An Economic Impact Analysis of a Sport Event using Big Data: The Case of Chuncheon Marathon

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Abstract

Sporting events have a significant social and economic impact on the host community. The purpose of this study was to assess the economic impact of the Chuncheon Marathon in Korea. Input-output analysis was used to assess the event's economic impact. Big data on card transactions were collected by setting the area around the gathering place and the marathon finish line for each event day. A total of 1,983,722 card transaction cases were collected for the analyses. The card transaction amount increased by 1.6 billion KRW in 2017 compared to 2016, but in 2018, it decreased by 1.4 billion KRW from 2017. The national input-output table published in 2015 by the Bank of Korea was used to calculate the economic impact of the event from 2016 to 2018. The results showed spending patterns during the event and the economic impact of the sporting event based on big data of card transactions. Practical implications based on the results are provided in the form of hosting multiple date marathon events and developing marketing plans with an emphasis on local participants to produce more food, beverage, and lodging revenues.

Key words: economic impact, sporting events, big data, input-output analysis, card transactions, spending patterns

Introduction

From as early as the 1990s, analysis of the effects of mega-events held in the urban district were topics of study and gained popularity from the late 1990s (Hiller, 1990; Müller & Gaffney, 2018). A sport event has an important social and economic impact on the host community because of a large number of visitors from other cities and countries (Preuss, 2005). Communities host a sport event in order to stimulate the local economy, entertain the community, and provide an opportunity to enhance community pride (Turco, 1998). Among three reasons, the economic impact can be the most important reason because a lot of studies have shown most sport events have a significant economic impact on the host communities (Barandela et al., 2018; Crompton & Lee, 2000; Gibson et al., 2012; Kwiatkowski, 2016; Mondello & Rishe, 2004). In order to analyze the effect that mega-events have on urban districts, studies have constantly used the term economic impact, which is defined as "the net economic change in the income of host residents that results from spending by visitors from outside the community" (Crompton, 2006, p. 71). Put it another

way, early studies set the goal of the economic impact analysis to predict the result of economic activities from mega-events based on the new demands that occur from visitors outside the district and the supply that the district where sporting mega-events (SMEs) is occurring needs to provide to meet the demands (Porter & Fletcher, 2008).

While there are a variety of fields of studies that analyzed the economic impact of mega-events (Agha & Rascher, 2016; Cabras et al., 2020; Hassan & Connor, 2007; Roche et al., 2013; Wolfe et al., 2022), sports management academia also has been keen to analyze the economic impact and legacy of sporting mega-events (e.g., Olympic Games, FIFA world cup, EURO Soccer Championship etc.). Especially assessing the single sporting mega-events, particularly the Summer Olympic Games, has been a major topic of study in sports management academia (Essex & Chalkley, 1998; Gold & Gold, 2016; Kassens-Noor, 2012; Li & Jago, 2013; Poynter et al., 2015; Viehoff & Poynter, 2016). The main focus of assessing the economic impact of SMEs constantly focused on providing the numbers of new jobs, changes in residents' (taxable) income, and wages (Matheson, 2006).

Yet, assessing the economic impact of comparatively medium or small sporting events has also been a topic of studies in sports management academia (Barandela et al., 2018). Topics of medium or small sporting events studies, such as assessing the economic impact and social impact of the events(Cobb & Olberding, 2007; Salgado-Barandela et al., 2023), were similar to those of studies that dealt with the economic impact of sporting mega-events (Barajas et al., 2016; Taks, 2013; Wilson, 2006). Barandela et al. (2018) found that small and medium-sized sporting events are relatively easy to host and manage, require a relatively low budget because they can utilize existing facilities, and are less crowded, so they can use tourism resources in less famous venues. Thus, it was a good opportunity to activate tourism in less famous cities using a small and medium-sized sporting event. However, there is

also a view that local governments may have a negative impact rather than revitalization of the local economy, as there are cases where local governments host sports events based on qualitative evaluations such as political causes without reviewing the economic ripple effect (Lee, 2007) and those events may lead to inflated multipliers and overestimated economic impact (Matheson, 2009). In Korea, relatively a lot of studies on the economic impact of small and medium sporting events have been conducted, such as the national youth soccer tournament (Cho, Hong, & Shin, 2019), Chuncheon world leisure games (Moon & Song, 2012), and KLPGA(Korean ladies professional golf association) tour (Shin et al., 2019). Barandela et al.'s (2018) study provided the benefits of holding a medium or small sporting event less difficulty in the management of an event, fewer budgets requirement to organize an event, presenting opportunities for districts that are less popular tourist destinations, contribution to a better distribution of tourism, and opportunities to utilize the extant sporting facilities in town.

