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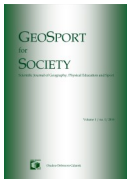


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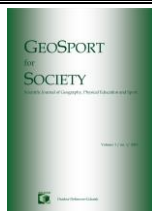
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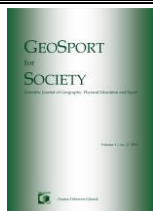
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Sensory, cognitive and motor disorders in patients with type 2 diabetes

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Abstract. Background: Neuropathy due to Type 2 diabetes causes sensory, cognitive and motor disorders. The present study was planned to examine sensory-cognitive and motor functions in patients with type 2 diabetes and to compare these results with healthy individuals. **Methods:** 20 healthy individuals and 20 patients with type 2 diabetes (19 females, 21 males), aged between 20 and 65 years were included in the study. Patients were separated as control and patient group. Sensory motor and cognitive functions were assessed by AYRES. Visual perception was analyzed with Space visualization test, Sensory integration test, Figure ground perception test and Position in space test, Somato sensory perception was examined with Localization of the tactile stimulus test and Graphesthesia test, Motor performance was evaluated with Imitation of posture test. All the tests were applied to both groups. **Results:** There was a statistically significant difference between patients and healthy individuals in space visualization ($p=0.001$), sensory integration ($p=0.001$), figure ground perception ($p=0.001$) and position in space ($p=0.001$) tests of visual perception and posture imitation test ($p = 0.001$) of postural praxis and graphesthesia ($p=0.001$) of somatosensory test. But there was no significant difference in localization of the tactile stimulus test ($p>0,05$) between groups. **Conclusions:** Sensory, motor and cognitive problems affect daily living activities and these problems cause that patients to live dependently on others. So detailed assessment should be applied for a better plan of treatment.

Keywords: type 2 diabetes, Ayres, sensory, cognition, motor

Introduction

Diabetes is a systemic disease and it affects various body systems including cardiovascular, gastrointestinal, immune, and nervous systems. Certain kind of sensory input, such as vestibular input, influences the whole brain as well as other sensory systems (Hewston & Deshpande, 2016).

Adverse effects of diabetes on cognitive system and memory disorders have been noticed by researchers for a long while. Equally, dementia is one of the most disabling common health problems. It affects the quality of life of demented patients (Saedi et al., 2016). Both type 1 and type 2 diabetes mellitus have been associated with performance decreased on numerous domains of cognitive function. The exact pathophysiology of cognitive dysfunction in diabetes is not clear, but it is likely that hyperglycemia, vascular disease, hypoglycemia, and insulin resistance play significant roles (Kodl & Seaquist, 2008).

Neuropathy because of Type 2 diabetes causes sensory, cognitive, and motor disorders. Sensory integration dysfunction is a neurological disorder that includes impairment in processing data from the different senses (vision, auditory, touch, olfaction, and taste), the vestibular system (movement), and proprioception disorders are prevalent in children and adults. Skenazy and Bigler, (1984) declared neuropsychological impairment of diabetes with some tests. But in the literature, there are few studies that evaluate whole effects of diabetes (Skenazy & Bigler, 1985; Goldstein & Morewitz, 2011).

While chronic metabolic and vascular changes seem to play an important role in the treatment of diabetes and at present there are few leads for the targeted diagnostics and treatment of individual patients, diabetes is becoming more common, this study will be very important to shed light on the treatment.

This study was intended to be performed because there are rare studies evaluating the whole sensory-cognitive and motor functions of adult patients with type 2 diabetes in the literature. The present study was planned to examine sensory-cognitive and motor functions in patients with type 2 diabetes and to compare these results with healthy individuals.

Materials and methods

Subjects

The study was conducted at Mustafa Kemal University Hospital between 2014 November- 2015 April. We evaluated 20 patients with type 2 diabetes mellitus and 20 healthy people who volunteered to participate in the study. The participants are aged between 20 and 65 years. This study is based on a prospective analysis of sensory, motor, cognition problems of diabetes mellitus. The study was carried out after approval from the Ethics Committee of the Mustafa Kemal University and obtaining a signed informed consent from the patients who volunteered to participate in the study (no: 31/10/2014/192).

The inclusion criteria were:

- Aged between 20 and 65 years,
- Diagnosed with type 2 diabetes for the diabetic group,
- Independent in mobility,

- Have cognitive capacity to answer the questionnaire.
The Exclusion criteria were:
- Individuals who had a serious systemic disease other than diabetes,
- Had mental problems,
- Pregnancy.

Measurements

The demographic information of the individuals was questioned. Sensory motor and cognitive problems were evaluated with Southern California sensory integration test (AYRES). These tests were declared by Dr. A. Jean Ayres, a visionary occupational therapist and educational psychologist. Tests assess the sensory, cognitive and motor functions. These test are: motor-free visual perception tests (space visualization, sensory integration, figure ground, position in space), Somatosensory tests (kinesthesia, finger identification, manual form perception, graphesthesia, localization of tactile stimuli, double tactile stimuli perception), motor performance tests (imitation of postures, bilateral motor coordination, standing balance, motor accuracy) and right-left discrimination test, crossing mid-line of body test (Royeen et al., 1981; Mailloux, 1990; Spitzer & Smith Roley, 2001; Ayres, 2005; Miller et al., 2007; Roley et al., 2007).

We evaluated motor-free visual perception with space visualization, sensory integration, figure ground, position in space tests in both groups. Somatosensory problems were investigated with graphesthesia and localization of tactile stimuli tests and motor disorders were assessed with imitation of postures tests. All tests were applied to control group and to patients by the same physiotherapist.

The tests were performed as follows:

a. Space Visualization test: There were 30 different test form boards in the test booklet. We discontinued after the 5th error. Accuracy and time score were recorded (Ayres et al., 1989; Mailloux, 1990);

b. Sensory integration test: A form with 13 separate images were used for this test. Participants were asked to copy the same figure from the top lines by combining the points at the bottom of the page. The total score was calculated using a scoring system of 0-1-2 according to the accuracy of the lines (Ayres et al., 1989; Vargas & Camilli, 1998);

c. Figure Ground Perception Test: A test booklet was used for this test. There are 16 test steps in the booklet. The participants were asked to find three figures on the top page, from the six figures on the bottom page. The accuracy figure number is noted (Ayres et al., 1989);

d. Position in space test: The test assessed the perception of the same shape in different positions. We discontinued after the 5th error. The participants were shown the figure on the warning card and the figures in the book. Correct responses and time were recorded (Ayres et al., 1989);

e. Graphesthesia: In which the participant draws with a finger the same simple design the therapist drew on the back of the participant's hand. Scored as 0, 1, 2 according to the similarity in the test booklet (Ayres et al., 1989);

f. Localization of tactile stimulus test: We used ball-point pen, centimeter ruler and shield. All tests were repeated on the other hand. Total right and left raw score were recorded (Ayres et al., 1989);

g. Imitation of postures: We did not need special material. The participant is asked to repeat the same 12 movements made with the hands and arms of the person standing in front of him in a swift manner. According to accuracy and quickness, scoring was done as 0, 1, 2 (Ayres et al., 1989).

Statistical analysis

For the statistical analysis, SPSS for Windows Release SPSS 22 was used. All data for normality was tested by using the Shapiro Wilk test. Test Differences between 2 groups were analyzed with parametric (Independent-Samples T test) and nonparametric tests (Mann-Whitney U). The characteristics of the study sample are described by mean and standard deviation for continuous variables, median, and minimum-maximum for ordinal variables.

