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Scenarios of Iranians' participation in leisure time physical activity

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ABSTRACT

This study aimed to develop scenarios of Iranians' future participation in leisure-time physical activity (LTPA). To this end, 12 experts in the field of leisure, sociology, and sport management were invited to take part. The Decision Making Trial and Evaluation Laboratory (DEMATEL) method was used to organize and analyze the data collected in a questionnaire featuring a pairwise comparison of 18 indicators of LTPA which were drawn from the relevant literature. The DEMATEL was then used to determine the critical uncertainties of the future participation in leisure-time physical activities. Considering the two most important critical uncertainties from economic and technological dimensions, four possible futures around Iranians' participation in these activities were created. By taking the uncertainties into consideration, decision-makers can contribute to the promotion in LTPA in the best and most efficient manner by having knowledge about the most influential framing factors of possible futures.

RÉSUMÉ

Cette étude visait à élaborer des scénarios pour inciter les Iraniens à faire de l'activité physique durant leurs temps libres (APTL). Douze experts dans les domaines du loisir, de la sociologie et de la gestion des sports ont été invités à y participer. La méthode DEMATEL (Decision Making Trial and Evaluation Laboratory) a servi à organiser et à analyser les données recueillies à l'aide d'un sondage comparant 18 paires d'indicateurs d'APTL tirés de la littérature pertinente. La même méthode a ensuite été utilisée pour établir les obstacles critiques qui pourraient compromettre la réalisation d'activités physiques durant les temps libres. Compte tenu des deux plus importants obstacles sur les plans économique et technologique, quatre éventuels scénarios de pratique d'activité physique par les Iraniens ont émergé. En considération de ces obstacles, les décideurs peuvent contribuer à la promotion de l'APTL le plus efficacement possible parce qu'ils connaissent les facteurs d'encadrement les plus influents sur les perspectives d'avenir.

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1. Introduction

Physical activity (PA) not only contributes to health and well-being, but has additional benefits related to social aspects of people's lives such as social integration and social growth (Wankel & Berger, 1990). Individual needs, reasons, and motivation are factors that are related to leisure time physical activity (LTPA) often resulting in regular participation, social, emotional, physical, and psychological benefits (Dergance et al., 2003; Martinez-Gonzalez et al., 2001; Ragheb & Tate, 1993).

However, based on global PA trends, inactivity is increasing (Hallal et al., 2012). This trend is reflected in 168 countries across the globe, which indicate that one-third of adults do not meet minimum recommended PA standards. Despite developed programmes for LTPA promotion, participation rates have not been significantly increased in different countries (Juneau & Potvin, 2010; Monda et al., 2008; Román-Viñas et al., 2007; Da Silva et al., 2014; Stamatakis et al., 2007). These characteristics are also true of Iran. For example, after administering the global physical activity questionnaire (GPAQ), a 7% reduction in the level of PA was identified in both Iranian males and females from 2007 to 2011 (Koohpayehzadeh et al., 2014). In the same way, Fakhrzadeh et al. (2016) in a systematic review of Iranians' PA status revealed that the prevalence of physical inactivity has remained high in the country.

1.1. Leisure time physical activity in Iran

Pour Ahmad and Salarvandian (2013) studied trends in historical changes of leisure spaces in Tehran and asserted that since the Qajar era (the 1920s) leisure spaces have been divided into three categories: leisure spaces for women, leisure spaces for men, and mixed leisure spaces. Further, the type of recreational spaces for both genders has changed over time. Thus, today we can see gender segregation in doing leisure activities such as women's parks, women's concerts, women's swimming pools, or sports stadiums for men.

Leisure-time has had a specific origin in Iran over 100 years ago, due to its intersection with Western culture, traditional, and Islamic values (Martin & Mason, 2006). From traditional to modernity and then Islamism, many changes have taken part in the leisure behaviours of Iranians. While the government is currently trying to adapt leisure behaviours with Islamic principles to enrich this time for society members, there are still some deficiencies in providing suitable and equal facilities especially regarding sports and physical activities. For example, Mansouri and Farzam (2015) investigated the constraints of participation in leisure-time sports and physical activities in Iran and concluded that insufficient availability of facilities is the most important barrier to

taking advantage of these opportunities. Similarly, Bahriny and Bell (2020) studied the pattern of urban park use in Tehran province and reported that the low quality of these green spaces (e.g., lower presence of facilities, safety, special attractions) can negatively influence pastimes of citizens of Tehran in these recreational areas. They also referred to the differences between male and female used areas, as some parks were much less-well-used by women. In the same way, Khosravi et al. (2020) investigated the reasons for the increased level of physical inactivity in the Iranian population and found inappropriate infrastructures as one of the top challenges in improving the physical activity level in Iran.

In addition to the aforementioned constraints, this situation is also influenced by other trends such as population change. Iran's population is predicted to increase by 144 million by 2050 (Mehryar & Ahmad-Nia, 2004). Besides, the population is aging in Iran as well as other parts of the world, resulting in a greater incidence of age-related health problems and additional costs for a large segment of the population (Sheikhhossein et al., 2020). Sheikhhossein et al. (2020) also pointed out the necessity of providing educational programs and suitable opportunities to influence the adoption of a healthy lifestyle among elderly people.

Similarly, another example of social change that is likely to influence PA is urbanization, which has increased 3 fold compared to 40 years ago in Iran (Abdi et al., 2016). Increased urbanization is an especially relevant issue because it requires more facilities and opportunities to meet PA standards for all segments of the population, especially in larger cities.

