Entertainment Computing 39 (2021) 100442

Contents lists available at ScienceDirect

Entertainment Computing

journal homepage: www.elsevier.com/locate/entcom

Investigating sports behaviors and market in Taiwan for sports leisure and entertainment marketing online recommendations

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ARTICLE INFO

Keywords:
Sports leisure and entertainment marketing
Sports products/service bundling
Sports models of delivery
Data mining
Recommendation systems
Entertainment computing

ABSTRACT

Sports are not only physical and mental activities, but also include leisure and entertainment activities. Sports leisure and entertainment marketing is an element of sports promotion that involves a wide variety of sectors and events in the sports industry. This particular style of marketing is concerned less with using a single strategy and more with using the content of sports, leisure and entertainment to assist online marketing efforts. This study examines the behaviors of Taiwan sports behaviors and market, a total of 1200 valid questionnaire data is organized for a database design. Data mining approach for entertainment computing, including cluster analysis and association rules, is used to determine the sports models of delivery and products. Using cluster analysis, we divide Taiwan sports participants into three clusters and then find each group's profiles. In addition, this study implements a rule-based recommendation approach, association rules, for investigating subjects' sporting as well as leisure and entertainment behaviors in terms of sports leisure and entertainment marketing and personalized recommendations.

1. Introduction

Sports are not only physical and mental activities, but also leisure and entertainment activities. In addition to the sports competition market, the sports commercial market and the sports population are also indispensable industrial developments for sports activities. Through sports, leisure and entertainment, it creates a huge online and offline markets for the sports industry and provides nutrients for the long-term development of professional and amateur sports. Sports leisure and entertainment marketing is a subdivision of marketing that focuses both on the promotion of sports events and teams. The promotion of other products and services through sporting events and sports teams are also developed by sports marketing operators. It is a service in which the element that is promoted can be a physical product or a brand name. The goal is to provide the client with strategies to promote a sport or to promote something other than sports through sports leisure and entertainment activities. Sports leisure and entertainment marketing is also designed to meet the needs and wants of the consumer through exchange processes [1]. These strategies include the traditional four "P"s of general marketing: Product, Price, Promotion and Place. Sports leisure and entertainment marketing involves another four P's that relate to the fact sports are considered to be a service. The additional four P's are Planning, Packaging, Positioning and Perception. The addition of the four extra elements forms the "sports marketing mix" [2]. Sports leisure and entertainment marketing are element of sports promotion that involves a wide variety of sectors in the sports industry, including broadcasting, advertising, social media, digital platforms, competitions, ticket sales, sports learning and community relations [3]. Sports leisure and entertainment marketing are also divided into three sectors. The first involves the advertising of sports and sports associations such as the Olympics, Spanish Football league and the NFL, as well as sports teams like Real Madrid and the New York Yankees. The second involves the use of sporting events, sports teams and individual athletes to promote various products. The third category involves the promotion of sports to the public, in order to increase participation [4].

The benefits of sports leisure and entertainment marketing are wide-ranging. The social media and businesses that promote their products and services through sports also receive benefits. Direct benefits accrue to leagues, teams and athletes that include revenue from tickets, media rights and sponsorship. Cities and countries also receive revenue from taxes and all of the stakeholders gain from the exposure that is provided through sports [5]. However, millennials are switching to new platforms

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https://doi.org/10.1016/j.entcom.2021.100442
Received 23 January 2021; Received in revised form 8 May 2021; Accepted 20 June 2021
Available online 24 June 2021

to access sports so that the roles of traditional media and sports leisure and entertainment marketing are changing. Outmoded inflexible contracts can leave little budget for the all-important activation and fans are choosing rival unofficial channels for gossip and insider information so the rewards are becoming difficult to attain. New and accessible ways to view sports, from mobile to social media, means there is less incentive for fans to attend events in person [6]. There is also a greater expectation for sports stars to effect an authentic natural voice for their brands and it is difficult to trace customers in a changing market [7].

According to the 2019 Sports City Survey by the Taiwan Sports Administration in the Taiwan, Republic of China (R.O.C), the proportion of the regular sports population was 31.3% in 2018. Although it is similar to the proportion of the regular sports population in European and American countries, the statistics of the Sports Agency show that: the main reasons for the non-exercise population in the mid-term are in the absence of time (50.1%), and the remaining ones are too tired for work (17.7%), too lazy to exercise (17.1%), inability to exercise (8.9%), and no Interest (6.6%). Among the sports population, 33.1% of the under 30 age group gradually increased to 40.7%. It shows that the younger the age, the higher the participation rate in sports, but with the increase of age, the proportion of people who do not exercise also gradually increases. On the other hand, the lifestyle, work, health, and self-traits of the people of Taiwan, R.O.C have gradually influenced the athleticism of the young and old, showing that Taiwan's athleticism are still not comprehensive enough [8]. Thus, in terms of amateur sports and sports leisure and entertainment marketing developments in Taiwan, how sports operators can provide and recommend sports products/service for leisure and entertainment to segment sports participants become a valuable and critical research issues.

This study's research goals are threefold. (1) It uses data mining to determine a preference ranking for sports products in different customer profiles and to use promotions to recommend sports products/service of leisure and entertainment to consumers. (2) In order to more precisely identify more complete customer profiles and segments by discovering knowledge about customers, the preferred sports models of delivery for a sports course to promote the sports learning. (3) Data mining, an entertainment computing approach, is used to determine the sports courses and products that allow sports leisure and entertainment marketing and sales bundling for specific customer cluster in terms of recommending sports marketing and sales strategies to Taiwanese sporting businesses.

