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## Measures to Vitalize the Commerce of the Central Business District of Uto City

**Tsunetoshi NASU, Riken HOMMA, Kazuhisa IKI**

*Graduate School of Science and Technology, Kumamoto University, Kumamoto city, Japan*

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### ABSTRACT

A previous study on the central business district of Uto City indicated that its decline was related to the operation of two newly built large-scale stores which shifted the center of the central shopping area from the central shopping street to the southeast of the city. Moreover, the openings of two by-pass roads were found to significantly affect the business in adjacent blocks. Building parking areas, open community spaces, rest facilities, and public toilets to replace the vacant shops are considered as feasible solutions to make the shopping street more accessible and convenient to customers. In addition, a bus station and railway crossing signal system are proposed to revitalize the central shopping street.

**Keywords:** Central shopping street, Vitalization, City center, Bus station

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### INTRODUCTION

A previous study on urban decline conducted in Uto City, Japan from 2000 to 2014 showed that, due to the operation of two newly built large-scale stores, the center of central shopping area is no longer located in the shopping street of the city but instead has shifted to the side of one of these stores at the southeast of the city [1]. The survey result also assessed the negative impact of the large-scale stores on commercial activities in the central shopping area. In addition, the preference of Uto City residents for the two new large-scale stores could be explained by the deterioration of the downtown areas and inconvenience due to the lack of essential facilities to serve the demand of modern customers [2].

In this study, the number and quality of the district's customer service facilities were analyzed to determine possible measures to address the declining commercial activity in Uto City's central business district. In addition, a survey of the opinion of business owners on solutions for improving their business was conducted. This study aims to: (1) Assess the number and quality of the customer service facilities of the city central business district; (2) Propose effective measures to enhance the attractiveness and competitiveness of the district's central shopping areas; and (3) Introduce a bus station and railway crossing signal system to increase the accessibility of the central business district.

### MEASURES TO REVITALIZE THE PROSPERITY OF THE CENTRAL SHOPPING STREET

#### Solution for Current Issues Based on Findings from Previous Studies

In this section, measures to revitalize the prosperity of the central shopping district are proposed based on findings from the questionnaire on the opinion of business owners in the district [2]. The result was drawn from opinions of the owners of 57 stores who agreed to participate in the survey. The total floor area of 57 stores is 9,690 m<sup>2</sup> (170 m<sup>2</sup> /per store). Figure 1 shows the suggestions of store owners regarding the facilities in the central shopping street that they believe would help improve the quality of customer service and competitiveness of the district. The most frequently suggested facility is

public parking lots (70%), followed by restaurants and cafeterias (58%), fresh food shops (49%), public toilets (46%), public relaxed spaces (42%), multifunctional and event field (32%), clothing shops (21%), and fast-food restaurants (16%).