Results

Twenty patients with type 2 diabetes and twenty healthy people who met the criteria, volunteered to participate and signed the informed consent included to study. 19 women (47,5%), aged between 20 and 65 years (46 years) and 21 men (52,5%), aged between 21 and 64 years (35 years) participated in the study.

We observed statistically significant difference in motor-free visual perception tests between groups. There was statistically significant difference between the patients with type 2 diabetes and the healthy individuals in space visualization total (p=0.001) and time (p=0.020) scores, sensory integration total and time scores (p=0.001), figure ground perception total score (p=0.001), position in space total and time scores (p=0.001), (table 1).

Table 1.Motor-Free Visual Perception Tests

Visual cognition tests	Tip 2 diabetes group X±SS	Healthy group X±SS	p	t	z
Space visualization - Total Score -Time	13.45±8.97 618.6±395.1	28.10±3,32 385.25±184.61	p=0.001* p=0.02*	- 6.849 2.393	
Sensory integration -Total score -Time	19.95±5.18 191.95±115.73	25.65±0.67 73.50±31.15	p=0.001* p=0.001*	- 4.875 4.420	
Figure ground perception -Total score -Time	27.1±5.06 417.5±174.85	39.5±4.39 344.3±173.16	p=0.001* p=0.19**	-7.96	-1.51
Position in space -Total score -Time	18.5±4.9 427.25±176.4	27.3±2.2 235.4±139.53	p=0.001** p=0.001**	3.81	-5.01

*: Independent Sample Tests

** : Mann-Whitney U test

We found statistically significant difference in graphesthesia both in right/left sides ($p=0.001$) while we couldn't found significant difference in tactile stimuli tests ($p>0,05$), (table 2).

Table 2. Somatosensory Tests

Somatosensory tests	Tip 2 diabetes group $\bar{X} \pm SS$	Healthy group $\bar{X} \pm SS$	p	t	z
Localization of tactile Stimuli	11.95 $\pm$ 0.22	12 $\pm$ 0.0	$p=0.317^{**}$		-1.0
Graphesthesia Left	8.35 $\pm$ 2.49	11.45 $\pm$ 0.94	$p=0.001^*$	-5.191	
Graphesthesia Right	7.75 $\pm$ 2.51	11 $\pm$ 1.83	$p=0.001^*$	-4.674	

*: Independent Sample Tests

** : Mann-Whitney U test

Statistical significance difference was found in posture imitation ($p=0.001$) test in which motor performance was evaluated (table 3).

Table 3. Postural Praxis Test

Motor performance test	Tip 2 diabetes group $\bar{X} \pm SS$	Healthy group $\bar{X} \pm SS$	p	z
Imitation of posture	18.6 $\pm$ 4.58	23.8 $\pm$ 0.69	$p=0.001^*$	-4.31

*: Mann-Whitney U Test

Discussion

The present study was planned to examine sensory-cognitive and motor functions in patients with type 2 diabetes and to compare these results with healthy individuals. We observed statistically significant difference in visual cognition (space visualization test, sensory integration test, figure ground test, position in space test), somatosensory tests (graphesthesia test) and motor performance (Imitation of posture test). The results of the study showed that Neuropathy due to Type 2 diabetes causes changes in sensory perception and motor function, and this cause limitation in learning functions and their independence in daily life living.

There were few study that assess whole sensory integration, motor and cognition problems in patient with type 2 diabetes. Our study is one of that rare studies that examined in type 2 diabetes patients so multiple parameters.

Hewston et al. declared latest evidence proposed that declines in sensory functions (somatosensory, visual and vestibular) in older adults with type 2 diabetes. Our results also showed somatosensory disorders in patient with type 2 diabetes (Hewston & Deshpande, 2016).

In our study there was significant difference in space visualization test between healthy and diabetic groups. Murray et al. used space visualization test in children with learning disability to assess motor dysfunction, sensory integration. They stated that coordination and perception might both showed the integration of the central nervous system and clumsiness seems to be related to some aspects of visual-perceptual ability (Murray et al., 1990).

There are different test to evaluate cognitive functions. Hazari et al. investigated cognitive functions in patients with type 2 diabetes with Mini-mental state examination test. They declared that patients with type 2 diabetes have decreased cognitive function which were more marked when the disease duration passed over 5 years and If in type 2 diabetes with hypertension, the cognitive impairment risks were increased too. We evaluated cognitive function with AYRES. We preferred this test because we couldn't find any test which assesses whole motor, cognitive, visual perception disorders. We found significant difference between two groups in sensory integration tests (Hazari et al., 2015).

Petersen et al. used AYRES in their study. They included 100 adult males in their study. Motor free visual perception was evaluated with figure ground position test like our study. They declared that it has some important advantages for assessing figure-ground perception in persons with motor impairment (Petersen & Wikoff, 1983).

Petersen et al. were assessed adult female performance on the AYRES Visual Figure Ground Perception Test (FGP) and to obtain an estimate of the test's reliability. They concluded that the FGP is a reliable assessment tool for use with adults (Petersen et al., 1985).

Our findings suggested that it is possible that metabolic imbalances and other factors could interact, either directly or indirectly and result in an altered central nervous system function and impaired cognition. There were a lot of studies about cognition disorders of diabetes but not sensory and motor disorders. So our study is important for evaluating whole diabetic neuropsychological complications and creating new treatments for adults and children (Strachan et al., 1997; Stewart & Liolitsa, 1999).

Andersen et al. examined Muscle Strength in Type 2 Diabetes. In 36 type 2 diabetic patients and in 36 control subjects matched for sex, age, weight, height, and physical activity, strength of flexors and extensors at elbow, wrist, knee, and ankle was assessed at isokinetic dynamometry. They found type 2 diabetic patients may have muscle weakness at the ankle and knee related to presence and severity of peripheral neuropathy. We found statistical significance difference in posture imitation ($p=0.001$) test in which motor performance was evaluated (Andersen et al., 2004).

Type 2 diabetes, has been found in the literature to impact dexterity and sensory function in the hands. Ochoa et al. evaluated the effects of tactile feedback on manual function in Type 2 diabetes patients. T2 diabetes patients and healthy controls underwent median nerve blocks at the wrist and elbow. All participants underwent traditional timed motor evaluations, force dynamometry, laboratory-based kinetic evaluations, and sensory evaluation. They found that mechanisms

outside of tactile dysfunction play a significant role in motor dysfunction in Type 2 diabetes. The data presented in this study provide evidence to rule out tactile dysfunction as the sole contributor to manual dysfunction (Ochoa et al., 2016).

Metabolic control of diabetes mellitus as well as the duration of diabetes mellitus seem to be important disease variables in the impaired cognitive performance. Regular assessment of cognitive function suggested to be performed as part of the routine review of diabetic patients (Van Harten et al., 2016).

We found that Motor-Free Visual Perception Tests scores of type 2 diabetes patients were worse than healthy group. Type 2 diabetes impact cognitive functions of those living with the disease.

We did not question duration of the disease, this was our limitation. Unfortunately the physiotherapist was not blind to disease of the patients and two groups were assessed by the same physiotherapist.

Conclusion

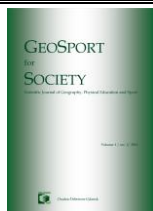
This study is important to take attention to the treatment of these functions, especially since changes in sensory perception and motor function in patients with Type 2 diabetes restrict individuals' learning functions and their independence in daily living activities. Not only for patients with type 2 diabetes even all metabolic disorders that affect the nervous system should be evaluated with tests to examine motor, sensorial and cognitive problems.