2. Theoretical background

2.1. Sports leisure and entertainment marketing

Sports leisure and entertainment marketing use sports, in any form, to help sell goods and services not only for sports competition but also for leisure and entertainment. This particular style of marketing is concerned less with using a single strategy and more with using the content of sports and leisure to assist marketing efforts. This is not limited to professional sports. It can include professional sports organizations, sports sponsors, sports goods supplier, sports advertisers, college athletics, minor leagues, or alternative sports on different lifestyles [9]. Since sports can be watched on a variety of platforms, sports leisure and entertainment marketing can take many different forms. Teams sell advertising space inside their stadiums to marketers who purchase billboards and other print advertisements and TV networks sell airtime during the events. Famous athletes also sign contracts to work as celebrity endorsers and lend their image to marketers [10]. In the first case, the promotion is directly related to sports activities. In the second case, the products can but do not have to be directly related to sports activities. When the promotion concerns sports in general, the use of this kind of strategy is called "Marketing of Sports." When the promotion does not concern sports, but sports events, athletes, teams or leagues are used to promote different products and the leisure and entertainment marketing strategy is denominated "Marketing through sports" [11]. When the promotion concerns increasing participation by the public, it is called "Grassroots Sports Marketing" [3]. To promote the products or services, the companies and associations use different channels, such as the sponsorship of teams or athletes, television or radio advertisements during the broadcast of sports events and celebrations and/or advertisements in sporting venues [12]. Chiu et al. [13] proposed and tested an empirical model linking internal marketing, organizational commitment and job performance in sports and fitness services. Moreover, this study further probed into the path of influence of internal marketing strategies on job performance of employees by including their organizational commitment in the mediating process. Puente-Diaz and Cavazos-Arroyo [14] examined sports consumers from Mexico to two experimental conditions: recalling two versus six brand attributes of their favorite brand and completed a set of questionnaires assessing brand quality, ease of recall, demographic questions, and thinking style. Results showed the hypothesized mediation effect of cognitive feelings on recalling fewer brand attributes and brand evaluations. Goebert and Greenhalgh [15] investigated fans' perceptions augmented reality (AR) activations within a sports leisure and entertainment setting. Findings indicated the visual appeal of AR is very influential on fans' intention to use an activation or provide positive word of mouth. Hence, marketers should note that smartphone based AR activations will likely be deemed relatively easy to use as most people are intimately familiar with their phone and there should be a significant focus on ensuring the AR is visually appealing.

2.2. Sports learning for leisure and entertainment

Sports leisure and entertainment learning are at models of delivery hat addresses concerns regarding traditional approaches to the teaching of physical education [16]. A models of delivery is broadly defined as the totality of student experiences that occur in the learning process. The term often refers specifically to a planned sequence of instruction, or to a view of the student's experiences in terms of the educators' or instructors' instructional goals [17]. Sports curricula can incorporate the planned interaction of pupils with instructional content, materials, resources and processes for evaluating the attainment of exercise or training objectives for leisure and entertainment [18]. The planning of a sports models of delivery starts from the center and proceeds to the periphery in linear and systematic stages, leaving no role for teachers, apart from delivery [19]. The need to measure the effectiveness of a sports models of delivery in terms of implementation and empirically relating it to outcomes ensures internal and external validity, such as golf sports. Therefore, teachers and coaches are transmitters who use professional methods to deliver skills, experience continuity between the past and present and implement simplistic standards for achievement [20]. However, as well as sports education systems in schools, a business model for sports leisure and entertainment learning must been developed, not only to cultivate professional athletes, but also for personal sports and leisure and entertainment pursuits, such as dancing, golf, swimming, tennis, fitness, yoga, rock climbing and ball games or aspheric sports [21,22]. These adult sports leisure and entertainment learning activities represent a significant business market in terms of sports leisure and entertainment marketing and sales that includes sports facilities, products, brand, advisements, community, social media, sports games and athletic competition. Many business opportunities require sports business models so a study of sports business models is pertinent to the requirements of sports management [23].

2.3. Recommendation systems

Recommendation systems are decision aids that analyze a customer's prior online behavior and present information about products that matches the customer's preferences. By analyzing the consumer's purchase history or by communicating with the consumer, recommendation

systems use both quantitative and qualitative methods to determine the products that best suit the customer. Most current recommendation systems recommend products that have a high probability of being purchased [24]. They use content-based filtering (CBF) [25], collaborative filtering (CF) [26], recommendation based on a network structure and graph theory (NSGT) [27]. Some studies have determined the effect of recommendation systems on customer's purchase behavior [24]. These studies argue that the recommendation decision must not be based on the probability of purchase, but the sensitivity of purchase preference and behavior that results from the recommendation action. Content-based filtering (CBF) methods use a description of the item and a profile of the user's preferences [28]. In a content-based recommendation system, keywords are used to describe the items and a user profile is constructed to indicate the type of item that the user likes. In other words, these associations recommend items that are similar to those that a user has liked in the past. This study uses CBF as a recommendation method and uses data mining results for further big data analysis of the sports marketing issue.

2.4. Data mining

Vast amounts of sports data are routinely collected about players, coaching decisions, and game events. Making sense of such data is important to those seeking a competitive edge. By transforming data into actionable information, scouts, managers, and coaches have a better idea of what to expect from opponents and how to use a player draft more effectively. With millions of dollars riding on the many decisions made within a sports franchise [29], the sports environment is ideally suited to data mining and knowledge management approaches [30]. Thus, the necessity to evaluate the role of data as a business resource in value creation is pertinent with the emergence of data mining as a powerful resource that enables new business models and changes the ways companies do business [31]. With the advances in technology and continually declining cost of computing and storage, firms are able to collect and store ever-growing volumes of data that have the potential to unlock new business opportunities. The new data resources bring a fundamental transformation to the creation of business value, requiring a re-examination of the contribution of data resources to value creation across different emergent industries [32]. In terms of data mining characteristics, they include capturing data, data storage, data analysis, search, sharing, transfer, visualization, querying, updating and information privacy. Lately, data mining tends to refer to the use of predictive analytics, user behavior analytics, or certain other advanced data analytics methods that extract value from data, and seldom to a particular size of data set [33]. In the regard of data analysis and computation, data mining approach, is a relatively recent process for the discovery of significant knowledge, such as patterns, associations, changes, anomalies, clustering and significant structures, from large amounts of data that is stored in databases, data warehouses, or other information repositories [34–37]. For example, Wicker and Breuer [38] explored the critical determinants of these organizational problems. The analysis is undertaken using quantitative data from the Sports Development Report 2009/2010, a nationwide online survey of sports clubs in Germany (n = 19,345) by using a data mining approach, decision tree. Sankaran [39] applied data mining (K-means cluster analysis) and identified four distinct groups of bowlers based on performance effectiveness. Thus, knowledge about customers/players that is extracted by data mining analysis can be integrated with sports management knowledge from research and then provided to business to manage sports market.