Chuncheon marathon is the biggest marathon event in Korea and the paramount regular sport event in the city of Chuncheon. It began in 1946, and more than 20,000 national and international marathoners have participated in this event since 2003. In addition, the Chuncheon marathon became the world's top 10 marathon event based on the number of finishers (17,883) in 2006. A total of 25,222 marathoners, including 19,886 men and 5,336 women, participated in the event in 2018, and 64.1% of them signed up for the full marathon course. Yet, although it was found valuable to assess the economic impact of the event as a medium sized sporting event, the Chuncheon marathon, even with its history and popularity, was not dealt with in the previous studies. Hence, the purpose of the current study was to assess the economic impact of the Chuncheon marathon in Korea using big data on credit card use.

Methods

Sporting Mega Events (SMEs) Measurement Tools

There are several methods to measure the economic impact of a sport event, such as multiplier analysis (Archer, 1982), input-output analysis (Leontief, 1986), computable general equilibrium (CGE) modeling, the social accounting matrix (SAM), the direct expenditure approach (DEA), and cost-benefit analysis (CBA) and the input-output analysis is the most widely used approach (Davies et al., 2013).

Multiplier Analysis

Archer (1982) commented on the multiplier analysis, first developed by Kahn (1931), as the 'first detailed model showing the direct and secondary effects of an increase in economic activity on an economy' (p. 238) when the multiplier can be defined as '...a method of assigning a numerical value to this linkage intensity' (Wanhill, 1983, p. 10). For instance, when adopted in analyzing the economic impact of major events, the multipliers represent proportions of changes in economic indicators that commonly include sales, output, income, employment, and value-added (Dwyer et al., 2010; Horwath Tourism & Leisure Consulting and World Tourism Organization, 1981) that occur due to the change of demand evoked from tourism (Li & Jago, 2013). Hence, multiplier analysis is one of the common tools that has been used in the past that evaluate the economic impact of various fields including beer festival(Cabras et al., 2020), and mega sport events in the forms of explaining how the economy can be stimulated by not only direct spending made by visitors but also through indirect and induced impacts from the visitors' spending (Hodur & Leistritz, 2007).

Computable General Equilibrium Models

According to Starr (1997), the computable general equilibrium (CGE) model refers to an applied economic methodology designed to assess the economy by considering all involved economic markets simultaneously. Dwyer et al. (2005) explain why CGE is being supported much by academia:

> Proponents of CGE modeling point out that those economy-wide, interactive effects should be taken into account in determining the impacts of increased tourism expenditure on a destination. Resource supplies are constrained, and greater resource requirements in one part of the economy will lead to lower use, and output, in other parts of the economy. Prices for goods and services that are used as inputs will be bid up, discouraging production elsewhere in the economy. When there is an increase in spending in the economy from visitors from abroad, the exchange rate will be bid up, discouraging exports and economic activity in other parts of the economy (p. 353).

Compared to Input-Output modeling, CGE models' assumptions are more acceptable than those of I-O modeling as CGE models accept that there are limits on resources (e.g., land, labor, and capital) when I-O models do not consider that limitation. Furthermore, CGE models also consider that wages or prices can be changed over time, whereas I-O models are utilized assuming no changes in wages or prices (van Sinderen & Roelandt, 1998; Yao & Liu, 2000; Harrison et al., 2000). Hence, compared to I-O models, negative effects of the events can be captured more properly when CGE models are utilized (Jago & Dwyer, 2006), thus allowing the researcher to base their studies on more realistic assumptions and produce more realistic results (Dwyer et al., 2005).