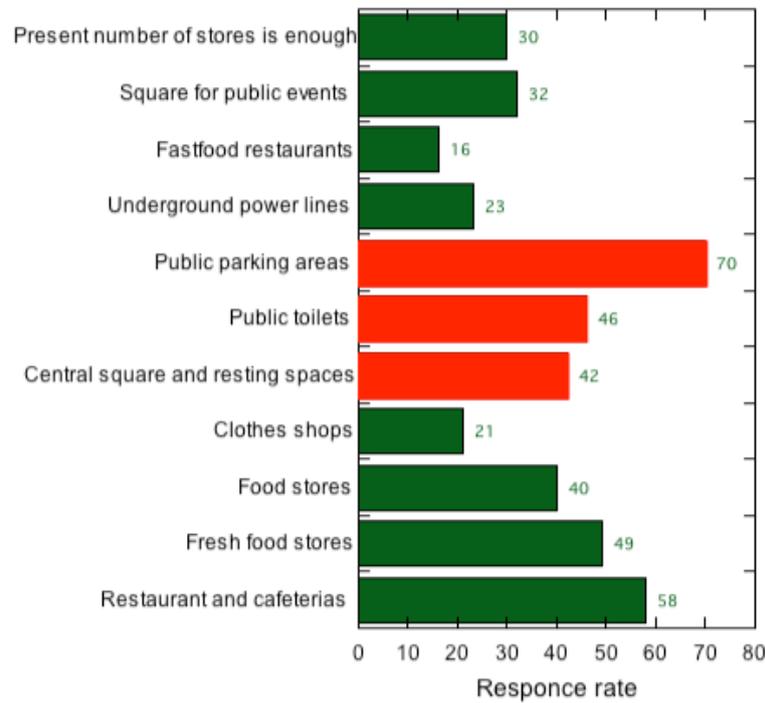


Figure1. Distribution of the regarding the possible measures to revitalize the business prosperity of the central shopping street

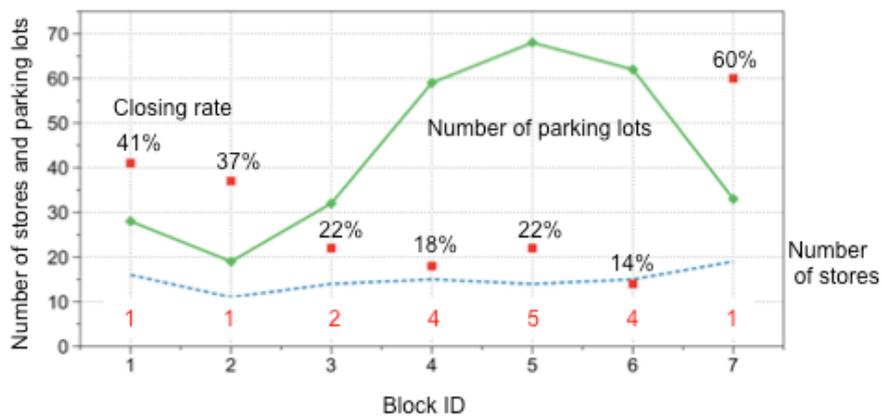


Figure2. Distribution of number of business stores and the number of parking lots available at each block.

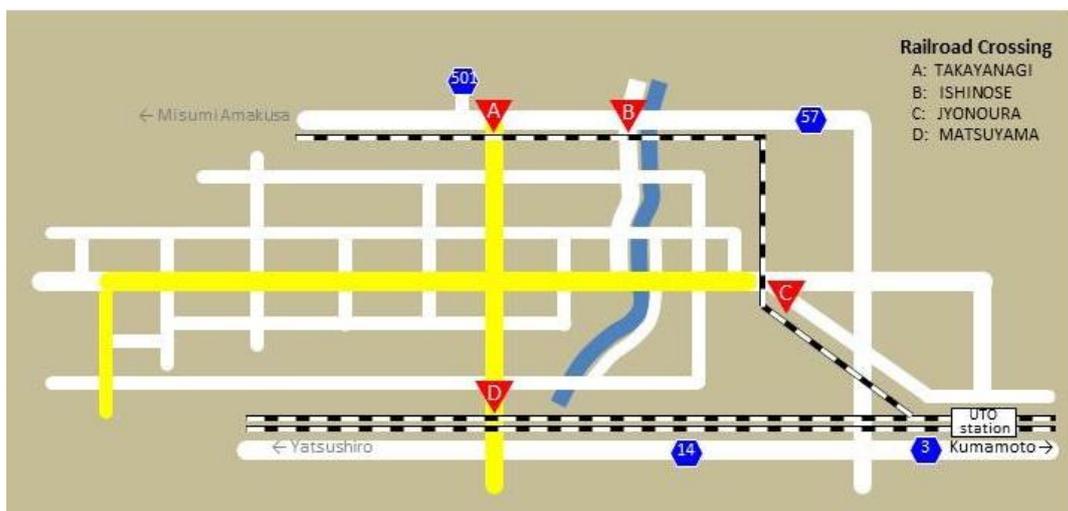
It is worthwhile to note that 23% respondents suggested using underground power lines to enhance the landscape of the district. Among the above mentioned facilities, building parking areas, public toilets, and the community rest areas are the most feasible measures that could be implemented by the local government. The result of the number of surveyed stores and car parking spaces available at each block is shown in Figure 2. The total number of available car parking spaces was 165 for 57 stores. In other words, the parking lots in the district were distributed at an average density of 2.89 spaces per store. In addition, according to the Statistics of Uto City, at the end of December 2014, of the 104 stores in the research area of this study, only 76 stores had parking spaces (73.08% of all stores).