Further, Damari et al. (2016) found that inactivity is currently spreading due to emerging trends in technology and access to the Internet. Ghafouri Fard et al. (2013) also indicated that the more exposure to playing video games, the less quality of life will result among students in Tehran province. They elaborated that it is accompanied by less PA and more aggressive behaviour among female students. New lifestyles associated with the development of and access to technology is affecting leisure behaviour in Iranian society, specifically amongst the young generation. For example, Sheykhi (2004) documented usage of technology is spreading broadly among younger Iranians (e.g., age between 15 to 29 years) contributing to inactivity and anti-social behaviours. In the same way, Masrour et al. (2012) explained that despite having on average eight hours per day of leisure-time during the summer season, most of the younger Iranian generation spends this free time on technological entertainment (e.g., playing video games, Internet, watching TV). Firouzjaeian and Gholamrezazadeh (2013) also reviewed the leisure patterns in Iranian society. They explained that contrary to the old generation which is following an active-collective pattern of leisure activities, the new

generation is moving forward with a passive-individual pattern, especially influenced by the emergence of technological tools.

However, some studies have reported that technology use can also contribute to an increase in PA (Koekoek & Van Hilvoorde, 2018; LeBlanc et al., 2013; Peyman et al., 2018). For example, health-related websites, are already in the spotlight, sports and fitness clubs use electronic entertainment to serve customers, and combining individualized technology with infrastructures of health and fitness centres are assumed to improve people's connectedness to these public health places (Nigg, 2003).

In brief, a wide and diverse range of trends and conditions can influence the amount and direction of LTPA in near future. Consequently, this study is aimed at the development of scenarios of Iranians' participation in LTPA with respect to influential trends and driving forces in this area.

1.2. Futures study

Futures study as a general concept means a kind of understanding of how the future will develop in order to make better policies (Van Dorsser et al., 2018). Different categories of paradigms have been considered in the field of futures study, but one of the most frequently used paradigms was developed by Mannermaa (1991). He created three types of paradigms: (1) the descriptive paradigm, which aims to provide the most probable predictions based on past developments. The future is therefore assumed to be predictable within this paradigm and relies on quantitative methods to reflect it (Kuosa, 2011; Mannermaa, 1991); (2) the evolutionary paradigm, which aims to better describe and understand the future of the world based on evolutionary rules. The main challenge in this paradigm is that the future assessments and prediction are done in chaotic phases (Börjeson et al., 2006; Kuosa, 2011; Mannermaa, 1991); and (3) the scenario paradigm, which seeks to describe different situations of the future. The value of developing different scenarios is based on their ability to help relevant organizations make the best decisions by imagining what is possible and by considering the implications of possible futures. Notably, a single, accurate future is not predicted and the scenario paradigm creates credible alternative futures. In contrast to the descriptive paradigm, the scenario paradigm also includes a broad range of methods (Kuosa, 2011; Mannermaa, 1991).

Based on this paradigm, Konno et al. (2014) contended that scenarios are narrative stories that have beginnings, middles, and ends that can, in their best forms, show how a situation might change over time in the coming future. In fact, by imagining some alternative futures and clarifying the consequences of actions, scenarios facilitate the decision-making process (Duinker & Greig, 2007; Johansen, 2018; Schoemaker, 1995). They describe

possible futures regarding driving forces, trends, and uncertainties around specific issues.

Two types of uncertainties are recognized in this process: cognitive and normative. Normative uncertainties consider that there is almost no knowledge about phenomena. With respect to cognitive uncertainty, some knowledge around an issue may exist, but it might significantly change in the future. Thus, imagining the future is a challenging work (Veenman, 2013).

Many research projects in different fields have been conducted using the scenario paradigm. In the field of sport and PA, for instance, Lewis et al. (2017) emphasized that technology could lead to an increase in sedentary behaviour and conversely provide opportunities to increase PA. They also suggested that further research should be done about the long-term outcomes of PA and technology interventions to increase PA participation. Neuvonen et al. (2018) also discussed alternative futures of outdoor recreation in Finland and recommended equal access to nature and fair distribution of health-related physical activities.

Merkel et al. (2016) developed two scenarios in the study of the future of European football clubs. In one scenario, clubs will take advantage of public demands in securing stadiums, competitive balance, and social interaction. But in their second, a less likely scenario, clubs gain income from extensive marketing, including short-term exploitation of all sources of revenue, such as stadiums, investors and sponsors, and broadcasting rights (Merkel et al., 2016). In another research work, Jonasson and Thiborg (2010) developed three possible scenarios about the future of E-Sport which include: (1) E-Sport as a counterculture or alternative to modern sport; (2) E-Sport accepted as part of the hegemony of sport; and (3) E-Sport as the future hegemonic sport.

As mentioned earlier, a wide range of forces can derive people towards participation in LTPA. With this in mind, to date, little attention has been devoted to future participation in these leisure activities. Therefore, this study was designed to (1) determine the causal relations between driving forces of Iranians' future participation in LTPA and specify critical driving forces (uncertainties) in this area; and (2) create scenarios of Iranians' participation in LTPA in near future based on the identified uncertainties.

2. Methods

A previous study by Ziaee et al. (2020) laid the groundwork for the present research by identifying a diverse range of key driving forces of LTPA through their consideration of the reports of Iran's horizon scanning research group and the STEEPV framework.

This research group consists of Iranian experts from different scientific fields that annually reports influential events and trends around Iranian society aiming at creating ‘a better future for all (Iranians)’. It considers also the STEEPV framework to identify a set of social, technological, economic, environmental, political, and value/cultural trends and driving forces at both global and local levels that can influence the future of the country (<http://www.ayandeban.ir/>). In other words, this framework is used to organize the extracted information from trends or events that come up in society, technology, economy, environment, policy, and values/culture (Schwartz, 1991). It should be noted that in conducting the previous study, the ‘Sport/Sports Sciences’ domain was also added as an additional domain to the STEEPV framework to include influential events in the sports world and sports sciences as well as performance of Iranian athletes that could affect participation in LTPA.