Input-Output Models

According to Leontief (1986), an Input-Output (I-O) analysis can be defined as '...a method of systematically quantifying the mutual interrelationship among the various sectors of a complex economic system' (p. 19). I-O analysis is a method to quantitatively analyze the interrelationships between industries through the production and trading of numerous goods and services within the national economy (Bank of Korea, 2015). It gained popularity thanks to its simplicity in usage and calculation and the estimation of the effects being

easy to interpret and communicate for policymakers (Mules, 1999). Some studies are using I-O analysis to measure the economic impact of sport events (Cho et al., 2019; Donnelly et al., 1998; Kim, 2007; Kwon et al., 2016; Regan, 1991; Wang, 1997) and other events (Hodur & Leistritz, 2007).

However, according to Dwyer et al. (2005), I-O analysis is not free from limitations. The aforementioned authors agree that I-O analysis can calculate the approximate increase of economic activities related to changes in people's spending in tourism, such as changes in direct spending and extra output from relevant industries (e.g., supplier industry). Yet, the authors point out that I-O analysis assumes that the resources needed to promote the economic activities in the tourism and related industries stream to the market freely and do not cause any changes in industries outside the tourism and related industries. Hence, I-O analysis tends to overestimate the positive effect, albeit ignoring the negative effect that an event can have on districts (Dwyer et al., 2005). Early studies mentioned that I-O analysis utilizes an incomplete economy model, which makes it inappropriate to assess the economic impact of an event (Dixon & Parmenter, 1996; Partridge & Rickman, 1998; Harrison et al., 2000; Fossati & Wiegard, 2001). Nevertheless, for a medium to a small event in a small city, Input-output analysis (I-O analysis) may be appropriate to assess the economic impact because the overestimation of the economic impact is "not likely to be too large at this level of analysis" (Dwyer et al., 2006, p.61). Hence, I-O analysis was selected as the most appropriate technique for this study since the Chuncheon Marathon is a medium-sized event held in a small city; Chuncheon's population is slightly less than 300,000 compared to Seoul, the capital of Korea, over 9 million (Statistics Korea, 2021).

Data Analysis

Usually, to measure the economic impact of a sport event using the I-O analysis, a survey should be conducted. However, since it is very difficult to conduct surveys in open spaces such as marathon and cycling events, there was little research on the economic impact

studies for marathon and cycling events (Barajas et al., 2016). Due to this reason, the current study used big data of card transactions to measure participants' and spectators' spending during the Chuncheon Marathon event instead of a survey. S card was selected to collect data because S card has 2.4 million merchants and 24 million members, 70% of the economically active population. It also has the number one market share and represents 200 million monthly card transactions times. Data on card transactions were collected by setting the area around the national basic area where the Gongjicheon amusement park, which is the gathering place and the finish line of the Chuncheon Marathon for each event day in 2016, 2017, and 2018. Data were analyzed by using SPSS 24.0, and descriptive statistics and frequency analyses were conducted.

The I-O table is a statistical table that analyzes the production and disposal of all real transactions that took place within the national economy for one year (Bank of Korea, 2015). It is prepared and published through actual measurement every five years by the bank of Korea. Partial surveys are conducted to revise and supplement the data, and an extension table is additionally published. In this study, the national I-O table published in 2015 was used to calculate the total production inducement, the total added value inducement, and the total employment inducement from the Chuncheon Marathon event.

Since the sport event industry is not classified into the exact economic sectors in the input-output table published by the Bank of Korea, the table was reclassified according to the judgment of the researchers by referring to the classification of the tourism industry. As a result, foods, beverages, beauty, health, sport/ leisure, hotels, gas, transportation, entertainment, retail stores, and other services were categorized into nine sectors such as 1) foods, beverages, and lodging, 2) arts, sports and leisure, 3) wholesale and retail, 4) education, 5) health and social services, 6) insurance and finance, 7) ICT and broadcasting, 8) transportation, 9) other services. Table 1 shows the production inducement coefficient, the value added inducement coefficient, and the employment inducement coefficient published by the Bank of Korea in 2015.