There were 28 stores that operated without parking spaces accounting for 26.92% off all businesses. For such stores public parking could be provided by making use of the space currently occupied by vacant stores.

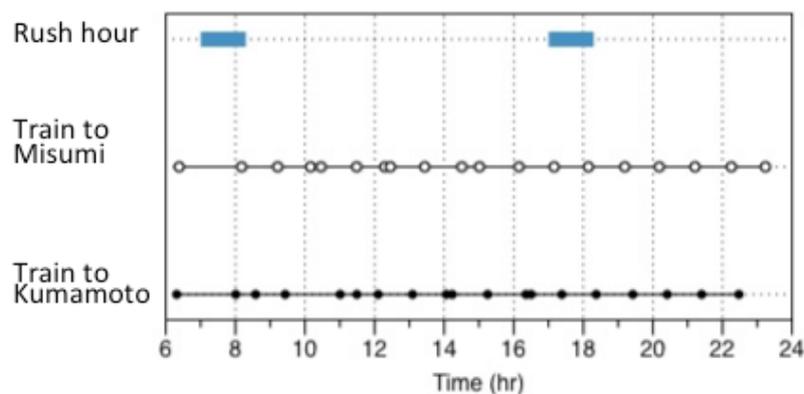
### Proposals for Increasing the Accessibility of the Central Business District

#### Renovation of a Railway Crossing Signal System for Increasing the Accessibility of the Central Business District

Figure 3 shows the locations of two railroads connecting Uto City train station and the neighboring provinces. These railroads border the central business district and cut through the main streets that lead to the district at four railroad crossings marked as A, B, C and D. The presence of these railroad crossings impede access to the central area, especially at peak rush hour periods from 7:00 to 8:15 a.m and from 5:00 p.m. to 6:30 p.m. The schedule of passing trains at the crossing D, which runs between Yatsushiro and Kumamoto, and other crossings (A-C) that run to Mitsumi implemented since 2016 are shown in Figure 4. It was found that there were 19 passing movements from 6:00 to 24:00.

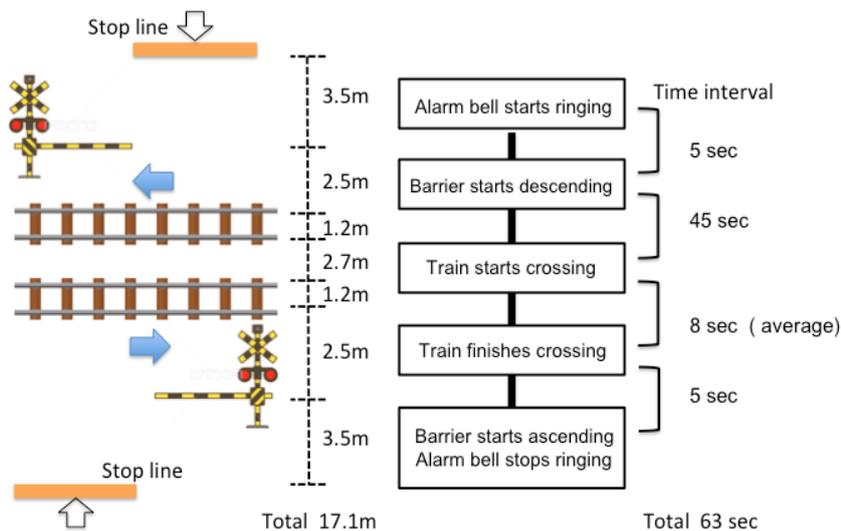


**Figure3.** Location of the four railroad crossings around the central business district (A: Takayanagi, B: Ishinose, C: Jyonoura and D: Matsuyama)



