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The Contribution of Applicable Smart and Sustainable Technologies in Recreation to City Happiness

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ABSTRACT

It is known that using time efficiently is important for individuals. The presence of the developing technology in the world in our individual lives is indisputable. Because; being able to match the availability of technology with smart equipment at suitable locations in cities that citizens can enjoy and use in a sustainable manner will contribute to social happiness. This study will enable us to understand the contribution of recreational smart technology in cities to urban happiness. Comparative information sources were provided with concrete data and semi-structured interviews with 17 experts who served the concepts of smart cities, recreation and happy cities in 4 different cities of the world (Istanbul, Indiana, Amsterdam, Shanghai) and were formed with the non-probability purposeful sampling method. Our qualitative research with a phenomenology pattern was conducted in Turkish and English. Audio and video recordings were transferred to the computer as text (transcription), approximately 5-6 pages each. Interview data were analyzed through Maxqda Analysis Program. Agreement between coders was found with different formulas. Research validity and purpose reliability were ensured for the themes formed through content analysis. An attempt was made to obtain comprehensive data, the responses in the data were coded, the relationships between each other were evaluated and divided into themes and sub-themes. 42 subthemes were found in the study. As a result, in 4 different cities; Comments and information from experts in the fields of smart city, technology, recreation and happy city are presented in sub-themes, and these sub-themes are suitable for the use of cities that want to use the relationship between the mentioned concepts.

Keywords: Leisure, Smart technology, Recreation, Happy City, Smart City

INTRODUCTION

In this study, where the concepts of smart city, technology, recreation, and happy city are addressed together, the relationship, bonds, and effects between these concepts have been examined. The aim is to identify both the tangible existence of the concepts of smart city and happy city in four major cities of the world (Istanbul, Indiana, Amsterdam, Shanghai) and their reflections on urban residents through recreational technologies. Therefore, experts who serve the concepts of smart technology and design, recreation, and happy city have been collaborated with in these cities. The purpose of the sample group is to gather information about urban recreational technology studies from individuals serving recreational city technologies, and to examine their perspectives on smart urbanism, urban technologies, recreational life, and urban happiness through them. This study aims to demonstrate that the concept of recreation can coexist with each of the concepts of smart city, technology, and happy city, or all of them simultaneously, serving as an important guide or companion for the development of these concepts in cities or societies. The goal is to identify the areas of study that can be developed in smart and happy

urbanism with the emerging sub-themes. When the research conducted in the literature is examined, it is observed that these concepts have not been addressed together, and when addressed separately, they have not been conducted through different continent, country, and city data sets as in our study. One of the important aspects that ensures the originality of the study is the simultaneous consideration of the concepts of smart city, technology, recreation, and happy city. Another significant feature of the study is that these concepts have been explored with experts living in those cities across three different continents.

It has provided the opportunity to compare perspectives of different cultures through findings, and it is also hoped to assist in the formation of a theme and sub-theme model database in terms of "recreational smart and happy urbanism" for Turkish cities. When this model is implemented in cities, it can have significant positive effects on the physiological, psychological, and social aspects of public health by influencing individuals (city dwellers) in terms of quality time, socialization, and happiness.

Factors affecting the results of the study, which cause similarities and differences in the perspectives of cities, countries, and cultures, can be evaluated as the management structure of cities, the density of the city, the expectations of the city dwellers, the pace of life in the city, working hours, and time spent commuting for work.

LITERATURE REVIEW

Concepts of Leisure Time and Recreation

Efficient use of time is of great importance for an individual to meet the needs and desires brought by their existence, as well as to cope with life's obligations. This is because the healthy nourishment of the body-mind balance is also affected by how an individual uses their time (Özkan, 2018).

When we categorize time management under three processes for its beneficial aspects, aside from obligations and needs, our third heading is the term "leisure time" (Erdemli, 2008). The term "to be free" is expressed as "licere" in Latin, and the English equivalent of the concept of leisure time, "leisure," is derived from this word. Similarly, the French word "loisir," which also carries the meaning of leisure time, originates from "licere" (Edginton et al., 1989).

Leisure time is defined as activities that are carried out outside of obligations imposed by one's family, profession, or society, such as sleep, household chores, or work activities that we are required to perform (Takiguchi et al., 2023; Iso-Ahola & Baumeister, 2023).

Kesim (2016) describes leisure time activities as recreational periods in which individuals participate by their free will to develop and reconstruct themselves outside of obligations. This shows that recreation is not limited only to sports and physical activities but also includes social, mental, playful activities and aspects of existence. According to Juniu and Henderson (2001), however, these choices may not always be free. Conditions may restrict choices. If we assume that conditions affect choices, it can be observed that the efficient use of time enables recreational choices to evolve into healthier conditions.

