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The Application of User-based Sports Matching System using Customer Satisfaction and Loyalty Analysis for Sports Event Contents

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Abstract

As the perception of sports activities changes positively, the desire and popularity for sports activities are rapidly increasing. Therefore, the popularity of sporting events is also increasing. Previous studies on sporting events have focused only on research in the field of social sciences. Therefore, in this study, in order to increase customer satisfaction and customer loyalty of sports event visitors, they were classified into challenge factors, competition factors, achievement factors, and relationship factors, and their effects on satisfaction and loyalty were studied and analyzed. And based on the research design model and empirical analysis, a user-based sports event matching system was proposed.

1. INTRODUCTION

As the perception of sports activities changes positively, the desire and popularity for sports activities are rapidly growing [1]. Therefore, the popularity of sporting events is also increasing. However, research on sports events has not been able to keep up with the rapidly changing social trends and has been focused only on the field of social science [2]. As the public's interest in ICT is increasing recently, it is considered that convergence research that grafts ICT technology into sports events is necessary [3, 4]. In this study, a questionnaire was conducted and researched on the effect of gamification-applied sports event content on customer satisfaction and customer loyalty. The survey period was conducted for about 3 weeks from March 29, 2021 to April 26, 2021. Due to COVID-19, a total of 200 questionnaires were collected through an online self-filling method. In this study, the elements to be applied to sports event contents were previously studied [5]. There are four elements to be applied: challenge element, competition element, achievement element, and relationship element. As a result of empirical analysis, among the factors applied to sports event contents, the challenge factor, competition factor, and achievement factor had a significant effect on customer satisfaction. And the challenge factor, competition factor, achievement factor, and relationship factor applied to sports event contents had a significant effect on customer loyalty. Customer satisfaction had a significant

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effect on customer loyalty. In this study, a user-based sports matching system case was presented based on the results of previous analysis. Through the suggestion system, users can freely match users using a matching algorithm in a way that gives matching points according to their preferred event and rank score. Section 2 describes the research model and hypothesis, questionnaire composition, and analysis method. Section 3, as an empirical analysis, factor analysis, reliability analysis, and research hypothesis verification were performed. Section 4 describes the agent performance analysis, and finally, Section 5 concludes.

2. RESEARCH DESIGN
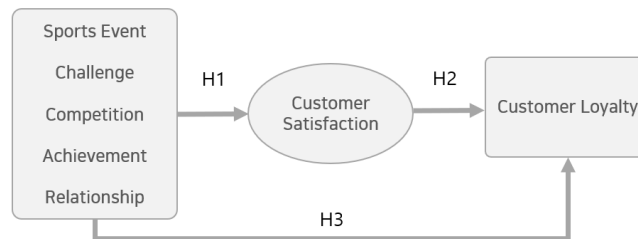
2.1 Research Model and Hypothesis

Figure 1. Research Model

In this study, sub-elements (challenge, competition, achievement, relationship) related to sports event elements were established to investigate the effect of sports event content on customer satisfaction and customer loyalty. The research model for customer satisfaction and customer loyalty was set up as shown in <Figure 1> below.

[H1] Sports event content will have a significant impact on customer satisfaction.
    H1-1: The challenge factor of sports event content will significantly affect customer satisfaction.
    H1-2: Competition factors of sports event content will have a significant effect on customer satisfaction.
    H1-3: The achievement factors of sports event contents will have a significant effect on customer
         satisfaction.
    H1-4: Relational factors of sports event content will have a significant effect on customer satisfaction.
[H2] Customer satisfaction will significantly affect customer loyalty.
[H3] Sports event content will have a significant impact on customer loyalty.

2.2 Questionnaire Composition

The questionnaire composition of this study consists of 16 questions, each of which is a sport event element: challenge, competition, achievement, and relationship. Customer satisfaction (experience, composition, compensation, ease of use) was used by Su-mi Yoon (2018) et al. The loyalty question was revised and supplemented and reconstructed on a Likert 5-point scale. In addition, demographic factors consisted of a total of 30 items with 6 items.

2.3 Data Collection and Analysis Method

From March 29 to April 26, 2021, the self-filling method was used using the online questionnaire for about 4 weeks. A total of 201 questionnaires were collected, 200 copies were used for empirical analysis,

excluding the first one with a large number of missing values. In this study, SPSS 18.0 was used to verify the reliability and validity of surveyed and collected data, reliability analysis and factor analysis were performed to secure reliability and validity, and frequency analysis and causality between each variable were performed to analyze demographic characteristics. Multiple regression analysis was performed to confirm the relationship and test the hypothesis.