In this regard, using the STEEPV framework and applying the Fuzzy Delphi Method (FDM), 18 out of 73 indicators were screened as key driving forces of Iranians’ participation in LTPA (for this see: Ziaee et al., 2020). These driving forces are projected in Table 1.

Thus, a logical next step, building the previous study, was to determine the most important and the most uncertain driving forces (also known as critical uncertainties) on which the scenarios of Iranians participation in LTPA are developed. That was what this study sets out to do. We aimed at building scenarios of Iranians’ future participation in LTPA.

In doing the present study, a pairwise comparison questionnaire of the 18 driving forces of participation in LTPA was prepared. This questionnaire

Table 1. The key driving forces of Iranians’ future participation in LTPA.

| Driver category | Drivers | |
|----------------------|-----------------------------------------------------------------------------------------------------|-----|
| Environmental | PA opportunities for vulnerable groups | D1 |
| | Distribution of PA facilities in both areas with high and low socioeconomic classes | D2 |
| | Air pollution (resulting from dust and dopants) | D3 |
| Social | Youth frustration | D4 |
| | Hope/disappointment about future | D5 |
| Economic | Purchasing power of people | D6 |
| | Economic infrastructures | D7 |
| Technological | The entertainment industry (e.g., video games) | D8 |
| | Emerging of electro-recreational tools | D9 |
| | Emerging of PA-related software (e.g., smartphones applications) | D10 |
| | Changes in technology and the amount of free time | D11 |
| | Using the Internet and informational technology to simplify access to PA information | D12 |
| | Virtual social networks | D13 |
| | Free after-school time | D14 |
| Sport/Sport Sciences | Winter sports development | D15 |
| | Trends in sport and LTPA-oriented businesses | D16 |
| | Structural changes in the sport ministry and sport federations using a recreational sports approach | D17 |
| | Performance of national sports teams (e.g., volleyball, football) | D18 |

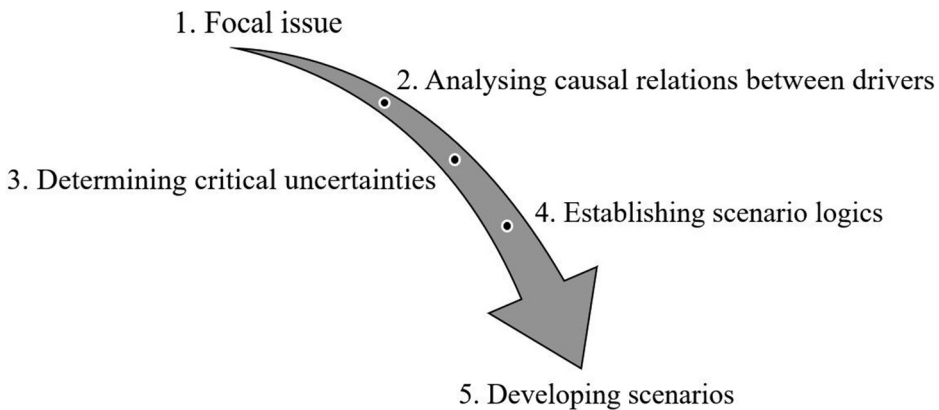


Figure 1. Stages of the research process.

was sent to 12 experts who were university faculty members (male and female) in the fields of leisure, recreational sport, sociology, and sport policy, and/or having a governmental position with at least ten years experience. In addition to their expertise, some of these individuals had contributed to Iran's horizon scanning reports and were familiar with the influential driving forces and trends of Iranians' lives. Each expert was asked to give his/her opinion based on a 4-point ordinal scale that ranged from 0 ('no influence') to 3 ('high influence').

After the data collection, the Decision Making Trial and Evaluation Laboratory (DEMATEL) method was then used to analyze the causal relations between the 18 driving forces and determine the two most important and uncertain driving forces (known as critical uncertainties). Next, we established four scenario logics (plots) based on the identified critical uncertainties.

Lastly, the experts were asked to contribute to creating scenario stories, consistent with each scenario logic (plot) (see [Figure 1](#)).

These stages are described in detail in the next following sections.

2.1. The DEMATEL method

Godbey et al. (2010) argued that there might be an intertwining relation between various factors in leisure participation. They argued that 'it is important to keep in mind that conceptually distinct constructs can be correlated. In fact, it is implausible to contend that there are any relevant variables connected with social life that would be entirely unrelated' (p. 114). So it was assumed that different, but related factors could provoke people to participate in LTPA as well. In this regard, the DEMATEL could

determine these interactions and rank the criteria based on their degree of importance and severity of influence.

The DEMATEL technique enables the researchers to divide the factors of a system into the cause and effect groups and consider the intensity of mutual relations (Gigović et al., 2016; Lin et al., 2011; Liou et al., 2008). This method is extensively employed to represent the effectiveness of each criterion (Lee et al., 2013) and solve complex and intertwined problems (W.-W. Wu & Lee, 2007). Indeed, in a totally interdependent system, all criteria of the systems are mutually related, directly or indirectly. Thus, any interference with one of the criteria influences all the others making it difficult to find priorities for action. The DEMATEL method is based on directed graphs (digraphs) enabling us to project and solve complex issues by dividing multiple criteria into cause and effect groups and visually capture causal relationships. The graph displays the mathematical results visually and unambiguously (Hsu, 2012; Shieh et al., 2010; Tzeng et al., 2007; Tzeng & Huang, 2011).

To pair-down the scenario factors, there are differences between the DEMATEL and other methods such as Factor Analysis.

While reducing a set of related factors into meaningful categories might suggest the use of a dimension reduction technique such as factor analysis, the DEMATEL was better suited to this study because it determines the causal interrelations between criteria as well as the most important and influential criteria, which is not expected from factor analysis. Further, the DEMATEL is not constrained by sample size (Tzeng et al., 2007).

