

The Effects of Transportation Infrastructure for Trade Development in Han China in the Early Silk Road

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Abstract: In light of the rapid globalization and trade development of Han China, the dynasty experienced unprecedented levels of expansion and economic prosperity. This article traces vital aspects of development through the historic accounts of transportation infrastructure across of China, namely the substantial manuscripts found at the Xuanquan Dunhuang postal station. Han China found that in order to increase international relations, there were key components that needed to be ameliorated – capacity of travel and proliferation of foreign commodities. At the same time, the empire needed to account for the spread of autonomous regions due to the regional expansion, meaning effective communication and a proficient network remained vital in maintaining the integrity of the empire. The resulting solution came to be the investments in the development of transportation infrastructure along the borders of China.

Keywords: transportation infrastructure, Han China, trade, economic growth, proliferation

1. Introduction

The Silk Road, spanning across the majestic dunes of the Taklamakan Desert to the grassy plains of Mongolia, connected the majority of Eurasia, both metaphorically and physically, for over 1500 years. This intricate system of trading routes allowed for the proliferation of information, new technology, spices, and most notably: Chinese silk. Modern knowledge regarding Ancient China's involvement in Silk Road trading largely relies on information recorded by the official Chinese dynastic histories, *Shiji*, *Hanshu*, and *Hou Hanshu*. Yet the politically influenced nature of these documents is predominantly written by Chinese court historians, which means that an unbiased depiction of the Ancient Chinese trading landscape does not exist. Most notably, historical accounts have shed little light on the transportation used by envoys and merchants, as well as the foreign and domestic commodities traded along the ancient silk road trading routes [1]. Information regarding Chinese frontier borders, facilitating the governance and protection of the Chinese population, as well as the daily routine of government officials or simple civilians, are all vital yet absent information critical to China's trade and economic development.

However, the surge in European archaeological expeditions, especially of ancient Chinese frontier sites, has since resulted in the resurfacing of many ancient Chinese manuscripts [2]. These documents revealed fragments of coveted information about life outside of the capital, or more specifically, the daily trading routine along the frontier borders of China. These frontiers are the essential management of foreign migration and relations between China and the neighboring regions. Of the most successful,

an expedition lasting from 1990 to 1992, led to the excavation of 23,000 wooden slips, hundreds of fragments of silk, and paper pieces, all of which were Han official documents. These artifacts were found at a Han postal relay station named Xuanquan, located at a diplomatic and trading route between China and Central Asia near Dunhuang [1]. Despite the empire-wide elite culture Han China exhibited, with a short populous being able to read and write, the manuscripts excavated surprisingly hosted a diverse range of texts in terms of social class and literacy levels, from military biographies to local school teachers and textbooks. The Xuanquan site and the excavated texts have since been studied by the Gansu Provincial Institute of Cultural Relics and Archaeology, yielding potent evidence on the social and historical environment of the area.

This paper aims to examine the impact of transportation infrastructure on the economic development of Han China through the Silk Road, with a particular interest in the excavated Xuanquan and Dunhuang manuscripts. This impact will be measured and discussed in regard to travel infrastructure's effect on the spread of new information and technologies, the efficiency and increased accessibility of Silk Road travel, and the widened variety of items being proliferated on the Silk Road. The specific period to be discussed is 111 B.C. to 107 C.E, a time of peak activity within the known transportation infrastructures and the period to which the aforementioned manuscripts date back. The period of interest also occurs within the wider backdrop of the Han dynasty (206 B.C.-220 A.D.) and even the brief Xin Dynasty (9 C.E. - 23 C.E.). During this period, the discovery of foreign countries previously unknown to China led to an influx in intergovernmental relations and economic reforms, simultaneously bringing unprecedented prosperity to China and the constituencies of the Silk Road [3].

According to the Xuanquan manuscripts, there were numerous classifications of transportation infrastructure, including usage as a postal and relay station, military site, and more. Depending on the specific context in the transportation infrastructure discussed in, it may be referred to as these other classifications.