**Figure4.** Schedule of passing trains that cross the central district

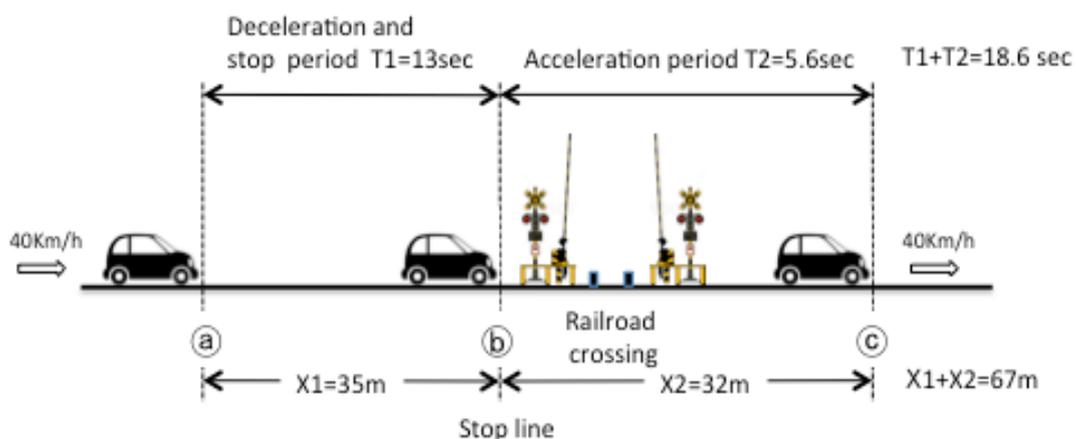
It was easily observed that the railroad behaved as a barrier that blocked the central business district from the access of the customers using individual vehicles. In addition, under driving regulations in Japan, a vehicle must decelerate and pause for a confirmation of clearance before accelerating to pass the railroad as illustrated in Figure 5. This time-consuming procedure slows down the traffic flow and negatively affects the accessibility of the central business district.



**Figure5.** The driving regulations in Japan, a vehicle must decelerate and pause for a confirmation of clearance before accelerating to pass the railroad.

Cross-referencing the rush hour period in Uto City and the schedule of passing trains that cross the central district (Figure 4), it was found that no trains pass during the rush hour period. This suggests that by replacing the shutter barriers currently being used with signal light systems, we would improve the accessibility of the central shopping district.

An experiment was conducted to examine the average amount of time taken by a car to pass the railroad crossing at the assumed speed of 40 km per hour (Figure 6). The process could be described as follows:



**Figure6.** Diagram of time consuming when the engine passing railroad that cross the central district

When a driver realizes there is a train crossing ahead, he will reduce the speed of the car from Location (a). The driver must completely stop his car in front of train crossings at the Stop Line (b) to confirm that no trains are coming from the left and right, and the car can move forward safely. The time needed to move from (a) to (b) with a distance of 35m and to confirm is 13 seconds (T1). After that, the driver starts to accelerate, pass the railroad and resume a speed of 40 km per hour at the point (c). The time needed to move from (b) to (c) with the distance of 32m (X2) is 5.6 seconds (T2). Therefore, at each railway crossing, each car needs a period of 18.6 seconds (T1+ T2) to move through the distance of 67m (X1 + X2). It is worth noting that without a railway crossing and driving at speed of 40 km per hour, to run from point (a) to (c) it would only take 1.5 seconds (T3= (X1 + X2)/40km). For the convenience of drivers and in order to improve traffic flow at the railway

crossroads, a railway crossing signal system is necessary. With a crossing traffic signal, vehicles will stop when the signal light is red for the train to pass and simply go through when the signal light is green.

