

The Influence of the Hokuriku Shinkansen on Komatsu–Haneda Flight Users: An Analysis of Opening the Kanazawa and Tsuruga Hokuriku Shinkansen

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1. Introduction

The opening of the bullet train or *Hokuriku Shinkansen* from Nagano to Kanazawa in March in 2015, which directly connects to Tokyo, has had important positive effects in Ishikawa Prefecture, such as the increase in the number of visitors to the area. However, this development has negatively influenced some industries in Ishikawa. In particular, the number of airline passengers between Tokyo (Haneda Airport) and Ishikawa (Komatsu Airport) has decreased after the opening, and the number of Komatsu–Handa (KH) flights also decreased from 12 flights per day before 2014 to 10 flights per day after 2016.

Because planners expected the reduction in the number of KH flights and implemented various measures to maintain the level of service offered. Such measures have ensured the operation of 10 KH flights per day at present, but the expansion of the Hokuriku Shinkansen to Tsuruga (Fukui Prefecture, next to Ishikawa Prefecture) from Kanazawa in the spring of 2023 may cause further negative impacts on the number of flights and passengers. However, accidents in the Hokuriku Shinkansen in those areas could result in the train shutting down for many days—a real problem that already occurred in 2019. Therefore, KH flights are expected to be continued due to risk management concerns about the area's transportation system and the related economic aspects.

Based on the validity of KH flights, this paper analyzes the effects on KH flights influenced by the Hokuriku Shinkansen Kanazawa opening and the extension to Tsuruga.

2. Features of the Hokuriku Shinkansen Kanazawa Opening

The Hokuriku Shinkansen Kanazawa opening has had some significant impacts on Ishikawa Prefecture. In general, because Hokuriku Shinkansen improves accessibility to the Kanto area, including Tokyo, it has increased the number of visitors to Ishikawa (and vice versa). The number of visitors in 2014 from the Kanto area was around 21,611,000 people, but that number rose to around 25,018,000 people in 2015, an increase of 3,407,000, or 15.8%. This figure has grown to around 25,000,000 (24,899,000 in 2019) after 2015, compared with around 21,000,000 before 2014 (Figure 1). The difference between the 2015 and 2019 figures indicates that over half of the total increase in visitors to Ishikawa is from the Kanto area, which clearly shows the Hokuriku Shinkansen effect (Table 1).

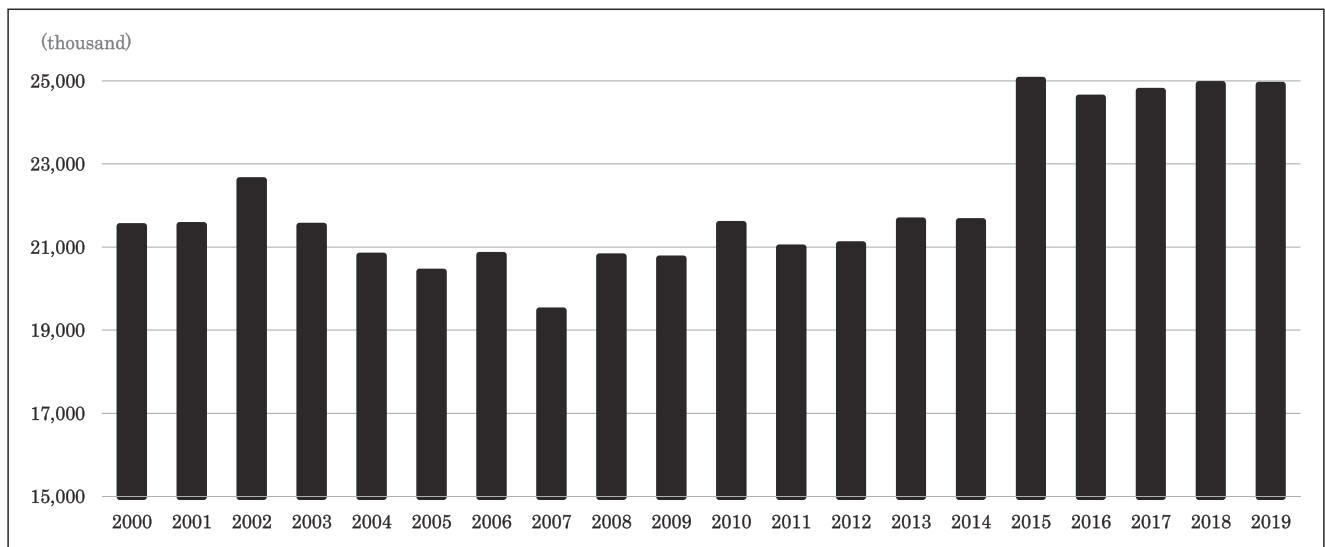


Figure 1 Number of Visitors to Ishikawa from 2000 to 2019

Source: Ishikawa Prefecture [2]