Sensory, motor and cognitive problems affect daily living activities and these problems cause that patients to live dependently on others. So detailed assessment should be applied for a better plan of treatment.

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Environmental quality management in hospitality industry on the example of Marriott Hotel in Warsaw (Poland)

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Abstract. Environmental management and sustainability have been recent important issues in the hospitality industry. The hotel industry, as a main sector of the hospitality industry, has benefited from environmental initiatives through improving corporate image and increasing resource and energy efficiency. Among various environmental issues that have been addressed in the hotel industry, managerial influence on environmental management is rarely investigated. The purpose of this paper was to examine the current state of environmental management in the Marriott Hotel in Warsaw. Further, this paper also determined a relationship between TQEM managers' personal environmental attitudes and organizational involvement in environmental management practices from the Marriott Hotel Warsaw. To achieve the purpose, the work examined currently adopted green practices, environmental attitudes, and their perception of advantages derived from environmental management.

Keywords: hospitality, quality, management, environment

Introduction

In the period of global competition environment, when a lot of services are offered, understanding the term of quality is transformed not only as an issue that is necessary to be solved but quality is seen especially as a competition opportunity (Ryglová et al., 2013). Hospitality sector is growing at a very fast rate in all over the

world. This sector can be broadly classified into hotel industry, travel and tourism, restaurants, pubs, clubs and bars, contract catering, and aviation. Other than that, hospitality is applicable at various places like in universities, sporting venues, exhibition centres and smaller events management companies. The industry was earlier part of travel and tourism but now it has a separate industry status, similar to aviation industry which was part of travel and tourism, hospitality industry. With the market competition of hotel industry being heated, it is critical that hotels have a breadth of resource and more flexible forms to meet the needs of a changing marketplace. In the past, the relation of total quality management (TQM), market orientation, and performance are equivocal. Environmental management have become one of the most critical management issues facing companies in a wide range of industries as well as hospitality firms as a result of growing environmental awareness among consumers, governments and social groups and employees (Wang et al., 2012). Reflecting this large scale trend, a number of research initiatives have been made to address these emerging issues in the hospitality industry context. The focus has been on identifying environmental management initiatives some green hotels have been making (Kirk, 1995). The identification of motivations for going green has also been the focus of a host of studies (Tzschentke et al., 2004).

Environmental quality management in hospitality

Quality of a product or service can be defined from different perspectives. Evans and Lindsay (2008) present the following perspectives: judgemental where quality is synonymous to superiority or excellence; product-based where quality is a function of specific measurable variable; user-based where quality is determined by what customer wants; value-based where quality is the relationship of usefulness or satisfaction to price and manufacturing-based where quality is conformance to specifications. In addition to these quality can also be customer-driven, which then means exceeding the customer expectations (Vähätiitto, 2010). Quality management has been a widely researched field of study. Managing quality usually relates to improving quality and quality can be improved in various aspects. Different quality frameworks developed propose that investing in quality within a company gives competitive advantage and even improvement in financial performance in the long run. Today when climate change concerns are widely recognized, companies have started to make investments in environmental quality. This can be translated e.g. to terms of improving environmental effectiveness or performance, investing in sustainable actions, improving energy efficiency, creating environmental cost management schemes, creating environmental management systems etc. Despite the differences in their terms and features they all tend to reach the same goal: to improve environmental quality. In addition to being useful for the environment and climate, the organizations investing in environmental quality might also gain cost savings and other benefits in their operations. Most successful examples of environmental management have been in the area of energy management where financial savings act as a clear motivator (Kirk, 1995) having environmental quality in a company thus requires a proper environmental quality management system or smaller subsystems to interpret it to internal or external stakeholders. Different

environmental management system and sub-system schemes exist, depending on the size of the company, on the formalness of the approach and on the industry.

A very important element in understanding environmental management is to understand what the environment is. The International Organization for Standardization (ISO) defined the environment as “the surroundings in which an organization operates, including air, water, land, natural resources, flora fauna, humans and their interrelation” (ISO 1996). Environmental Management (EM) can be said to mean different thing to different people, however Hewitt and defined it as “management of an organization’s or company’s impact on the environment”. Therefore, in this work, EM is ‘the process of reducing the environmental impact of an organization or people’s activities through the control of all aspects of their operation that can cause or lead to an impact on the environment’.

The figure below (fig. 1) depicts PDCA (Plan-Do-Check-Act) process which plays a significant role in reducing people’s impact on environment.

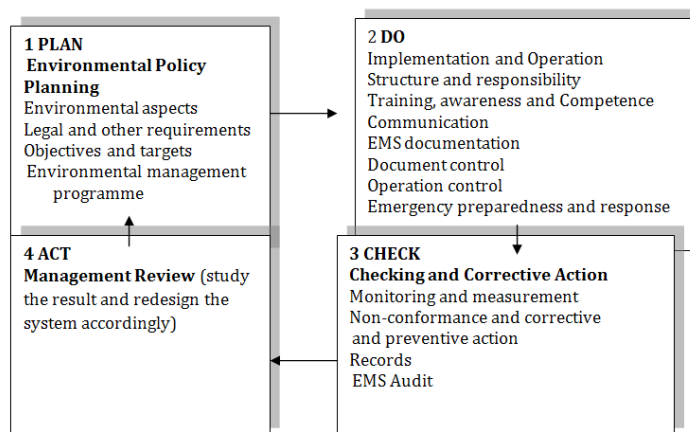


Figure 1. Plan-Do-Check-Act process

Source: The P-D-C-A Cycle for TQEM adapted from TQEM (1993, 7)

It is very important to make all the activities in the order presented to be sure that the negatives as well all the difficulties are being reduced before getting the service to the customer.

The hospitality industry has been traditionally considered one that does not have a great impact on the natural environment compared to such industries as gas and oil, and other consumer product manufacturing industries. However, the hotel sector, in particular, one of the main business sectors in the hospitality industry, generates much more negative environmental impacts than the public perceives, consuming a vast amount of local and imported non-durable goods, energy and water, as well as emitting a large amount of carbon dioxide (Kirk, 1998; Bohdanowicz, 2006). As an emerging business strategy in the hospitality industry, environmental management has been attracting much interest from industry practitioners as well as scholars.

Total Quality Management (TQM) is a quality management system which may have an impact on firm performance in both manufacturing and service organisations (Claver-Cortes et al., 2007). TQEM is an extension of TQM taking in consideration costs and environmental issues (Miles& Russell, 1997) and can thus be seen as a non-standardized environmental (quality) management system (EMS) that may have an impact on environmental performance. There is no single way to implement TQEM so comparing TQEM processes in different companies and the results gained from the programs can be quite difficult. To avoid this, TQEM, such as TQM, can be certified by third-party organization which makes the process more standardised and comparable. For TQM the certification is quality standard ISO 9000 and for TQEM environment standard ISO 14000 (Miles & Russell, 1997).