3. Research design

3.1. Research framework

The research framework for this study is shown in Fig. 1, which gives an outline of a questionnaire to determine the behavior of athletes and construct customer profiles to study a market segment. The questionnaire was used to collect data, which was compiled into a comprehensive database to analyze the sporting behaviors of athletes. An actual field study was performed to determine the behavior of athletes and preliminary and secondary data was collected, such as information about sporting activities, preferences, behaviors, locations, learning and the purchase patterns for sporting goods. Specific database requirements were defined. The data from the completed questionnaires was used to design the architecture of the databases and the databases were used to partition users in terms of behavior, as reveled in the data mining process. Apriori algorithmic association rules were used to analyze analogies and disparities in the sporting behaviors of athletes. These were examined in the context of "Purpose of exercise", "Sports professional courses", "Consumption behavior", "Sports products", "Preference for a brand of sports goods" and "Product promotions". A system to recommend marketing strategies to sporting athletes was developed.

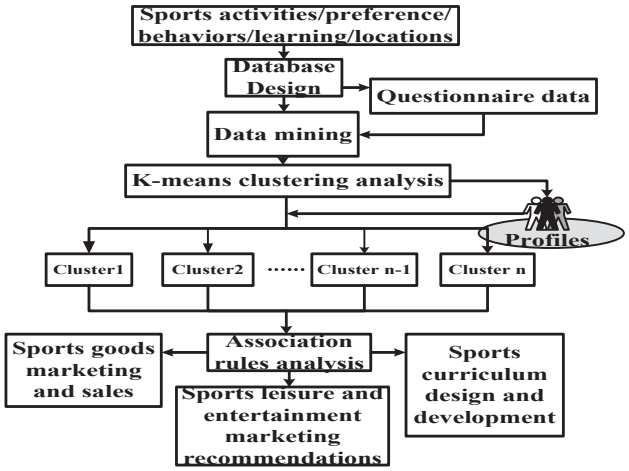

Fig. 1. Research framework.

3.2. Subject background

This study used questionnaires to collect data and determined customer preferences and behaviors in relation to sports products and services by constructing a database. The formal questionnaire that was used in this study involved issuing parallel questionnaires: a paper questionnaire and online questionnaire. This was designed to allow friends and relatives to also complete the questionnaire. Questionnaires were issued to subjects of different ages to ensure a greater than average sample size. The online questionnaire were surveyed via Luckydog, communication software (Line), and social platforms (Facebook, Instagram, Dcard, PTT) and recorded the respondent's IP location, to avoid duplicated responses and to increase the correctness and completeness of the research database. Questionnaires were distributed from August 3, 2016 to October 8, 2016 by using the Surveycake system. A total of 1200 online questionnaires were completed. After discarding incompletely, inappropriately or excessively answered questionnaires, the information from the remaining 1081 questionnaires was incorporated into the database. The return rate for the questionnaires was 90.08%. The data showed that the database involved a higher proportion of male participants (55.7%) than female participants (44.3%). In terms of the age of respondents, 56.3% of the adults were between 20 and 40 years of age, 18.7% were less than 20 years of age and 25% were over 40 years of age. University graduates comprised 61.8% of the surveyed users, and those who had completed postgraduate studies comprised 15.9%. In terms of employment, the largest group worked in service and manufacturing industries, comprising 54.7% of the total surveyed users. Those with disposable monthly incomes of USD 833 to USD 1333 comprised 71.7% of the surveyed users. Further descriptions of subjects'

profiles are given in the section on clustering analysis.

3.3. Questionnaire design

The questionnaire design of this study is divided questions into seven parts with 34 items: The first part (customer background): reading basic information, to determine demographic statistics, such as gender, age and education level, a total of six items. The second part (exercise purposes): including main purpose, frequency, time spending, ball exercise, aspheric sports, exercise companion and locations, a total of seven items. The third part (sports courses): including sports items, course preferences, professional courses, starting unit, sports venue and duration, a total of five items. The forth part (sports product purchase behaviors): including purchase motivation, consideration, product item, channel, physical location and online shop, a total of six items. The fifth part (types of product): including ball sports product, aspheric sports product and accessories, for a total of five items. The sixth part (preferences on sports product brand): including ball sports product brand and aspheric sports product brand, for a total of two items. The seventh part (preferences on promotions): including promotion programs, social media and pay method, for a total of three items. All questions are designed as the nominal and ordinal scales (not the Likert's scale). For example:

Which sports do you usually exercise? (Multiple choice)

① Tennis ② Badminton ③ Billiard ④ Basketball ⑤ Yoga/tippies ⑥ Golf ⑦ Swimming ⑧ Bicycle ⑨ Other ___

(Please list your three top choices in order __/__/__)

3.4. Relational database design

Codd [40] developed the concept of relational databases to represent interrelated data in the form of a table in the 1970s. Relational databases use the concept of an entity in a business environment. The attributes of entities and their relationships are used to interpret events that occur and messages that ensue. An entity is an important object, event, or