Table 1. The Bank of Korea Industry Index Table for 2015

Industry Sector	Production inducement coefficient	The value added inducement coefficient	Employment inducement coefficient
Foods, beverages, and lodging	2.148	0.824	11.5
Arts, sports and leisure	1.763	0.885	9.4
Wholesale and retail	1.725	0.887	11.4
Education	1.522	0.920	13.2
Health and social services	1.727	0.833	15.7
Insurance and finance	1.646	0.927	7.6
ICT and broadcasting	1.689	0.870	8.1
Transportation	1.692	0.663	8.5
Other services	2.744	0.834	9.0

Results

A total of 1,983,722 card spending cases were collected for the event from 2016 to 2018. The ratios of local residents to visitors were 60.5% to 39.5% in 2016, 64.1% to 35.9% in 2017, and 65.6% to 34.4% in 2018. The card sales amounts were 3.3 billion KRW for local residents and 2.15 billion KRW for visitors in 2016, 4.56 billion KRW for residents and 2.55 billion KRW for visitors in 2017, and 3.69 billion KRW for residents and 1.93 billion KRW for visitors in 2018. The amount of card use increased by 1.6 billion KRW in 2017 compared to the previous year, but in 2018 it decreased by 1.4 billion KRW from the previous year.

The results showed the sales rankings by industry sectors from 2016 to 2018. Foods, beverages, and lodging accounted for the largest portion of the sales, followed by wholesale and retail, arts, sports and leisure, transportation, health and social services, and education in the order. Overall spending increased in 2017 compared to 2016 but decreased in 2018. As a result of the analysis, the total spending of visitors and residents for the Chuncheon Marathon was 5,456,923,888 KRW in 2016, 7,111,217,996 KRW in 2017, and 5,626,555,352 KRW in 2018.

<Table 4>, <Table 5>, and <Table 6> show the results of analyzing the production inducement effect, added value inducement effect, and employment inducement effect in 2016, 2017, and 2018 using the 2015 I-O table published by the Bank of Korea. The production inducement effect of the 2016 Chuncheon Marathon in <Table 4> was 10,589,844,384 KRW in total. Specifically, 'foods, beverages, and lodging' showed the highest figure at 4,738,405,566 KRW, followed by 'wholesale and retail' at 2,724,043,169 KRW, 'art, sports and leisure' at 1,202,348,139 KRW, 'transportation' at 1,028,977,531 KRW, 'other services' at 662,505,573, and health and social services' in the order of 169,348,508 KRW. As a result of calculating the added value inducement effect, the added value inducement effect due to the 2016 Chuncheon Marathon was found to be 4,547,021,611 KRW in total. Specifically, 'foods, beverages, and lodging' showed the highest figure at 1,817,712,377 KRW, followed by 'wholesale and retail' at 1,400,710,893 KRW, 'art,

Table 2. Spending of residents and visitors in 2016, 2017, and 2018   (KRW)

	Residents	Visitors	Total
2016	3,302,552,851	2,154,371,037	5,456,923,888
2017	4,560,041,688	2,551,176,308	7,111,217,996
2018	3,692,726,570	1,933,828,782	5,626,555,352

Table 3. Spending in 2016, 2017, and 2018 (KRW)

Industry Sector	2016	2017	2018
Foods, beverages, and lodging	2,205,961,623	2,352,774,235	2,228,842,331
Arts, sports and leisure	681,989,869	743,378,841	644,969,532
Wholesale and retail	1,579,155,460	2,648,659,349	1,732,182,162
Education	42,041,640	879,786,706	28,969,723
Health and social services	98,059,356	182,319,289	97,753,861
Insurance and finance	-	145,881,794	-
ICT and broadcasting	135,300	158,271,382	99,200
Transportation	608,142,749	146,400	727,895,239
Other services	241,437,891	-	165,843,304
Total	5,456,923,888	7,111,217,996	5,626,555,352

sports and leisure' at 603,561,034 KRW, 'transportation' at 403,198,643 KRW, 'other services' at 201,359,201, and health and social services' in the order of 81,683,444 KRW. As a result of analyzing the employment inducement effect of the 2016 Chuncheon Marathon was found to be 59.2 people in total. 'Foods, beverages, and lodging' had 25.4 persons, 'wholesale and retail' had 18.0 persons, 'art, sports and leisure' had 6.4 persons, 'transportation' had 5.2 persons, and 'other services' had 2.2 persons.

