



Investigation of Factors Influencing Sports Engagement and Physical Activities of Undergraduate Male Students in Saudi Arabian Context

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Abstract

Background and study aim: Engagement in sports activities seems to affect university students positively. Nevertheless, the Saudi Arabian academic context is experiencing a decrease in participation in such activities, leading to problems for the student population. Accordingly, students who engage less in sports activities select unhealthy lifestyles and harmful diets, affecting their academic performance. Besides, no comprehensive models are available to illustrate the influential factors on the participation of students in physical activities.

Material and methods: Thus, the present research examined the factors affecting the engagement of male students in physical activities in the academic context of Saudi Arabia. For this purpose, 643 students were examined to collect the required data. The partial least squares method was used to analyze data.

Results: The results of the study showed that all related variables could explain around 54% of the variance in participation in sport. These variables included financial support, human resources, sports policies, sports programs, social culture, sports facilities, as well as sports tools. The results, therefore, represent an acceptable and high predictive power, while also indicating sports programs and financial support as the significant and influencing factors on the participation in sports activities. It can also reflect the motivation and tendency of university students to engage in physical activities and have higher participation levels when different sports programs are available to satisfy them.

Conclusions: Based on the results, sports programs and financial support were the most significant factors influencing participation in sports. University management and policymakers can use the proposed model along with the influential factors to gain a better understanding of the drivers resulting in participation in sports.

Keywords

Sport participation; Social cognitive theory; Students; Saudi Arabia; PLS-SEM.

Abbreviations

WHO: World Health Organization; PE: Physical Education; GCC: Gulf Cooperation Council; SCT: Social-Cognitive Theory; HRM: Human Resource Management; CB-SEM: Covariance Based Structural Equation Modeling; PLS-SEM: Partial Least Squares-Structural Equation Modelling; AVE: Average Variance Explained; HTMT: Heterotrait-Monotrait; IPMA: Importance-Performance Map Analysis.

Introduction

Sport can be defined as all types of physical activity aiming at expressing or improving physical fitness as well as mental well-being through casual and organized engagement, with subsequent formation of social relations or achievement of the desired results at different levels of competition [1]. Different studies have been conducted across the world on the contribution of sports to the improvement of health and the enhancement of individual lifestyle. As a result, the undesirable effects of inactivity, such as the increased prevalence of various chronic health problems, obesity, and cardiovascular complications are currently well-understood. Accordingly, the development of new methods with a focus on modifying inactivity and its subsequent complications seems necessary [2]. As stated by Medadi Nansa and Ghafouri, organized sports can affect the changes in the population level significantly and positively as high and long-term engagement in physical activities along with an interesting environment can facilitate health interventions, including the promotion of mental health, enhancement of emotional or social performance, and the quality of life associated with social relationships [3]. According to Snedden, et al. engagement in physical activities is associated with lower levels of depression, higher levels of satisfaction, and a variety of advantages such as better mental health as well as well-being [4].

Sports and physical activities have been long integrated into general education. Most studies at the academic and international levels have referred to the positive relationships between children's engagement in physical activities and their success in academic performance. The association of physical activities and academic performance has been already investigated by several researchers [5,6]. For example, according to Drummond and Pill, engagement in sports and associated PE activities can provide the students with the chance of understanding the valuable role of teamwork, while applying academic skills in different areas as a component of high-quality education [7]. Adolescents can potentially experience better cognitive functioning as well as academic performance through sports activities and better fitness levels associated with individual health. Besides, according to Sigfúsdóttir, Kristjánsson, and Allegrante, children can face the risk of obesity because of inadequate diets or insufficient physical activities, influencing their health conditions in future stages of life [8]. As indicated by Bautista, Relojo, Pilao, Tubon, and Andal, children and adolescents with nutritious diets and high engagement in sports activities have higher performance

regarding different measures of cognitive abilities and academic performance [9].

University context contributes to the process of teaching and learning, education, research, as well as technology. Professional teaching required for jobs at high levels and personal development is provided by universities through their educational programs. Universities also play a key role in different social and legal arenas [10]. University students have more energy and emotions compared to other educational contexts because of their specific age-related conditions. According to İnan, et al. students in the context of university regard engagement in sports as one of their norms [11]. As pointed out by Boubeta, et al. physical activity is integrated into the university curriculum, and sports can potentially play a critical role in academic education at this level [12]. As stated by Gómez-López, et al., a healthy lifestyle is usually disregarded and moderate to serious sports also decrease when studying in university [13,14]. Accordingly, it seems essential to take the required measures and address such problems. Failure to perform sports activities regularly can be among the main obstacles in the development of a healthy and efficient lifestyle. In addition, research has shown a decrease in the commitment to sports activities at the accessible time with increasing age when less time is allocated to moderate or vigorous sports [15]. Thus, engagement in physical activities seems critically important for university students to improve their energy and obtain persistent physical and mental stability.

According to the report by World Health Organization (WHO), as the age increases, the level of physical activities decreases, and also women are less physically active compared to men [16]. The Saudi Arabian population is particularly vulnerable to this decline in participation in sports and physical activities. As an example, females have lower levels of physical activities (26.3%-28.4%) compared to males (39.0%-42.1%) in their adulthood, as shown by the report of Gulf Cooperation Council (GCC) countries concerning the popularity of adequate physical activities (a minimum of 150 minutes/week) [17]. The reported values are considerably lower compared to what is observed in developed nations, including Australia and the U.S., and also the EMR neighbors, including Egypt [18]. As shown by Statista Research Department, Cint's research considering the number of hours allocated to exercise/participation in physical activities in Saudi Arabian contest during 2017-2018, 13.7% of Saudi Arabian respondents exercised <1 hour a week (Figure 1).

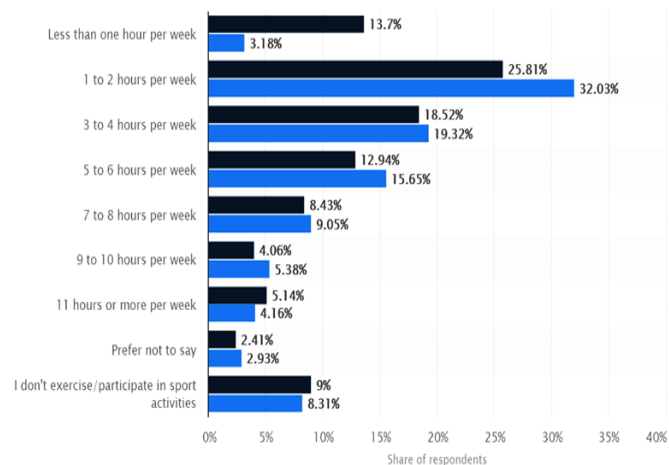


Figure 1: Saudi Arabia-number of hours spent on exercise/sport activities 2018. Note: (■) 2017; (■) 2018.

Particularly, current studies have shown that approximately 78.1% of Saudi Arabian adolescents experienced inactivity in sports, representing one of the public health burdens in this country [19]. Indeed, a value of 18.4% was reported for Population Attributable Fraction (PAF) for all-cause mortalities related to physical inactivity in this population, which is manageable through the engagement of inactive individuals in the proposed physical activities. The PAF values obtained for this Saudi Arabian population are higher compared to that of the Eastern Mediterranean Region (12.5%) or WHO regions (9.4%) [20]. Primary health care should focus on wellbeing instruction awareness to give the population more energy to do daily exercise and consequently deal with inactivity.

As stated by Sayyd, et al. younger male undergraduates are increasingly becoming more inactive considering the vision 2030 goals [21]. According to the observations of the researcher, there were several barriers to the engagement of this population in the academic context, affecting the development of PE. Participation of male undergraduate students in sports can be facilitated by dealing with the existing barriers. A major part of research on sports activities in the academic context of Saudi Arabia has primarily considered females. As an instance, Samara, et al. investigated the various parameters associated with sports activities such as self-efficacy along with the perceived obstacles as well as advantages of these activities in young females in the context of Saudi Arabia [22]. As they indicated, female students had awareness of the advantages of such activities for their health conditions, as well as well-being. Accessibility to special places was one of the main barriers to the sports activities in this group. Meantime, Khalaf, et al. investigated how prevalent physical activities and their related factors were amongst university students [23]. They referred to four main determining factors for the level of physical activity of female students. When focusing on the prevention of the physical inactivity patterns which threaten health, such factors play an important role in dealing with non-communicable problems as well as obesity in which the special conditions and requirements of the women are emphasized in the Saudi Arabian context.