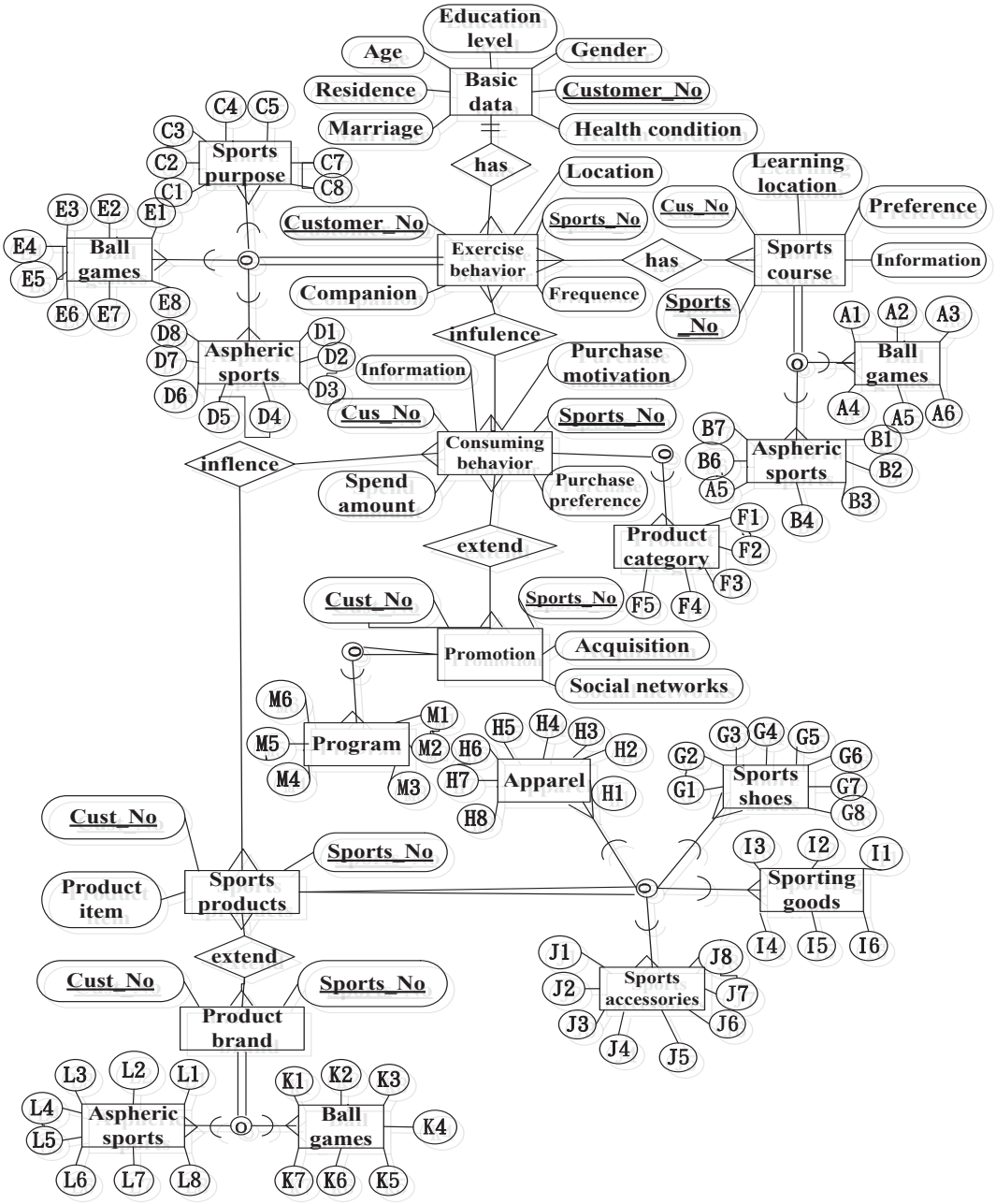

Fig. 2. Database modeling: E-R diagram.

concept that exists within a corporation and which affects its ontological objectivity. Data attributes to describe the characteristics of entities. It comprises the conceptual entity database that is derived by integrating categorized attributes. The relationships between these attributes, as determined by the questionnaire, define seven entities, three existing relationships and sixty-seven attributes (E-R diagram). In this study, the relational database contains 7 entities, 3 relationships and 67 attributes in the database structure for further data mining analysis in the Fig. 2.

3.5. Data mining approach

3.5.1. Association rules

Discovering association rules is an important data mining problem [41], and there has been considerable research on using association rules for data mining problems. The association rules algorithm is mainly used to determine the relationships between items or features occurring synchronously in databases. For instance, during a trip to the shopping center, if the people who buy item X also buy itemY, there exists a relationship between item X and item Y. Such information is useful for decision makers. Therefore, the main purpose of implementing the association rules algorithm is to find synchronous relationships by analyzing random data and use these relationships as a reference for decision-making. The association rules are defined as follows [42]:

Make $I = \{i_1, i_2, \ldots i_m\}$ the item set, in which each item represents a specific literal. D stands for a set of transactions in a database in which each transaction T represents an item set such that $T \subseteq I$. That is, each item set T is a non-empty sub-item set of I. The *association rules* are an implication of the form$X \rightarrow Y$, where $X \subset I, Y \subset I$ and$X \cap Y = \Phi$. The rule $X \rightarrow Y$ holds in the transaction set D according to two measurement standards - *support* and *confidence*. Support (denoted as$Sup(X, D)$) represents the rate of transactions in D containing the item set X. *Support* is used to evaluate the statistical importance of D, and the higher its value, the more important the transaction set D is. Therefore, the rule $X \rightarrow Y$ which has *support* $Sup(X \cup Y, D)$ represents the rate of transactions in D containing$X \cup Y$. Each rule $X \rightarrow Y$ also has another measuring standard called confidence (denoted as$Conf(X \rightarrow Y)$), representing the rate of transactions in D containing both X and Y. That is, $Conf(X \rightarrow Y) = Sup(X \cap Y)/Sup(X, D)$.

In this case, $Conf(X \rightarrow Y)$ denotes if a transaction includes X, the chance this transaction also contains Y is relatively high. The measure of confidence is then used to evaluate the level of confidence concerning the association rules$X \rightarrow Y$. Given a set of transactions, D, the problem of mining association rules is used to generate all transaction rules having certain levels of user-specified minimum support (called *Minsup*) and confidence (called *Minconf*) [43]. According to Agrawal et al. [44], the problem of mining association rules can be broken down into two steps. The first step is to detect a large item set whose support is greater than*Minsup*, and the second step is to generate association rules, using the large item set. Such rules must satisfy the following two conditions:

$$Sup(X \cup Y, D) \geqslant Minsup$$

$$Conf(X \rightarrow Y) \geqslant Minconf$$

$$Lift = Confidence(X \rightarrow Y)/Sup(Y)$$

3.5.2. Cluster analysis

The process of partitioning a large set of patterns into disjoint and homogeneous clusters is fundamental in knowledge acquisition. It is called *Clustering* in most studies and has been applied in various fields, including data mining, statistical data analysis, compression and vector quantization. The *k-means* is a very popular algorithm and is one of the best for implementing the clustering process. K-means clustering proceeds in the following order. First, the K numbers of observations are randomly selected from all N number of observations according to the number of clusters, and these become centers of the initial clusters. Second, for each of the remaining N–K observations, the nearest cluster is found in terms of the Euclidean distance with respect to xi = (xi1, xi2, …; xip,…, xiP). After each observation is assigned to the nearest cluster, the center of the cluster is re-computed. Last, following the allocation of all observations, the Euclidean distance between each observation and the cluster's center point is calculated to confirm whether they have been allocated to the nearest cluster. In addition, several studies have discussed implementation of the k-means algorithm for cluster analysis as a data mining approach [45].

