

A Study on Stall Economy from the Perspective of Smart Cities: with the Example of Shannxi Province Based on Digital Technology

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Abstract The First China's New Smart City Construction Summit Press Conference was held on August 1st in Beijing ^[1]. The past few years have seen the topic of intelligent city rush into the forefront of the news and other media. The ground-breaking economy has also been the focus of the people's concern and the government's attention. This report addresses the coordination of the relationship between the stall economy and the smart city, taking Shannxi, China, as an example ^[1], and examines the joint impact of the smart city and the stall economy on the political economy of the city in the context of the epidemic. Based on the study of the market economy and the smart city, a large amount of data was collected employing field visits and questionnaires, and statistical analysis. This paper summarizes the influence of the market economy on social and economic development and puts forward a better way to develop the market economy by using the smart city under the epidemic situation¹.

Keywords: Smart Cities, Stall economy, Covid-19 pandemic

1 Introduction

Since the outbreak of the coronavirus epidemic in 2020, the human economy and society have been hit hard, and our market economy, which micro, small, and medium-sized enterprises dominate, has suffered a considerable blow. Human economic forms and habits in the economic society have made the development of human society a big challenge like never before. Indoor

¹ Shanxi, China, located in central China, on the east bank of the middle reaches of the Yellow River, is one of the important birthplaces of the Chinese nation and has a deep cultural heritage. It has unique snacks and many historical monuments and has several titles such as National Historical and Cultural City. Shaanxi Province is also committed to foreign friendship city exchanges and has had friendly exchanges with several cities in the United Kingdom, the United States, France, and other countries.

shopping has been banned in large numbers, crowds are not allowed to gather, and people have had to reduce their indoor activities to avoid gathering and cross-contamination. As a result, global consumption levels have fallen significantly and the pull of domestic demand from shopping has been drastically reduced. In China, however, there is a form of economy that has been around for a long time - the floor stall economy. Nominated by the Prime Minister, the informal economy, a form of economy that people are happy to see and hate, had a significant impact during the epidemic. As the dire situation eased and control policies were relaxed, the number of people choosing to spend money at mobile vendors rose, and in many regions, the number of people choosing to spend money at mobile vendors rose, based on the need to boost domestic demand and mitigate the impact of the epidemic. In many regions, the demand for boosting domestic demand and mitigating the epidemic's impact has given the stall economy a more significant foothold and scope for growth than before. It is this impact on China's economic recovery and development that we want to examine. In the post-epidemic era, when the economy has been stimulated to a certain extent, we have to face the question: after using the stall economy to contribute to the country's economic recovery, we need to examine further and consider how the stall economy should be treated in the process of urban management so that it can fully play its positive role in the economy and society while maintaining good market order and urban image through appropriate monitoring mechanisms. In this regard, we focus on the contemporary hot concept of the smart city and study the combination of the floor stall economy and the smart city for more sustainable development.

2 Smart City: Economic Growth and Stall Economy

China's street stall economy first originated from the "Commercial Revolution" in the Northern Song Dynasty, when cities were fully opened for business, and street stalls were legal, which was the beginning of market liberalization in China. In the particular period of 2020, the stall economy eased the pressure on employment and became an essential grip on stable employment. With the changing economic policies, the stall economy has played different roles at different times. For example, the Shaanxi provincial government has proposed to develop the stall economy and give incentives according to the situation while also allowing consumers to get more price discounts². During the economic downturn, the capital of the land was effectively lost, leaving the state without sufficient funds for economic recovery. During the pandemic, indoor consumer enthusiasm drops significantly, and the land stall economy is more likely to attract consumers by boosting domestic demand and reducing the inventory of businesses. This is also more in line with the "people-friendly" concept of the smart city construction process.

Comparing total retail sales of consumer goods in Tier 1 cities, Tier 2 cities, and Tier 3 cities, before and after the epidemic, and for residents of 4 rural areas (See Figure 1).

² Shaanxi liberalizes "stall economy," allows moderate occupancy_consumption (sohu.com)



Figure 1 National data on total retail sales of consumer goods

It reports a decrease in total retail sales of consumer goods in 2010 from the year before because of Covid-19, by over 3.9 percent.

Figure 2 is the statistical yearbook about total retail sales of consumer goods in Shanghai by 2019 when 2020 has not been published yet.