Health-associated physical fitness components, including cardiorespiratory conditions, body fat, muscle strength, and flexibility of the female students were investigated by Alahmadi at Taibah University in Madinah, western Saudi Arabia [24]. As the results of the study showed, high percentages of body fat along with lower hand grip power reflected unfavorable physical fitness consequences. It is, therefore, necessary to target such indicators to improve the health conditions of this population at Taibah University. Besides, Al-Jumayi examined the sports activities and their impacts on the success of Taif university female students in their education [25]. The study population spent adequate time on daily sports, after which they had positive feelings. In addition, the study population was adequately aware of continuous exercise and its necessity for their health and mental conditions, leading to their academic success and better accommodation of the lectures.

Nevertheless, there is not enough information on the independent association of physical activities and academic achievement in terms of different modifiable behaviors in adolescents [26]. Several researchers have examined the association of physical activities and academic success [27]; however, it is not clear whether engagement in sports and academic success are specifically related or not. The independent association between lifestyle behaviors (sports activities) and academic achievement has been rarely investigated. In fact, there is scarce research on the examination of the combined effects

of behaviors such as diet, sports activities, and sleep on academic achievement. On the other hand, students face more problems due to their lower engagement in physical activities, one of which is the adoption of unhealthy lifestyles and diets. Besides, engagement in physical activities is related to the academic success of this population. Particularly, although the government of Saudi Arabia pays more attention to sports participation, there are still lower levels of sports activities and engagement in this country, leading to serious problems for the population. Accordingly, it is assumed that sports activities affect academic achievement more significantly. Nevertheless, not much research at a large scale has investigated the direct relationship between sports engagement in adolescents and their academic performance. As far as the author knows, there are no previous studies investigating the independent relationships of physical activities and academic achievement in Saudi Arabian male students. It is not either investigated whether students' engagement in different health behaviors is related to their higher academic achievement.

Overall, as the review of related literature in the context of Saudi Arabia and worldwide shows, no comprehensive models are available to illustrate the influential factors on the engagement of male university students in physical activities. A significant part of prior literature has considered differences between genders, social parameters, and motivation. Regarding Saudi Arabian universities, little research can be found focusing on the participation of male students in physical activities. Thus, more research on the identification of influencing factors on the engagement of this population in physical activities seems necessary. Hence, the present study mainly aims to achieve the following objectives:

- Development of a research framework to investigate the associations of physical and sports activities with academic achievement in a Saudi Arabian sample.
- Investigation of factors influencing sports engagement and physical activities of undergraduate male students in Saudi Arabian context.

The present study is different from the previous works because of examining the effects of physical as well as sports activities on the academic achievement of the students instead of focusing on inactivity risk factors, making it unique since even though there is some research on physical activities and their health-related benefits, no focus has been on factors encouraging male adolescents to participate in such activities. The organization of the current paper is illustrated in the following:

The theoretical model of the research is presented and the hypotheses are developed in section 2. Then, research methodology and results are presented in the next two sections. Section 5 discusses on the obtained results and brings research implications. Section 6 is allocated to the theoretical and practical elaboration of the implications. Section 7 is allocated to the research limitations and further research. Finally, the study concludes in section 8.

Literature Review

Theoretical framework and development of the hypotheses

Social-Cognitive Theory (SCT): Based on SCT, human behavior is affected by the interaction of individual (values, self-efficacy, and expectations of outcomes), experimental (behaviors of others, feedback), and behavioral (previous behaviors) parameters, known

as called triadic reciprocal causation [28]. SCT knows the people's behavioral intentions as a function of cognitive personal as well as environmental factors [29]. In fact, it proposed a comprehensive framework through which the determining factors of behaviors are understood, and the possible mediators as well as processes in behavioral changes can be describes [30]. Human behaviors are defined by this theory in the form of the triadic, dynamic, and reciprocal interplay of individual, behavioral, and environmental factors. Humans perceived self-efficacy, outcomes, and outcome expectations regarding their individual objectives, morals, and standards affect their cognitive processes [31]. Self-efficacy is a subset of SCT and reflects the self-regulatory mechanisms denoting the skills or capacities for a performance along with self-belief in individual capabilities to show efficiency or ability to increase motivation and endeavor to solve problems [32]. As stated by Young, et al. outcome expectations and perceived self-efficacy can be regarded as the central constructs from the perspective of SCT [33].

Considering SCT, Bandura referred to the central argument that human behaviors, individual factors (such as cognitive aspect), and environment affect and are affected by one another, through reciprocal determinism called triadic reciprocal causation [34]. SCT considers self-efficacy, representing individuals' perceived abilities to show the desired behaviors, as the central determining factor for task-oriented behaviors [35]. According to Bandura's proposed model, humans performance is dependent on the interaction of three sets of factors or effects, including behaviors, environment, and individual (such as cognitive or emotional aspects). Every influential set on the performance of humans influences other sets and is influenced by others as well. Accordnig to Bandura, in addition to being affected by and reacting to the social and built environmental factors, people can also show regular engagement in consideration, self-supervision, self-appraisal, indirect learning, and innovation using generative imagination as well as communication (Figure 2).

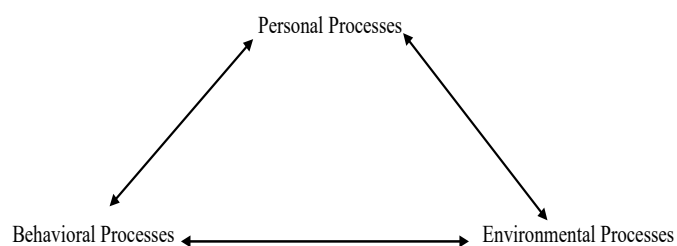


Figure 2: Model of reciprocal interactions.

The behavioral explanations are provided dynamically and reciprocally by the SCT, emphasizing the interaction of individual (beliefs, attitudes), environmental (social, physical), and behavioral factors to result in a certain behavior [36]. According to Bagherniya, et al. programs for nutritional education and physical activities can be designed for adolescents using SCT. That is, individual belief in (a) the importance of physical activities and (b) their true capabilities of doing such activities can lead to their intention toward physical activity. Thus, it is supposed that interventions on physical activities through social cognitive approach are performed based on rational and value-centered idea of satisfying individual values and beliefs and/or establishing expectations of their capabilities using different factors, including individual/observational achievements, along with social motivation [37]. Figure 3 represents the conceptual framework which explains the research hypotheses, while the sections which follow focus on the description of the relevant constructs (Figure 3).

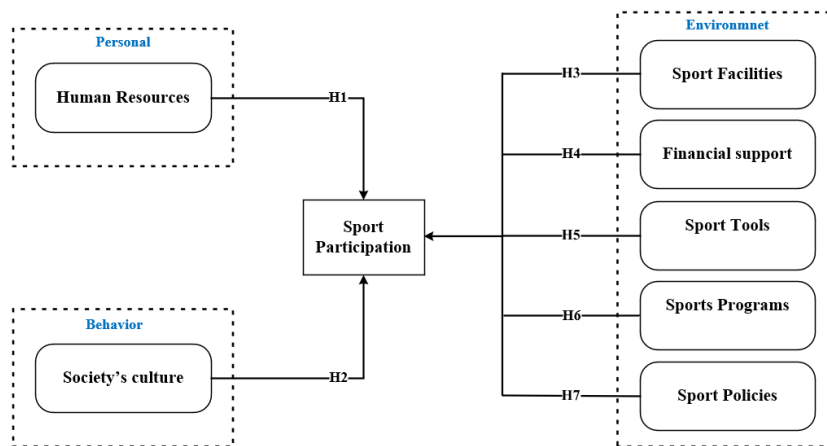


Figure 3: Proposed conceptual framework.