In his study, Kılbaş (2001) conveys Descartes' view that one of the factors determining the intelligence of societies is to work by valuing time and then to be able to renew oneself. In this case, it is important for individuals and society to be able to live their time with the value and awareness of leisure time for developed or developing societies.

According to Veal (2004), in its simplest definition, recreation is the experiences and activities that an individual chooses and sustains during their leisure time. Specifically, the sought-after experiences and sustained activities literally "restructure" the individual so that they can feel refreshed and fulfill their daily obligations (Veal, 2004).

Recreation, with its functions such as exploring different places, traveling and seeing, getting to know and learn about different cultures, expanding and broadening one's existing environment, and having fun, is evaluated in line with individuals' participation purposes and consists of activities that provide satisfaction (Altuntaş et al., 2022; Heckel et al., 2023; Yousip et al., 2024).

Thus, existence during leisure time, for both children and adults, will open up new paths in an individual's or urban resident's social perspective and perhaps in their career plans (Gürbüz, 2006; Koçak et al., 2018). In this case, when the inherent active presence of recreation is consciously combined with the concepts of technology and happiness in cities, it can make positive contributions to community health and well-being.

Although advancing technology has made our lives easier, it has also brought some negative aspects. Examples include a decrease in physical activity, deterioration in individuals' connections with one another, and as a result, family members who become alienated from each other or communication breakdowns. This change and development, along with popula tion growth, have led to an increase in

demand for recreational activities and areas (An et al., 2023;Gumus et al., 2018; Öztürk, 2021). These demands also increase the importance of recreation.

The significance of leisure time and recreation is not only a concept that we encounter today; it also influenced the course of individuals' lives in various dimensions in the past. In line with increasing technological advancements and scientific studies, the replacement of human labor with technology significantly affects the importance of recreation and leisure time.

Concept of Smart Cities and Sustainable Technology

The concept of smart cities was first used in the 1990s, and in the subsequent period, it was addressed and defined in various dimensions. Briefly reviewing these definitions:

According to Komninos, these are regions built on the digital infrastructure for managing creativity, institutions of knowledge creation, communication, and information, with a high capacity for learning and innovation (Abadía, 2022).

They are complex cyber-socio-technical systems where humans, cyber products, and technical systems interact together to achieve a goal related to quality of life in urban areas (De Nicola & Villani, 2021).

They are city management strategies aimed at increasing the competitive performance of cities in socio-economic, ecological, logistical, and economic terms, with high information density (Kourtit & Nijkamp, cited in Özdemir, 2022).

According to Caragliu and colleagues, they are cities that invest in human and social capital, traditional and modern network infrastructure, supporting a sustainable economy and a high quality of life, and managing natural resources wisely through citizens' political participation (Abadía, 2022).

The definitions emphasize that the concept of a smart city has three main goals: sustainability, improvement of quality of life, and efficiency, rather than a sole focus on technology (Perez-Prada et al., cited in Ünsal, 2023).

The concept of smart cities, which has existed for many years, underscores the importance of communication infrastructure in production and development. However, the differentiation of technologies due to artificial intelligence in recent years has expanded this definition. The Smart City concept has also reflected on significant areas such as the Olympics, with an Energy Monitoring System established in the city prior to the 2018 PyeongChang Winter Olympic Games, a first in the 122-year history of the Olympics (Karaman et al., 2019). Therefore, it would not be correct to expect today's definitions of smart cities to withstand the test of time. In his study, Alkan (2015) states that city economist Andrea Caragliu defines a smart city as a city that invests in human and social capital, establishes traditional and modern information and communication technology (ICT) infrastructure, achieves sustainable economic growth and high quality of life, and manages natural resources through participatory governance. In this context, the concept of a smart city encompasses smart economy, smart mobility, smart environment, smart society, smart living, and smart governance.

A Smart City (UN Commission on Science and Technology for Development, 2016) is a city with at least one or more initiatives related to the following six smart features, urban intelligence guidelines (China Development Bank Capital, 2015), design, and related applications:

- Smart Mobility: e.g., emission-free transportation, improved parking and accessibility
- Smart Economy: e.g., high-tech industry, ease of doing business, and innovation culture
- Smart Living: e.g., e-health, public safety, and intermodal transportation
- Smart Governance: e.g., e-government services, open data, and transparency
- Smart People: e.g., agile civil society, social inclusion, and e-learning
- Smart Environment: e.g., green environment, sustainable building, and water management

According to Paskaleva (2011), the concept of a smart city exists for outcomes, while it is used for the process of innovation and change. Nam and Pardo (2011b) view a smart city as an urban innovation in technological, network, and policy terms. According to Zygiaris (2012), a smart city is the intellectual capability of that city, addressing various innovative socio-technical and socio-economic perspectives of development.