The DEMATEL method has also been used in a number of other fields of study, including leisure and recreation. For instance, Chen and Sun (2012) applied a hybrid model of DEMATEL and Analytic Network Process (ANP) methods to identify influential factors and relative weights of personal preference (physical condition, psychology, and entertainment) and

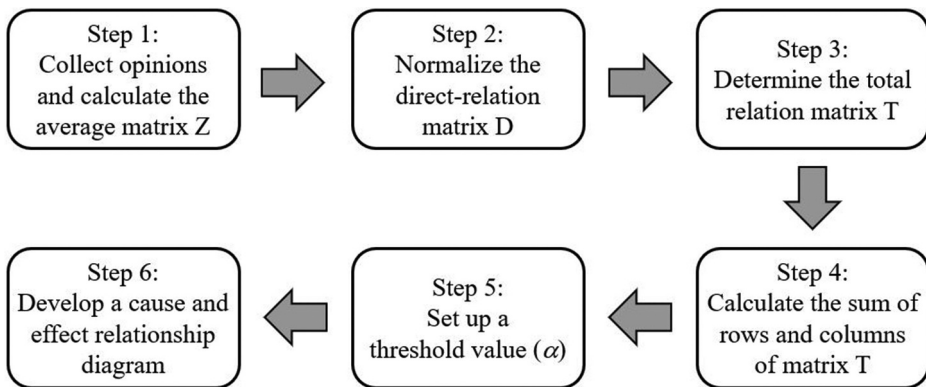


Figure 2. Flow chart of the DEMATEL method process (Source: Li & Mathiyazhagan, 2018).

external environment (society, environment, cost, and family) application, related to senior Taiwanese citizens' participation in recreational sports. They, for example, reported that the experts were most concerned with psychology and entertainment and least concerned with environment and cost. The experts also found psychology and entertainment most important among the three criteria of personal preference. Also among the four external environment criteria, experts considered society and family important.

In another research project, Tan and Kuo (2014) aimed to prioritize the facilitation strategies of leisure constraints in Taiwan. Using the DEMATEL method, they explained how the priority constraints influence other factors and concluded that money and time are two strong causer constraints that influence leisure participation. This means that the policy strategies should target the aforesaid constraints first.

The steps of the DEMATEL technique are described within Figure 2 and are described in the following sections (Chen & Sun, 2012; Han & Deng, 2018; Lin et al., 2011; Shieh et al., 2010; H.-H. Wu & Chang, 2015; W.-W. Wu & Lee, 2007):

Step 1: Calculate the average matrix. The notation of x_{ij} indicates the degree that each expert believes factor i affects factor j . For example, the experts indicated how much they believed a specific driver influenced each of the other drivers using the 4-point influence scale. The diagonal elements of the matrix are set to zero in which $i = j$.

An $n \times n$ non-negative matrix will be then established for each expert as $x^k = [x_{ij}^k]$, where k is the number of experts with $1 \leq k \leq H$, and n is the number of elements in the system (in this study, the 18 drivers). To aggregate all opinions from H experts, the average matrix $A = [a_{ij}]$ can be constructed as follows:

$$a_{ij} = \frac{1}{H} \sum_{k=1}^H X_{ij}^k \quad (1)$$

Step 2: Normalize the direct-relation matrix. Based on the direct-relation matrix A , the normalized direct-relation matrix D can be calculated as follows:

$$D = A \times S \quad (2)$$

Where,

$$S = \text{Min} \left(\frac{1}{\max_{1 \leq i \leq n} \sum_{j=1}^n a_{ij}}, \frac{1}{\max_{1 \leq j \leq n} \sum_{i=1}^n a_{ij}} \right) \quad (3)$$

After normalization, each element in matrix D falls between zero and one, which means we have standard and comparable elements.

Step 3: Calculate the total relation matrix (matrix T). Matrix T represents the total relations between each pair of factors. The total relation matrix is defined as follows:

$$T = D(I - D)^{-1} \quad (4)$$

Step 4: Calculate the sum of rows and columns in Matrix T . In this matrix r and c ($n \times 1$ and $1 \times n$ vectors) represent the sum of rows and columns of the total relation matrix, respectively. If r_i is the sum of i th row in the matrix T , then r_i summarizes both direct and indirect effects given by factor i to the other factors. If c_j is the sum of the j th column in the matrix T , then c_j represents both direct and indirect effects by factor j from the other factors. When $j = i$, the sum ($r_i + c_j$) shows the total effects given and received by factor i . That is, ($r_i + c_j$) indicates the degree of importance that factor i plays in the entire system. In contrast, the difference ($r_i - c_j$) illustrates the net effect that factor i contributes to the system. In particular, if ($r_i - c_j$) is positive, factor i is a net cause, while factor i is a net receiver or effect if ($r_i - c_j$) is negative. For example, the sixth driver (D6) is a net cause, and the first driver (D1) is a net receiver in the present study (see Result Section).

Step 5: Set up a threshold value to obtain the digraph. Since matrix T provides information on how one factor affects another, a decision-maker must set a threshold value to filter out negligible effects. Thus, only the effects greater than the threshold value are chosen and shown in an impact-relation digraph. The threshold value is set up by computing the average of the elements in the matrix T :

$$\alpha = \frac{\sum_{i=1}^n \sum_{j=1}^n t_{ij}}{n^2} \quad (5)$$

The digraph is produced by plotting the dataset of ($r + c, r - c$). The value of ($r_i + c_j$) is presented as prominence and indicates the importance of factors. Equally, the value of ($r_i - c_j$) shows severity of relation between criteria meaning that criteria with a higher value of $r - c$ have a higher impact on another and are assumed to have higher priority, and those having lower values receiving more impact from another are assumed to have lower priority.

