, tourism has driven efforts to protect and showcase Dunhuang's Silk Road relics. Such initiatives reinforce Dunhuang's role in the bridge between eastern and western civilizations, much like its historical function as a Silk Road crossroads.

Year	Number of Total Visits (thousands)	Number of Foreign Visits (thousands)	Number of Domestic Visits (thousands)
1980	22.6	2.3	20.3
1985	92.0	15.6	76.4
1988*	303.7	31.0	272.7
1989	220.0	12.1	207.9
1990	338.8	23.1	315.7



1991	400.0	34.0	366.0
1992	450.0	38.0	412.0
1993	480.0	37.0	443.0
1994	440.7	37.0	403.7
1995	450.0	32.0	418.0
1996	500.0	36.4	463.6
1997	507.0	34.0	473.0
1998	524.6	40.6	484.0
1999	530.0	52.8	477.2
2000	603.5	75.0	528.5
2001	610.0	68.0	542.0
2002	580.0	61.0	519.0
2003	500.0	20.0	480.0
2004	820.0	61.0	759.0
2005	1002.0	79.0	923.0
2006	1201.0	69.0	1132.0
2007	1403.5	90.4	1313.1
2008	920.0	35.8	884.2
2009	1200.0	22.2	1177.8
2010	1510.0	31.0	1479.0
2011	2090.0	57.8	2032.7
2012**	3120.4	73.1	3047.3
2013 <sup>15</sup>	4020.0	N/A	N/A
2014 <sup>16</sup>	5070.0	N/A	N/A
2015 <sup>16</sup>	6603.9	N/A	N/A
2016 <sup>17</sup>	8010.0	N/A	N/A
2017 <sup>18</sup>	9004.5	45.3	8959.2
2018 <sup>18</sup>	10773.0	70.5	10702.5
2019 <sup>19</sup>	13373.3	66.9	13306.4
2020 <sup>20</sup>	6584.4	7.6	6576.8
2021 <sup>21</sup>	10243.0	N/A	N/A
2022 <sup>21</sup>	3193.1	N/A	N/A
2023 <sup>21</sup>	16829.3	N/A	N/A
2024 <sup>22</sup>	20920.4	N/A	N/A

Table 1: Number of visits to Dunhuang from 1980, 1985, 1988-2024



Source: Tourism Market Analysis Report (2013)<sup>23</sup>

\*Before 1988 the Chinese government only compiled data for 1980 and 1985

\*\* Tourism Market Analysis Report (2013) only covers data until 2012

### **2.3.4 Tourism Fluctuation Analysis**

A three-time increase in number of visits in 1988 compared to that of 1985 is likely the result of the Mogao Grottoes being listed as a UNESCO World Heritage in December 1987. The drastic drop in number of visits from 2002 to 2003 was because of a pandemic in China. Still, when Dunhuang launched direct flights to and from Beijing, the numbers grew significantly as the city became accessible to travelers from relatively developed areas in China. In 2008, however, the number of visits dropped yet again, but this time due to three major influences: the 2008 Beijing Olympics, the devastating Wenchuan Earthquake, and the Great Financial Crisis; the latter mostly affected the number of foreign visits. At the start of the pandemic, in 2020, the number of visits dropped by 50.76% compared to the previous year. The most recent drop in visits is the 2022 Coronavirus lockdown, where strict pandemic regulations were implemented throughout China.

## **III. Methods**

Throughout the paper, facts and numerical data were taken from relevant articles and past research papers both online and in books. Surveys were sent out and field experiments were done at the Mogao Grottoes and responses have been collected, documented, and used in this paper.

## **IV. Results**

The responses from field experiments and surveys show consistency with data from official sources done by the government and professors in Dunhuang Academy.

### **4.1 Surveys**

In the first part of this section, the paper provides details about how the survey was developed and administered. Then an outline of the survey results can be found in the second part. Two versions of the survey were created, one in Chinese Mandarin and one in English.