Human Resources (HR): Sports assessments are associated with a complicated expression of different factors which highlight the scientific grounds accessible every time required, the technologic and environmental components, and the material as well as human resources. It should be, however, noted that human resources play a key role in sports as well as other activities despite the significance of all other factors [38]. HRM has been widely characterized as the policies, strategies, processes, and mechanisms which affect the behaviors, attitudes, values, and functioning of individuals working within organizations [39]. As stated by Weerakoon, HR planning and strategic HRM have critical importance for organizational effective functioning and need adequate management [40].

According to Xu, et al. HR considerably hinders the adoption of schools that promote health and the chances for students to access physical activities in primary schools while also preventing access to after-school physical activity programs for students at the age range of 11-14 years [41]. In fact, HR is a central component of successful sports implementation since it can speed up efficient administrative standards in different businesses [42]. Successful endeavors to improve sports primarily depend on the abilities and competencies of HR. as a result, the accessibility of HR, including instructors and administrators, can be a serious challenge requiring consideration in the advancement of sports activities within an academic context. Thus, the following hypothesis is raised:

H_1 : HR and sports participation are positively associated.

Social culture: Based on Robbins and Judge, organizational culture represents a system of common meanings taken by the members, differentiating it from others [43]. Besides, according to Hendriani, et al. culture is knowledge obtained for the interpretation of experiences, resulting in social behaviors [44]. Entrepreneur support, individual loyalty, and value for the business activities are among social culture indicators. In addition, Saraf referred to sports as an integrated part of the recent social culture and a critical means to preserve and subsequently develop national cultural traditions along with aesthetic values [45]. Acceptance of social rules and expectations that form the culture by individuals through socialization and using them to identify how to act, social-cultural rules become internalized [46]. According to Jarvie, sports, culture, and society are the most extensive, detailed, and reflective introduction to the sociocultural

analysis of sport recently accessible, requiring a new agenda for the discipline [47]. It is necessary for all students with a tendency towards a sport. Hence, the next research hypothesis is raised:

H_2 : Social culture and sports participation are positively associated.

Sport facilities: Sport facilities are a value or process supporting people to obtain and enhance health, wellness as well as social engagement [48]. Sports facilities with services aimed at serving not only elite sports are capable of providing different advantages for the bigger society, and can enhance the promotion of social capital through the establishment of a place for social meetings made possible by engagement in sports [49].

Considering the physical context, availability of sports facilities is usually supposed to account for the obvious differences in sports engagement to some extent [50]. According to Nicholson, et al. accessibility of sports facilities can be one of the central factors in policies for active engagement in sports [51]. Obviously, national, governmental, and local policies for engagement in sports primarily considers the supply and accessibility of facilities. van Bottenburg and de Bosscher evaluated the effects of sport promotion on sports engagement [52]. They subsequently indicated that increased supply of sports facilities contributed to higher levels of sports engagement. Besides, macro-level can also affect participation in sports. The macro-level or sports infrastructure reflects sport facilities such as gyms, sport fields, swimming pools, parks, and sport programs (non-profit sport clubs, commercial sport providers, and the municipality) [53]. With the development of basic sport infrastructure, studies have indicated the interdependence of providing sports facilities and engagement in sports [54]. Prior research has shown that providing nearly all kinds of sport infrastructure affects participation in sport activities positively [55]. Besides, according to Kumar, et al. engagement in sports starts from policies, continues through facilities, leads to users' health, Well-Being, And Social Capital [56]. Therefore, the following hypothesis is raised:

H_3 : Sports facilities affect engagement in sports positively.

Financial support: Participation in sports is related to income. Families with lower levels of income usually experience problems to engage in sports due to the large financial burden it may impose, not

possible for them to make [57]. Meantime, Anokye, et al. referred to positive financial incentives, such as subsidies for sports engagement, as factors which increase the levels of physical activities especially for those previously available [58]. Physical activities can also lead to financial benefits; for example, children with physical activity are more likely to have a better health and wealth as adults in comparison with their inactive peers [59]. According to Karusisi, et al. strategies to enhance sports engagement need to consider spatial and financial availability of special facilities and deal with educational differences in sports practices [60]. As pointed out by Thibaut, et al. each individual needs opportunities to participate in sports, while the financial and economic crises along with increasing poverty rates are leading to the exclusion of low-income families and individuals from engagement in sports [61]. Pule, et al. showed in their study that inadequate financial support from parents prevented participation in sports among learners [62]. Claudia stated that family and financial support were of great importance in coping with the change from the junior athlete to senior level [63]. Hence, the following research hypothesis was raised:

H₅: Financial support affects participation in sports positively.

Sport tools: Sports can strongly encourage the youth in every society, and from a historical perspective, sports have shown power in dealing with social problems, such as anti-social behaviors and cultural exclusion [64]. According to Al-Tawel and AlJa'afreh, students were mostly reluctant to engage in physical activities because of the accessibility and appropriateness of the sports facilities and tools, social factors, and health dimensions [65]. Besides, as reported by Seryozha, the number of sports tools and items was related to lower levels of physical activities and the conditions of sports facilities [66]. The aesthetic dimension of the settlement showed a lower relationship with physical exercise concerning the males. Sayyd pointed to the importance of sports tools in the improvement of physical activities at an academic level [67]. A number of 103 university students showed their agreement that sports tools in the Saudi academic context required enhancement and updating. Only 11 university students felt satisfied with sports instruments in the academic context of Saudi Arabia. Thus, knowing the challenges which affect physical activities in the above context is essential from the perspective of university students. In addition, Khaled, et al. indicated factors influencing commitment to sports activities, including access to time and sports tools, support by family and society, and finally, behaviors [68]. According to what was mentioned, lack of sporting tools can be among the most serious challenges for engagement in sports. Hence, the following hypothesis is raised:

H₅: Sports tools affect participation in sports positively.

Sports programs: Youth can participate in programmed exercises through sports programs to promote specific sports fields for further engagement in future [69]. Based on Ponsoda, et al. young people engaging in out-of-school sport programs can achieve significantly higher degrees of self-efficacy, prosocial behaviors, and personal as well as social accountability regarding other adolescents who participate in different activities or among those not practicing any activities [70]. The results of their study agree with the prior research by Carlo, et al. on the relationship of prosocial behaviors and physical activities and emphasize the importance of sports programs established in particular to enhance prosocial abilities in sport programs [71]. As indicated by Bergeron, the transformations to conventional adult exercise facilities and activities would promote

safety and eagerness to exercise, particularly in the case of adequate supervision [72]. Thus, with increasing knowledge and adequate sports programs the collective and effective promotion of a lifetime of safe sports engagement and different habits associated with healthy activities will be possible. As pointed out by Edwards, et al. schools provide a critical context for engagement of adolescents in free time physical activities in the form of extracurricular programs [73]. It has been repeatedly indicated by cross-sectional research that participants in youth sport programs have more physical activities, expending higher levels of energy, and spending a greater time in physical activities compared to their non-sport peers [74]. Meantime, children show higher levels of activity if they engage in organized school sports programs [75]. In the same vein, Shull, et al. pointed out that children participating in sport programs across middle school and maintaining their engagement up to high school will probably have higher levels of physical activities compared to non-participants [76]. Therefore, the following hypothesis is raised:

H₆: Sports programs affect participation in sports positively.

Sport policies: The policy can be defined as an instrument and targeted activity stemming from a political issue or challenge [77]. As stated by Widdop, et al. sports policies are a set of central and local governmental policies which shape engagement in line with policies aimed at health, education, as well as services targeting special populations [78]. According to Eime, et al. a more balanced approach and systematic policy regarding population-based engagement can probably support sports to give priority to the retention issues taking place within adolescence, especially for the female population. Sports policies are recommended to focus on keeping participants and not actually the overall throughput of members every year [79]. Based on Widdop, et al. policymakers should consider beyond merely sports policies to obtain higher rates of sports participation [80]. As mentioned by Hoekman, et al. local sports policies focus primarily on developing and promoting the local physical infrastructure for sports [81]. Besides, Collins stated that sport policy should address the economic and commercial implications of a specific function, while taking into account the sports culture and, especially, issues associated with gender, race, equity, and tradition [82]. Besides, there is a persistent conflict between a policy that focuses on assisting the elite athletes and the sports with an international profile, and policies enabling local societies to take part in a wider scope of sports activities. Furthermore, national sports policies and achievements in international competitions are assumed to affect individuals' decisions toward engagement in sports and physical activities [83]. Thus, the following hypothesis is raised:

H₆: Sports policies affect participation in sports positively.