Considering these two values, we can specify both the most important and the most uncertain driving force (driver). Drivers with both these characteristics are referred to as 'critical uncertainties' (Rhydderch, 2017).

2.2. Scenario approach (four quadrants matrix – minimal approach)

The DEMATEL method was applied to identify critical uncertainties. In this stage, only two criteria are enough to draft scenarios. Considering the 2×2

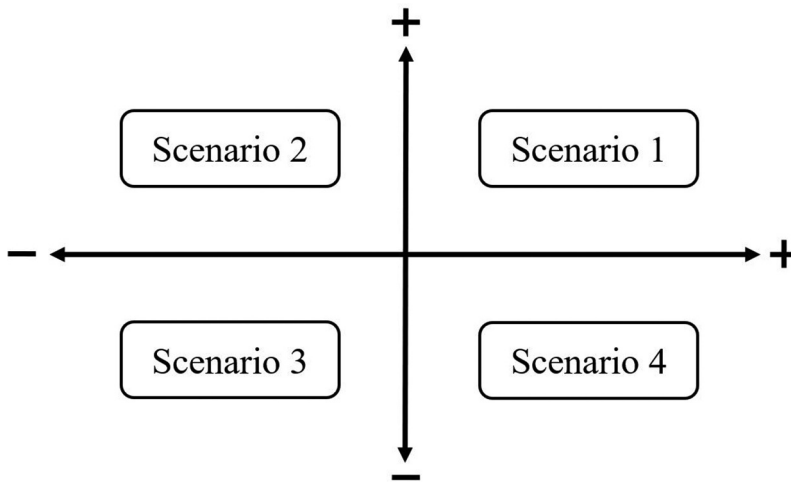


Figure 3. The 2×2 scenario matrix.

scenario matrix approach, scenarios are constructed based on the two most important critical uncertainties (Amer et al., 2013; Ogilvy & Schwartz, 1998).

By the intersection of two axes of the matrix and combining the lower and upper bounds of the two most important critical uncertainties (see Figure 3), four scenario logics (plots) each representing a plausible alternative future, are developed to examine the focal issue (Mietzner & Reger, 2005; Ramirez & Wilkinson, 2014; Rhydderch, 2017). Notably, a scenario logic (plot) is defined as a framework within which a scenario is generated (Rounsevell & Metzger, 2010).

Normative and exploratory approaches are the most popular approaches in developing scenarios. Normative scenarios are generated with regard to goals and strategies to achieve these goals, but the exploratory scenarios consider the framing factors (Milestad et al., 2014). In this regard, Iran's horizon scanning group's reports were the basis for developing exploratory scenarios in the current research project.

The scenario story building is an excellent technique of integrating certain and uncertain aspects of the future, either individually or by a group of individuals. Arguably, 'scenario stories may be seen as a "bridge" between the analytically oriented planning and the creatively oriented vision making activities due to their ability to transmit both rational and creative layers of thoughts and beliefs' (Rasmussen, 2005, p. 230). The simplest method for scenario story building is the expert model in which a person or a small group of experts contribute to developing the scenarios (Lindgren & Bandhold, 2003).

In the last stage, the same experts were explained how to use the generated knowledge in the previous stages (driving forces of LTPA and

critical uncertainties) as input to build scenario stories. They were asked to develop these stories according to the logic of each scenario space. To do so, we also provided them with a scenario construction guide, which covered up the aforesaid inputs. Further, two examples of scenario contents were included to help the experts get familiar with the structure of scenarios. To this end, they were individually asked to look ahead roughly 3 to 5 years in writing stories and then give each scenario space a catchy, short, and memorable name. Notably, five experts contributed to developing the scenario stories.

We chose to ask the ideas and insights of experts of the present study in such a manner because they were required to consider all the aforementioned inputs in order to create narratives, which would entail a long time to write scenario stories. Further, it was not possible to develop the scenarios by holding, for example, group sessions or a workshop due to the experts' unavailability and also the time limit for conducting this research project.

After the viewpoints were collected in this way, they were re-written to integrate all the collected drafts of each scenario into one. To finalize four unique scenario stories, we left out the parts of each collected scenario draft that semantically overlapped one another and then decided on the suggested names.

3. Results

The importance of eighteen factors can be prioritized as $D6 > D1 > \dots > D3$, where 'purchasing power of the people' is the most important factor with the value of 7.8501, while 'air pollution' with the value of 4.1625 is the least important factor. We divided the factors into two categories of cause and effect groups according to the value of $(r - c)$, and then considered the causes rather than effects (see [Table 2](#)).

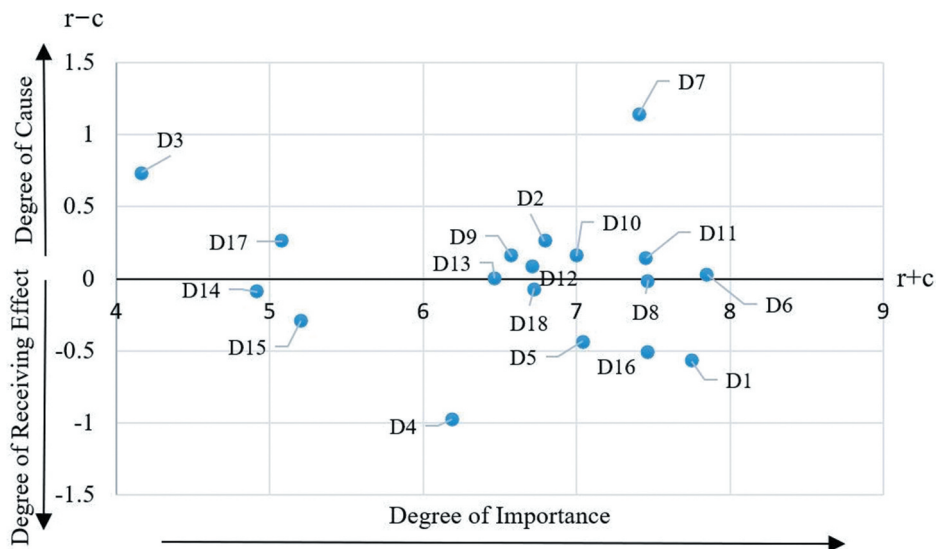
[Figure 4](#) displays a summary of the results by plotting the measures derived from the DEMATEL technique analysis. In the causal diagram, the horizontal axis represents the importance of factors while a vertical axis divides the factors into the cause and effect groups. In other words, important factors can be ranked based on $(r + c)$ values, and the values in $(r - c)$ can be used to separate the factors into cause and effect groups.