### **4.2 Survey Development and Administration**

To better understand the influence of Dunhuang as an economic catalyst, a Microsoft Forms survey was developed. Most of the questions in the survey are multiple choice. This is done to save time for survey takers, as they may end up being reluctant to spend too long on this and make up inaccurate responses. The first section of the survey requires respondents to fill in their basic information, that is, where they grew up, their age, how many times they've been to Dunhuang, how influential Dunhuang was, and what attracted them to Dunhuang. The purpose of having respondents' basic information is to get an idea of what types of people are likely to

visit Dunhuang and why, as this could be influenced by where they grew up and their age. Next, cultural, economic, and religious importance in Dunhuang's development were explored by including questions that ask for the opinions of respondents based on their experience in Dunhuang. For more valid results, only those who have been to Dunhuang answered these questions. Finally, a section for suggestions on respondents' visit to Dunhuang was included and much feedback was received, such as how their experience has been different during different visits and which parts of their trip was the most interesting.

### 4.3 Survey Finding Analysis

Three weeks after sending out the survey, 177 responses were obtained. Most of the respondents took the Chinese version of the survey. A translation of the responses from Chinese to English was done so that the results can be accurately and collectively compiled. Future researchers are encouraged to leverage this tool when administering surveys in different languages. Then responses for the English version (27) and the Chinese version (150) were aggregated. After excluding the responses from people who have never been to Dunhuang, the rest of the data was made into a compilation from the different questions and diagrams were created to help with visualizing the proportions of respondents' choices.

As shown in Figure 1, 45 of 177 survey takers have been to Dunhuang, making up 25.4% of the total respondents. Of which, 24.3% have been to Dunhuang once or twice, and 1.1% have been to Dunhuang three or four times. The rest of the responses and diagrams will be focused on those who have been to Dunhuang.

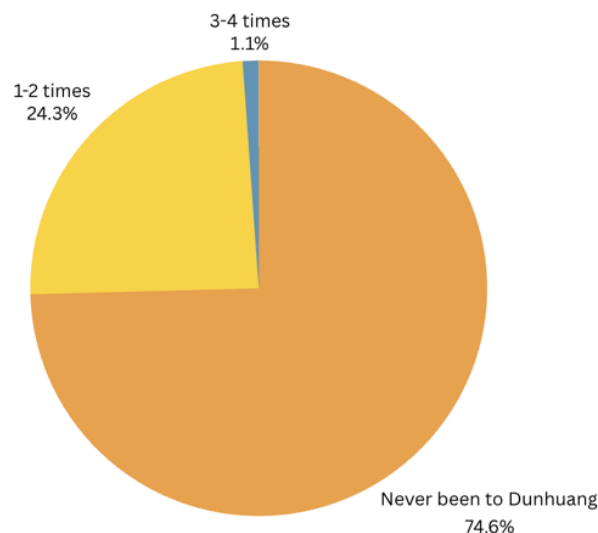


Figure 1: Number of visits based on all survey takers



According to Figure 2, it can be seen that most respondents are above the age of 22, suggesting that Dunhuang typically attracts adults instead of children. However, as the responses were filled in by mostly adults, this could have resulted in skewed proportions of results. Also, as it is less common for those under the age of 18 to travel alone, this could be a reason why there are more adult respondents.