According to the Shanghai Municipal Bureau of Statistics' February to December 2020 publication, Shanghai's total retail sales of consumer goods in 2020 were 1460.46 billion yuan, down 7.8 percent compared to 2019 - well above the national average³ (See Figure 2).

³ The data come from National Bureau of statistics of the People's Republic of China website: <https://data.stats.gov.cn/easyquery.htm?cn=C01&zb=A0H&sj=2020>

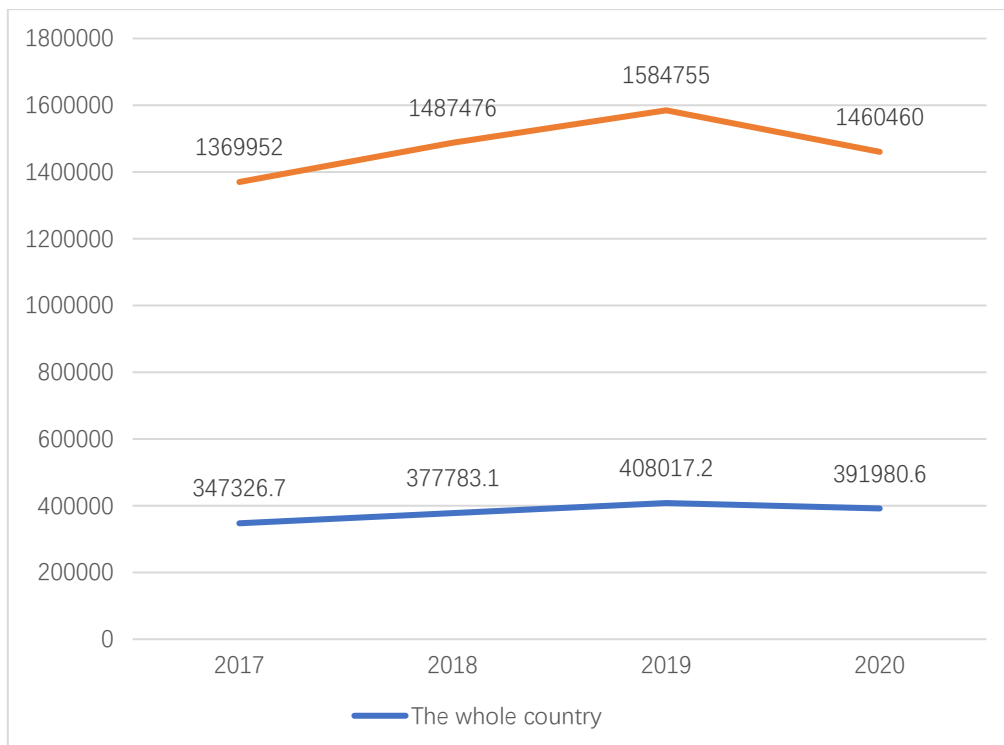


Figure 2 Shanghai's and Country's Total Retail Sales of Consumer Goods

The informal economy's relatively low level of development in Shanghai, a highly modern city, led to a massive stockpile of unsaleable inventory under the onslaught of the new crown epidemic and was partly responsible for the massive drop in total retail sales of consumer goods.

Urban governance under the smart city concept allows for data-backed rationalization of the economy. Using mathematical tools such as hierarchical analysis, a staggered approach can be adopted between the artisanal cultural and creative stalls and the snack and beverage stalls to drive patronage to the cultural and creative stalls while reducing vicious competition among the ground stalls in the same food and beverage category.

Data analysis can also provide recommendations on the management of ground stalls that take into account the prevention and control of the epidemic, using mathematical modeling methods, thus ensuring the vitality of the stall economy after the epidemic. After the survey, we found that, firstly, the main customers of the ground stalls are youngsters, with a predominance of female visitors (77.85%), 22.15% of visitors were male (See Figure 3), and most of them said that the ground stall bazaar is a 'good place' to relax and spend time. Secondly, the industries with the most significant sales in the floor stall economy are food stalls such as snacks and drinks. 57.05% of the respondents thought that mobile stall vendors were generally civilized in their behavior. The top three categories that customers would generally prefer to buy from a street stall are plants, fruits, and household items. In this survey, 133 people favored selling small objects, earrings, and cultural creations (See Figure 4). Thirdly, the hygienic environment,

service attitude, and price-setting of ground stalls are the core competitiveness of ground stalls, and for some stalls, there is still much room for improvement in terms of hygienic environment." In this survey, while 36.91% of consumers believe that the floor stall economy offers good value for money, 10.07% of consumers also believe that causing traffic congestion is very annoying for them. Improving quality, reducing traffic congestion, and operating in a civilized manner are the main issues that need to be addressed in running a floor stall economy.