3.6. Data mining tool – SPSS modeler

The databases for this research were constructed through a surveyed questionnaire under randomized sampling. The questionnaires used online distributions that reached social network communities, to explore various online behaviors of Line users. There were six structural components in the questionnaire, encompassing the basic information of Line users, sticker motive for the Line community, participating preference in the Line community, Line promotion, online shopping preference and Line community types. In addition, other investigated issues included sites for online shopping platforms, purchased items, information gathering behavior, and the degrees of acceptance of online channels. This study uses the SPSS Modeler to analyze data using K-means clustering, followed by the application of the Apriori algorithm to each cluster to analyze the association rules (Fig. 3).

4. Data mining results

4.1. Cluster analysis

Using the six structural components that were defined using the questionnaire responses, fifty-nine subcomponents were created: "Purpose of exercise", "Sports professional courses", "Consumption behavior", "Sports products", "Preferences for sports goods brands" and "Product promotions". These subcomponents became the foundation for the clustering process. The data samplers are incorporated into the SPSS Modeler, which uses a K-means clustering algorithm to partition the database constituents into three clusters: Cluster-1 (493 data entries) and Cluster-2 (379 data entries) and Cluster 3 (209 data entries).

Cluster 1: Sunshine type male cluster: This group is mainly young men. For these, the type of sporting goods or training courses are the main factors and they have a preference for currently popular styles. This cluster group is single, aged from 18 to 24 years old and has a college degree. The main purpose of exercise is interest, for excitement and to increase physical fitness. They exercise is 3 to 4 times weekly. The venues for their sports activities are schools, gyms and public facilities. The sports in which they participate include volleyball, baseball, softball, fitness, racing cycling, running, aerobic dance, tennis, rock climbing and swimming. They usually exercise alone, with friends or with a classmate or teacher. They spend an average monthly 33–83 USD on sporting goods and motivation for consumption includes exercise and training and a desire for fashionable clothing and to pursue fashionable pursuits.

Cluster 2: Young women's personality cluster: This group is an emerging sector. They tend to choose sporting goods that reflect their lifestyles and this is their main consideration. This cluster is aged from 25 to 39 years old, has a college degree and is in a relationship. The main purpose of exercise is to tone the body, as a social pursuit and to relieve stress. They exercise 3 to 4 times weekly. They go to stadiums, gyms, sports centers and workplace facilities. Sports activities include tennis, baseball, badminton, yoga/tippies, dancing and swimming. They usually exercise alone, or with colleagues, a boss or a significant other. They spend an average monthly of 84–133 USD on sporting products and motivation for consumption includes adding to a collection, as a gift, promotions and fashion.

Cluster 3: Actuarial family cluster: The proportion of men and

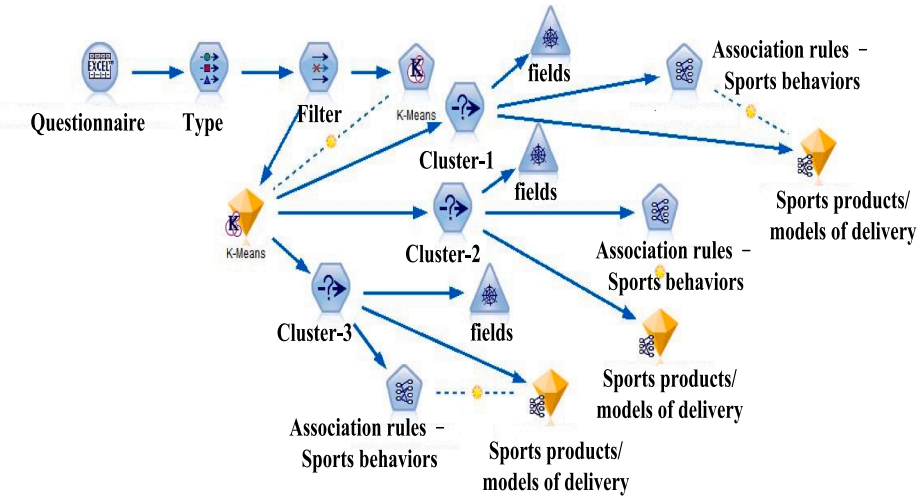

Fig. 3. Data mining process – SPSS modeler modelling.

women in this cluster is more even than that for the other two clusters. Because they are older, they choose sporting products based on whether the product is reasonable and whether there is a discount. They purchase to add to a collection or as a gift. This cluster group is aged 36 years or older, has a master's degree and is married. They exercise mainly for health, as a social pursuit and to increase physical fitness. They exercise 1 to 2 times weekly. They go to professional venues, gyms, community sports facilities, sports parks and use workplace facilities. Their preferred sports include tennis, golf, softball, yoga /tippies, mountain climbing and leisure cycling. They usually exercise with family or relatives, a colleague or a boss or a spouse. They spend an average monthly of 84–133 USD on sporting goods and motivation for consumption includes adding to a collection, as a gift, promotions and exercise or training. This study uses a K-means clustering algorithm for analysis. Eleven structural components, as defined by the results from the questionnaire, are used as the clustering variables. An association analysis then uses an Apriori algorithm.

4.2. Analysis of the association rules

This study uses a SPSS Modeler to analyze the association rules for three different athletic profiles in terms of the purchase of sports goods and sporting behavior and promotions, to recommend sports marketing and sports models of delivery options. Fig. 4 shows the model for the analysis of the association rules.

4.2.1. Pattern 1: Sports leisure and entertainment marketing recommendations

Using a criterion for minimum antecedent support of 2% and a minimum rule confidence of 25%, all lift values are greater than 1, so there are five significant association rules, as shown in Fig. 5 and Table 1. For association rule 1, it is seen that customers (athletes) who buy footwear at sporting goods stores are motivated to buy because they like sports or need a pair of shoes that work for them. They also prefer the Converse brand and favor promotions that use coupons. This rule can be used to recommend a sports marketing strategy for the sunshine type male cluster. Other association rules are inferred for other marketing recommendations for Cluster 1.