2. Recorded Benefits of Transportation Infrastructure

2.1. Efficient Travel and Longer Distance Covered

The development of transportation infrastructure was essential in increasing the distance that traders were able to travel in one journey, as well as the quality of life and efficiency throughout the arduous process of traversing the Silk Road. Through the employment of military force in the year 111 B.C.E, Han China was able to take control of the Gansu Corridor, a route that stretched across barren deserts to the Qilian mountains, the then-natural border of China. This newly acquired route was integral to trade development, allowing China to gain direct access to Central Asia [4]. The Xuanquan manuscripts reference the quick colonization of the region, in which the large-scale relocation and forced immigration of the people of the Central Plains occurred. Within the Dunhuang Prefecture, essentially a district under the administration of the Dunhuang governor, two counties were established: one further east and one further west, named Guangzhi and Xiaogu respectively. These counties became the core connective locations to the wider Central Asia, serving as vital assets to the Han government. However, due to the long distance separating these counties, it was imperative for the Han government to develop an efficient and safe system of transportation. Xuanquan was an example of such an initiative, allowing for cross-county trading services to harness the economic promise of the Gansu Corridor [1].

The governmental assistance in developing these transportation means and infrastructure was essential in ensuring swift completion and constant modifications to maximize efficiency, as highlighted in the Xuanquan manuscripts. Of the published manuscripts, several references the management of relay horses and carts at Xuanquan, resources which were often provided by the local

government. The 3 large stables found at the Xuanquan station itself show the degree of the investments made by the Han government to preserve the transportation infrastructure and its quality [1]. A manuscript dated back to 23 B.C. provides detailed reports on the conditions in which the carts were kept and whether there existed any broken parts. The heavy emphasis on the usability of the carts implies their frequent usage and their importance in regard to Silk Road travel. One specific example of such transportation modes being employed was recorded in 18 B.C.E, where Guzhi, the Vice-Envoy of the King of Shanshan, and Niaobuzhuan, Vice-Envoy of the King of Shan, were “provided with a cart driven by four horses” to carry tribute goods into Dunhuang [1].

The Gansu corridor’s long stretch was also accommodated by the transportation infrastructure, with many being able to provide sufficient resources to act as a resting point. This is shown through food records, whereby food storage and rations were carefully tracked. According to the records, millet seemed to be the main source of food during travel intermissions, as seen by the 142,370 liters of millet recorded at the station [1]. The daily rationing of food supplies was also recorded, showing large consumption of food by both humans and animals. Records of luxury goods such as beef, chicken, fish, mutton, and wine among others were also shown. However, these foods were likely restricted to high-ranking government officials. Traveling merchants were also provided with room and board, among the 27 guest rooms found at the station. One recorded incident shows Xuanquan being able to hold “a total of 470 guests from various states” [1].

Additionally, the trips of Han government officials were especially well-recorded, and oftentimes provided evidence of the distance of their travel. While it has already been established that the Gansu corridor is incredibly difficult to travel, we can see that officials from as far as Chang’an and the Central plains resided in Xuanquan as a temporary stopping point for notable diplomatic journeys. One recorded example was that of a government official from Pingyin, 2000km away, who had to travel to Dunhuang to deliver fees to the local authority [1].

The geographical importance of Xuanquan also sheds light on the specific services the transportation infrastructure was able to provide. Being at the foot of the glacial Qilian mountains, Xuanquan had access to a large water source, a vital asset for travelers and their transportation animals in such dry conditions [1].

A specific correlation between efficient travel and economic development is the hastened reallocation of resources and reduced times for traders to buy and sell. As previously mentioned, government officials frequently passed by with records of resources and commodities, such as government money, or more importantly, water resources. In the development of the borders of China, such as the Gansu corridor, building sustainable oases was an objective of the Han government, allowing for the production of basic goods such as agriculture to happen as close to the expansion as possible [5].