Table 1 Number of Visitors to Ishikawa from Areas in Japan (Thousand People)

	2013	2014	2015		2019	(2014 to 2019) Increase Rate
(Total)	21,631	21,611	25,018		24,899	15.2%
Movement in Ishikawa Pref.	9,590	9,559	9,810		9,507	-0.5%
Toyama Pref.	1,808	1,872	1,956		1,881	0.5%
Fukui Pref.	1,000	997	1,014		931	-6.6%
Kanto Area	2,426	2,419	4,542		4,134	70.9%
Chukyo Area	1,998	1,963	2,003		1,998	1.8%
Kansai Area	2,593	2,521	2,714		2,661	5.6%
Other Areas	2,217	2,280	2,979		3,787	66.1%

Source: Ishikawa Prefecture [2]

3. Effects on Komatsu–Haneda Flights

The Hokuriku Shinkansen Kanazawa opening has also influenced KH flights. As explained in the introduction, there are 10 flights per day at present, but before the Hokuriku Shinkansen Kanazawa opening, there were 12 flights per day. As expected, the Hokuriku Shinkansen Kanazawa opening has led to a significant decrease in the number of KH flight passengers, totaling 1,124,000 in 2015, a 626,000 decrease (35.8%) compared with 2014. There had been roughly 1,500,000 to 2,000,000 passengers until 2014, with the number staying around 1,100,000 after 2015. The decrease rate of the average number between 2015 and 2019 is about 33.3% less compared with the average number between 2010 and 2014.

In Figure 2, the thick line and the dotted line indicate the actual and estimated number of KH flight passengers, respectively, between 2000 and 2019. The numbers from 2015 to 2019 are contingent on the tendency of the number of KH flight passengers between 2000 and 2014 continuing until 2019 based on estimation derived from a regression analysis of the actual number of KH flight passengers between 2000 and 2014. Thus, regarding the real number of flight passengers from 2000 to 2019 in detail (the thick line), it is clear that the number decreased

quickly from 2015 after the Hokuriku Shinkansen Kanazawa opening. However, at the same time, even before 2014, they decreased gradually.

Therefore, comparing the difference between the real and estimated numbers of KH flight passengers from 2015 to 2019, there could be a reduction of about 310,000–440,000 passengers due to Hokuriku Shinkansen Kanazawa opening.

The next analysis concerns the profile of current KH flight passengers. According to questionnaire responses from users of Komatsu Airport who do not live in the Hokuriku area. The Komatsu Airport Association et al [3] conducts the survey every two years (8 times until 2014 from 2000), and the results show that (1) about 33.8% to 43.0% of Komatsu Airport users visit Kanazawa, (2) about 22.8% to 27.6% visit the southern areas of Ishikawa, (3) about 6.5% to 11.7% visit the northern areas of Ishikawa (except the Oku Noto Peninsula area), and (4) about 10.2% to 12.4% visit Fukui Prefecture. Conversely, the results of the same survey conducted in 2016 and 2018 after the Hokuriku Shinkansen Kanazawa opening indicate that (1) about 30.6% in 2016 and 28.9% in 2018 visited Kanazawa, and (2) about 6.8% in 2016 and 5.0% in 2018 visited the northern areas of Ishikawa, which reveals relatively large declines in both numbers. However, (3) about 23.1% in 2016 and 25.4% in 2018 visited the southern areas of Ishikawa, and (4) about 19.7% in 2016 and 22.7% in 2018 visited Fukui, meaning that those two areas are still relatively important for KH flight passengers because the KH flights for those who live in these areas (i.e., the southern areas of Ishikawa and Fukui Prefecture) could still have positive effects regarding time savings compared to the Hokuriku Shinkansen (Table 2).

Because the tendency of KH flight passengers who live in the Hokuriku area is inferred to be the same as those who do not live there, the results of the questionnaires would be the same when those who live in the Hokuriku area are questioned, leading to the estimation that the areas that benefit more from the Hokuriku Shinkansen Kanazawa opening are around Kanazawa and areas along the Shinkansen route, especially the northern areas of Ishikawa. As a whole, it is more convenient for those who live there to use the Hokuriku Shinkansen than Komatsu Airport when they need to go to the Kanto area. For people living in the northern areas of Ishikawa, the travel time to Kanazawa Station is shorter than that to Komatsu Airport, and the cost of the Hokuriku Shinkansen is more reasonable than that of KH flights. However, some people living in the southern areas of the Ishikawa and Fukui areas benefit less from using Hokuriku Shinkansen compared to taking KH flights; thus, some of them might prefer the KH flights to the Hokuriku Shinkansen for travel to the Kanto area.