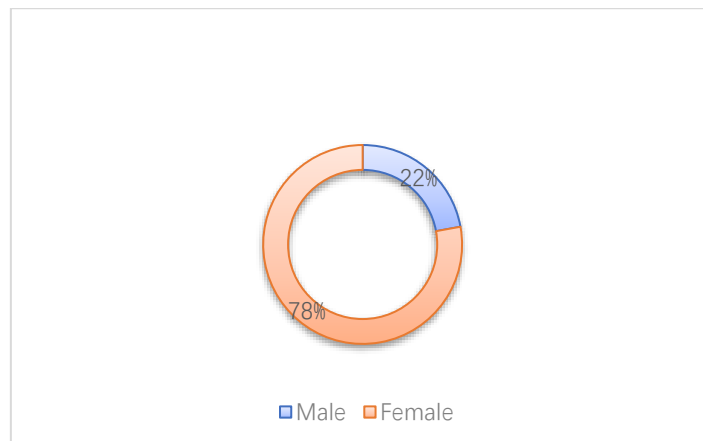


Figure 3 Gender Ratio of Respondents

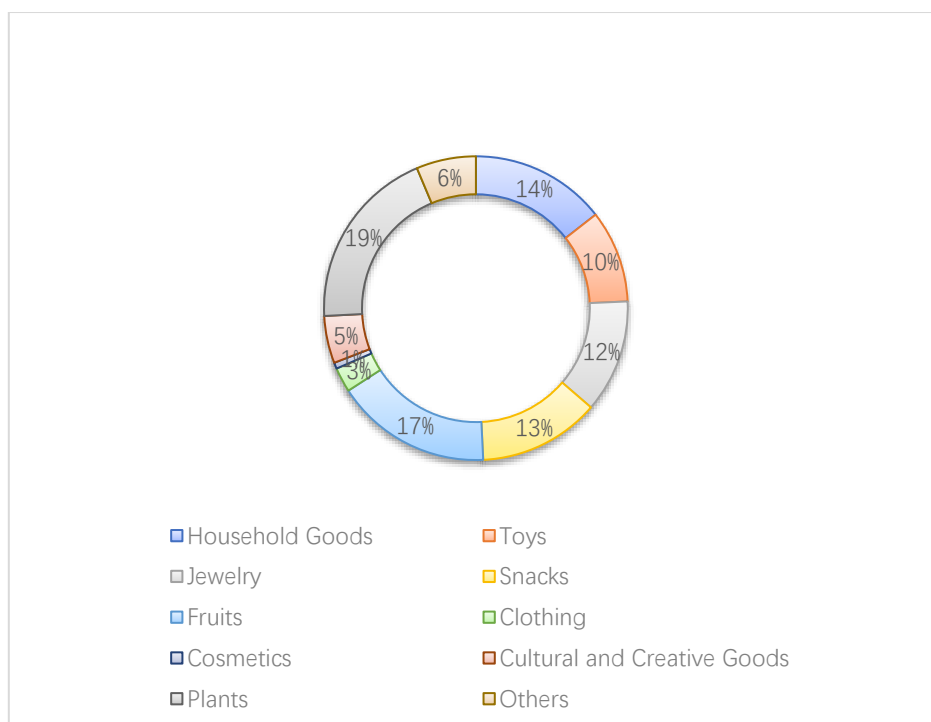


Figure 4 Goods Purchased on Stalls

Lately, the relevant stall assessment models were developed through mathematical tools such as hierarchical analysis and principal component analysis, combined with the findings obtained in the data analysis, and simulated through software such as Matlab and Mathematic, resulting in an assessment report that would suggest feasible options for improving the stall economy.