In order to map the causal relationships in the total influence matrix (T), the cells above the threshold value (see step 5 of the DEMATEL method) should be considered. To this end, the values above the threshold can be assumed equal to 1, and the rest of them equal to 0. Thus, in drawing a graph, if the cell has a value of 1 (e.g., from the row factor

Table 2. The cause-effect classification and importance ranking of drivers.

| Cause | Category | Driver | r | c | r + c | r - c | Overall rank |
|-------|------------------------|-------------------------------------------------------------------------------------------------------|--------|--------|--------|--------|--------------|
| D6 | Economic | Purchasing power of people | 3.9388 | 3.9114 | 7.8502 | 0.0273 | 1 |
| D8 | Technological | The entertainment industry (e.g., video games) | 3.7312 | 3.7392 | 7.4704 | 0.001 | 3 |
| D11 | Technological | Changes in technology and the amount of free time | 3.7984 | 3.6558 | 7.4542 | 0.1426 | 5 |
| D7 | Economic | Economic infrastructures | 4.2696 | 3.1346 | 7.4042 | 1.1349 | 6 |
| D10 | Technological | Emerging of PA-related software (e.g., smartphones applications) | 3.5777 | 3.4209 | 6.9986 | 0.1568 | 8 |
| D2 | Environmental | Distribution of PA facilities in both areas with high and low socio-economic classes | 3.5242 | 3.2649 | 6.7891 | 0.2592 | 9 |
| D12 | Technological | Using the Internet and informational technology to simplify access to PA information | 3.3959 | 3.3115 | 6.7074 | 0.0843 | 11 |
| D9 | Technological | Emerging of electro-recreational tools | 3.3657 | 3.2123 | 6.5780 | 0.1534 | 12 |
| D13 | Technological | Virtual social networks | 3.2342 | 3.2336 | 6.4678 | 0.0006 | 13 |
| D17 | Sport & Sport Sciences | Structural changes in the sports ministry and sports federations using a recreational sports approach | 2.6693 | 2.4116 | 5.0809 | 0.2577 | 16 |
| D3 | Environmental | Air pollution (resulting from dust and dopants) | 2.4488 | 1.7137 | 4.1625 | 0.7351 | 18 |

| Effect | Category | Driver | r | c | r + c | r - c | Overall rank |
|--------|----------------------|-------------------------------------------------------------------|--------|--------|--------|---------|--------------|
| D1 | Environmental | PA opportunities for vulnerable groups | 3.5873 | 4.1606 | 7.7478 | -0.5732 | 2 |
| D16 | Sport/Sport Sciences | Trends in sport and LTPA-oriented businesses | 3.4775 | 3.9909 | 7.4685 | -0.5134 | 4 |
| D5 | Social | Hope/disappointment about future | 3.3028 | 3.7363 | 7.0391 | -0.4334 | 7 |
| D18 | Sport/Sport Sciences | Performance of national sports teams (e.g., volleyball, football) | 3.3279 | 3.397 | 6.7249 | -0.0691 | 10 |
| D4 | Social | Youth frustration | 2.6074 | 3.5809 | 6.1882 | -0.9735 | 14 |
| D15 | Sport/Sport Sciences | Winter sports development | 2.4568 | 2.7475 | 5.2043 | -0.2906 | 15 |
| D14 | Sport/Sport Sciences | Free after-school time | 2.4148 | 2.5055 | 4.9202 | -0.0907 | 17 |

**Figure 4.** The prominence-causal diagram of criteria.

A to the row factor B), then an arrow can be drawn from A to B which means that factor A is the cause of factor B.

As noted, scenarios are developed according to the two most important and uncertain driving forces (critical uncertainties). So based upon the results, 'purchasing power of people, 'the entertainment industry', 'changes in technology and the amount of free time', and 'economic infrastructure' were distinguished as the most important critical uncertainties, respectively. With respect to the relevance of these critical uncertainties, we combined them into two uncertainties as follows:

- (1) **Economic category**- Economic infrastructures and purchasing power of people (Horizontal axis); and (2) **Technological category**- Changes in technology and entertainment industry (Vertical axis).

Considering the 2×2 scenario matrix (see Figure 3), four scenario logics (plots) were established by combining the labels of the ends of horizontal and vertical axes (Figure 5). Thus, we chose the labels 'progression' and 'recession' for both economic and technological domains to represent the lower and upper bounds of the aforesaid critical uncertainties.