Methodology

Data collection and samples

The present study used a quantitative approach with questionnaires. The purposive sampling which selects the subjects according to a specified purpose was used. According to Daniel, this method aims at purposeful selection of members that meet certain inclusion as well as exclusion criteria to participate in the research. Besides, as stated by Workneh and Liyew, this method helps select a sample which leads to the highest relevance and numerous data regarding the topic under study [84]. Given the above-mentioned, 25 Saudi Arabian universities were chosen through this method. It should be noted that there are no empirical studies focusing on the associations of sports

activities and influencing factors on the engagement of individuals, access to sports facilities, and the requirements of male students in the academic context of Saudi Arabia. Besides, as Al-Hazzaa and AlMarzooqi indicated in their observational study, 80% of individuals were far away from a desirable level of physical activities which could affect their health conditions, leading to chronic diseases [85]. Students seem appropriate targets for education businesses because of their central contribution to the learning process. Particularly, Saudi Arabian male university students make up a significant number of this population. Thus, the current study has focused on this population at undergraduate level. G*Power software was employed to check sample adequacy. G*Power is regarded a significantly effective analytical approach used in different statistical analyses in a variety of fields such as social and behavioral contexts for the calculation of the sample size (Figure 4).

As shown in Figure 4, according to Cohen's recommended effect size ($F^2=15$, α error prob=0.05, and β error type II=0.20), and regarding 9 independent constructs or predictors, the results of the above-mentioned software led to an acceptable sample size of $n=154$ to evaluate the suggested model. Data collection and hypothesis testing were performed using the questionnaire-based survey methodology in the current study. University students selected from 25 Saudi Arabian universities made up the study population. The context of the study included public universities directed by the Ministry of Higher Education (MHE). Totally, online surveys of 643 respondents were collected. Overall, 303 respondents met the exclusion criteria because their answers were not complete and showed suspicious response patterns. The study sample included 643 respondents of whom 38%, 30%, 15%, and 17% were at age ranges of 21-23 ($n=245$), 18-20 ($n=193$), 24-26 ($n=97$), and >27 years ($n=108$), respectively. Tabiah University has the highest number of students ($n=245$), after which there were King Abdulaziz ($n=51$) and King Fahd ($n=40$) universities, followed by Jazan ($n=37$), Imam Abdelrahman ($n=29$), and Mohammed bin Saud ($n=25$) universities.

As shown by the responses, 132 and 106 respondents were in their third and second years of their study, respectively. Besides, 91, 88, and 65 respondents were in their fourth, fifth, and sixth years of study, respectively. Nevertheless, among the study participants, 161 respondents preferred not to disclose their year of study.

Results

PLS-SEM analysis which includes measurement model and hypothesis testing was initially used to determine whether the variable items were reliable and valid, while examining the proposed research hypotheses. Given the exploratory instead of confirmatory nature of the research, PLS-SEM was used rather than SEM based on covariance. In other words, this method shown higher adequacy compared to CB-SEM because of higher analytical efficiency [86]. Besides, as shown by Hair, et al. PLS-SEM does not show sensitivity to a specific sample size compared to CB-SEM in terms of sampling size and distribution of data. In addition, complicated models, including several variables and measurement items are set and evaluated easily while data distribution hypotheses are not imposed. The total process can be observed in Figure 5.

Testing of the measurement model

The constructs' validity as well as reliability were examined to perform the first phase of the PLS-SEM analysis measurement model

testing. Examination of Cronbach's alpha and CR aimed at determining the measurement model reliability. According to Table 1, the values of these two exceeded the proposed 0.7 threshold, which means exceptional reliability of the measurement model. Outer loadings and AVE were used to assess convergent validity which indicated the scope of construct convergence to provide an explanation of the items' variance. As shown in Table 1, these two values exceeded the proposed 0.7 and 0.5 thresholds, correspondingly, which means that the conditions were met (Table 1).

Nevertheless, the scope of empirical distinction of one construct from other is determined by discriminant validity. The AVE square root of the construct was compared with other construct correlations to obtain discriminant validity, which was also evaluated using the cross-loading as well as the Heterotrait-Monotrait (HTMT). According to recommendations by Barclay, Higgins, and Thompson, every indicator should needs to show higher loads on its own construct compared to others when analyzing the indicators' cross-loadings [87]. Regarding cross-loadings, the load of every construct item has to show higher values compared to the loadings of other items. As shown in Table 2, every item shows higher loading values compared to its cross-loading (Table 2).

HTMT can be considered one of the new approaches to the evaluation of discriminant validity in PLS-SEM, preparing the grounds for the model assessment. This approach has been defined by as the ratio of the correlation indicators average within constructs that measure a variety of phenomena to the correlation indicators average in the same construct. A value of 0.90 is required for this ratio, and exceeding this threshold means a lack of conceptual or statistical correctness for the construct. Table 3 shows HTMT values of <0.90, confirming conceptual and statistical validity of all constructs and sub-constructs. This analysis is applied to ensure the effective relationship of the research reflective variable with its indicators in the path model (Table 3).

Assessment of the structural model

The structural model assesses collinearity in its first step. Collinearity is held between two or more constructs when measuring identical attributes of a tangible or intangible item, and VIF is used for its calculation. A tolerance value of ≤ 2 and a VIF value of ≥ 5 in PLS-SEM indicate the possibility of collinearity. According to Table 4, the model faced no collinearity issues, which means all tolerance and VIF values exceeding the thresholds of >0.20 and <0.2, respectively. Accordingly, removal of the model constructs was not required due to the lack of collinearity (Table 4).

As stated by Hair, et al., the values equal to 0.75, 0.050, or 0.25 for the coefficient of determination (R^2) are regarded as substantial, moderate, or weak. Thus, higher R^2 values increase the predictive power of the structural model. The value of R^2 was assessed using the PLS algorithm for all dependent constructs, demonstrating the overall value of 0.54 for engagement in sports. Accordingly, the independent constructs can explain 54% of the constructs in engagement in sports (CSF, FF, HRF, SFF, SPF, TF, as well as PF).

Assessment of the path coefficients is the next step in the structural model. The path significance was estimated using bootstrapping with 5000 sub-samples (one-tailed test), leading to significance values of 1.28 (Sig=10%), 1.65 (Sig=5%), and 2.33 (Sig=1%) for t values in one-tailed test. The t-value results following implementation of bootstrapping using PLS 3.0 are represented in Figure 6.