A dynamic visualization model is created through the Unity engine to show customer flow changes as the stall takes improvements in hygiene, pricing, etc. By performing a simulation for the crowd, a 'zone box' is the store, and the actual stepping can be arranged to get the data and then assign parameters.

Issues such as management of the scope of ground stall operations, real-time information sharing, timely dispatching of city staff, and rapid decision-making all place higher demands on the management capabilities of the relevant departments in each region.

3 Smart City: Unique Towns and Stall Economy

The stall economy is the smoke and mirrors of the earth. After tea and dinner, various kinds of snack streets, pedestrian streets, and other places where stalls gather embody a city's popularity and characteristics. From local snacks to local specialties, the stall economy always brings a different kind of lively and surprising. For example, in Chengdu's Kuanzhai Alley, an ordinary alleyway has become unique and attractive to thousands of visitors because of the variety of vendors, the different flavors of snacks gathered together, and the unique local culture that can be experienced in the alleyway. This attracts more tourists, thus achieving the purpose of using the land to increase economic income. In such small streets and alleys, the city's true character can be experienced, and the authentic atmosphere gives the fast-developing society a chance to become "a thousand cities with a thousand faces" instead of having its character eroded. In Shaanxi, China, the provincial government insists on "flexible enforcement" while stimulating the stall economy, allowing mobile vendors to occupy the area for a certain period. The Shaanxi provincial government has been able to use culture in conjunction with the stall economy to attract tourists during the non-epidemic period by first reviving the local economy.

At present, if the stall economy wants to gain proper attention and gain, long development, the first thing is to combine the field and combine the national policy with the actual situation. Shaanxi province is rich in culture, combining the stall economy with culture can promote the economic inflow from outside the province, but the primary problem is how to solve its economic downturn. Finding how its economy can recover the fastest and with relevant policy support, the stall economy will make an outstanding contribution. The first thing to do is to please the thinking that equates the ground-floor economy with the low-end economy. Imagine if Paris did not have so many cafes on the Left Bank and so many people drinking coffee on the streets every afternoon. Would people feel less in Paris? The floor stall economy gives more of a sense of the smokiness of the city. People feel the city's living culture, consumption habits, customs, and traditions through the stalls; a city has its unique characteristics, many of which are hidden in the hawker carpets among them stalls. Moreover, these functional characteristics, the perfect fit for the smart city of "a thousand cities, a thousand faces," provide a tremendous economic and cultural basis for the call. ^[2]

4 Smart City: Green and Low-carbon and Stall Economy

Smart cities also strongly advocate the concept of “green” low-carbon ^[3], and the development of smart cities has evolved into “urban green smart development” ^[4].

The key to going low-carbon and green by transforming the way residents live and travel is to reduce carbon emissions and thus promote low-carbon living. On the one hand, smoky attractions such as ground-floor markets make visitors more willing to give up their car travel alternatives to browse on foot, which to a certain extent contributes to carbon reduction.

The smart city management platform developed by Chinshang combines multiple poles, using big data and artificial intelligence to establish a unified cloud platform service. Its intelligent light pole equipped with cameras, display screens, broadcasting can realize the system automatically linkage to achieve the function of occupying the road management. When the camera detects a non-designated stall area has an illegal occupation of the situation, through the public radio broadcast beep, notify staff to deal with, and achieve intelligent monitoring and early warning. In addition, the smart street light also integrates functions such as LED intelligent lighting, video surveillance, information dissemination, public broadcasting, environmental monitoring, wireless WIFI, emergency call, water monitoring, and 5G base station, which can provide standardized power and network support centrally, and can also seamlessly access various scenarios of the nighttime economy, which has a vast imagination. The digital construction of smart cities can reduce the cost of managing vendors to achieve green economic development.

On the other hand, the local tourism industry is boosted by the land stall economy, and the economic income generated by the tourism industry is a significant source of revenue for the local government. Government policies support regional tourism development, and the development of tourism also urges the government to accelerate urban infrastructure development, making cities more livable and comfortable. Accelerating tourism development is conducive to the city’s external exchanges, thus opening up the geographical limitations and accelerating the city’s open development. The development of the tertiary industry is conducive to the rational adjustment of industrial structure so that the proportion of primary industry structure will be reduced, thus reducing carbon emissions, promoting the development of green industry and supply-side structural reform, forcing enterprises to carry out green energy reform, promoting the development of green economy, using tourism to increase fiscal revenue, and also making part of the heavy industrial cities get links, so that the local carbon emissions are relatively lower, keeping pace with low-carbon development, and this will accelerate China’s goal of reaching the carbon peak by 2035.