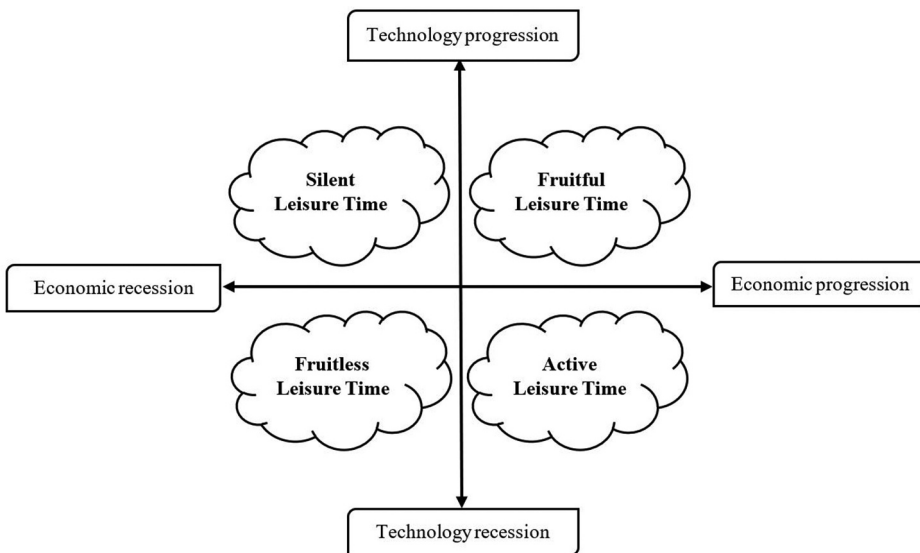


Figure 5. The logical scenario framework.

4. Discussion

Based upon article 3 of Iran's constitution, it is imperative to develop PA throughout the society (Papan-Matin, 2014). Consequently, the Ministry of Sport and Youth has prepared some strategic plans as well as financial support to develop sport for all programs. These programs include promotion in local sports centres, sports infrastructures, and sports culture (Presidential Research Center, 2016). However, it has been reported that PA in Iran has decreased around 7% from 2007 to 2011 both in males and females and almost 35% of the Iranians still do not meet the minimum recommended level of PA (Koochpayehzadeh et al., 2014; World Health Organization, 2015). Regarding the contribution of a wide and diverse range of driving forces and trends to this decline, scenarios of Iranians' participation in LTPA were generated according to the most important uncertainties from economic and technological domains. By imagining the framing conditions and the outcomes of possible futures, the following scenarios could contribute to better planning around Iranians' participation in LTPA. Referring to Figure 5, four scenario logics (fruitful leisure time, silent leisure time, fruitless leisure time, and active leisure time) were developed.

1. Fruitful Leisure Time Scenario (solid economic infrastructures and purchasing power of people + progressive technological and entertainment industry):

Nowadays, leisure time is booming due to the decrease in working hours. This change has also included Iran. The authorities of health and sport have therefore taken steps to develop opportunities to improve people's lives in a more dynamic manner which is promoting the foundation of physical and psychological well-being. Moreover, by having a dynamic economy and more financial affordability, also the family foundation in which leisure activities are selected for the members, has been able to develop healthy lifestyle patterns, which represents the change in the leisure behaviours. For example, choosing outdoor leisure time physical activities over home-based leisure activities (e.g., watching TV) is regarded as a consequence of the economic progression. The same point has been made elsewhere, notably in Chigbu et al. (2020). They concluded that also economic improvement can positively drive outdoor physical exercises in Nigeria.

Positive outcomes are emerging in society because of successful managerial actions such as:

- Effective environmental actions that reduce pollutants, have contributed to people's participation in outdoor PA.

- In response to increasing trends in outdoor PA, leisure industries like recreational and adventure sports have attracted different demographic groups.
- The solid economic situation has resulted in conditions in which all society members can enjoy outdoor leisure activities in the best way possible.
- Due to the progress in the economy, numerous recreational leisure events are being held at a local level which has prompted people to allocate more time to away from home leisure activities. In response to the economic progression, also recreational centres can contribute to developing PA using advancements in technology (e.g., Virtual Reality) and sport sciences.

Comprehensive economic developments also emerged in day-to-day life and have taken advantage of new technologies. One of the tools that has been widely provided for Iranians to make a difference in their living standards is the Internet and communication technology. Better use and access to these telecommunications packages and technological tools play an important role in developing LTPA. As an example, consider the work of Hurling et al. (2007) who concluded that the Internet-based behaviour change system helps maintain an elevated level of PA. In the same way, also Huhman et al. (2005) found that encouraging activities via the Internet and mass media campaigns can increase the level of PA among school-aged children.

Today in Iran, the growing economy has assisted in developing the leisure industry and related businesses. Relevant authorities and stakeholders have also reformed organizational structures to develop healthy lifestyles and wellness throughout Iranian society.

2. Silent Leisure Time (weak economic infrastructures and purchasing power of people + progressive technological and entertainment industry):

In recent years, the waves of change, caused by technological advances across the whole world have also been felt in Iranian society. On the other hand, the environmental and economic obstacles (e.g., inequitable access to recreational sports facilities, an imbalance in the use of these facilities in different geographical areas, an increase in the inflation rate as well as the lack of improvement in GDP) have interrupted leisure democracy and consequently led to the growing of unwillingness towards LTPA.

Nowadays Iranians have much more free time resulting from technological progress, but less income to take advantage of it as well. While Iranian society seems to be responding to global changes, modernity, and technological advancements, the main issue in this scenario is an economic recession which not only limits the role of technology to boost Iranians'

participation in LTPA but also encourages more inactive leisure (e.g., watching movies, listening to music, playing video games, Internet surfing). In this situation:

- Regarding economic issues, leisure time has decreased due to the increase in working hours.
- The lack of investment in developing the PA culture has also contributed to more sedentary lifestyles.
- Media consumption of professional sport has been increased rather than the population being physically active.
- The level of PA has decreased due to easy access to technological tools (e.g., mobile applications).

In this regard, passive leisure is more attractive to most people rather than active leisure, and a passive lifestyle has become engrained within the general population. Therefore, government has to pay more to social and health care systems to compensate for the stagnation of active leisure and physical inactivity outcomes (e.g., obesity, diseases, anti-social behaviours).