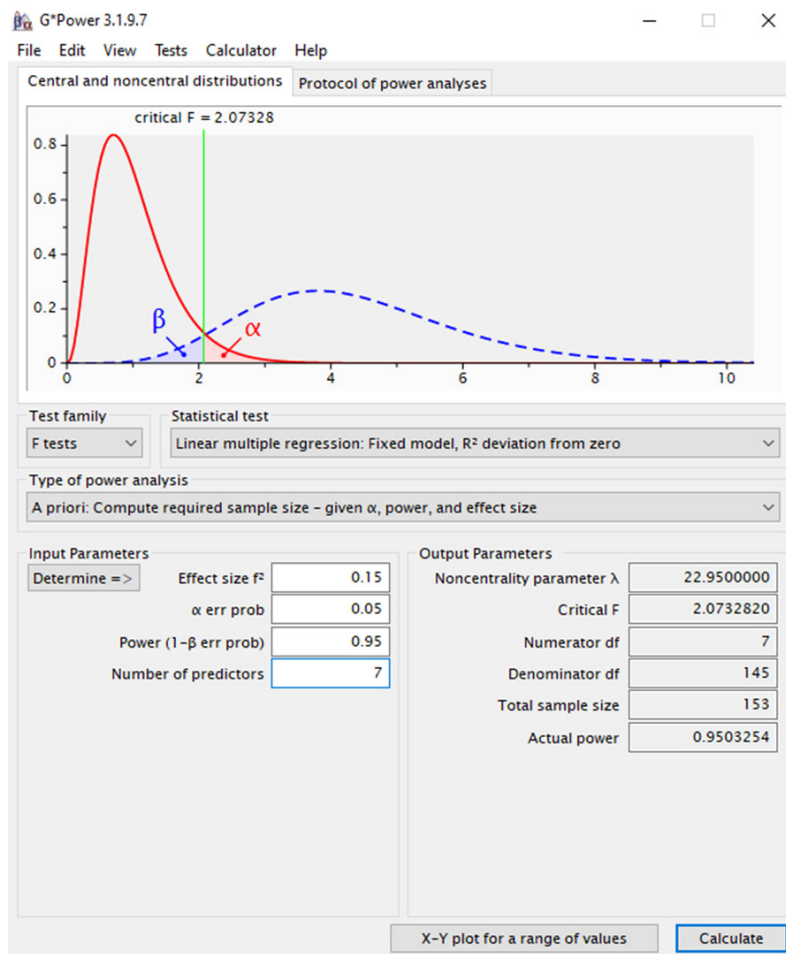


Figure 4: G*Power statistical analysis for sample size.

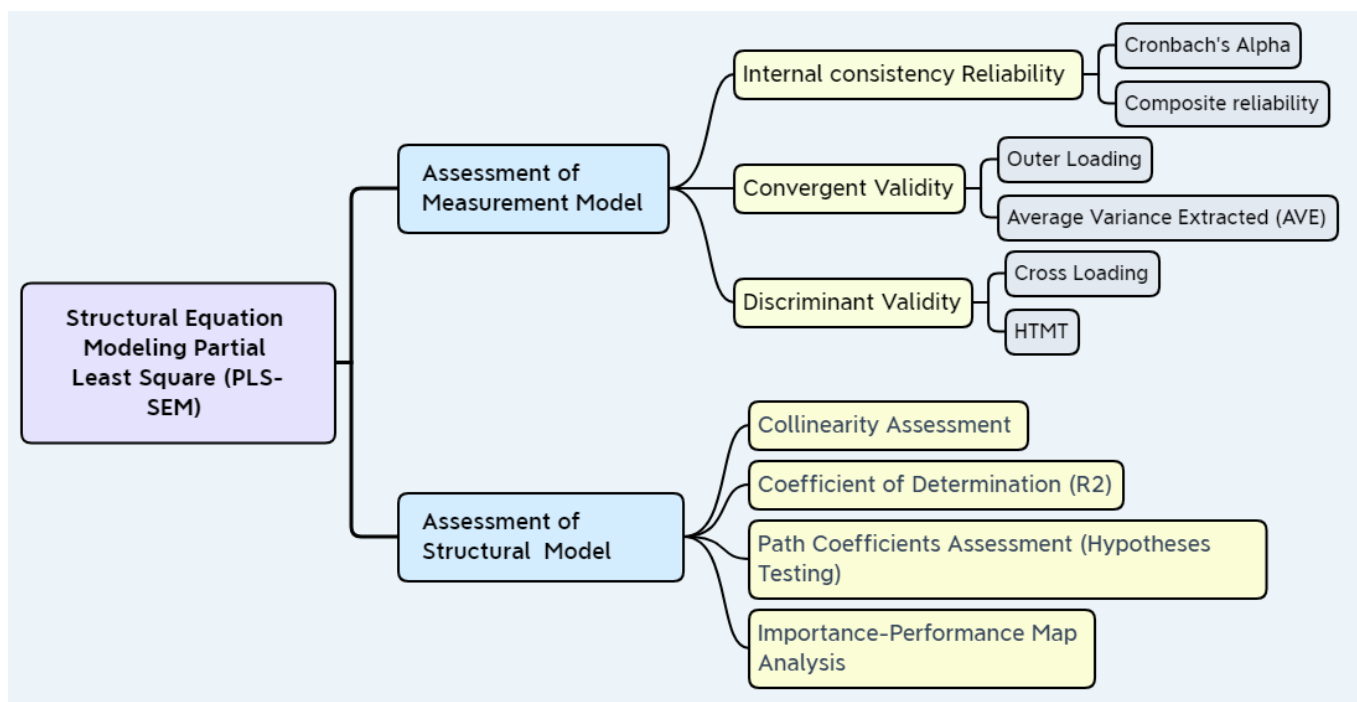


Figure 5: Steps of PLS-SEM analysis.

(CA)	Indicator	Outer loading	Composite reliability (CR)	Cronbach's alpha (CA)	AVE
Financial	FF1	0.79	0.835	0.755	0.505
	FF2	0.761			
	FF3	0.684			
	FF4	0.61			
	FF5	0.691			
Human resources	HRF1	0.711	0.921	0.902	0.596
	HRF2	0.738			
	HRF3	0.622			
	HRF4	0.813			
	HRF5	0.813			
	HRF6	0.808			
	HRF7	0.844			
	HRF8	0.8			
Sport policies	PF1	0.814	0.943	0.927	0.734
	PF2	0.821			
	PF3	0.861			
	PF4	0.892			
	PF5	0.885			
	PF6	0.864			
Sport programs	SPF1	0.757	0.93	0.916	0.574
	SPF2	0.781			
	SPF3	0.557			
	SPF4	0.654			
	SPF5	0.784			
	SPF6	0.805			
	SPF7	0.752			
	SPF8	0.834			
	SPF9	0.758			
	SPF10	0.847			
	SPF11	0.838			
Society culture	CSF1	0.831	0.845	0.771	0.579
	CSF2	0.691			
	CSF3	0.668			
Sport facilities	CSF4	0.83	0.908	0.882	0.588
	SFF1	0.748			
	SFF2	0.669			
	SFF3	0.819			
	SFF4	0.733			
	SFF5	0.862			
	SFF6	0.687			
SFF7	0.878				
Sport participation	SP1	0.883	0.91	0.851	0.771
	SP2	0.873			
	SP3	0.855			
	TF1	0.865			
	TF2	0.837			
Sport tools	TF3	0.802	0.918	0.888	0.691
	TF4	0.796			
	TF5	0.79			

Table 1: Constructs' reliability and convergent validity.