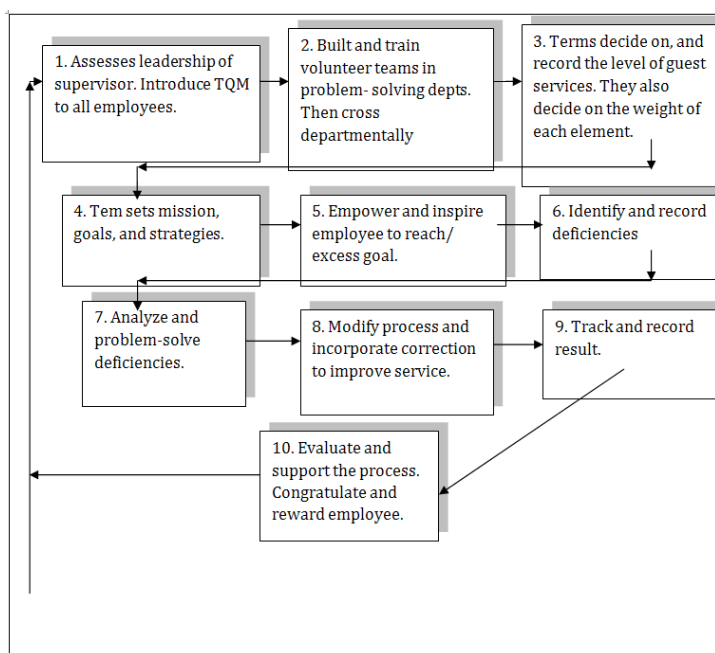


Figure 2. Total Quality Management process

Source: Walker J. R., Miller J., Supervision in the hospitality industry. Leading Human Resources, Wiley 2012, p. 222.

The Marriott Hotel – case study

As a study method, case study research offers greater opportunity than other study methods to gain a holistic view of the study, enables to study different aspects and their relations to each other and also to view the process within its total environment. Case studies can also mix of quantitative and qualitative evidence. A single-case study can represent a testing of a theory that has a set of different propositions (Yin, 1994).

The case organization of this study is a hotel in Warsaw centre in Marriott International. The scope of the research is thus narrowed down to tourism industry and especially to hospitality services. While the research methodology limits the

study to one single case and the empirical part of the research is based mostly on one company's internal factors, consumer viewpoint of environmental quality has been left on smaller notice in this study. While it is generally recognized that people are becoming more aware in environmental sense, improving environmental performance (or internal environmental quality) it will likely result in answering better the customer's needs. However, analyzing the consumer viewpoint would necessitate a larger study related to several hotel operators in order to have reliable results. Therefore it is not coherent to include it to this research.

The LIM Centre/Warsaw Marriott Hotel building was open in 1989. It is one of the most spacious buildings in Warsaw and is not only a high class, five-star hotel with large, modern conference space and numerous exclusive restaurants and bars, but also an A Class office building. The LIM Gallery is located downstairs and houses 40 exclusive shops, cafes, restaurants and a casino. The hotel rooms are located on the top 20 floors and feature 522 updated guests rooms including 95 suites, three concierge levels and on-site parking. The Hotel also has 16 meeting rooms totalling more than 2,600 square meters of meeting and exhibition space and six restaurants and bars. The rest of the 40-story building is occupied by offices and medical center (Marriott hotel website).

In order to be able to create an environmental management system for accommodation service provider the basic process of the service needs to be described. Separates accommodation services to class A and class B services. Class A services comprise of the components that can be divided by the following physical boundaries presented in table below (table 1).

Table 1. Room class A division

A1 room	A2	A3 Common rooms
A-1-1 bedroom area	Reception administration area	A-3-1 Corridors
A-1-2 Private bathroom Etc		A-3-2 lounges Etc

Source: authors' elaboration Class B services again are linked to tourist accommodation according to following categories (presented below in table 2)

Table 2. Class B services

B1 Food services	Kitchen, restaurant bars.
B2 Wellness & Recreation	Swimming pool ,sauna, sports facilities , solarium etc.
B3 Conferences services	Conferences area, sanitary facilities, administration common room etc
B4 Green area	Garden , park ,fields etc.
B5 Parking area	Indoors and out door parking, transport mean
B6 Shopping services	Supermarket ,others shop
B7 Others services	

Source: authors' elaboration Jones et al [2003] again describe accommodation processes by identifying socio-technical systems in hospitality operations presented in table 3

Table 3. Accommodation process

Operational systems (operation-wide)	Procurement and control, stores, maintenance and
---	---

	engineering, environment and waste
Accommodation services	Front office, housekeeping
Food production systems	Food preparation and production
Food and drink service Systems	Foodservice and dining, cleaning and dishwashing, bars

Source: Jones, P., et al., 2003

None of the classifications as such is not enough suitable for analyzing accommodation processes while they are somewhat simplistic as such. However, when combining these accommodation process classifications to a single framework case company accommodation processes can be properly described. The frameworks are combined in a way that each system or service is allocated to certain area of the hotel. The areas are described with physical boundaries, here rooms, common facilities and restaurants, which are derived mainly from the APAT model.

The Marriott Hotel has in addition to hotel room premises also common lounge with a bar, fine dining restaurant and kitchen, conference facilities, gym, play room for children, self-laundry facilities for guests, some office premises and a parking garage. Table 4 presents the services and accommodation processes of the Marriott Hotel.

Table 4. Marriott Hotel services and accommodation process

Type	Room	Common facilities	Restaurants
Physical boundaries (objects)	Rooms and suites	Conference facilities, gym, self-laundry, parking garage, common lounge, play room for children, office premises	Fine-dining restaurant, bar
Systems/ services (activities)	Front office, Housekeeping, Maintenance and Engineering	Housekeeping, Maintenance and Engineering	Food preparation and production, Foodservice and dining, clearing and dishwashing, bars

Source: authors' elaboration

Creating environmental strategy

Energy use is usually mentioned always first in theories so it can be concluded that energy consumption is one of the most important factor of environmental quality. The more energy is consumed, the less environmentally qualified hotel.

LIM Canter/Warsaw Marriott Hotel commissioned a site survey to determine the measures that would best meet their needs. They decided to proceed with a complete, tailor made and turnkey upgrade of the building's heating, ventilation and air-conditioning (HVAC) system which resulted in a complete, reliable and efficiency-oriented solution. Energy use of hotel Marriott was calculated simply by gathering consumption data from energy invoices. The data was then collected to a spreadsheet and analyzed accordingly. So far hotel Marriott is not using any more systemized approach for gathering energy consumption data, such as electronic maintenance books that are commonly used in real-estate business data from the

last four years. Some of the programs and their performance are used in Warsaw Marriott Hotel.

- Re-Lamp” campaign replaced 450,000 light bulbs with fluorescent lighting in 2006 and saved 65 percent on overall lighting costs;
- smoke-free policy announced and applied to Marriott hotels improves indoor air quality and as a result of that, helps save 30 percent of energy use for air treatment systems;
- replacing 4,500 outdoor signs with LED and fiber optic technology saved 40 percent of outdoor advertising energy use in the first year of the program (Marriott International, 2007).

Currently implemented energy management practices are identified in Warsaw Marriott Hotel:

- implementing a renewable energy program such as the use of wind power, solar power, and run-of river power,
- adopting automated (Computerized) energy control system,
- replacing incandescent light bulbs with fluorescent lighting. (Using high energy efficient lighting),
- installing energy-efficient laundry equipment,
- using digital thermostats to control guestroom energy consumption,
- installing occupancy sensors (they automatically turn the lights out when guests leave the room),
- using waste heat from the power generator,
- using energy star-qualified products,
- installing triple-glazed windows or reflective glass to save energy for heating and cooling,
- replacing outdoor and exit signs with Light Emitting Diode (LED) signs.