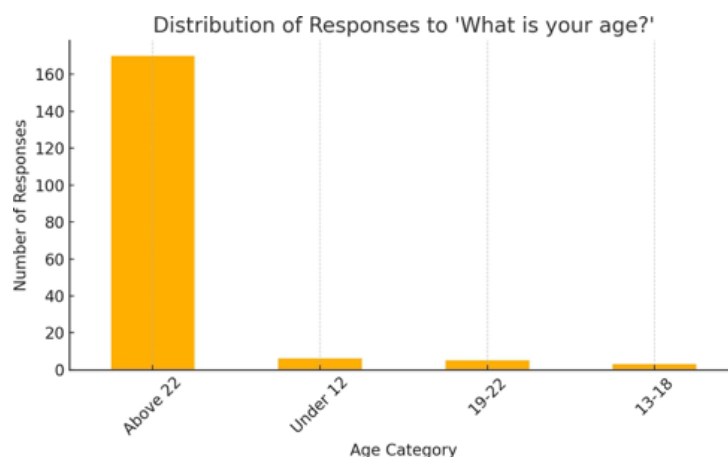


Figure 2: Age distribution of survey takers

Figure 3 displays what attracted those respondents to Dunhuang. The four choices are Dunhuang's cultural background, natural scenery, social media, and recommendation from others. Based on the bar chart, 40 survey takers were attracted to Dunhuang by its cultural background, further strengthening the previous point that Dunhuang's rich culture is one of the biggest reasons for its economic development. Note that the respondents may choose more than one tourist attraction so the total number on the diagram is more than 45.

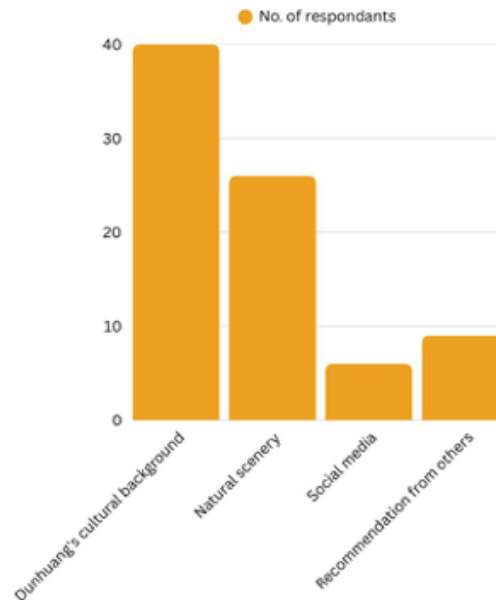


Figure 3: Attractions in Dunhuang

After knowing what attracted Dunhuang's tourists, we wanted to know how influential Dunhuang was to them. Figure 4 shows that most visitors think going to Dunhuang has been a very influential experience, allowing them to know more about the product of an exceptional cross-cultural connection. Different levels of influence could be determined by different individual's experiences and activities they participated in.

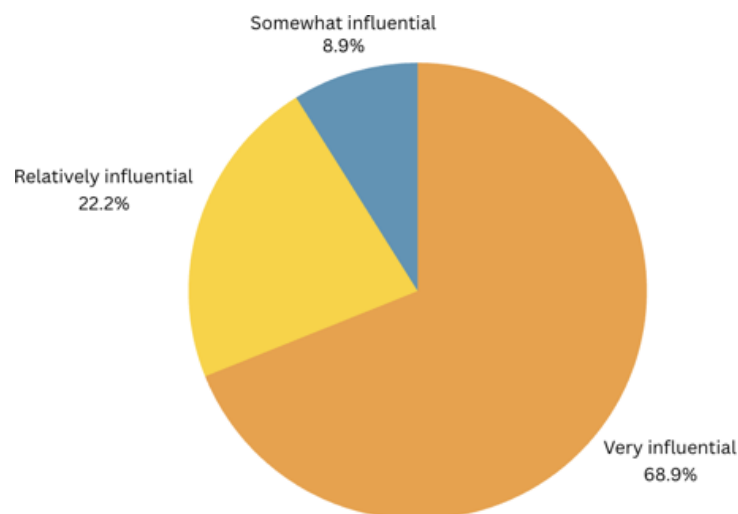


Figure 4: How influential Dunhuang was to survey takers

As cultural exchange on the Silk Road played a large part in the prosperity of Dunhuang, the survey started off with questions relating to how important respondents think cultural diversity is

to this city. The more diverse the culture is, the more it should be reflected off the caves and the artifacts. As shown in Figure 5, 81% of respondents believe that cultural diversity is very important to Dunhuang, suggesting that this diversity, which is reflected off the designs of the sculptures, murals, infrastructure, and content in the manuscripts, left approving memories to the respondents.