5 Smart City: Big Data and Stall Economy

Through the intelligent digital city management system, it can realize:

(1) Grid-based management ^[5]. A team of information collection supervisors is established to inspect within the delineated grid to achieve rapid discovery, rapid disposal, and rapid feedback of urban management problems. As a kind of administrative reform, grid-based management relies on unified urban management and a digital platform to divide urban management

jurisdictions into cell grids according to certain standards. By strengthening the inspection of components and events in the cell grid, a form of supervision and disposal that are separated from each other is established. Urban grid management is a breakthrough in applying digital city technology in China. For example, mobile, Unicom, and national grid can monitor urban facilities, urban health, and security conditions at any time. Once a problem is found, the situation will be carried out in time to feedback to the higher level, thus increasing the connection between the upper and lower levels of the city, making big data and the city connected at all times. [7]

Shaanxi Province has set up six categories, such as introduction, organization, and leadership, membership information, general election, work dynamics, propaganda, etc. which will cover all the work of NPC supervision, representative management, and representative performance, forming a systematic and intelligent 'NPC grid' work pattern [8].

What is true for residential management can also be valid for the informal economy. The informal economy has been unacceptable to urban managers for a long time because of its wild nature, which is challenging to manage. Grid-based management can pinpoint the focus of conflicts and maintain good law and order. Then with today's digital information management tools, it is believed that it can effectively assist the development of the ground-floor economy.

(2) Data security. Establish a digital city management off-site disaster recovery data area to prevent data loss and damage. Establish fixed files for mobile vendors. So when vendors are mobile and files are fixed.

(3) Visualization management. Let city managers effectively grasp city information and achieve transparency and visualization in management.

The said smart city or digital city is the application of information technology such as the Internet of Things, cloud computing, and big data to form urban spatial information using 3D visualization and integrating all data on a 3D model platform of the city, which in turn forms a viewable and manipulative smart city management platform. The application of next-generation technologies promotes urban services, management, and construction into a wisdom mode.

3D model of the city has its unique advantages in displaying smart city data, with the help of UI interaction design, making the display effect shocking, visually with a strong sense of technology, space display intuitive and natural, so in the development of smart city management, 3D visualization is one of the critical use of technology. According to the size of the scene, the method of building the scene 3D model, at present, we mainly have the following:

·3DGIS generating 3D models

This type of 3D model is made based on 2D geographic information, developed by the program to support user interaction. According to the map data batch generation of the entire city building white square model, the need to manage the park, buildings, critical areas, etc., needs to be based on the white square, fine model production, and placed in its corresponding location in the city. Then through the rendering, in order to improve the accuracy and texture of the city model, rendering a different visual style of the city model, people can set different environmental scenes, such as sunrise, sunny rain, etc., weather. Finally, dynamic and specific sound effects are added to help highlight essential elements, from comprehensive display to local focus, so that viewers can more easily understand the logic of its display.

·Tilt photography modeling

Tilt photography technology through the UAV carrying multiple sensors through multiple angles of flight to collect ground images. After the software processing of the actual scene model, the slower the flight speed to collect images more comprehensive, the more detailed the model obtained. Compared with the square model generated by 3D GIS, the 3D model obtained by tilt photography is closer to the actual scene and more intuitive, and at the same time, using the advantages of large-scale aerial photography and tilt photography batch extraction and processing can significantly reduce the cost of urban 3D modeling.

·Dynamic effects of tilt photography

After converting the model generated by tilt photography into geographic information data, it can be integrated with business system data docking to provide various business-level application displays. Similarly, the model can also be rendered in different environmental styles, with dynamic and sound effects. Similarly, tilt photography can be widely used in smart parks, smart scenic spots, smart campuses, smart communities, etc.