3. Fruitless Leisure Time Scenario (weak economic infrastructures and purchasing power of people + conservative technological and entertainment industry):

The purchasing power of society members is low so that they cannot afford basic costs and this issue has influenced people's leisure behaviour as well. It means that worries about how to meet the basic needs of life, such as housing, food, clothing, etc., stays a major obstacle hindering willingness to engage in LTPA.

One of the consequences of a decline in purchasing power is the conversion of society members into a multi-career phenomenon, with some members of society working in more than two different areas of expertise in order to increase the income level which has left almost no free time for their weekly planning to promote PA.

Moreover, due to the dire economic situation in Iran, society members are faced with growing social corruption. The family foundation that could play a significant role in motivating people to PA, is unstable now. On the other hand, macroeconomic factors such as the financial system's instability and low or even a lack of growth have left the economic structure of Iran in tatters. Migration to the large cities has been increased due to the lack of equal job opportunities and urbanization has consequently limited equal access to PA facilities.

Accordingly, if we assume that even people have the readiness and passion to participate in PA during their leisure time, a defective economic system does not provide the necessary infrastructure and facilities to meet people's demands. In this situation, leisure is a luxury and is only accessible

to society's elites, meaning the majority of Iranians do not have access to good active leisure facilities due to costs that are beyond their means. Along with all of these, the entertainment industry, modern technologies, and also media products which could be also incentives for increasing the level of PA among Iranians, has remained undeveloped, and the intensive reliance on the single-product economy has left the leisure industry in a state of stagnation. In this scenario, the following conditions apply:

- Leisure businesses are not prospering, except for a few businesses with unique features, such as health clubs.
- Because of the lack of improvement of living standards, an inactive lifestyle and domestically unstructured leisure time have developed more than before.
- Iranian society still does not have a satisfactory ranking in terms of happiness, PA, and life expectancy. Also, despite having plans to develop PA, we cannot find significant progress in people's participation in these health-related activities.

In these circumstances, insufficient constructive interactions among sport, health, and education organizations have damaged PA-related programs. Therefore, the actions of relevant authorities do not go beyond the theory because of insufficient PA opportunities and poor infrastructures.

4. Active Leisure Time Scenario (solid economic infrastructures and purchasing power of people + conservative technological and entertainment industry):

Because of economic development, members of the society have a high quality of life and are passionately partaking in PA programs. Increasing levels of income per capita and low inflation rates along with a strong economy enable people to choose and engage in their favourite PA due to increased accessibility to specialized equipment, facilities, and pleasant environments. The advanced economic status generates income for practitioners of leisure activities such as the Ministry of Sport and Youth, sports federations, and even sports clubs that have contributed to the development of sport and physical activities in the public domain. This development makes it possible for participants to create structured health-related PA plans that do not hinder their financial or social status. By exploiting such capacities, the country has been at the forefront of this progress and also public health has both improved and been promoted.

Nowadays, the economic situation has increased Iranians' participation in LTPA. Moreover, technology's influence acts as a 'two-edged sword'; from one perspective, lack of development in certain tools (e.g., Internet, electronic games, smartphones) that could have led people to inactivity, now help contribute to higher levels of participation.

Although advancements in the entertainment industry around the world and also in the increased availability of new software and electronic entertainment devices have gradually replaced more traditional forms of LTPA, Iranian society misses the potential benefits of a developing leisure industry and the benefits of technologies related to active recreation that could contribute to PA improvement, associated with a solid economic situation. It has created a disequilibrium between the opportunities provided to the people and the rate of PA uptake.

In today's Iranian society, the improved economic development and living standards have provided opportunities to take advantage of facilities for PA. However, unstructured and unpurposeful advancements in the entertainment industry and the use of technological devices have limited some other opportunities as well.

5. Conclusion

In developing the scenarios of Iranian's participation in LTPA, the most important critical uncertainties are associated with economic and technological domains. Four possible scenarios are generated depending on which uncertainties presented themselves in the future.

Iran has recently faced many economic fluctuations that have influenced the country in various respects. Moreover, unorganized development in technology and the entertainment industry has influenced PA and social health as well. People's participation in LTPA is influenced by the presence and depth of these uncertainties.

To improve LTPA in Iranian society, the key point is to take advantage of technological progress and to apply suitable economic policy. Moreover, the Iranian authorities (e.g., Ministry of Sport and Youth, Health Ministry, Education Ministry, leisure managers) should strengthen the policies oriented towards health-related technology, and also provide proper economic plans to boost PA in different possible futures. Thus, having flexible plans seem to be a key success factor for developing or at least maintaining the participation rate in PA at a recommended level in each future state (scenario). In this regard, the government and commercial companies could probably play an important role in developing LTPA in situations of either progression or recession in the economy and technology.

5.1. Limitations

Regarding the interdisciplinary nature of this research, experts from various fields, including psychology, economy, environment, culture, etc. were required. While we tried to carry out this project by asking a diverse range

of experts from the aforementioned fields, only experts in the fields of leisure, recreational sport, sociology, and sport policy contributed to conducting the present study. This means that other aspects of the focal issue might have been revealed and discussed if we had reached out to a more diverse expert panel. For example, it seems that also the status of the traditional and religious texture of the society could play a part in Iranians' future participation in LTPA, which was not expanded in this study.

As argued in other related studies (see, for example, Tan & Kuo, 2014), the sample size is a limitation. Smaller samples are typically associated with the use of a DEMATEL survey because of the demands it places on participants. In this study, much effort was expended to encourage experts to participate, which inevitably leads to smaller samples.

Besides, in doing the current research project we did not expect the emergence of the Corona pandemic, which presumably to some degree influenced people's participation in LTPA as well. Yet, it reminds us that the future is imbued with uncertainty and therefore we need to be prepared for different situations to be able to effectively deal with the status quo.

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