Water consumption according to Marriott International’s linen reuse program, encouraging guests to reuse lines and towels during their stay contributes to saving 11 to 17 percent on hot water (Marriott International, 2007). 100-guest room property with 75 percent occupancy can save an estimated \$25,000 per year through a linen and towel reuse program. These savings are derived from an 81,000 gallon reduction in water consumption and 540 gallon reduction in detergent. Using water-efficient devices (low-flow or infrared-activated faucets, low-flow showerheads, low-water-volume toilet, sink aerators, and Energy Star qualified cooking devices etc.) Water consumption rules from Marriott are as follows

- instituting a linen reuse program,
- regularly fixing toilet leaks,
- using water-efficient laundry equipment and dishwashers,
- placing water meters in guestrooms to track usage,
- adopting water saving campaigns in kitchens (washing dishes when there are full loads or not using running water to wash vegetables etc),
- adopting water-efficient or xeric gardening techniques,
- using treated wastewater in garden irrigation.

When it comes to waste production and recycling opportunities, the Marriott Hotel is recycling cardboard for which a cardboard press is used to pack it smaller and the organic waste from the restaurant is recycled as bio waste. Even paper is not recycled in the office premises due to the fact that no paper recycling for businesses exist in the area (only private consumers have the ability to self deliver their paper waste to paper refuse bins). Food & beverage service area in particular generates various solid and organic wastes such as packaging and food waste, aluminium cans, glass bottles, corks and cooking oils. The housekeeping operation also generates cleaning materials and plastic packaging-

Marriott progress for reduce waste is as follows:

- placing recycling bins in all front and back-of-house areas,
- purchasing used or recycled-content products,
- adopting a donation program (leftover guest amenities, old furniture and appliances and food),
- composting organic kitchen waste & using refillable amenity dispensers,
- providing reusable items such as cloth napkins, glass cups, ceramic dishes with food and beverage service,
- grinding guest soaps to use as laundry detergent for hotel uniforms,
- purchasing food items and cleaning chemicals in bulk containers,
- recovering used cooking oil and food waste.

The Marriott Hotel does not have a follow-up system for the use of chemicals yet, so the amount and quality (environmental friendliness) of chemicals used is not possible to know. The greatest chemical substance use is naturally due to housekeeping and cleaning. Within this category laundry makes one greatest function where chemicals are used but this is something where Marriott hotels do not have a direct control of. Laundry of linen and towels is outsourced at the hotel and therefore the only way to affect to the chemicals used in laundry washing is to lobby the laundry entrepreneur to use environmental friendly chemicals and not excessively. Suggested targets are the ones that are measured in performance part of the model, which are presented in table 5.

Table 5. Environment policy setting target

No.	Performance indicator	Target measure	Reviewed on
Objective 1: Energy	kWh/m ²	Less than 310 kWh/m ²	Quarterly basis
Objective 2: Water	litter/GN	150 - 170 litter/GN	Twice a year
Objective 3: Unsorted waste	€/m ² and €/GN (in kg's as soon as possible)	0,9 kg/GN	Yearly basis
Objective 4: Chemicals	g/GN	30 g/GN	Yearly basis

Source: authors' elaboration

One target in addition to these is a certified environmental management system approach. It is recommended to set a target for acquiring the Eco-label, while it has most comprehensive guidelines and it is most generally recognized in Poland. With the current figures of energy and water consumption acquiring the certificate would not be a problem but it still necessitates follow-up systems for waste and used chemicals.

The actual environmental strategy should be created with a team consisting of employees from different apartments, such as management, maintenance, house-keeping and front-office staff. With the proposed strategy they should go through what of the actions are feasible to execute in the short run and which might call for longer time to initiate. Separate persons in charge should also be chosen to make sure that each physical boundary and system or service of the hotel's accommodation process is taken properly in consideration and that continuous improvement is happening all the time. These persons should also be in charge of collecting the data and monitoring the actual performance in environmental quality improvement. Strategy proposition for linking environmental actions to service and accommodation processes in the Marriott Hotel is presented in the table 6.

Table 6. Strategy proposition

To conclude, one can present all the environmental quality providing by hospitality industry in a graphic way as follows (figure 3):

	Physical boundaries	Systems /services	Strategy
Rooms	Rooms and suites	Front office, Housekeeping, Maintenance and engineering, Environment and Waste	Diminishing paper use in the front office, giving customers guidance on how to save resources during their stay (e.g. towel and linen reusing), giving customers guidance on shutting down all the electronic equipments while not staying in the room, giving guidance on using the sauna energy-efficiently, offer possibilities for waste recycling, using environmental-friendly chemicals in cleaning, making sure that radiators are adjusted properly in rooms and that room facilities work well
Common facilities	Conference facilities, gym, self-laundry, indoor parking space, common lounge	Housekeeping, Maintenance and engineering, Environment and Waste	Have energy-saving light bulbs in common areas and motion sensors in rooms where light is not needed all the time, offer information on energy saving actions in the hotel, offer environment friendly detergents in self-laundry, offer waste recycling possibilities
Restaurants	Fine-dining restaurant, bar	Food preparation and production, Foodservice and dining, clearing	Offer organic food and food that is produced locally, use energy-saving equipments

		and dishwashing, bars	
Extra services	-	-	-

Source: authors' elaboration

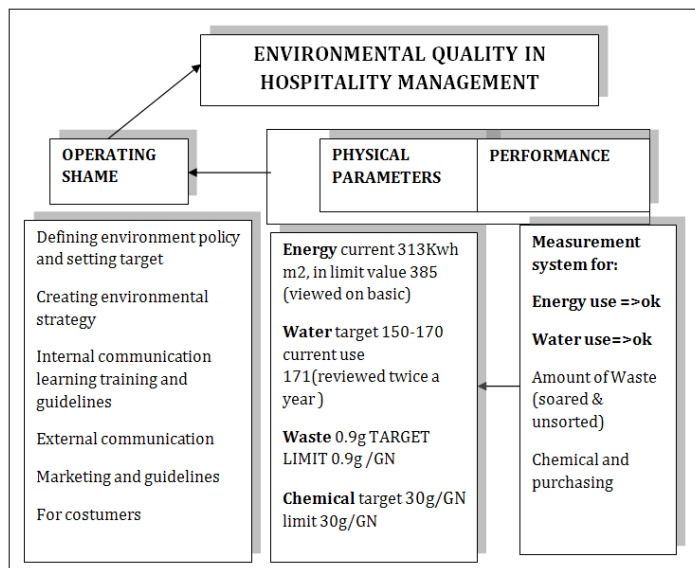


Figure 3. Environmental quality management framework introduced by the Marriott Hotel

Source: authors' elaboration

Conclusions

Environmental management is a growing business trend and a critical strategic issue in a wide range of industries. Governments, environmentally concerned customers, employees, and non-governmental organizations all require business firms to be environmentally responsible. The hotel industry, a main sector of the hospitality industry, plays a significant role in greening of the hospitality practices. Under recent economic conditions, energy and resource conservation practices are getting much more attention from hoteliers than ever before as a way of reducing operating costs and increasing resource efficiency. However, return on investment can be a major concern for hotel managers in promoting green programs for their property.