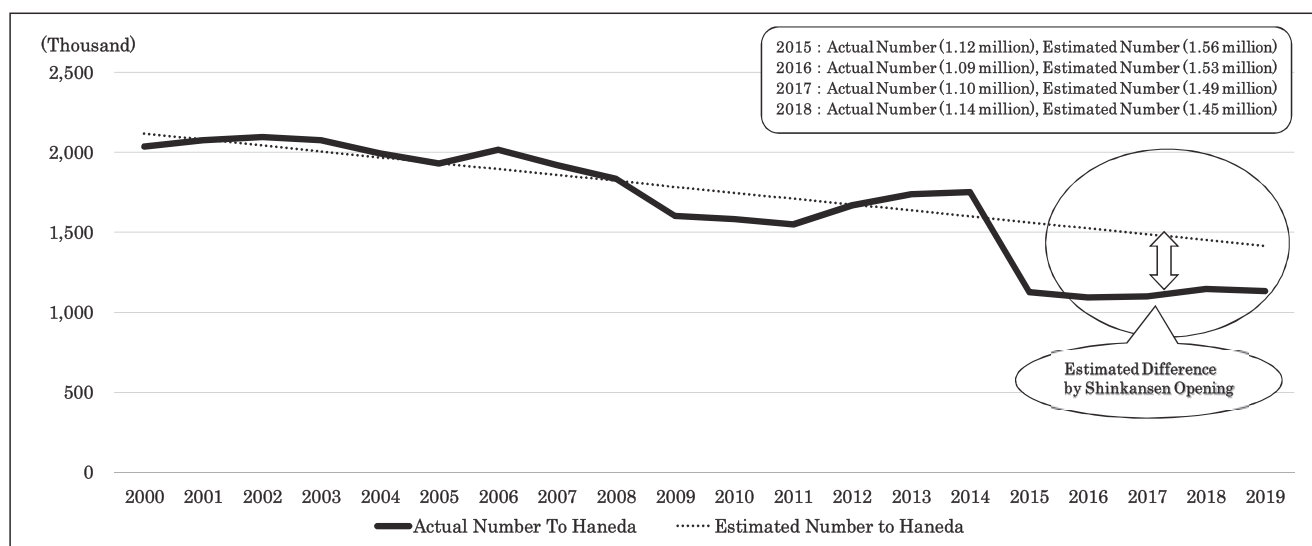


Figure 2 Number of Users of Komatsu Airport from 2000 to 2019

Source: Komatsu Airport Association et al. [3]

Table 2 Questionnaire Responses about Places to Visit by Komatsu–Haneda Passengers

Places/Year	2000	2002	2004	2006	2008	2010	2012	2014	2016	2018
Oku Noto Peninsula	5.4	5.8	4.6	2.8	4.2	3.1	6.0	7.9	9.3	5.8
North Areas of Ishikawa	8.2	11.7	7.4	6.5	7.7	6.5	10.6	7.7	6.8	5.0
Kanazawa	37.7	33.8	36.2	38.7	43.0	42.2	40.7	37.8	30.6	28.9
South Areas of Ishikawa	24.6	27.6	22.8	25.4	26	25.2	23.0	23.8	23.1	25.4
Fukui	11.6	10.8	11.8	11.5	11.8	11.8	10.2	12.4	19.3	22.7
Others	12.4	10.2	17.1	15.1	7.4	11.2	9.5	10.5	10.9	12.1

Source: Komatsu Airport Association et al. [3]