As a result, the production inducement effect of the 2017 Chuncheon Marathon in <Table 5> was 13,094,863,615 KRW in total. Specifically, 'foods, beverages, and lodging' showed the highest figure at

5,053,759,057 KRW, followed by 'wholesale and retail' at 4,568,937,377 KRW, 'education' at 1,339,035,367 KRW, 'art, sports and leisure' at 1,310,576,897 KRW, health and social services' at 314,865,412 KRW, 'ICT and broadcasting' at 267,320,364 KRW, and 'insurance and finance' in the order of 169,348,508 KRW. The results indicated that the added value inducement effect due to the 2017 Chuncheon Marathon was found to be 6,180,238,412 KRW in total. Specifically, 'wholesale and retail' showed the highest figure at 2,349,360,843 KRW, followed by 'foods, beverages, and lodging' at 1,938,685,970 KRW, 'education' at 809,403,770 KRW, 'art, sports and leisure' at 657,890,274 KRW, health and social services' at

Table 4. The economic impact analysis of Chuncheon Marathon in 2016

Industry Sector	Production Inducement effect (KRW)	Value added inducement effect (KRW)	Employment inducement effect (Persons/1B KRW)
Foods, beverages, and lodging	4,738,405,566	1,817,712,377	25.4
Arts, sports and leisure	1,202,348,139	603,561,034	6.4
Wholesale and retail	2,724,043,169	1,400,710,893	18.0
Education	63,987,376	38,678,309	0.6
Health and social services	169,348,508	81,683,444	1.5
Insurance and finance	-	-	-
ICT and broadcasting	228,522	117,711	0.0
Transportation	1,028,977,531	403,198,643	5.2
Other services	662,505,573	201,359,201	2.2
Total	10,589,844,384	4,547,021,611	59.2

Table 5. The economic impact analysis of Chuncheon Marathon in 2017

Industry Sector	Production Inducement effect (KRW)	Value added inducement effect (KRW)	Employment inducement effect (Persons/1B KRW)
Foods, beverages, and lodging	5,053,759,057	1,938,685,970	27.1
Arts, sports and leisure	1,310,576,897	657,890,274	7.0
Wholesale and retail	4,568,937,377	2,349,360,843	30.2
Education	1,339,035,367	809,403,770	11.6
Health and social services	314,865,412	151,871,968	2.9
Insurance and finance	240,121,433	135,232,423	1.1
ICT and broadcasting	267,320,364	137,696,102	1.3
Transportation	247,709	97,063	0.0
Other services	-	-	0.0
Total	13,094,863,615	6,180,238,412	80.0

151,871,968 KRW, 'ICT and broadcasting' at 137,696,102 KRW, and 'insurance and finance' in the order of 135,232,423 KRW. The employment inducement effect of the 2016 Chuncheon Marathon was found to be 81.1 people in total. 'Wholesale and retail' had 30.2 persons, 'foods, beverages, and lodging' had 27.1 persons, 'education' had 11.6 persons, 'art, sports and leisure' had 7.0 persons, 'health and social service' had 2.9 persons, 'ICT and broadcasting' had 1.3 persons, and 'insurance and finance' had 1.1 persons.

The production inducement effect of the 2018 Chuncheon Marathon in <Table 6> was 10,812,401,997 KRW in total. Specifically, 'foods, beverages, and lodging' showed the highest figure at 4,787,553,327 KRW, followed by 'wholesale and retail' at 2,988,014,229 KRW, 'art, sports and leisure' at 1,137,081,285 KRW, 'transportation' at 1,231,598,744 KRW, 'other services' at 455,074,026, and health and social services' in the order of 168,820,918 KRW. As a result of calculating the added value inducement effect, the added value inducement effect due to the 2018 Chuncheon Marathon was found to be 4,672,884,969 KRW in total. Specifically, 'foods, beverages, and lodging' showed the highest figure at 1,836,566,081 KRW, followed by 'wholesale and retail' at 1,536,445,578 KRW, 'art, sports and leisure' at