To sum up, it can be concluded that physical parameters of energy and water are as environmentally friendly as possible at the Marriott Hotel. Energy and water consumption fit easily the limit values determined. Important is still trying to cut down energy consumption as much as possible and measure it with proper ratios, e.g. kWh/m². Waste handling and recycling in the region is something a single hotel does not have an effect on but some follow-up systems for the wastes produced at the hotel premises should be developed. The simplest method for this is to follow-up the costs of waste handling in comparison to hotel surface or guest nights. Waste

recycling pilot projects would also be good to test, even if actual recycling is not yet possible. It is not only the customers who should be taught to recycle, but also the employees of the hotel. The same applies for chemicals. Proper follow-up system gives some sort of guidance of how much chemicals are consumed at the hotel. Following the consumption usually also gives a chance to follow the quality of the products, i.e. how environmental friendly they are. Hotel industry has impacts on organizational response to environmental issues. Therefore, in order to promote environmental management in the hotel industry, related organizations, governments, and stakeholders need to focus on raising their environmental awareness as well as providing information on successful cases of environmental management.

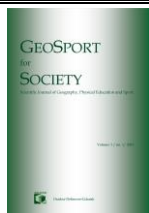
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The Relationship between Personality and Physical Activity

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Abstract. The present article is a meta-analysis of existing literature regarding the relationship between personality and physical activity. The interest of specialists for the role of the athlete's personality in achieving sports performance is highlighted by various studies and research. However, it was not possible to establish a certain "standard" for the personality of the athletes who achieve great sport performance, but a number of common features were revealed. On the other hand, the second direction of this meta-analytical study regards personality development based on its classical structure, temper, skills and individual character of sport practicing subjects.

Keywords: personality, physical activity, sport performance, personality development, temper

The concept of "personality"

Psychological studies and research pay great attention to personality due to the fact that it is a point of reference in determining and influencing the attitude of athletes.

The definition of personality as a concept has experienced many attempts since 1937 when Gordon Allport considered that an inventory and classification of this concept is necessary. Withal, to Gordon Allport we owe the most well-known definition of personality: the dynamic organization of certain psychological and physical systems within the individual that determine a specific thinking and behavior (Allport, 1981). Analyzing the definition proposed by Allport, Bonchiș (2009) argues that it contains concepts and actions such as *dynamic organization* which reveals that personality is constantly changing, but also a *psycho-physical*

system which means that personality involves changes both at psychologically and physically level.

Regarding its structure, the personality consists of *temper* which is innate and is the most easily to observe and identify, *skills*, a complex of individual processes and psychological attributes that allow the successful accomplishment of certain activities, as well as *character* by which we understand the idea of trait and attitude, essential attributes of an individual that determine a unitary way of manifestation (Bochiş, 2009).

Different research on personality and its relationship with individual, interpersonal and social behaviors are equally important regardless the period of time they have been argued (Funder, 20011; Funder & Fast 2010). The predictive power of personality is highlighted in the meta-analyzes performed on the theory which argues the links between personality and sport performance (Cristea, 2015). Meta-analytical studies show that personality traits can predict on long term certain results that athletes can achieve in areas such as happiness and health, relational engagement, group cohesion and social behavior (Hampson, 2012; Benet-Martinez & Ozer, 2006).

Personality and sport

Starting with Coleman Griffith, considered to be the promoter of sports psychology, personality has remained an essential element in this area, and psychologists have continued to make efforts to understand the personality of the successful athlete.

Valley (2002) is surprised that despite the overwhelming evidence that highlights the role of personality in achieving great sport performance, many researchers believe that this topic has not revealed significant results.

Valley, however, is contradicted by Allen in an analytical study regarding research on sports psychology that contains descriptive reports of athletes' personality profile, changes in personality and sport performance development, personality differences between athletes and individuals who are not practicing an organized sport, differences in the personality of athletes practicing different sports or between athletes and members of different physical activities groups (Allen et al., 2013; Marcu & Buhaş, 2014). In the 60s and 70s research on athlete's personality increased exponentially, with over 1.000 published studies (Fisher, 1984), transforming the vision over the concept and strengthening the understanding of personality. In recent years, the frequency of studies on athletes' personality has decreased, with very little progress in answering some of the fundamental questions raised at the beginning of the last century. The decline of the interest for studying personality is hard to explain. An explanation can be the fact that the research of the athlete's personality turned to more specific concepts such as anxiety, optimism, resistance and mental toughness. These aspects have been over-studied lately and researchers used general concepts measured in the context of sport in order to understand the behavior of athletes throughout the competition (Gucciardi & Gordon, 2011; O'Rourke et al., 2011). The tendency of athletes to experience anxiety or to show resistance or optimism offers too little information about their

personality. There are good reasons to believe and expect the athlete's personality to have a mild prediction (based on theoretical grounding) on the performance that an athlete can achieve in career (Poropat, 2009). The author sustains that performance, both in work and in the academic environment, is determined by factors related to the ability and desire to achieve performance.

We are tempted to believe that achieving performance in sport is most likely determined both by the individual's mental capacity to cope with different pressures (the quality of sports infrastructure, geographical position, etc.) and by the athlete's desire to achieve very good results, expressed through effort and perseverance (Ilieş et al., 2014).

Over time, the relationship between personality and sports performance has been investigated by researchers who have used a wide variety of research methods. A particular approach compared the personality traits of athletes who compete at a high level of performance with those of athletes competing at a lower level (Dumitrescu, 2015). Although this type of method used in comparative studies does not exclude the contribution of other variables in generating differences in sport results, it provides valuable information about the athlete's personality linked with long-term performance and successful sports career (Buhaş, 2015). These studies have highlighted the fact that high performance athletes are more extrovert and more emotionally stable.

Other studies have analyzed differences in performance and compared the profile of novice and advanced athletes by correlating the results obtained in personality tests with the competitive performance obtained by athletes. Generally, between novice and advanced athletes there were no significant differences in the prediction of short-term success (one match, one encounter) based on the results obtained by athletes in personality tests (Evans & Quarterman, 1983; Garland & Barry, 1990; Morgan, 1968; Rogulj et al., 2006).

Other two types of approaches include studies that correlate the results of personality tests with long-term performance indicators, and studies comparing professional level athletes with athletes who are not performing. The ability to predict long-term performance based on the personality profile of the athlete is also sustained by the significant results obtained by Piedmont and Sindik (Piedmont et al., 1999; Sindik, 2010).

Strong effects were also observed between the athlete's personality and progress at a superior level of competition, in high-performance sports.

Predictability based on personality is sustained by Aidman (2007), who argues that the results obtained by junior elite athletes in personality tests can predict whether they will evolve to a high level and achieve sports performance seven years later. Although the author admits that more critical studies are needed, he claims that long-term success in sport is personality-driven but personality does not influence short-term success.

It should not surprise anyone that the attempt to predict short-term performances based on athlete's personality has failed because a single moment of bad luck, an unexpected event, or a wrong decision of a referee or an official can fundamentally change the outcome of the competition.

Since it is impossible to appreciate the level of short-term sports performance based on personality, researchers have focused their attention on the dimension of the personality concept, including also some behaviors associated with sport success. A study made by Woodman (Woodman et al., 2010) on a group of British gymnasts has shown that consciousness is an ascendant factor in the quality of athletes' training for competition, and emotional stability has been a positive factor for an efficient approach of the competition.

Other studies have highlighted the effect of personality on mental states such as aggression (Trninić et al., 2008) and the mechanisms used to adapt to this state (Allen et al., 2012; Allen et al., 2011; Kaisele et al., 2012). Research results reveal that more introverted or extroverted athletes, as well as those with low emotional stability, have a high predisposition to display aggressive behaviors. Athletes with a high level of consciousness and high emotional stability show openness and willingness to solve problems by using adaptation mechanisms.

