商業地間の介在機会効果を考慮した集客数予測モデルの構築
ーJR 博多シティ開業によって、天神と博多の人の流れはどう変わるのかー

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福岡都心部では、2011 年 3 月、新博多駅ビル「JR 博多シティ」が開業した。福岡都心部には、天神地区と博多地区の 2 つの核がある。天神地区は、約 26 万㎡の売場面積をもつ九州最大の商業地であるが、博多駅地区も、これを契機に、4 万㎡から、11 万㎡の売場面積をもつ大規模な商業地となることになった。

「JR 博多シティ」開業で、天神地区と博多駅地区との人の流れがどのように変化するのか、とくに、これまで博多駅経由で天神地区へ行く来訪者の多くは博多駅を素通りして天神地区に行っているとされているが、開業後はどのように変化するのか、また逆に、天神経由で博多駅地区に行く来訪者のほとんどが天神地区にトラップされているとみられているが、開業後はどのように変化するのか、が大きな話題となっている。

本研究の目的は、このような博多駅を素通りしている人数と天神地区にトラップされている人数が、現状でどの程度あり、「JR 博多シティ」開業で、これがどのように変化するのかを予測することである。そのねらいは、博多駅の素通りや天神のトラップのように、行先商業地への途上にある商業地が行先選択に与える影響を介在機会効果と定義し、これまで明確に推定されることのなかった介在機会効果を明示的に推定しようとすることにある。具体的には、行先商業地とその途上の商業地との相互作用を介在機会効果として導入した、行先商業地出向頻度ポアソン回帰モデルを構築し、博多駅を素通りする天神地区への来訪者数と天神でトラップされる博多駅地区への来訪者数を介在機会効果として推定し、その開業前後での変化を、天神、博多駅地区への入込み来街者数とともに予測した。

その結果、天神地区の入込み来街者数は、27.9 万人/日から 26.5 万人/日へと減少し、博多駅地区では、14.3 万人/日から 19.4 万人/日へ大幅に増加。博多駅を素通りする人数は、2 万人/日から 6 千人/日と 1.4 万人/日の減少に対し、天神でトラップされる人数も 2.3 万人/日から 1 万人/日と 1.3 万人の減少となった。

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An on-site Poisson model for forecasting the numbers of visitors at shopping sites with explaining their mutual intervening opportunity effects: How many shoppers who used to pass through Hakata to Tenjin would be intercepted if a big commercial complex is developed at Hakata station located midway to Tenjin district?

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Abstract

In Kyushu island of Japan, Kyushu Shinkansen connecting Fukuoka and Kagoshima started full operation on March 12th, 2011. Almost at the same time, Hakata terminal station located in Fukuoka city finished its redevelopment and the new JR(Japan Railway) Hakata terminal station building named "JR Hakata City" opened on March 3rd, 2011. The JR Hakata City is a shopping complex with total floor space of 200 thousand m^2 and 100 thousand m^2 shop floor area increased by 94 thousand m^2 shop-floor area from the previous one. Fukuoka City is known as a twin city composed of two core CBDs with their transport terminals: One is Hakata district including JR Hakata station and the other is Tenjin district including NNR(Nishi-Nippon Railroad) Tenjin station. Tenjin consists of many shops and three main department stores. Its shop-floor area amounts to 260 thousand m^2. JR Hakata station and NNR Tenjin station is about 2km apart from each other and connected by subway and by bus.

Facing with the drastic increase of shop-floor area of Hakata district, Tenjin district is worrying about how the opening of JR Hakata City affects their business. At present, many visitors seem to travel through Hakata to Tenjin without stopping at Hakata because there is not so much retail agglomeration at Hakata. Of quite interesting problem is how this situation would change if the big shopping site, JR Hakata City opened. As suggested by this instance, if some shopping site is located midway from visitors' home to their destination, the site is said to be an intervening opportunity to the destination. It has the intervening opportunity effect on the destination, which is defined as the difference of the numbers of visitors to the destination between with and without the intervening opportunity.

The purpose of this paper is to predict the changes of the actual numbers of visitors to Hakata and Tenjin districts caused by the opening of JR Hakata City while specifying the above intervening opportunity effect.

For the purpose we constructed a Poisson regression model with intervening opportunity effects to estimate how many visitors who used to visit Tenjin through Hakata without stopping at Hakata would be intercepted by the new redevelopment of JR Hakata City. We also estimated how many visitors who used to be trapped by Tenjin on the way to Hakata in turn would not be intercepted by Tenjin after the opening of JR Hakata City.

As a result, we obtain the following: While the total number of in-migrants to Tenjin decreases by 14 thousand persons per day that of Hakata increases by 50 thousand persons per day. As for the intervening opportunity effect of Hakata on the destination of Tenjin, we estimated the number of travelers who pass through Hakata to visit Tenjin at present as 21 thousand persons per day, which would become decreased by 14 thousand persons per day after the opening of JR Hakata City. On the other hand, we estimated the number of travelers who are intercepted by Tenjin on the way to Hakata at present as 23 thousand persons per day, which would become decreased by 13 thousand persons per day after the opening of JR Hakata City.

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