	Society culture	Financial	Human resources	Policies sport	Sport facilities	Sport participation	Sport programs	Sport tools
CSF01	0.838	0.309	0.396	0.399	0.256	0.274	0.411	0.319
CSF03	0.831	0.305	0.326	0.39	0.21	0.2	0.37	0.268
CSF04	0.691	0.172	0.275	0.23	0.121	0.105	0.26	0.139
CSF05	0.668	0.259	0.246	0.255	0.214	0.137	0.26	0.21
FF02	0.255	0.79	0.518	0.607	0.549	0.537	0.575	0.607
FF03	0.305	0.761	0.439	0.477	0.376	0.38	0.428	0.413
FF04	0.27	0.684	0.38	0.447	0.328	0.33	0.377	0.335
FF05	0.274	0.61	0.358	0.395	0.387	0.325	0.417	0.375
FF06	0.179	0.691	0.446	0.47	0.338	0.388	0.434	0.369
HRF01	0.242	0.476	0.711	0.484	0.53	0.36	0.541	0.6
HRF02	0.274	0.442	0.738	0.529	0.544	0.398	0.569	0.569
HRF03	0.29	0.378	0.622	0.421	0.46	0.312	0.448	0.501
HRF04	0.326	0.475	0.813	0.538	0.484	0.382	0.597	0.555
HRF05	0.326	0.503	0.813	0.565	0.483	0.419	0.626	0.555
HRF06	0.377	0.487	0.808	0.555	0.422	0.454	0.648	0.468
HRF07	0.341	0.492	0.844	0.577	0.499	0.428	0.678	0.549
HRF08	0.404	0.51	0.8	0.572	0.435	0.474	0.639	0.459
PF01	0.343	0.613	0.576	0.814	0.514	0.48	0.633	0.567
PF02	0.35	0.597	0.563	0.821	0.493	0.508	0.637	0.55
PF03	0.421	0.554	0.593	0.861	0.503	0.483	0.663	0.548
PF04	0.393	0.587	0.646	0.892	0.551	0.55	0.695	0.592
PF05	0.403	0.606	0.579	0.885	0.535	0.531	0.684	0.557
PF06	0.352	0.575	0.591	0.864	0.546	0.546	0.69	0.575
SFF01	0.169	0.427	0.466	0.438	0.83	0.499	0.431	0.647
SFF02	0.237	0.467	0.427	0.481	0.748	0.481	0.44	0.56
SFF03	0.171	0.372	0.468	0.422	0.669	0.42	0.476	0.514
SFF05	0.258	0.497	0.519	0.542	0.819	0.555	0.593	0.66
SFF06	0.206	0.378	0.43	0.427	0.733	0.466	0.441	0.548
SFF08	0.236	0.515	0.543	0.544	0.862	0.564	0.576	0.728
SFF10	0.189	0.385	0.476	0.409	0.687	0.351	0.413	0.618
SP01	0.222	0.486	0.446	0.493	0.572	0.878	0.562	0.545
SP02	0.216	0.517	0.46	0.547	0.52	0.883	0.575	0.522
SP03	0.243	0.491	0.483	0.55	0.565	0.873	0.616	0.581
SPF01	0.344	0.546	0.633	0.637	0.59	0.572	0.757	0.611
SPF02	0.35	0.541	0.634	0.62	0.532	0.54	0.781	0.618
SPF03	0.242	0.302	0.441	0.397	0.352	0.309	0.557	0.409
SPF04	0.28	0.438	0.557	0.479	0.37	0.372	0.654	0.45
SPF05	0.375	0.482	0.582	0.579	0.435	0.501	0.784	0.529
SPF06	0.296	0.495	0.581	0.612	0.484	0.547	0.805	0.541
SPF07	0.374	0.474	0.562	0.587	0.453	0.465	0.752	0.511
SPF09	0.375	0.474	0.616	0.62	0.443	0.549	0.834	0.544
SPF10	0.333	0.507	0.612	0.604	0.488	0.512	0.758	0.547
SPF11	0.387	0.541	0.633	0.702	0.585	0.591	0.847	0.626
TF01	0.292	0.523	0.626	0.569	0.695	0.583	0.638	0.855
TF02	0.287	0.515	0.554	0.562	0.699	0.514	0.604	0.865
TF03	0.308	0.471	0.528	0.506	0.632	0.537	0.573	0.837
TF04	0.265	0.539	0.551	0.575	0.655	0.516	0.608	0.802
TF05	0.206	0.491	0.578	0.53	0.636	0.437	0.55	0.796

Table 2: Loading and cross-loading of measure.

	Financial	Human resources	Sport policies	Sport programs	Society culture	Sport facilities	Sport participation	Sport tools
Financial	-	-	-	-	-	-	-	-
Human resources	0.73	-	-	-	-	-	-	-
Sport policies	0.807	0.753	-	-	-	-	-	-
Sport programs	0.751	0.849	0.839	-	-	-	-	-
Society culture	0.455	0.48	0.49	0.501	-	-	-	-
Sport facilities	0.679	0.706	0.674	0.695	0.313	-	-	-
Sport participation	0.688	0.598	0.679	0.743	0.287	0.718	-	-
Sport tools	0.722	0.773	0.727	0.79	0.364	0.9	0.715	-

Table 3: Heterotrait-Monotrait (HTMT) ratio.

Item	VIF	Item	VIF
CSF1	1.48	SP1	2.138
CSF2	1.78	SP2	2.184
CSF3	1.501	SP3	1.963
CSF4	1.465	SPF1	2.14
FF1	1.451	SPF2	2.32
FF2	1.616	SPF3	1.497
FF3	1.429	SPF4	1.687
FF4	1.229	SPF5	2.311
FF5	1.336	SPF6	2.504
HRF1	2.046	SPF7	2.016
HRF2	2.082	SPF8	2.837
HRF3	1.504	SPF9	2.084
HRF4	2.444	SPF10	2.843
HRF5	2.306	TF1	2.451
HRF6	3.084	TF2	2.622
HRF7	2.772	TF3	2.16
HRF8	2.772	TF4	1.977
SFF1	2.437	TF5	1.981
SFF2	1.886	PF1	2.287
SFF3	1.49	PF2	2.349
SFF4	2.201	PF3	2.961
SFF5	1.781	PF4	3.617
SFF6	2.765	PF5	3.409
SFF7	1.635	PF6	2.845

Table 4: Results of collinearity assessment.

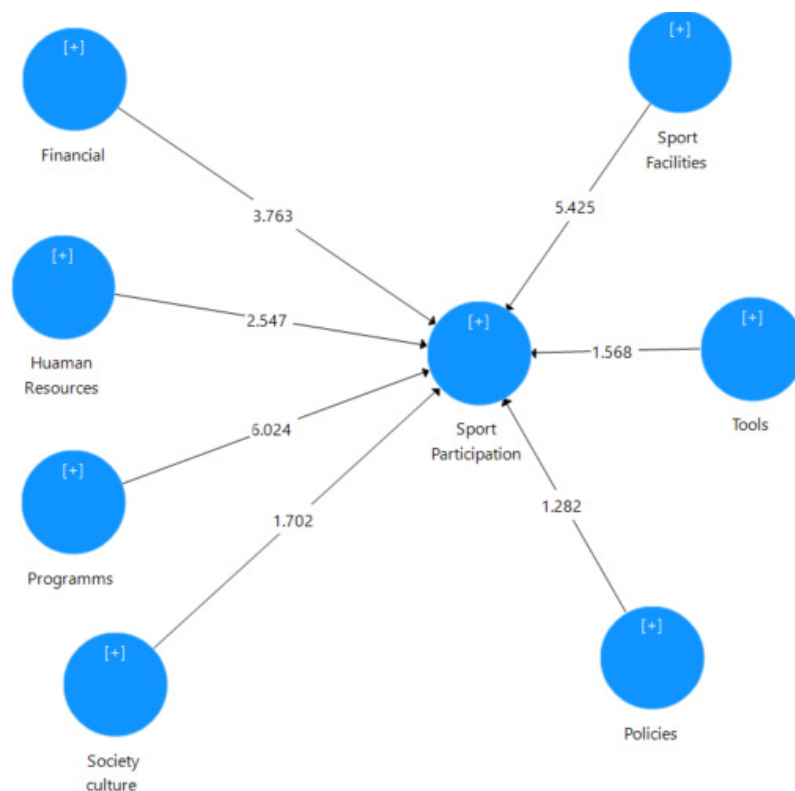


Figure 6: Steps of PLS-SEM analysis.

Examination of the path coefficients, p-values, and t-value (bootstrapping results) confirmed the research hypotheses. PLS-SEM was used to identify the impacts of independent constructs on engagement in sports. According to bootstrapping results, all research hypotheses affected engagement in sports significantly. The hypotheses were validated or rejected using path assessment results (β , t-value, and P-value). Table 5 and Figure 7 indicate the results of hypothesis testing. Table 5 summarizes the results of each hypothesis in the model (Table 5 and Figure 7).

According to the results shown in Table 5, all paths were positively and significantly related to the dependent construct. Besides, based on this table, the path between human resources and engagement in sports shows significance ($\beta=0.136$, t-value=2.547). As a result, there was an agreement among the research participants that social culture affected engagement in sports positively ($\beta=0.056$, t-value=1.702). Besides, sports facilities had significant and positive impacts on engagement in sports ($\beta=0.265$, p=5.425). Financial support and participation in sport were also significantly associated ($\beta=0.147$, p=3.763). In addition, sports tools and engagement in sports ($\beta=0.091$, p=1.568), sports programs ($\beta=0.4.3$, p=6.024), and sports policies ($\beta=0.086$, p=1.282) were significantly associated.