4. Estimation about the Effects of the Hokuriku Shinkansen Tsuruga Expansion

The negative effects regarding the number of KH flight passengers due to the Hokuriku Shinkansen Kanazawa opening seem to have lessened now, but the next turning point will be the Hokuriku Shinkansen Tsuruga expansion, which is going to be launched in the spring of 2023. Because the new stations will be located in the southern areas of Ishikawa and Fukui, some people living around these areas might possibly change the way they travel to the Kanto area, so it may be unavoidable that the number of KH flight passengers will decrease. In that sense, what matters is how many KH flight passengers change their transportation methods. To analyze it, the methods are as follows. First, on the basis of both the actual number of KH flight passengers until 2014 and the estimated number from 2015 to 2019 in the case that the Hokuriku Shinkansen Kanazawa opening had not happened, the number of KH flight passengers was estimated until 2023 by using retrogression analysis. The important point is that the Hokuriku Shinkansen Tsuruga opening will have almost no effect on those who live in Kanazawa and the northern areas of Ishikawa when they go to the Kanto area because the nearest Shinkansen station for them is Kanazawa Station. Moreover, new Shinkansen stations are constructed far from their areas, so those who live in the southern areas of Ishikawa and Fukui will be influenced. Considering those features, the reduction of the number of KH flight passengers would mainly stem from people who live in the southern areas of

Ishikawa and Fukui. Thus, the point is that the number from 2020 to 2022 is estimated from the trend until 2019, but the number of KH flight passengers in both the southern areas of Ishikawa and Fukui in 2023 would be estimated in a different way. That estimation is calculated by adding the reduction of KH flight passengers in the southern areas of Ishikawa and Fukui. However, even if the Hokuriku Shinkansen extends to Tsuruga, the time savings might be less than for people in Kanazawa and the northern areas of Ishikawa, as is indicated in Table 3. Therefore, the estimations were set at three patterns according to such features.

- (1) The decrease rate of KH flight passengers would be 6.5% (one fourth of the decrease in number after the Hokuriku Shinkansen Kanazawa opening) because the time-saving effect is relatively less.
- (2) The decrease rate would be 12.5% (half of the decrease in number after the Hokuriku Shinkansen Kanazawa opening) because the time-saving effect is less, but for some people, using the Hokuriku Shinkansen might be reasonable.
- (3) The decrease rate would be 25% (the same level of decrease in number after the Hokuriku Shinkansen Kanazawa opening) because the time-saving effect is less, but as the present environmental concerns and regional policies might urge people to use the Hokuriku Shinkansen, the reduction could be at the same level as after the Kanazawa opening.

As a result, KH flight passengers in 2023 would be estimated at around 799,000 to 871,000 (Figure 3). Compared

Table 3 Time-Saving Effects to Tokyo by Hokuriku Shinkansen

	Time Saving by Shinkansen (max time saving)
Toyama–Tokyo	3 hours and 23 minutes ⇒ 2 hours and 08 minutes
Kanazawa–Tokyo	4 hours and 01 minutes ⇒ 2 hours and 28 minutes
Fukui–Tokyo	3 hours and 25 minutes ⇒ 2 hours and 53 minutes
Tsuruga–Tokyo	2 hours and 51 minutes ⇒ 3 hours and 17 minutes

1) In the case of Tsuruga, passengers still save time when using the Tokaido Shinkansen via Maibara Station even if the Hokuriku Shinkansen directly reaches Tokyo.

Source: Fukui Prefecture [1]