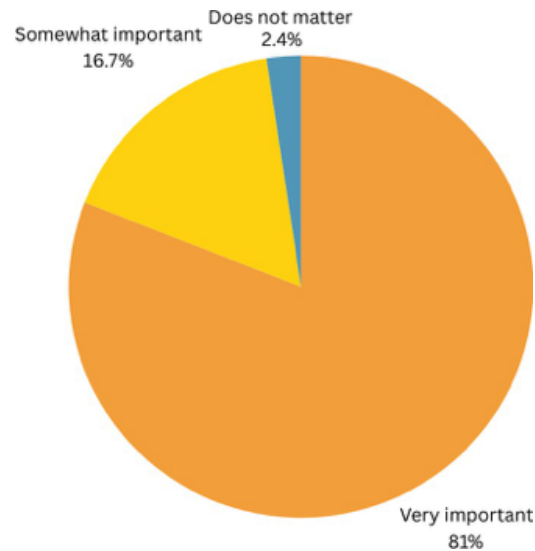


Figure 5: How important is cultural diversity to Dunhuang

Every respondent in Figure 6 recognizes that protection and preservation of the Mogao Grottoes is essential, as shown by the sizable number of respondents who chose very important as the response to the question “is the protection of Mogao Grottoes important?”

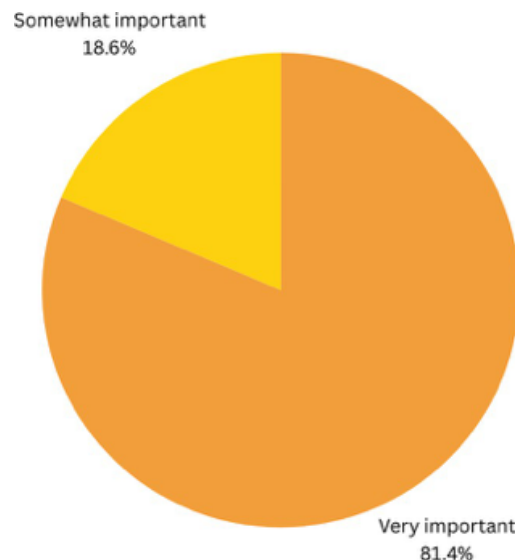


Figure 6: Is protecting the Mogao Grottoes important to Dunhuang's economy

To gain a better understanding of Dunhuang's economy in modern times, a question that asks for the expenditure of respondents per day is included, which is shown in Figure 7. According to the results, well over half the respondents spent within ¥100 to ¥500, suggesting that Dunhuang's commodities and facilities are quite costly within its province, but relatively affordable compared to more developed areas in China. However, respondents may have included their transportation fees on some days, so actual costs spent on Dunhuang's sites and services itself may be lower.

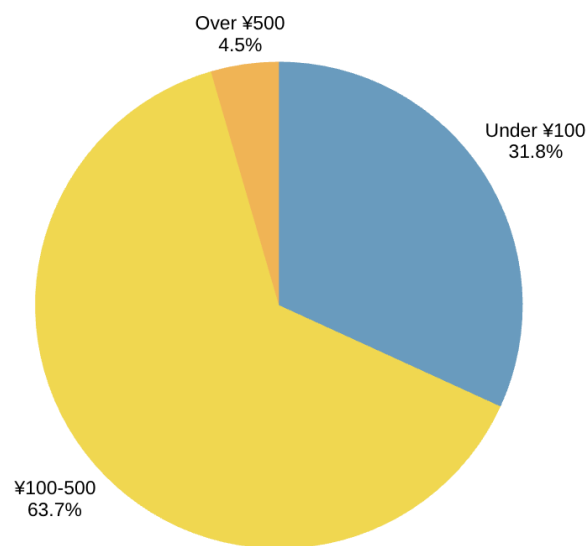


Figure 7: How much survey takers spent every day

Finally, an analysis on the third aspect of the survey, religion, was done. Figure 8 suggests that only just below half of the respondents believe that religion has been helpful in shaping Dunhuang's development. Although why the respondents chose their answer to this question is unclear, there is a chance that those who chose barely helpful may be the ones who came to Dunhuang for the natural scenery and performances. Some may be discouraged by queuing and climbing stone steps to see the few caves open to the public.