6 Optimization of Transport Systems in Smart Cities: Transport and Stall Economy

The future of transportation will be increasingly flexible, intelligent, and open in the model of smart cities. Identifying and analyzing data from images recorded by video surveillance, coils record patterns such as driving speed and number of vehicles traveling in a certain period; keeping user records and driving routes for every single transaction taken by taxi drivers with the application of intelligent platforms; identifying and recording information about the rides of passengers getting on and off in buses for data query and emergency management when necessary. The acquisition, analysis, and full utilization of these data will assist urban transportation managers in the governance process to think, make decisions and improve and optimize the transportation system. Ali cloud built by the flying system, people can quickly and widely read and analyze the road conditions collected by the cameras on the city roads in real-time, and through algorithms to study and judge the pattern of changes in the flow of people and vehicles, calculate the traffic conditions in the city at each moment and make decisions, coordinate the setting of traffic lights in each street, changes in the length of the program, intelligent and scientific planning of traffic routes, and finally achieve as much as possible the balance of traffic flow, the average speed of vehicles that can be driven in the road. In the end, the traffic flow will be balanced. The average speed of vehicles on the road will be increased within a reasonable range so that traffic congestion and other “urban diseases” in many large cities can be alleviated to a specific scale and degree.

7 Smart City Amenities Maintenance Intelligence - City Image and Stall Economy

The governance model of smart cities enables the organic combination of modern digital technology and urban management, and law enforcement needs through close control and powerful arithmetic, intelligent identification and analysis of various behavioral phenomena

occurring in the city, more sensitive detection, and early warning of problems, intelligent action to respond. In recent years, from Liuzhou, Guangxi, through the time-slot monitoring of the online rate and trajectory of the sludge transport truck, the implementation of community urban environmental health grid pilot, the first one-stop mobile law enforcement workstation, etc. and constantly broaden the quality and efficiency of urban services; to Deqing County for the city management business to create garbage classification, grease supervision, intelligent sludge, city AI and other digital scenarios, to clarify the blind areas of responsibility around the intelligent supervision and maintenance of the cityscape, significantly reducing the cost of time and energy generated by grassroots inspection, passive complaints and other case discovery methods, to ensure that the hidden dangers affecting the neatness of the cityscape environment are handled efficiently and timely, at the same time, with the gradual use of driverless sanitation operation vehicles, the future of road cleaning and other work At the same time, as driverless sanitation vehicles are gradually put into use, the efficiency and quality of road cleaning and other work will be further standardized, so that urban cleaning is further guaranteed.

8 Smart Cities - Civic Life and Stall Economy

With the development of smart cities transforming, residents' feedback is convenient. Urban management operations will also gradually become transparent and democratic, giving citizens more and more convenient channels to complain about problems and give feedback. Today, the application of voice intelligence technology can convert and process voice data received by hotlines into text, refine keywords, and conduct extensive data analysis so that the most common problems of concern are revealed; some regions have also started to build innovative platform report pages so that residents who find infrastructure faults can fill in the report form by scanning the exclusive QR code and promptly inform the maintenance personnel in the neighboring areas to deal with them. With the further development of digital technology in the future, the

In the past, there were often specific data barriers between various departments in the government. Duplicate investment and construction sometimes inevitably brought unnecessary consumption for administrative costs. However, under the new technology, it has become possible to break down information silos, realize data sharing, unify and standardize the management of the business of various departments and units, and realize the sharing of government data. With "blockchain" technology, data sharing among various authorities will be unified, more secure, and efficient, and relevant information will be transmitted and shared in real-time, significantly enhancing the efficiency of business processing and improving the problem of cumbersome procedures and travel for people.

Multi-channel problem collection. Broaden the channels for the public to participate in urban management. Citizens can report problems, consult policies, make suggestions, and request help at any time through their mobile phones.

9 Conclusion

Smart City Management is a multi-faceted, comprehensive urban management platform that integrates information acquisition, information processing, entire process monitoring and

supervision, analysis and decision-making, video monitoring, emergency linkage, and joint command and dispatch^[9], which aims to use various information technologies and innovative concepts, based on people-oriented, green and low-carbon concepts, to open up and integrate urban systems and services, enabling enterprises to use public resources to create more value, the government to achieve refined and dynamic urban management and services, and improve the quality of life of citizens, is a trend and help for high-quality development in China in the new era. With the continuous development and changes in technologies such as the Internet of Things, cloud computing, and digital mining, the planning and construction of smart cities are being carried out one after another in various cities in all aspects of social governance.

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