Using a criterion for minimum antecedent support of 2% and a minimum rule confidence of 25%, all lift values are greater than 1, so there are six significant association rules. For association rule 3, customers who buy clothes and pants at sporting goods stores are motivated to buy because they want to reflect their personal style with sporting apparel. They prefer the Nike brand and favor promotions that have a limited time offer for the purchase item. This rule can be used to recommend a strategy for sports marketing to the young women's personality cluster. Other association rules are inferred for other marketing recommendations for Cluster 2 (see Tables 2 & 3).

Using a criterion for minimum antecedent support of 2% and a minimum rule confidence of 25%, all lift values are greater than 1, so there are five significant association rules. For association rule 5, customers who buy a coat at sporting goods stores are motivated to buy because they want to add to a collection or purchase a gift. They prefer the Nike brand and favor promotions that discount the purchase item. This rule can be used to recommend a sports marketing strategy for the actuarial family cluster. Other association rules are inferred for other marketing recommendations for Cluster 3.

Fig. 4. Association rules analysis model.

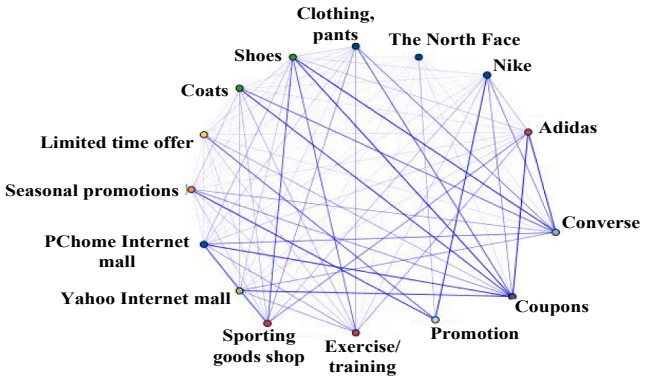

Fig. 5. Association map of sports leisure and entertainment marketing recommendations (Cluster-1).

Table 1
Association rules for sports leisure and entertainment marketing recommendations (Cluster 1).

Rule	Lift	Sup	Conf	Consequent	Antecedent			
				Types of goods	Motivation	Channels	Brand	Promotion method
R1	6.57	2.43	28.57	Shoes	Exercise/training	Sporting goods shop	Converse	Coupons
R2	3.16	2.43	25.00	Shoes	Exercise/training	Yahoo Internet mall	Adidas	Discount
R3	2.53	2.23	36.36	Coats	Promotion	Sporting goods shop	Nike	Limited time offer
R4	2.45	2.23	27.27	Clothing, pants	Exercise/training	Internet mall	Nike	Seasonal promotions
R5	2.08	2.03	30.00	Coats	Promotion	Yahoo Internet mall	The North Face	Discount

Table 2
Association rules for sports leisure and entertainment marketing recommendations (Cluster 2).

Rule	Lift	Sup	Conf	Consequent	Antecedent			
				Types of goods	Motivation	Channels	Brand	Promotion method
R1	7.90	2.11	50.00	Accessories	Exercise/training	PChome Internet mall	Converse	Discount
R2	6.32	2.11	25.00	Accessories	Exercise/training	Sporting goods shop	Adidas	Coupons
R3	3.74	2.11	75.00	Clothing, pants	Dressing in apparel	Sporting goods shop	Nike	Discount
R4	3.29	2.11	62.50	Coats	Exercise/training	Yahoo Internet mall	The North Face	Coupons
R5	2.70	2.11	25.00	Shoes	Dressing in apparel	Sporting goods shop	Nike	Discount
R6	2.70	2.11	25.00	Shoes	Exercise/training	PChome Internet mall	Converse	Discount

Table 3
Association rules for sports leisure and entertainment marketing recommendations (Cluster 3).

Rule	Lift	Sup	Conf	Consequent	Antecedent			
				Types of goods	Motivation	Channels	Brand	Promotion method
R1	6.64	2.87	66.67	Accessories	Exercise/training	Sporting goods shop	The North Face	Limited time offer
R2	6.19	2.39	80.00	Accessories	Exercise/training	Department store counters	New Balance	Coupons
R3	3.98	2.39	40.00	Clothing, pants	Fashion	Yahoo Internet mall	The North Face	Discount
R4	3.98	2.39	40.00	Coats	Exercise/training	PChome Internet mall	New Balance	Coupons
R5	3.30	2.39	60.00	Shoes	Collection/gift	Sporting goods shop	Nike	Discount

4.2.2. Pattern 2: Recommendations for sports models of delivery – Learning for leisure and entertainment

The use of association rules reveals the preferences of each cluster customer profile in terms of courses, the number of hours spent, sports companions, sports venues and the preferences in terms of the integration of the commencement unit. Identifying unknown gaps in the sports market might also reveal new niche markets, new sports courses or curricula that can be recommended. Using this information, those who start or manage a sports business are more aware of customers' sports preferences and the development of new products. In this regard, this study studies the second knowledge pattern by making sports models of delivery recommendations. Using a criterion for minimum antecedent support of 2% and a minimum rule confidence of 25%, all lift values are greater than 1, so there are five significant association rules. For association rule 1, it is seen that customers who want aerobic dance programs usually participate with friends in the gym who are engaged in sports, the period of exercise is usually more than 90 min and they prefer gyms to have professional courses. This rule can be used to recommend eye-catching promotions that are relevant to the lifestyles of the sunshine type male cluster. Other association rules are inferred to other models of delivery recommendations for Cluster 1. Using a criterion for minimum antecedent support of 2% and a minimum rule confidence of 25%, all lift values are greater than 1, so there are five significant association rules. For association rule 5, customers who want swimming courses usually participate with friends in the gym who are engaged in swimming exercise, the period of exercise is usually between 31 and 90 min and they favor professional courses. This rule can be used to recommend eye-catching strategies that are relevant to the lifestyles of the young women's personality cluster. Other association rules are inferred to other models of delivery recommendations for Cluster 2. Using a criterion for minimum antecedent support of 2% and a minimum rule confidence of 25%, all lift values are greater than 1, so there are five significant association rules. For association rule 4, it is seen that customers who want tennis courses usually participate with family/relatives in sports parks who are engaged in sports, the period of exercise is usually more than 91 min and, they favor sports centers that have professional courses. This rule can be used to recommend eye-catching strategies for sports learning that are relevant to the lifestyle of the actuarial family cluster. Other association rules are inferred to other models of delivery recommendations for Cluster 3.