In addition to the direct effects of personality on results, various studies showed also noticeable tempering effects manifested by an extraverted temperament. The extent to which sport performance is influenced by the presence of the public (Graydon & Murphy, 1995) and to which a certain emotion has positive or negative effects has been shown to be moderated by the athlete's extraverted character. Specifically, when competing in front of a public athletes with an extroverted temperament seem to achieve superior results than those obtained by introverted temperament athletes, but this situation is not valid when the audience is not present. Regarding anger, it seems to have some positive effects, but only on athletes who have high levels of extraversion.

Globally, our data show that personality plays an important role in sport performance, but we believe that further research is needed to reveal important details about the dimensions of the personality effect and its relationship with different important factors associated with success in sports.

For a long time researchers wanted to establish a personality pattern for the successful athlete (Dragoş, 2015). Although common personality traits have been observed for athletes who have achieved great performance in sports, this desideratum remains a utopia.

As for personality differences between athletes and individuals who do not practice organized sports, there is solid evidence showing that personality is associated with sport practicing. Clearly, athletes consistently demonstrate higher levels of extraversion, show better emotional stability and are more open to new experiences than individuals not practicing sport.

Although temper is influenced in a high degree by genetics, following studies on personality we can state that not only people with extroverted temper decide to practice sports and not only they are successful or perform in sport. As there are no pure typologies of extraverted or introverted temperament, and temper is only one of personality components, we argue that athletes' personality seems stronger as a result of the athletes' exposure to situations where they have to exhibit emotional and behavioral control under conditions of psychological pressure, to engage the

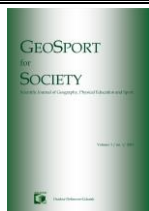
inner mechanisms of will and to increase their tolerance to frustration, because performance in sport means giving up to many life pleasures.

In conclusion, we can state that, to a certain extent, athlete's personality is under the influence of genetic traits; but it mostly forms due to the environment where the athlete develops physical and mental abilities, forms cognitive patterns that lead to the formation of character that will predict on long-term the athletes' behavior in order to achieve performance in sports.

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Territorial development indexes for team sports (football)

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Abstract. The field of territorial planning through specific methods and instruments may provide significant contribution in the spatial organization and management of sports activities. Quantitative elements such as number of inhabitants at neighborhood, village, commune, town, county, region level, number of players, population on age and gender groups, level of economic development, together with specific infrastructure elements (football fields or other types of sports arenas) and with qualitative elements (competitional level, number of players on age groups, junior, senior, amateur and professional teams) etc, all these used in mathematic formulae can generate indexes which would reflect the development level or the practicing or attractiveness degree of a certain sport at territorial unit or locality level. In this study, for the game of football, we propose *the territorial development index for football (Tdif)* and *the football practicing index (Fpi)*. With the values resulted, hierarchized, ranked and compared, important contribution may be provided for the elaboration of studies and of implementation and spatial development strategies of a sport or sportive activity.

Keywords: sport team, football, territorial development index, football practicing index

Introduction

In order to capture the quantitative (number) and qualitative (territorial impact) aspects (Bairner, 2011; Ilieș et al., 2016a, 2016b), to generate the possibilities and results for the scientific research into the relationship between settlements and sport (Bale, 2003; Reilly and Gilbourne, 2003; Conner, 2014; Ilieș et al., 2014; Buhaș, 2015; Kozma et al., 2015; Ilieș et al., 2016c) we propose two

calculation indexes regarding the development degree and amateur football practicing degree at territorial unit level (Bale & Vertinsky, 2004), with examples on two levels: Romania on county level and Bihor and Satu Mare Counties on commune level. One of them is the territorial development index for football (I_{tdf}) and the second one is the football practicing index on age groups (I_{fpi}). Both indexes can be used for all categories of sports, differences being made by the interpretation of the resulted values deviation.

The instruments (Indexes)

The territorial development index for football (I_{tdf}) is an index with applicability in spatial analyses and all types of territorial-administrative units such as: macro-regions, lands, regions, counties, micro-regions, towns and communes, localities (cities, towns and villages) or physical-geographic units: depressions, valleys, mountain units, hilly units or field units etc. In order to obtain a value comparable between territorial units of the same level (rank), the obtained value is multiplied by 100.

The calculation formula is: $I_{tdf} = (N_t/N_{loc/TAU})$ and the used calculation elements are:

N_t – total number of teams from the analyzed territorial unit (only one team per territorial unit/locality/commune/town is taken into consideration, in case there are more than one) and

$N_{loc/TAU}$ – number of localities/communes/territorial units from the analyzed upper rank territorial unit and it includes at least two localities.

The obtained values are grouped on five classes, to which it is added for comparison the average value for the territorial unit (classes above and below the average are differentiated). The typology of classes generated by the value of the territorial development index for football, on value classes, has the significances presented in table 1.

Table 1. Classes above and below the average are differentiated

<i>Classes</i>	<i>Values of I_{tdf}</i>	<i>Peculiarities at the levels of towns and communes (Territorial Administrative Units - TAU)</i>
1	Over 1.00	The territorial coverage degree shows us that on the county territory there is more than one football team per territorial unit
2	0.75-0.99	High coverage degree means a high level of amateur football per territorial unit
3	0.50-0.74	Average development level means two subcategories differentiated by the index average value per territorial unit
4	0.25-0.49	Low development level
5	Under 0.30	Very low development value

The territorial development index for football (I_{tdf}), generates data comparable at the territorial unit level, cartographically transposed and which reflect the development degree and the territorial spread of amateur football game. In this case as well, for exemplification, it is applied at regional level (North-West Region) for the same competition year (2016-2017), on counties at city, town and commune level (fig. 1) and at locality level (fig. 2). The high number of teams, together with the number of

TAUs/localities emphasize a territorial reality poorly dimensioned spatially from the point of view of the football phenomena development.

To exemplify the usefulness, for the proposed work tools, we accomplished, for the 2016/2017 competition year regarding the amateur football game, seniors' competitions, a Romania level (0,63) and North-West region 0,66 (fig.1). According with table 2 and figure 1, in the region, only Cluj County 1.02 has total coverage at TAU level, respectively at least one football team for each city, town or commune from the administrative structure of the county. Within the second category, with high amateur football development degree and territorial coverage with values between 0.75 and 1.00, is Satu Mare 0,80. The third category (0,50-0,74) include 3 counties Sălaj, Maramureș and Bistrița-Năsăud. The lowest values, from the low development level (under 0.25-0,49 teams/TAU) is one of the biggest county or region: Bihor with 0,41 teams/TAU.