The final criterion used to assess the structural model and examine the significance of the independent variables along with their performance in explaining the dependent variable is the Importance Performance Map Analysis (IPMA). The researchers can improve their PLS-SEM analysis using IPMA which can lead to further results as well as findings [88]. This way, the results of PLS-SEM are extended to another dimension consisting of the principal significance and performance of every construct [89]. Besides, the construct total effect is in contrast with the average scores of the latent variable in the

preceding construct. The total effect and the average latent variable scores represent the significance of the constructs in the development of the target construct and their performance, respectively. IPMA analysis primarily aims at recognizing the constructs with nearly higher significance for the target constructs. Obviously, decision- and policy-makers can use the results of the IPMA analysis across the organizations to improve areas with higher significance and lower performance. Figure 8 indicates the results of IPMA analysis (Figure 8).

According to Figure 8, sports programs, sports facilities, and financial support played a critical role and were highly important in engagement in sports. Among these, sports programs showed the greatest significance in the research model, with an overall effect size of around 0.474. Accordingly, as the performance of the sports programs increases by one point, the performance of sports engagement by the size of programs' significance value will increase, which is of course less than the average to a slight extent in comparison with other constructs. Significance and performance values of 0.301 and 46.308 were reported for sports facilities, respectively. Besides, a value of 57.634 for the average latent variable score indicated the significant role of financial support; however, its significance was lower than sports programs and facilities (Sig=0.186). Nevertheless, human resources and social culture did not affect engagement in sports, given the overall effect values of -0.164 and -0.068, correspondingly. Despite their high performance, the constructs of sports tools, sports policies, social culture, as well as human resources had low overall effect values in comparison with the three other constructs previously mentioned. A summary of the IPMA results is presented in Table 6 according to the order of construct significance with a high total effect (Table 6).

Hypothesis	Path	Original sample (O)	T-value	P-values	Results
H ₁	Human resources->Sport Participation	0.136	2.547	0.005	Supported
H ₂	Society culture->Sport Participation	0.056	1.702	0.044	Supported
H ₃	Sport facilities->Sport Participation	0.265	5.425	0.00	Supported
H ₄	Financial support->Sport Participation	0.147	3.763	0.00	Supported
H ₅	Sport tools->Sport Participation	0.091	1.568	0.058	Supported
H ₆	Sport programs->Sport Participation	0.403	6.024	0.00	Supported
H ₇	Sport policies->Sport Participation	0.086	1.282	0.1	Supported

Table 5: Results of hypotheses testing.

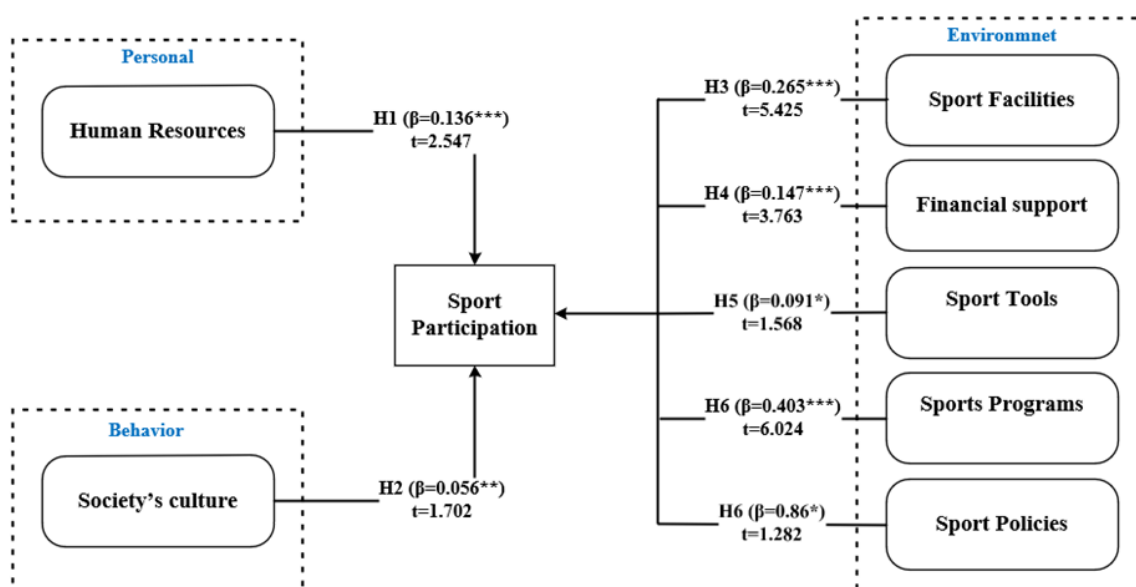


Figure 7: Results of the structural model.

Independent constructs	Importance to the sports participation	Performance	Path coefficient (Significant level)
Programs	0.474	48.902	Significant
Sport facilities	0.301	46.308	Significant
Financial	0.198	57.634	Significant
Tools	0.1	45.808	Significant
Policies	0.092	49.177	Significant
Society culture	-0.068	62.832	Significant
Human resources	-0.164	49.485	Significant

Table 6: Construct's categorization based on their importance.

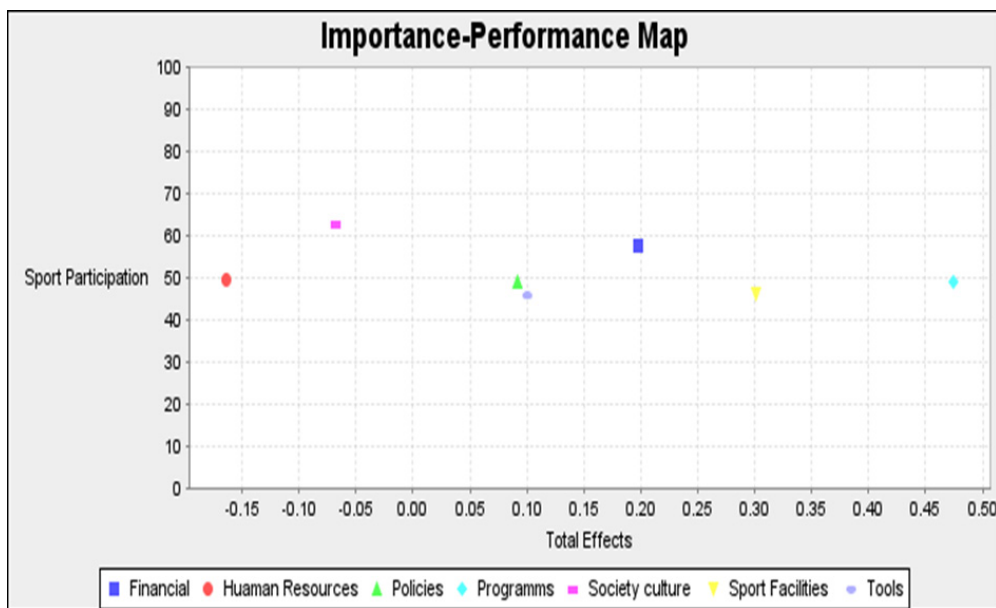


Figure 8: Importance-performance matrix analysis map. Note: (■) Financial; (●) Human resources; (▲) Policies; (◆) Programmes; (■) Society culture; (▼) Sport facility; (●) Tools.

Discussion

The health conditions of students are an important issue which needs special attention. One of the benefits of physical activities is their impacts on health and well-being. Although different studies have examined the associations of physical activities and academic achievement, there is scarce research on the specific association of engagement in sports and academic attainment. There are particularly no comprehensive models in the Saudi Arabian context to illustrate the influential factors on the engagement of male students in physical activities. In other words, there is scarce research in the academic context of Saudi Arabia with a focus on the engagement of this population in such activities. Thus, further studies are required to determine these influencing factors in the mentioned context. Thus, the present study focused on the factors which affect undergraduate male students' engagement in sports in universities of Saudi Arabia.

The experimental indications show that the independent and dependent variables are positively and significantly associated. Thus, the results of the statistical analyses could support the proposed research hypotheses and their significant positive associations with engagement in sports. According to the hypothesis testing, sports programs, sports facilities, and financial support had the highest effects on students' engagement in sports.