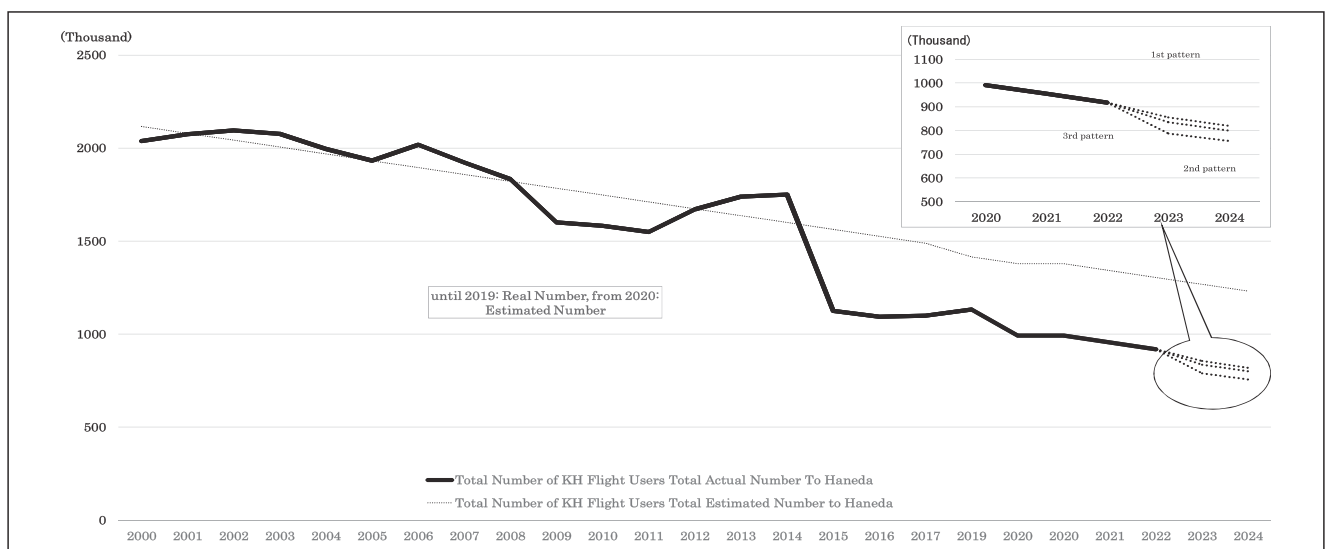


Figure 3 Estimated KH Flight Passengers after the Hokuriku Shinkansen Expansion to Tsuruga

Source: Komatsu Airport Association et al. [3]

Table 4 Number of Komatsu–Haneda Flight Passengers

	Average Number of Passengers per Flight between 2010 and 2014	Average Number of Passengers per Flight between 2015 and 2019	Estimated Number of Passengers and Flights in 2023 (Komatsu - Haneda)
Komatsu - Haneda	1,657,418 (378.4 per Flight)	1,118,290 (306.0 per Flight)	799,000 to 1,070,000 [7 to 10 Flights] (300 per Flight)

1) The number of KH flights is 12 between 2010 and 2014.

2) The number of KH flights is 10 between 2016 and 2019.

Source: Komatsu Airport Association et al. [3]

with the actual number of KH flight passengers in 2019, the decrease rate could be 261,000 to 333,000. Though the estimated damage might be less than the decrease after the Hokuriku Shinkansen Kanazawa opening, it could be reduced from 49.8% to 45.7% compared with the actual number in 2014.

On the basis of these estimations, it can also be estimated how many KH flights per day are available. According to the calculation of the number of KH flight passengers per flight from the actual number of KH flight passengers, a KH flight at present has about 300 users per flight on average (Table 4). When this number is applied to the three analyzed patterns, seven to eight flights (actually 7.3–8.0 in the calculation) are possible if 300 passengers are boarding on average. This means that there could be a three-flight reduction, at most, in the number of present KH flights. Indeed, it could be said that there is some difference in the number of KH flight passengers based on the flight schedule, but if it is not possible to avoid letting the Hokuriku Shinkansen Tsuruga expansion reduce the number of KH flight passengers, it is important to react to that situation properly and to implement an appropriate policy that could decrease the negative effects on KH flights.

5. Conclusion

In this paper, the effects of the Hokuriku Shinkansen Kanazawa opening on KH flights and KH flight passengers were analyzed, as well as how the Hokuriku Shinkansen Tsuruga expansion will influence KH flights. The results indicate that the Hokuriku Shinkansen Kanazawa opening has encouraged many KH flight passengers to use the Hokuriku Shinkansen. Moreover, the Hokuriku Shinkansen Tsuruga expansion, which is going to be launched in the spring of 2023, might lead more KH flight passengers to use the Hokuriku Shinkansen, and the number of estimated KH flight passengers could decrease, on average, to 40%, compared to the 60% level before 2014. Furthermore, regarding the number of KH flights, there could be a reduction to seven flights a day, compared with the present 10 flights or the 12 flights in 2014 and before.

Therefore, if the present number of flights is thought to be reasonable, some policies need to be adopted. In addition, compared with the situation before the Hokuriku Shinkansen Kanazawa opening, the fact that the total of over 600,000 KH flight passengers per year decreased (in the case of a comparison between the numbers in 2014 and 2019) means nearly a daily decrease of 1,700 passengers who do not use the facilities at Komatsu Airport, simply speaking. Not only do many organizations (e.g., restaurants and souvenir shops) in Komatsu Airport lose sales, but many transportation systems (e.g., taxis and buses) generate less revenue, weakening the area's economy.

Therefore, to minimize the negative effects on KH flights, concrete policies should be introduced promptly for organizations and workers related to Komatsu Airport. Additionally, because the area's population has decreased gradually, it could become more difficult to maintain the number of KH flights. Thus, more effective policies—including increasing the area's population—are necessary to maintain the number of KH flights, as well as improvements to the airport itself to attract people.

References

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- [2] Tourism Promotion Strategy Department, Ishikawa Prefecture, "Tourism Statistics of Ishikawa,"
- [3] Komatsu Airport Association and Komatsu Airport Internationalization Committee, "Outline of Komatsu Airport," Annual Reports, 2000–2019.