3. EMPIRICAL ANALYSIS

3.1　Demographic Characteristics

In terms of demographic characteristics, by gender, 119 men (59.5%) and 81 women (40.5%) were married, 163 unmarried (81.5%), and 37 married (18.5%) by age, 20-29 by age. 143 people aged 143 (71.5%), 40 people 30-39 years old (20.0%), 12 people 50-59 years old (6.0%), and 5 people 40-49 years old (2.5%) were in that order, and occupation was 78 students (2.5%). 39.0%) were analyzed in the order of 57 professional/free workers (28.5%), 17 business/management workers (8.5%), 16 sales/service workers (8.0%), and 12 technical/office workers (6.0%). Educational background was 102 (51.0%) college graduates, 40 graduates (20.0%), college students 37 (18.5%), and 21 high school graduates (10.5%) in that order. %), 57 (28.5%) less than 2 to 3 million won, 24 (12.0%) less than 3 to 4 million won, and 12 (6.0%) more than 4 million won.

3.2　Factor Analysis and Reliability Analysis

3.2.1 Sports Event

Factor analysis of sports events was performed using the principal component factor extraction method and the varimax rotation method. As a result of the test of factor analysis applicability, the KMO measure of standardization adequacy was 0.803, and the result of Bartlett's sphericity test, =2112.120, significance level was .000. It was found to be suitable for factor analysis. Accordingly, the factor names of 'sports event' were composed of 'achievement', 'challenge', 'competition', and 'relationship, respectively, and the result of reliability analysis for each factor was .913, which secured relatively high reliability.

3.2.2 Customer Satisfaction

As a result of testing the applicability of factor analysis of customer satisfaction, the KMO measure of standardization adequacy was 0.757, and the result of Bartlett's sphericity test, = 488.180, significance level of .000, indicating that it was suitable for factor analysis. Accordingly, 'customer satisfaction items were composed of experience, composition, compensation, and convenience of use. As a result of the reliability analysis for each factor, it was .884, which secured relatively high reliability.

3.2.3 Customer Loyalty

As a result of the test of the applicability of factor analysis of customer loyalty, the KMO measure of standardization adequacy was 0.842, and the result of Bartlett's sphericity test, =677.480, significance level of .000, which was suitable for factor analysis. Accordingly, 'customer loyalty items consisted of word of mouth intention, recommendation intention, reuse intention, and revisit intention. As a result of the reliability analysis for each factor, it was .930, which secured relatively high reliability.

3.3   Validation of the research hypothesis

H1. The effect of sports event content on customer satisfaction (Hypothesis 1)

Multiple linear regression analysis was performed to find out whether sports event contents affect customer satisfaction. As a result of the analysis, it can be said that this regression model is suitable as F=139.415 (p<.001), and adj. =0.676, indicating an explanatory power of 67.6%. Among these factors, achievement excluding competition is == 0.604 (p<).001), the conduction is == 0.332 (p<).As 001), the relationship was == 0.148 (p<.001), which had a significant effect on customer satisfaction.

H2. Effect of Customer Satisfaction on Customer Loyalty (Hypothesis 2)

As a result of the analysis of hypothesis 2, it can be said that this regression model is suitable as F = 570.310 (p < .001), and =0.741, indicating 74.1% of explanatory power. Customer satisfaction was β=1.004 (p<.001) and had a significant effect on customer loyalty.

H3. Impact of sports event content on customer loyalty (Hypothesis 3)

As a result of the analysis of Hypothesis 3, it can be said that this regression model is suitable with F=79.213 (p<.001), and adj.=0.611 showed an explanatory power of 61.1%. Achievement is == 0.413 (p<).001), the challenge was ==0.215 (p<.001), the competition was ==0.311 (p<.001), and the relationship was ==0.272 (p<.001), which had a significant effect on customer loyalty.

4. USER-BASED SPORTS MATCHING APPLICATION SYSTEM

4.1   Present system application

In order to investigate the effect of sports event contents on customer satisfaction and loyalty, questionnaires were collected, and research models were presented in Chapters 2 and 3 and empirical analysis was conducted.

Accordingly, it was confirmed that sports event contents had a significant effect on customer satisfaction and customer loyalty, respectively. Chapter 4 presents a user-based sports matching application system based on the research analysis and verification results.
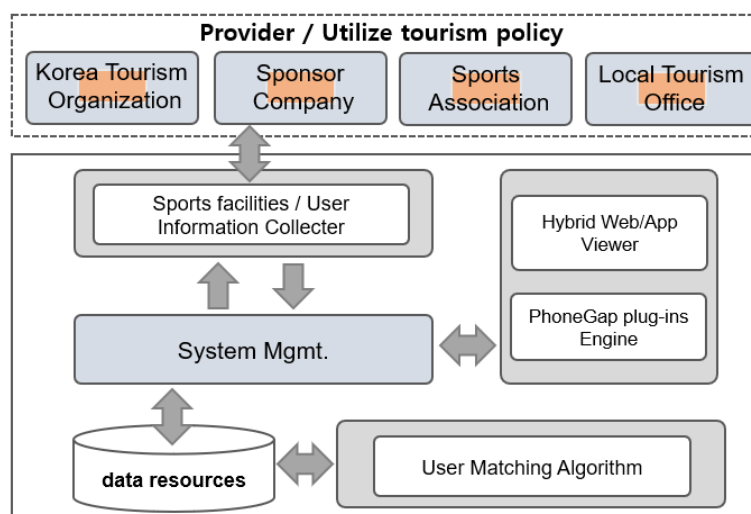

Figure 2. System Configuration

The following is the overall configuration of the system presented in this study in <Figure 2>.