The research findings showed sports programs as one of the most influencing factors on engagement in sports ($\beta=0.4.3, p=6.024$). these findings agree with the results obtained by Taliaferro, et al. indicating that the current economic conditions are threatening the sports programs in high schools [90]. Thus, instructors and policymakers have to invest on such programs and their provision for the young people to participate in sports. Meantime, it is believed that the youth participating in extracurricular sports programs are more likely to show higher self-efficacy values compared to those who do not participate in sports [91]. Besides, according to Grima, et al. young people may become less committed when they do not have access to sports programs [92]. According to the authors, the only focus

of sports programs should not be on developing athletic aspects because physical and psychological dimensions need emphasis as well. According to Dixon, participants referred to the requirement for more flexibility of exercise and sports programs regarding their time and the class or league expectations [93]. As stated by Fraser-Thomas, et al. sports programs for youth contribute significantly to their experiences and engagement [94]. It was also shown that these programs for youth can promote several internal benefits, including motivation toward success, participation in school, caring, accountability, social qualifications, empathy, cultural competencies, resistance capacities, capabilities in resolving conflicts, and fostering positive identities. In the same vein, Allen believed that schools are capable of capturing and encouraging participation in more activities through out-of-school sports programs. Besides, academic success may be affected positively by sports programs if their design aims at facilitating positive changes in the desired context. Thus, it was shown in the present study that universities can facilitate activity in students and motivate this population to get more involved with physical activities by providing adequate sports programs.

Based on the findings, sports facilities had significant and positive effects on engagement in sports, which agrees with the results obtained by Nicholson, et al. The authors stated that accessibility of these facilities can affect the policies for sport participation. The differences which are evident in sport participation can be somehow affected by the access to sports facilities. Besides, according to Hoekman and van den Dool, improved engagement in sports was significantly associated with accessibility to sports facilities in Netherlands [95]. In addition, it was shown by MacIntosh and Spence as well as Kumar, et al. that such facilities contribute significantly to the increase in engagement, development, or positive changes in the health and well-being conditions of both individuals and communities [96]. Rowe, et al. referred to the lack of scientists' attention to the investigation of sports facilities in terms of providing opportunities to bring individuals together through sports activities [97]. However, Wicker, et al. stated that access to such facilities can

play a key role in engagement of individuals in sports, and different sports infrastructures have positive effects on engagement in sports in general [98]. Dallmeyer, et al. also referred to positive associations of availability of sports facilities and engagement in physical activities and exercise [99]. It was found by Poulidou, et al. that access to sports facilities, participation in sports, and health conditions of individuals were probably associated [100]. Based on these researchers, there was a significant relationship between accesses to sports facilities and outdoor compared to indoor physical activities. Hence, access to sports facilities is associated with engagement in physical activities. According to Widdop et al., access to sports facilities which are of high quality and affordability can contribute to higher levels of engagement in sports. As shown by Hoekman, et al. local policies aimed to provide sport facilities and promote sports in Netherlands had a special attention to those groups lagging behind in engagement. Ultimately, Reis, et al. referred to the economic advantages resulting from the provision of new sports facilities and infrastructures with no reference to the potential social as well as health consequences of enhanced engagement in sports and physical activities obtained by the utilization of the provided facilities [101]. Thus, sports facilities play a key role in sports participation. Accordingly, strategies should be followed in the academic context to increase access to such facilities and motivate students toward participation in sports and physical activities.

Based on the research experimental findings, financial support affected engagement in sports positively and significantly. This finding agrees with the findings of Reece, et al., regarding the annual payment for sports of the Australian children and the financial support provided by sports vouchers in different states and regions to overcome the existing financial problems and develop the engagement of this age group in organized sports [102]. It was supposed that financial support could increase engagement of the study population on physical activities. Pule, et al. also studied the obstacle of engagement in sports for the South African students at primary and secondary levels. They identified different obstacles for participation of children in school sports, including parents' failure to provide financial support. Karusisi, et al. also stated that policies for the enhancement of sports engagement have to focus on developing spatial as well as financial accessibility of special facilities and dealing with educational imbalances in sports activities. Besides, Thompson et al., stated that higher social status was associated with more financial support of children for sports participation, which means access to higher opportunities in comparison with those belonging to lower social status [103]. Thus, children from lower social strata also require financial support. Therefore, governments, universities, and different sources have to provide financial support to promote engagement of students in sports activities.

Conclusion

University students are provided with the necessary health benefits through physical activity. Nevertheless, there are some problems due to lower levels of students' engagement in such activities, leading to the adoption of an unhealthy lifestyle along with harmful dietary habits. Thus, the present work sought to examine the influential factors on the involvement of Saudi Arabian male undergraduate students in sports activities. The results of the study showed that all related variables could explain around 54% of the variance in participation in sport. These variables included financial support, human resources, sports policies, sports programs, social culture, sports facilities, as well as sports tools. The results, therefore, represent an acceptable

and high predictive power, while also indicating sports programs and financial support as the significant and influencing factors on the participation in sports activities. It can also reflect the motivation and tendency of university students to engage in physical activities and have higher participation levels when different sports programs are available to satisfy them. Accordingly, university managers and educational policymakers should provide the requirements, including proper sports programs along with the required financial support to provide the students with a better experience of their participation in physical activities. Besides, financial support seems to be a critical technique through which students are attracted to engage in physical activity within the academic context.

Theoretical and Practical Implications

Based on the social cognitive theory, the relationship of engagement in sports with some independent variables was investigated in the present study, which had some theoretical and practical implications. According to theory, the proposed model and the influencing factors on engagement in sports can facilitate identification of the drivers resulting in participation in sports by top managers of the universities and policy-makers. It should be also noted that previous research in Saudi Arabia has not presented a comprehensive model to illustrate the influencing factors on the engagement of male students in physical activities. Nevertheless, this is one of the first studies examining the behaviors of students from three perspectives, personal behaviors, and environmental factors considering social cognitive theory.

The sports programs affect sports participation significantly. It was shown that engagement in sports has positive and significant relationships with sports programs. Thus, top managers of universities have to consider the necessary grounds, including good sports programs. Besides, physical activities are currently integrated into university programs. When such programs satisfy the needs of students, give them the required motivation, and promote their social interactions, the students will be more likely to engage in physical activities. Hence, students demand, including sports programs should be considered to encourage this population to engage in different sports in the academic context.

The present study had several practical implications through illustration of the influential factors, including sports programs, sports facilities, and financial support provided management and policy-makers in the designing and introducing such activities. Given that participation of male students in physical activities is currently developing, the present research can provide insights for policy-makers as well as practitioners for the adoption of motivating policies for this population to have higher levels of sport participation in academic context. In addition, sports programs are shown to contribute significantly in the proposed model. Hence, managers and policy-makers at the academic level have to consider the introduction of activities which are more related to sports. Such programs have to take the nature of the male students' favorites such as running, football, basketball, swimming, etc. into account, as these activities may be more attractive for this group.

Limitations and Further Research

The present work was restricted from several aspects. Initially, the research participants were chosen from undergraduate male students, while the number of postgraduate male students is increasing in the academic context of Saudi Arabia. Accordingly, the research findings should be generalized with caution. Therefore, future studies are

required to compare these two groups of students, highlighting the considerable differences in the effect of factors. Another limitation of the present work is that it has been conducted through a quantitative approach and a survey-based method to collect the required data. Yet, different techniques, including qualitative approaches may lead to a better understanding of the influential factors on the engagement of students in physical activities. Future research should consider various research procedures, including experimentation, interviewing, and focus groups. Third, the present research was carried out in the academic context of Saudi Arabia, where participation in sports does not show a broad prevalence. This limitation can reduce the scope of generalizability of the findings to the academic context of other countries. Ultimately, the well-utilized factors were considered in the current work, and those which could potentially have significant impacts on the participation of students in physical activities were not covered. Nevertheless, all possible factors cannot be included in a single model due to the possibility of providing imprecise results. Further research is required with a focus on different factors to provide a better understanding of the phenomenon under study and deal with the research limitations. More detailed investigations can be carried out on health factors, social interactions, knowledge, as well as motivation.

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Availability of Data and Materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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