Table 6. The economic impact analysis of Chuncheon Marathon in 2018

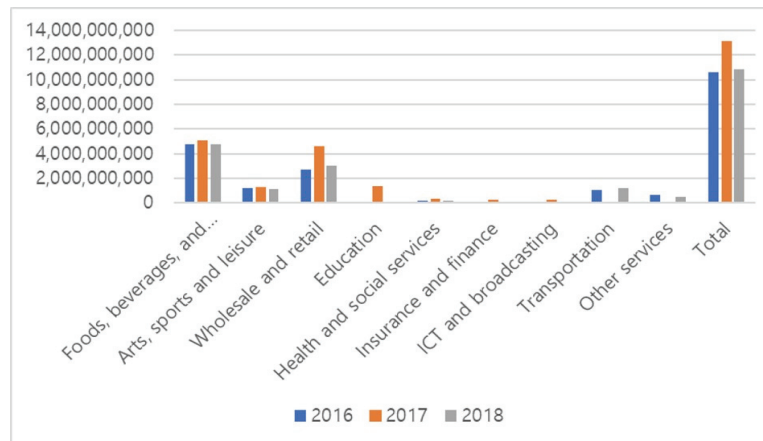| Industry Sector	Production Inducement effect (KRW)	Value added inducement effect (KRW)	Employment inducement effect (Persons/1B KRW)
Foods, beverages, and lodging	4,787,553,327	1,836,566,081	25.6
Arts, sports and leisure	1,137,081,285	570,798,036	6.1
Wholesales and retail	2,988,014,229	1,536,445,578	19.7
Education	44,091,918	26,652,145	0.4
Health and social services	168,820,918	81,428,966	1.5
Insurance and finance	-	-	-
ICT and broadcasting	167,549	86,304	0.0
Transportation	1,231,598,744	482,594,543	6.2
Other services	455,074,026	138,313,316	1.5
Total	10,812,401,997	4,672,884,969	61.0

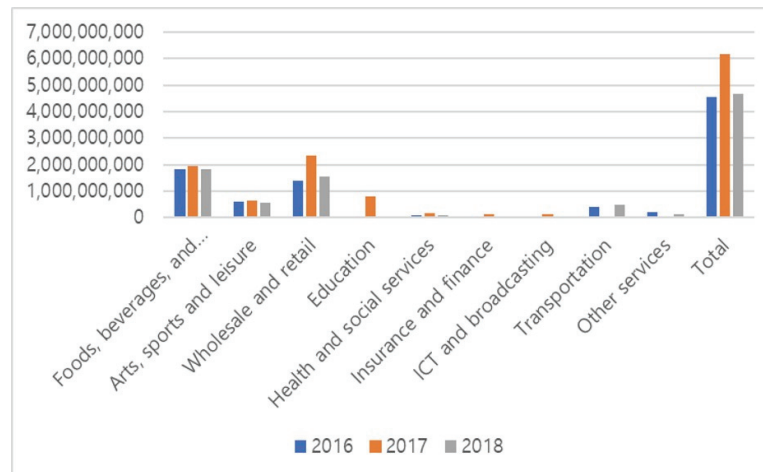**Figure 1.** Production inducement effect graph.

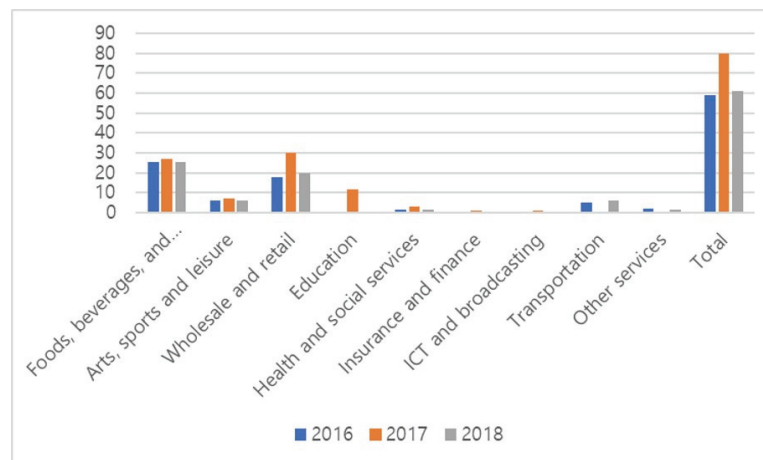**Figure 2.** Value added inducement effect graph.