A specific altercation, recorded in 39 B.C.E, involving gift-giving camels, provides further evidence of transportation infrastructure hauling vital goods:

Envoy Yangbodao and Vice-Envoy Biantian, sent by the King of Kangju, and Envoy Gumo, Vice-Envoy Shaqun, and Nobleman Weini, sent by the King of Suxie, all kowtow and say: “We have contributed camels [to the Han] on behalf of our kings several times in the past. [Each time] we entered [the Han territory] at Dunhuang Pass. We traveled through one county after another and fed [the camels] continuously [to maintain their weight]. After arriving at Jiuquan Prefecture we gave [the animals] to the authorities. The governor [of Jiuquan] and Yangbodao, along with the rest of us gathered to assess the weight [of the camels]. This time, Yangbodao and all once again entered the [Han] border to contribute camels on behalf of our kings. We traveled along the road and fed the animals at each stop. After we arrived at Jiuquan [and gave the camels to the authorities], however, the governor of Jiuquan assessed the value of the animals only with his assistants. Yangbodao and the rest of us were not allowed to see the camels again. The one male and two female camels

contributed by Gumo on behalf of his king were all white. [But the governor] said that they were yellow. The camels contributed by Yangbodao were all fat. [But the governor] said that they were thin. [What the governor said] was untrue. [We were] treated unjustly [1].

Due to their characteristic environmental resilience (carrying more weight, water efficiency, etc.), camels were heavily invested in by the Han government. As evident from the text above, camels were used as coveted gifts across the Silk Road. As Ying-Shih Yü notes, foreign visitors “used tributes as cloaks for trade”. The Xuanquan Manuscripts prove that “envoys” are frequent merchants traveling near the border, contributing gifts to the Han government. Yet interestingly, the “contributions”, despite their connotations, were not free and were paid for by the Han government, thus there were recordings such as these of tension and disputes [1]. More importantly, this proves the movement and trade of camels were promoted along the trading routes. The intervals of attention the camels required were often provided by the resources from the transportation infrastructure.

At the same time of the recorded incident, the government had just launched several military campaigns against the Xiongnu, while also further expanding along the northwest. Hence, camels were in heavy demand and due to the specialization of the camel trade in the region [6], a large number of Asian merchants increased the supply, ultimately promoting economic growth. The travel of these foreign merchants was essential due to the essential goods they provided, explaining the large attention of the investigation.

2.2. Better Spread of Information and New Technologies

The documentation of the camel transaction also provides information on how postal stations served as a platform for communication between traders and the Han government, through the establishment of a routine postal-relay network. This specific documentation is a complaint, filed within the corridor borders. What is not published is that the Han government, after receiving the complaint, ordered the Dunhuang prefecture to conduct an immediate investigation into the quality of these camels and whether the complaints were justified. As part of the investigation, Xuanquan was ordered to provide the documentation of food provided to these merchants and their camels. This level of communication was previously unprecedented, and reliable documentation and communication were able to better address these trivial problems faced in trading [1].

The transportation infrastructure importantly acted as a postal office for the postal-relay network the Han government had set up for efficient communication. Similar to our modern-day post office routine, only on a significantly larger scale. Due to the large size of Han China’s territories, along with its continued expansion, communication was essential in connecting the overarching government with its constituent regions. The production and circulation of daily administrative documents from the local government to the central government allowed for continued control over specific territories. Several pieces of evidence of this can be found in the leftover letters and documents found at Xuanquan [1].

The importance of the postal-relay network in protecting the safety of travelers cannot be overstated. The effectiveness of the network can be seen after the collapse of the Han government, in the transitional period towards the Three Kingdoms period. As the Chinese-run network service was shut down, almost instantaneously, travel along the Gansu corridor became significantly more dangerous. Without support from the central government, the Central Asian traders became less protected, and the frequency of robbery by local bandits spiked drastically [1].

Establishing the postal-relay network and necessary transportation infrastructure, Han China was able to experience a sharp growth in trade volume, allowing for building better foreign trade relationships along with a heightened reach. Furthermore, it is evident that the preservation of goods heavily relied on communication, reducing the risk and cost of travel, promoting more merchant traders, and in turn expanding the economy.