- Providers consist of Korea Tourism Organization, sponsor companies, and sports associations. These providers provide the sports matching system with the location, operating hours, facility information and usage status of sports facilities in real time.
- Hybrid Web/App Viewer and Phone Gap Plug-ins engines can receive necessary information through web/app so that users can use the sports matching system.
- System Mgmt. is the person responsible for the management of the use of the sports matching system and can read and modify the information in the system. It performs tasks such as allocating user accounts and passwords, setting security access levels, and allocating storage space. It also prevents unauthorized access from penetrating naviruses.
- Sports facilities / User Information Collecter collects and refines data so that the information provided by the provider can be used smoothly in the system.
- Utilize tourism policy delivers data from the sports matching system to the Korea Tourism Organization, local tourism offices and sports associations. After identifying popular facilities or events from the received data, it is used as a tourism policy.

4.2 User Matching Algorithm

The user matching algorithm gives a matching score according to the preferred event and rank score [6, 7]. The given matching score is the same as <Figure 3> user_rank _score and desired_item. The algorithm in <Fig 4> first finds users who have selected the preferred event and adds 0, 30, and 40 points to the 'total score' based on the scores of user_rank _score and desired_item <Figure 3>. Then, we find users who have registered 'Rank Score' and add 5, 15, 20, and 30 points to 'Total Score' based on the scores in user_rank_score. Then, the gender and age group of 'User 1' and 'User 2' are checked, and if the information of 'User 1' and 'User 2' in each case matches, 6 points are added to the 'Total Score'. If 'total score' is not 'good', repeat this process from the beginning, and if 'good', register it in the PossibleMatches table.

```
user_rank _score = {
    30: [user1 - user2 <= 3],
    20: [user1 - user2 <= 6],
    15: [user1 - user2 <= 12],
    5:  [user1 - user2 > 12],
}
desired_item = {
    40: [user1:Event1, user2: Event2],
    30: [user1:Event2, user2: Event2],
    0:  [user1:Event1, user2: Event2],
    0:  [user1:Event2, user2: Event1],
}
def isMatch(event, fiends, desired_item):
    for i in range(len(event)):
        if fiends/event[i] == fields/event:
            Add desired_item[0, 30, 40], point of 'TotalScore'
        elif place[i] == 'place':
            Add desired_item[i]
        check3_preferences(Gender, AgeGroup, Exercise period)
```

```
            matching += findUserSolution(user2, number)
            fine the top25% user1(user2) by sorting mathced user1(user2) in ascending order
            matching += findUserSolution(user2, insert)
            matching += findUserSolution(user2, delete)
            if matching is acceptable?(manager)
                    change 'checkmatchstatus'
            else return
        return True


def check3_preferences(Gender, AgeGroup, ExercisePeriod):
    if Gender, AgeGroup, ExercisePeriod == user1 and Gender, AgeGroup, ExercisePeriod == user2:
        Add desired_item[6], TotalScore each cases
        if TotalScore == 'good':
            Save PossibleMatches
        else:
            return


def findUserSolution(user2):
    while(The number of user1(user2) == 1:
        Find_User[user_id]
        if Find_User[user_id, number]:
            insert user1(user2) ID into ? Number of user2 table
        elif Find_User[user_id, insert]:
            insert user1(user2) ID into ? FinalMatches table
        elif Find_User[user_id, delete]:
            delete user1(user2) ID into ? PossibleMatches table

    return Find_User[user_id]
```

Figure 3. Sequence Algorithm

Then, if the number of 'User 2' is 1, 'User 1' is found. Then, the ID is inserted into the 'FinalMatches' table, and the ID of 'User1' is deleted from the 'PossibleMatches' table of 'User1'. If the number of 'User 1' is 1, if it is not 1, proceed again and find the user by sorting the number of matched users from 'PossibleMatches' to the top 25%. Then, in ascending order, the ID of 'User1' is inserted and the ID of 'User1' is deleted from the 'PossibleMatches' table to the 'FinalMatches' table. And the final result is confirmed by the 'manager', and the matching algorithm is made.

5. CONCLUSION

In this study, through the system of the proposed app, it is possible to play sports without a club or a friend belonging to it. In addition, it provides information of sports facilities to users and enables real-time reservation and match matching. The proposed app in this paper presents six ways to use it to promote sports tourism. First, the manager of the app can activate sports tourism by holding sports events by selecting sports with active matching. Second, through sports events, Spumonis can be fostered where sports and cities grow together. Third, the proposed app can be applied to the tour course as a sports experience item for the existing sports tourism course. Fourth, real-time reservation is possible using the proposed app, and user-matching system can be used to provide mobile oriented sports convenience to relieve the inconvenience of

the existing reservation system. As a result, local and private sports facilities may be activated Fifth, the sports activities of users can contribute to the revitalization of the local economy by purchasing sporting goods and food items. Sixth, data generated while using such a user matching system can be analyzed and used to improve tourism content services and establish tourism industry policies.

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