5. Discussions

5.1. Customer profiles for sports leisure and entertainment marketing recommendations

This study uses data mining methods to determine customer profiles for the Taiwanese sports market, the motivation for purchase, channels, brands and preference for promotions for sports products. The first implication concerns the profile and marketing recommendations for sporting goods customers.

Fig. 6 shows a knowledge map that details recommendation mechanisms to describe who, when, why, what and how to implement sports leisure and entertainment marketing for Taiwanese sports customers. In terms of comprehensive leisure and entertainment marketing, Nike and The North Face could sell shoes and clothing/pants using coupons and discount promotions in sporting goods shops and on the PChome/Yahoo Internet mall channels, using exercise/training adventure and activities for marketing. In terms of niche leisure and entertainment marketing, because of the high pricing/revenue market, New Balance could sell sports professional equipment using limited time offer promotions at department store counters for customers who are adding to a collection or purchasing a gift for some specific celebration or seasonal activity to sell to actuarial family cluster customers. Because the sunshine type

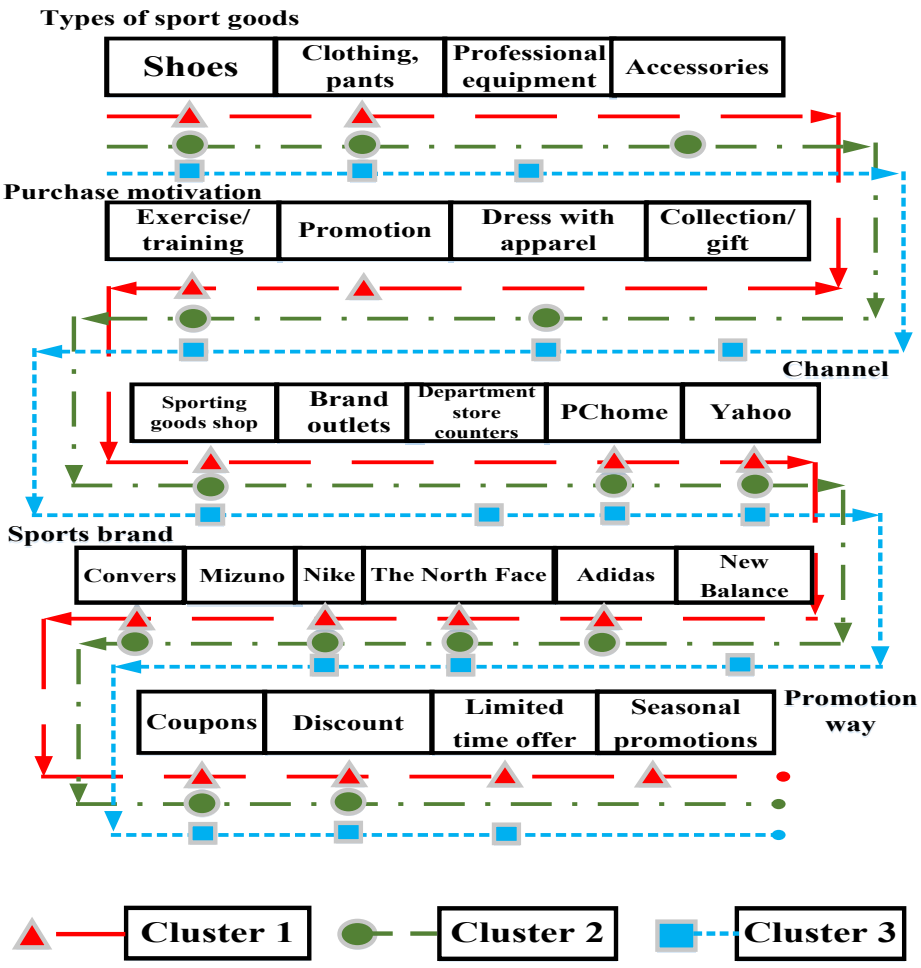

Fig. 6. Knowledge map for sports leisure and entertainment marketing recommendations.

male cluster has a low purchasing ability, Converse, Nike and The North Face could sell shoes, clothing and pants products using all promotional methods through physical and virtual channels to satisfy customer needs, wants and demand for sports exercise/training and product promotions.

The first implication shows that segmentation of the sports leisure and entertainment market has increased in popularity as a strategy to target appropriate customers. Sports can be of greater benefit to marketers than a game because of the link to the history and heritage of a region or a specific market. The challenge to sports marketers is to dynamically engage with audiences using innovative strategies. Understanding sports leisure and entertainment marketing is a significant challenge for marketing practitioners and researchers who are affected by changing global contexts. The appeal of sports marketing is enhanced by implementing intelligent analysis and planning approaches that increase business/customer interactions and identification. Therefore, the task of sports marketers is to focus on the best ways to determine appropriate strategies, based on analysis and planning decisions. Sports leisure and entertainment marketing practice will be enhanced by further research into the best methods to disseminate sports-related information, such as customers' purchase preferences and behaviors. This can be done using scientific targeting marketing messages that are processed by evaluation because of their subjective orientation.

5.2. *Customer profiles for sports models of delivery recommendations*

In this study, cluster analysis and association rules are combined to determine the preferences of sporting customers for sports and courses for ball games and aspheric sports in terms of duration, sports companion, sports venue and the starting unit. The second implication is relevant to sporting customers' profiles and sports models of delivery recommendations in terms of learning for leisure and entertainment.