As shown in Figure 4, there were 19 passing movements at crossings A, C and D from 6:00 to 24:00 19 times. As calculated above, it takes 63 seconds for each movement, whereby in 18 hours between 6:00 and 24:00 ( $18 \times 3600\text{sec} = 64,800 \text{ sec}$ ).

The time period that allows vehicles to pass each crossing is 63,603 second ( $T_4=64,800\text{sec}-63\text{sec} \times 19$  times). Accordingly, the flow of cars running through one railroad crossing in the period from 6:00 to 24:00 is calculated as follows:

- (1) In present condition:  $T_4/(T_1 + T_2) = 63,603/18.6 = 3420$  cars
- (2) When using the railway crossing signal system:  $T_4/T_3 = 63,603/1.5 = 43,402$  cars on average, when using a railway crossing signal system, vehicle traffic will increase 26.6 times ( $43,402\text{cars}/3,420\text{cars}$ ) at each of railroad crossing A, B, C and D. As the results, the traffic jam at peak hours could be resolved.

### Bus Station

In addition to facilitating the customers who use private vehicles by increasing the parking area and reducing traffic obstruction of the railroad crossings, creating favorable conditions for customers who use public transport is also essential to increasing the number of visitors to the commercial district. Figure 7 shows a map of two main bus routes which pass through the central commercial district of Uto City with two opposite directions for each route. It is worth noting that none of these four lanes have stop inside the commercial district. Therefore, we propose to open a bus station at a location of vacant stores in between Blocks 3 and 4 as shown in Figure 8. Accordingly, approach paths of the buses to a station were shown in Figure 9. The bus station will include functions such as a waiting room, toilet, information center, and resting and drinking area.



Figure7. Map of bus routes passing through the central commercial district (A-D)

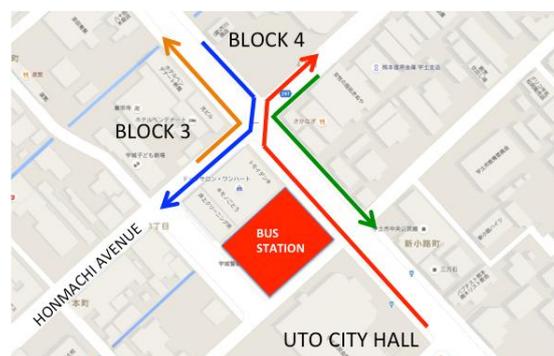
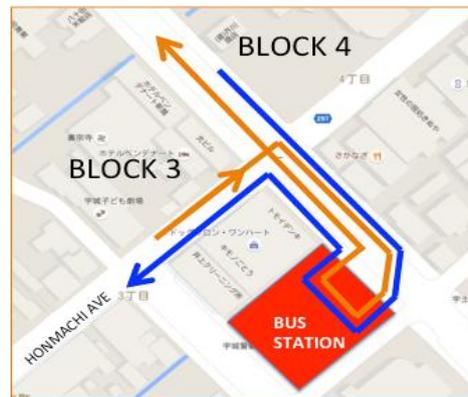


Figure8. Diagram of proposed bus station for enhancing the accessibility of the commercial district



**Figure9.** Proposed bus station and bus route for increasing the convenience of visitors and customers

## CONCLUSIONS

In this study, feasible solutions which would enhance the competitiveness of the central business district were proposed based on the questionnaires and assessment of the actual situations. In summary, we suggest the following measures to address the current decline of commercial activity in the central business district of Uto City:

1. The lack of parking space could be solved by making use of the parking spaces of the closed shops for public parking.
2. Change the closed shops into public toilets or public spaces.
3. Create more public spaces to be used for organizing events, morning markets, etc.
4. The parking or leasing fee of public lots could become income of the closed shops.
5. Install a signal operation system at four railroad crossings to increase the flow of vehicle traffic that runs into the city.
6. Bus stations in Block 2 and Block 3 should be constructed to encourage the access of consumers by bus transport.
7. In addition, creating more customer service facilities and diversifying the shop types would help to revitalize the prosperity of the central shopping street.

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