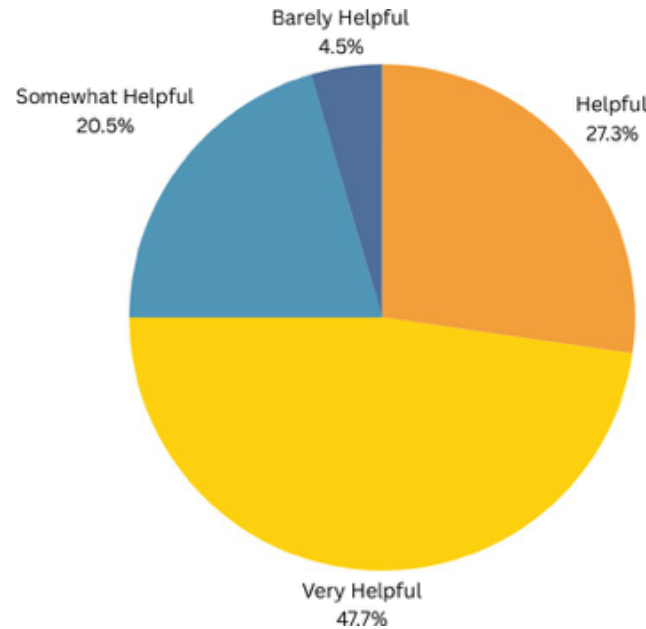


Figure 8: How helpful has religion been in shaping Dunhuang's economic development?

## V. Discussions and Conclusions

Below are the key findings and conclusions of after data have been compiled from the survey results:

1. According to the table of number of visits to Dunhuang each year, a substantial increase in popularity of the Mogao Grottoes, defined by the surge in number of visits, can be seen after being recognized as a UNESCO World Heritage Site. This title likely boosted Dunhuang and the Mogao Grottoes' renown within China and across the world, leading to a general upward trend in the number of visits.
2. The age group with the highest number of respondents who have been to Dunhuang are adults above the age of 22. This suggests that Dunhuang is not, or only rarely known to the younger generation.
3. Another factor that skewed the data for people who have been to Dunhuang was where they grew up; most of the respondents who have been to Dunhuang are the ones who grew up in Mainland China. With fear of losing the succession of Dunhuang's culture and history, this research paper was written to give a better understanding of how people see Dunhuang and what improvements can be made based on the open-ended questions in the survey.
4. Results on expenditure indicate that Dunhuang's economic development is largely based on the expenditure of Mainland Chinese adult tourists who likely came for either the views or have seen advertisements of Dunhuang on Chinese online platforms. Therefore it can be interpreted that despite the fact that Dunhuang used to be a cultural hub of a mixture of Western and Eastern culture, this city nowadays is very much sustained by

Chinese tourists, with the exceptions being scholars and few interested international tourists.

5. Cultural diversity, protection of grottoes, and religious influences are all largely influential to visitors, displaying the scale and continuity of the richness and diversity of the Dunhuang region during the time of the Silk Road.
6. The majority of respondents believe cultural diversity, religion and protection and preservation of the Mogao Grottoes has been and will continue to be highly essential and beneficial for Dunhuang and its economy.
7. The average daily expenditure in Dunhuang is between ¥100 to ¥500 (around \$13 to \$70). These values may be higher at the Mogao Grottoes' park area and other tourist attractions like the Singing Sand Dunes and Crescent Moon Spring; expenditure will likely be lower for other areas of Dunhuang.

In general, this study explores the various factors that shaped Dunhuang into the city it is today. Despite being lost for many decades, Dunhuang's Mogao Caves are now listed as one of UNESCO's World Heritage Sites and as one of the main projects the Chinese government will focus on. Considering the vulnerable state of the grottoes, the number of visits has been controlled for the protection of the caves and the artifacts since observing an upward trend of the number of visits from 1988 onwards. For Dunhuang to reach a wider range of audience without increasing the rate of the caves' deterioration, digital exhibitions and Dunhuang-themed merchandise may be the solution to future promotion and development. After all, it is hopeful that this impeccable legacy that carries the knowledge of centuries of scholars may continue to be preserved and studied for future generations.

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