Fig. 7 shows a knowledge map, which details the recommendation mechanisms that describe who, when, why, what and how to implement sports curricula for Taiwanese sports customers. In terms of course type, there is no overlap in the types of sports courses for the three clusters for ball games or aspheric sports. In terms of the sports venue, indoor sports, dancing, swimming, yoga/tippies and fitness courses could be designed by gyms, schools and sports centers for customers. In terms of course preference, 31–90 min or more is the favored duration for most customers who participate with friends in a gym. In terms of niche marketing, yoga/tippies are aspheric sports that appeal to all types of companions for cluster 2 and 3 customers. Therefore, gym businesses could start and implement yoga/tippies courses for these segments that have different durations. However, sports businesses could cooperate with schools and government institutes to start and implement sports courses using their facilities and outsourcing sports courses that learning for leisure and entertainment.

The second implication demonstrates that more empirical studies of the development of sports curricula are required to determine whether leveraging of customers and recommendation systems varies across customer communities and markets and the sports events/factors that influence this difference for different niche segments. It is also necessary to determine whether customers and recommendation systems can be moderated based on a customer's learning and course preference, in terms of their sports learning needs, wants and demands. Therefore,

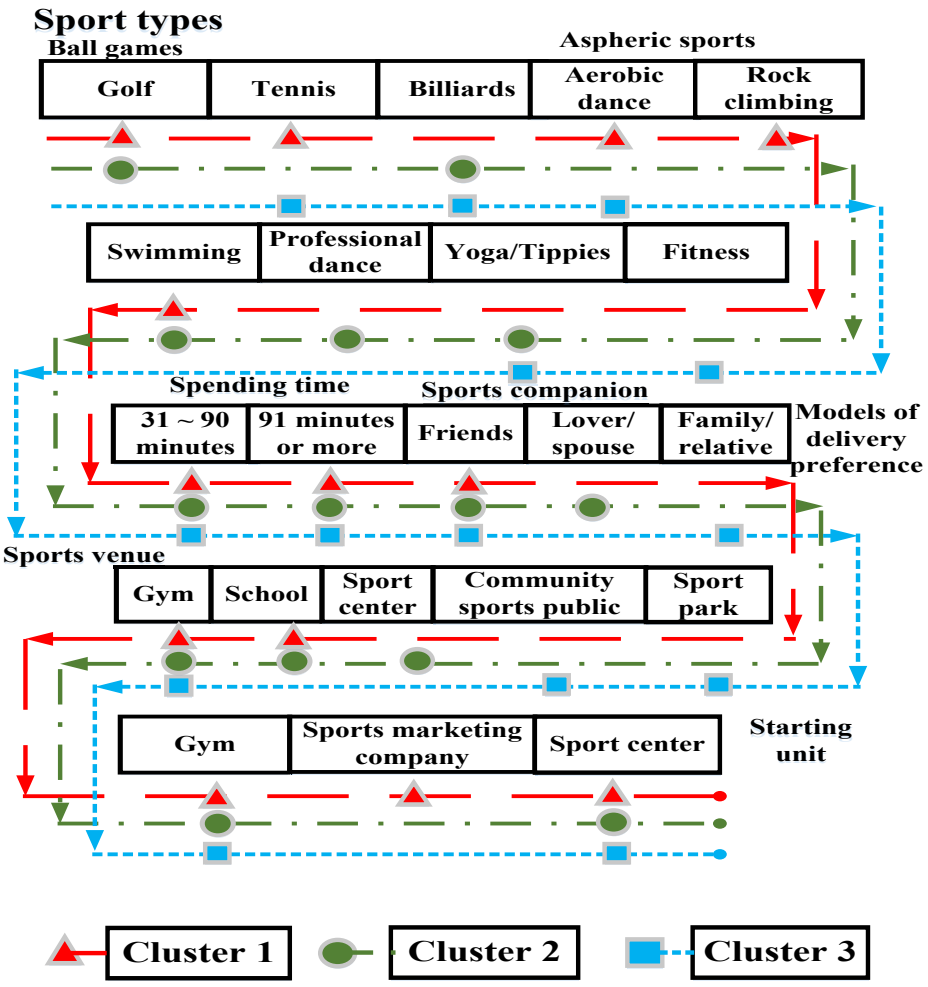

Fig. 7. Knowledge map for sports models of delivery recommendations.

sports leisure and entertainment marketing practice will be enhanced by further research into the best methods to study sports learning patterns, such as customers' learning preference and behaviors. This will enable sports products and services to benefit from a better appreciation of sports leisure and entertainment marketing.

In summary, Figs. 6 and 7 show that, in terms of integrated sports leisure and entertainment marketing and models of delivery recommendations, Nike and The North Face could sell shoes and clothing/pants using coupons and discount promotions through sporting goods shops. In addition, these two sports operators promote their brand and products through PChome/Yahoo Internet mall channels using exercise/training adventure and activities as a marketing plan. They could also cooperate with other sports business, such as gyms, to start and implement indoor aspheric sports courses that have sports brand/product/service extensions. By doing so, sports businesses could create a platform that provides a more complete sports product/service and enhance online and offline sports leisure and entertainment marketing and sales.

6. Conclusion, limitations and future studies

Although there are many investors in the sports market, only a few really succeed with their business models in a changing market. Only by creating competitive marketing strategies and having a competitive advantage in products, brands and services to increase added value, companies can meet customer needs. Then, because of customer satisfaction, each customer successfully makes purchases and carries out deep and wide purchases and loyalty. Sports businesses have a greater chance of success by implementing an intelligent marketing approach, such as data mining. This study finds that some sports purchases and course-taking behavior patterns, including the course preferences and customer purchase behaviors for sporting customers, must be identified in order to generate different sports leisure and entertainment marketing alternatives. The results of this study provide sports businesses with marketing alternatives that can be used to identify potential customers, develop sports leisure and entertainment marketing strategies, identify proper bundles for products, brands or services, engage in effective promotion activities and earn higher profits by using sports marketing recommendation systems. The research findings might be a reference to different countries/market. Finally, a total of 1200 valid questionnaires data were completed for data mining on this study. However, more data from a national wide of Taiwan should be consider for future study and also is a limitation of data volume on this study. In addition, different data mining approach, such as C&T tree and decision tree, should be implemented on the future studies in terms of generating difference perspectives observations on the sports marketing recommendations.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgment

This research was funded by the Ministry of Science and Technology, Taiwan, Republic of China (MOST 109-2410-H-032-032-).

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