2.3. Proliferation of a Wider Variety of Items

As aforementioned, an account of daily trading routines along the routes was recorded in the excavated manuscripts, providing insightful evidence into the wider proliferation of foreign and domestic goods. The Mogao caves, found in the southern cliffs of the city of Dunhuang and often referred to as the “Library caves”, hosted over 50,000 manuscripts and can vividly illustrate the diversity of Chinese border cities. Although the majority of texts were written in Chinese and Tibetan, both local languages of the area, numerous texts were written in foreign languages such as Sogdian, Khotanese, Sanskrit, Uighur, and even Hebrew. The texts depict how foreign trading communities were integral to the city’s social structure and provided an alternative to the uniformity of ethnic backgrounds closer to the capital [4].

Furthermore, the religious texts discovered are also a clear indication of the origin of the travelers in the cosmopolitan city of Dunhuang. The Zoroastrian, Manichee, Christian, and Jewish documents underscore the various Middle Eastern and Central Asian countries outsourcing these traveling merchants [4]. The manuscripts further bear witness to the immense amount of imports and exports seen by the trading routes in Dunhuang. Persian silk, diverse precious stones, metal-ware, incense, and fragrances were all foreign goods described by the scrolls, interestingly written in Sogdian and Turco-Sogdian. The scrolls suggest the city of Dunhuang was an exporting powerhouse, producing inland Chinese luxury goods such as silk, wool, cotton, tea, camels, etc. Foreign goods experienced the largest economic growth, as they were often viewed as prestigious and frequently caught the attention of the wealthy upper class [4]. This promoted an influx of foreign goods and travelers. Additionally, foreign travel provided dual-sided benefits to the government, as not only was trading increased, but the fees incurred from services provided by the transportation infrastructure provided the government with an additional source of income.

3. Political Fragmentation

It has been established that through transportation infrastructure, the Han government had the means to rapidly expand and assert its status as an economic hegemon. The well-established postal-relay network provided by transportation infrastructure also played an especially key role in promoting the stability of Han China through ensuring accountability from local authorities in the form of reports and documentation to the central government. However, this autonomy may have been extended to the point of negative political fragmentation. This ultimately negatively affected the economic prosperity of Han China.

It is important to consider how the resources needed for China’s expansion were provided. From the Xuanquan manuscripts, it is clear that large amounts of resources allocated out of Central China were either to bolster trade or to facilitate expansion. Yet the surge in the need for resources resulted in heavy taxes on the population, driving costs higher and introducing corruption and personal political gain among local governments and authorities [7]. Thus, the political fragmentation, as history proves, drove political instability, very well leading to a collapse in the Han economy. Although, the extent to which transportation infrastructure led to the ultimate collapse of the Han dynasty must be further examined.

4. Conclusion

Contextualizing the importance of the transportation infrastructure, the large investments the Han government made are apparent. Not only was the station of Xuanquan frequently under the supervision of the governor of the Dunhuang prefecture, but a constant flow of high-ranking government officials also often visited, including a Han government delegation. The level of attention

this county-level postal station exhibited was highly unusual, strengthening the government's view of the importance of the transportation infrastructure.

Furthermore, the city of Dunhuang itself is a reflection of the beneficial transportation routes travelers would take, meaning high relevance towards the transportation infrastructure along the routes. In other words, Dunhuang as the epicenter of a globally driven city must reflect upon the importance of transportation routes in achieving these successes. We can see that economic efficiency must be attributed to the efficiency of transportation routes. This interconnectedness between transportation infrastructure and a region's economy can even be explained by modern-day macroeconomics. One specific study by Kwang-Jing Yi examines the development of transportation infrastructure in the modern-day silk road, and the core idea still holds with the ancient silk road, where Dunhuang was able to experience economic prosperity. The transportation infrastructure was able to facilitate foreign goods and services, but also foreign competition and population, thus increasing the volume of trade transactions and job opportunities in the city of Dunhuang [8, 9].

Ultimately, from the empirical qualitative evidence the excavated manuscripts have provided, it's without a doubt that our knowledge of the daily trading routine along the border of the silk road has been deepened, importantly highlighting the necessity of the transportation infrastructure for the betterment of the trade and economic development in Han China.

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