Figure 3. Employment inducement effect graph.

570,798,036 KRW, 'transportation' at 482,594,543 KRW, 'other services' at 138,313,316, 'health and social services' at 81,428,966 KRW, and 'education' in the order of 26,652,145 KRW. As a result of analyzing the employment inducement effect of the 2018 Chuncheon Marathon was found to be 61.0 persons in total. 'Foods, beverages, and lodging' had 25.6 persons, 'wholesale and retail' had 19.7 persons, 'art, sports and leisure' had 6.1 persons, 'transportation' had 6.2 persons, 'education' had 1.5 persons, and 'other services' had 1.5 persons.

The results showed that the induced production effects of the event in 2016, 2017, and 2018 were 10.59 billion KRW($8.17M), 13.09 billion KRW($10.1M), and 10.81 billion KRW($8.34M); the induced value-added effects were 4.55 billion KRW($3.5M), 6.18 billion KRW($4.77M), and 4.67 billion KRW($3.6M); and the induced employment effects were 59.2, 80.0, and 61.0 persons, respectively. Compared to 2016, in 2017, the production inducement effect, value-added inducement effect, and employment inducement effect all increased, but in 2018, all decreased to the level of 2016.

Discussion

The purpose of this study was to analyze the economic impact of hosting the middle-sized sport event, specifically Chuncheon Marathon in Korea. The economic impact of the event was analyzed by scrutinizing the spending patterns by industry sectors based on the card transaction data of visitors and residents during the Chuncheon Marathon from 2016 to 2018. Furthermore, the ripple effect of the sport event on the local economy was analyzed using the I-O analysis method. As a result of the analyses, the Chuncheon Marathon, which is held every year, shows that the overall spending of participants and spectators, including residents and visitors, increased in 2017, compared to 2016 but in 2018, spending decreased to the level of 2016. When the spending of residents and visitors is compared, it was found that the overall spending of local residents was much higher for three years, and spending of local residents continues to

increase. Since local runners participate in their hometown marathon as a substitute to participate in an out-of-town marathon, it should be noted that local marathon runners are an important part of the marathon event (Cobb & Olberding, 2007). Spending of local residents and visitors generated during the event was found to have a positive effect on production, added value, and employment in the Chuncheon area. The results of the study share the findings from the previous studies (Kim, 2007; Kim et al., 2017; Kwon et al., 2016; Nam et al., 2013), hence, supporting the results of studies that spending of local residents and visitors during sports events develops the local economy and furthermore causes economic ripple effects to other related industry sectors. According to the results of the study, although the Chuncheon marathon had a positive economic ripple impact on the local economy, it was found that relatively small economic effects occurred compared to other small and medium size sport events because it was a one-day sport event despite the fact that over 20,000 people participated in the event. One explanation for this result may be that accommodation costs were relatively low because Chuncheon is close to Seoul, the capital of Korea, by an hour's distance.

Next, in order to measure the economic effects of sporting events, previous studies not only depended on participants, coaches, and visitors' estimation of consumption expenditure based on their memories of spending but also the approximate number of visitors was estimated, which then, the overall economic impact of the event was measured (Cho et al., 2019; Kim, 2007; Kim, 2014; Kim et al., 2017; Kwon et al., 2016; Park & Seol, 2011). However, in this study, for more detailed estimation, card transaction data were collected and analyzed for the national basic district, including Gonjicheon park, where the marathon started and finished. National Basic District means 'an area that is divided into areas smaller than the area of Eup/Myeon/Dong based on road names and addresses with certain boundaries determined' (Jang & Kim, 2020), and card transaction data were collected around the Gonjicheon park. Therefore, it is significant that the economic effect was estimated through big data analysis based on actual transaction data rather than

a consumption estimation method that relied on the memory of the survey respondent. However, although the estimate was made based on the transaction details of S card Company, which has the largest share in the domestic market, there are limitations of the research because not all card transactions were included, and details of cash transactions were not included. However, in the case of surveys, there may be cases where the spending details of participants, parents, and visitors are overestimated due to double calculations (Cho et al., 2019). Still, this study did not overestimate the spending of participants and visitors because it analyzed actual transactions.