Tabelul 2. Romania. North-West Region. *The territorial development index for football (I_{tdf}) at county level* (sources: www.frf.ro)

No	County	Towns (no of TAU)	Communes (no of TAU)	Villages (no)	Total (TAU) c+d	Total c+e	Teams (no)	I_{tdf} At level of TAU	I_{tdf} at level of localities
a	b	c	d	e	f	g	h	i	j
1	Cluj	6	75	420	81	426	83	1,02	0,19
2	Satu Mare	6	59	220	65	226	52	0,80	0,23
3	Sălaj	4	57	281	61	285	43	0,70	0,15
4	Maramureș	13	63	214	76	227	40	0,53	0,17
5	Bistrița-Năsăud	4	58	235	62	239	31	0,50	0,13
6	Bihor	10	91	430	101	440	41	0,41	0,09
	North-West Region average	43	403	1800	446	1843	290	0,66	0,16
	Romania average	320	2861	12957	3181	13277	2012	0,63	0,15

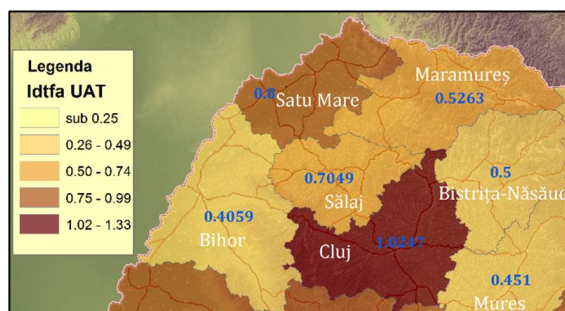


Figure 1. *The territorial development index for football (I_{tdf}) at county level by TAU* (sources: www.frf.ro)

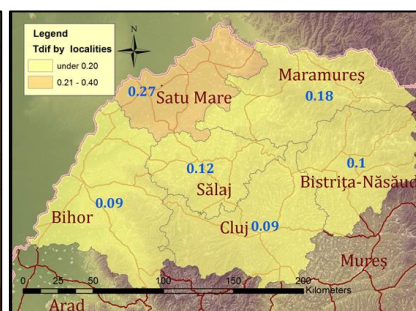


Figure 2. *The territorial development index for football (I_{tdf}) at county level by localities* (sources: www.frf.ro)

The same index, at *locality level* and on the same value scale, emphasizes even more the interest manifested by population and local authorities for amateur football (fig. 2). Figure 2 and table 2 emphasizes according with national average

(0,15 team/locality), Satu Mare County (0,23), Cluj County 0,19 and Maramureş County 0,17 are over national average.

Amateur football practicing index (I_{fpi}), just as the previously presented tool, is the second analysis tool proposed and with its values there can be emphasized the impact of a sport and of the specific competition upon the population of a certain area (territorial unit, country, region, county, locality, village), by reporting the number of signed players to one thousand inhabitants, which can represent the total population or differentiated according to gender, age groups, occupation, education level etc. In this case, we propose the I_{afi} index resulted from reporting the male population from the 19-40 age group of the reference territorial unit (administrative or physical-geographic one) as follows:

$$I_{fpi} = (N_p / P_{m19-40}) \times 1000$$

The calculation elements are:

N_p – total number of players from each territorial unit;

P_{m19-40} – population with specific age between 19 and 40, since it is about senior teams, we used the male population from the territorial unit.

The values correspond to the territorial reality as much as the age group of the reporting population is close to that of practicing the analyzed sport and the territorial unit overlaps the locality. Thus, generally, for juvenile sport the 10-19 age group is recommended, or even younger, while for seniors, the 18-40 groups. The calculation formula can be adjusted according to specifics of the analyzed sport as well. The analysis can also be made on environments (urban and rural) or on gender (males, females).

Table 3. North-West Region from Romania. *Amateur football practicing index by ages group (I_{fpi}) at the level of county in 2016/2017 competition* (sursa datelor: www.frf.ro)

no	County	Seniors teams (number) Leagues 4-7	Average number players /teams	Total number of players (c * d)	19-40 age male population	I_{afi} (c/f)*1000
a	b	c	d	e	f	g
1	Sălaj	43	20	860	28237	30.5
2	Satu Mare	52	20	1040	49964	20.8
	Region average	290	20	5800	384610	17.2
3	Bistrița-Năsăud	31	20	620	38487	16.1
4	Cluj	83	20	1660	115524	14.4
	National Average	2012	20	40240	2839013	14.2
5	Maramureş	40	20	800	68596	11.7
6	Bihor	41	20	820	83802	9.8

To exemplify the usefulness, the second proposed work tools, we accomplished, for the 2016/2017 competition year regarding the amateur football game, seniors' competitions, a Romania level and North-West region (figure 3 and table 3).

Thus, the I_{fpi} calculated at Romania level by using the counties as reference units was for 2016 of 14.2‰ male gender players, aged between 19 and 40. Region's amateur football map generated by the values obtained at county level (figure 3) emphasize the high level of attractiveness areas such Sălaj 30,5‰ and

Satu Mare 20,8‰. The lowest values are recorded, paradoxically, in counties with high economic potential such as: Cluj 14,4‰, Bistrița-Năsăud 16,1‰ or Bihor 9,8‰ and Maramureș 11,7‰, both counties under national average (14,2‰). The resulted values reflect combinations at county level between elements such as: spatial dimension of the county, economic development level, demographic potential, population ratio on specific age group, football tradition, interest shown by local authorities, etc.

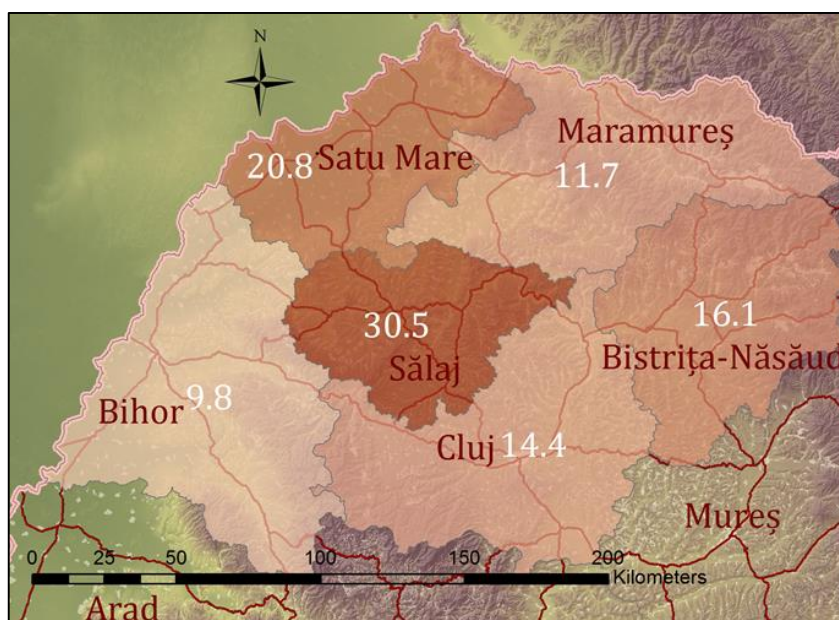


Figure 3. North-West region of Romania. Amateur football practicing index (I_{fp}) by age group (19-40) male population, by counties 2016/2017 (sources: www.frf.ro)

In conclusion, the two proposed indexes, through the obtained values and value classes, can be extremely useful spatial analysis tools with results applicable in elaboration of strategies of territorial organization and planning of sports activities and sports in particular.

The two indexes, apparently simple, generate values comparable between the same types of territorial units and reflect through cartographic transposition the development degree, attractiveness degree, territorial spread and the development perspective of a sports game.

The resulted values reflect combinations at county level between elements such as: spatial dimension of the county, economic development level, demographic potential, population ratio on specific age group, football tradition, interest shown by local authorities, etc.

Applied to amateur football at different territorial levels, the values generated on specific age groups and genders reflect a situation very close to the territorial reality, and the use of a class typology with specific features together with the adjusted cartographic representation represent an important scientific endeavor to support federations and regional and local administrations in order to implement

and develop amateur football. Also corroborated with economical-type elements, the values of these indexes multiply the importance of such a study at TAU level and reflect even more accurately the territorial reality if the analysis is made at the lowest level. The resulted values, at federation or local and regional level, are very useful in elaborating the development strategies and plans of sports activities.

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