Usually, many studies on the economic ripple effect of sporting events analyze data from one year of consecutive events (Cho et al., 2019; Kim, 2007; Kim, 2014; Kim et al., 2017; Kwon et al., 2016; Park & Seol, 2011; Shin et al., 2019), and most cases of comparing and analyzing the economic effects of various sporting events for one year (Nam et al., 2013), but this study is based on the past three years. Therefore, it shows how the economic effects of sporting events have changed over the past three years based on the data over the years. Therefore, it is meaningful that in-depth analysis and analysis of change is possible rather than a one-time analysis of economic effects based on single-year data.

Consumption expenditure for local sporting events can be seen in most cases estimated based on sporting event-related expenses of the participants and coaches to participate in the sporting event, local and out-of-town visitors to watch the event, and the organizing committee to hold the event (Cho et al., 2019; Nam et al., 2013; Park et al., 2017; Shin et al., 2019;). However, there is a possibility that the economic ripple effect of the event may have been underestimated since this study did not include the cost of hosting the sport event, and the cost of the organizing committee for holding the event was not included. It is suggested that future research should consider this limitation to measure the more precise economic impact of a sport event. In addition, although card transaction history data was collected for the national basic area, including the park and the start and finish line of the marathon, it

is possible that visitors' consumption occurred in other areas that cannot be ruled out. On the other hand, it is assumed that visitors and local residents visited and spent consumption in the Gongjicheon park area to participate in the Chuncheon marathon. Still, there is a possibility that consumption occurred by visiting the area regardless of the Chuncheon marathon. According to a study by Agha and Taks (2018), when a mega sport event is held, local residents may stay at home or go out to avoid congestion due to the event. It was pointed out that measuring economic effects without spending can be erroneous. Therefore, this study has great significance in that it tracked the consumption expenditure of both local residents and visitors, focusing on the national basic district.

Based on the results of the study, the authors suggest the following practical implications. First, since this study highlighted the economic impact of hosting a mid-scale marathon event in a small city, the authors suggest planning this event as a multiple-day event. More specifically, the data from this study has shown that the highest economic impact of hosting the Chuncheon Marathon came from food, beverages, and lodging. This implies that if the event can be held over multiple days, rather than as a single-day event, the economic impact of hosting the event may become even stronger. While this is not a common form in South Korea, there are cases in the U.S., such as the Covenant Health Knoxville Marathon, which hosts fun runs (e.g., a kids run, 5 K, etc.) on the day before the actual race. Moreover, the St. Jude Memphis Marathon also hosts its event on multiple dates, featuring expo events before the race dates and inviting participants who have committed to raising a certain amount of funds as part of the marathon. Therefore, benchmarking these multiple-day formats of marathon events against the Chuncheon marathon may attract more visitors to the city, ultimately leading to a higher economic impact, particularly in the areas of food, beverages, and lodging. Next, the results of this study suggest that the economic impact was higher for locals' spending than for visitors' spending. Therefore, it is suggested that promotions be implemented to attract more local participants to the event. Another foreign case that can be bench-

marked is the Akron Marathon Race Series, which invites local companies to form a team and participate in the marathon, specifically calling it the 'Corporate Challenge.' Participating local companies receive benefits, including company recognition at the event, training materials, and a discount on the race entry fee for qualified companies. Attracting local businesses' participation will lead to a higher number of local residents' involvement, which will result in a higher economic impact, as this study has shown.

Limitations and Future Study Opportunities

Currently, the data used in this study is card transaction data from 2016 to 2018. The marathon was not held from 2019 to 2021 due to COVID-19, but the Chuncheon marathon was held again in 2022. It is suggested that future research should conduct to measure the economic impact of the Chuncheon marathon since 2022 in order to understand how the economic ripple effect of the Chuncheon marathon has changed since COVID-19 and which industry sectors people spend money to participate in the marathon event since COVID-19.

Author Contributions

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Conflict of Interest

The authors declare no conflict of interest.

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