It is known that smart cities fundamentally stem from the idea of "information and communication technologies" as the focal point for future cities (Batty et al., 2012); however, smart cities have many aspects in reality. Defining an area as "smart" does not solely depend on the presence of information transfer infrastructure. In a smart city, "intelligence" is generally competence, ability, IQ, and social cohesion (Batty et al., 2012). In this

sense, a smart city is expected to be a sustainable city (Batty, 2013). In this context, the coming together of individuals with a consciousness of leisure time, along with the presence of technologies, may lead to the existence of sustainable technologies and thus smart cities.

According to Hassanein (2014), smart city designs and furniture have this facilitating aspect. Smart cities that use technology to improve the design and services of smart street furniture to reduce costs and resource consumption have become a symbol of the concept of public spaces, enabling city dwellers to interact with each other in an effective and active way. In fact, the impact of designs on individuals can also be seen in sports disciplines, and when examining the variables affecting success in sports clubs, the structure of the facilities is among the internal factors (Karaman & Karagözoğlu, 2021).

Concept of Urban Happiness and the Happy City

In the first Global Happiness Policy Report (2017) by the "World Happiness Council," as part of the World Government Summit in Dubai, recommendations were made to increase happiness globally through smart cities, social welfare, job welfare, education, and other sectors. These developments in many urban designs in Dubai, including new livelihoods and infrastructure, help people maintain their livelihoods, increase their incomes, and support their families. Efforts to increase happiness are making significant progress through the reorganization and innovations in workplaces, shopping centers, medical facilities, recreational amenities, and even spaces where people can walk and meet (Gökçek, 2019).

The concept of a happy city is a phenomenon that considers the emotional infrastructure in the city as the most important infrastructure. However, happy cities can only exist in infrastructures that provide welfare, comfort, and the exchange of ideas and thoughts, thus creating a healthy emotional environment. A happy city is also part of the concept of a good city, like a green city or a smart city. However, there is a small difference between this concept and others. A smart city is equipped with the latest technology-based resources for the benefit of society. In contrast, a happy city is built on emotional connection and collective joy with the smart city (Jain, 2019).

Jain (2019) lists the elements of the concept of a happy city as follows:

• Public Transport System: Happy cities are those with efficient public transport systems. A low-carbon transport system ensures less pollution and a healthier life.

• Infrastructure: Effective infrastructure is key to happy cities. Essential elements of infrastructure include waste disposal systems, water recycling systems, general cleanliness, information technology infrastructure, wireless internet points, disaster management systems, and providing sufficient numbers of stadiums, recreational parks, and other public spaces for the general welfare and community health.

• Emotional Connection: As a biological being, humans are social beings with neural circuits such as the mirror neuron system, oxytocin neurotransmitter, and enhanced empathy capability (Altınbaş et al., 2010). A happy city allows people to form bonds in line with their nature as social beings. Recreational activities and experiences serve this unique biological infrastructure of humans, functioning to create bonds, integrate, unite, include, and connect, thereby being an important component of individual and community happiness (Pakiş, 2020).

• Cultural Practices: Cultural practices refer to various practices and rituals that connect the city. In this context, they also serve urban happiness.

• Sense of Security and Safety: The general security and safety of people living in the city form the essence of happiness. There must be a strong and pervasive sense of safety for people to enjoy their stay.

• Safety for Women: Issues concerning the safety of women have become very important. Can a woman walk alone at midnight? If a city is happy, it has adequate facilities to ensure the safety of women. • Safe Lanes for Pedestrians: Happy cities not only provide good transportation but also ensure favorable conditions for pedestrians. This way, people can walk comfortably in the city and enjoy being there.

• Eco-Friendly Practices: Factors such as greenery, water recycling systems, the provision of alternative energy sources (including solar energy), etc., generally constitute eco-friendly cities. If a city is green, it contributes to being a happy city. Montgomery (2013) argues that a happy city is the same as a green city or a low-carbon city. Therefore, adequate investment in green infrastructure is essential.

• Gardens and Public Libraries: Cities become pleasant living spaces when they have enough gardens and public libraries for city residents.

• Theaters and Entertainment Centers: People need entertainment centers for enjoyment. The presence

of sufficient entertainment centers, theaters, amusement parks, restaurants, etc., is important for the concept of a happy city.

• Culture of Sharing: The most important thing that makes a city happy is the general culture of cooperation and sharing among its residents.

The Relationship between Recreational Smart Technologies and the Happy City

Since the consciousness of leisure is not forced and relies entirely on the free choice of the individual, such activities and habits can take a sustainable form. Smart recreational technologies, with their facilitating, unifying, sustainable, and functional characteristics, can contribute to the happiness of urban dwellers with a consciousness of leisure. In today's digital age, the integration of recreational products and applications with technology offers urban residents opportunities in terms of speed, accessibility, convenience, and functionality to integrate recreation into their lives (such as accessing, benefiting from, and sharing recreational products and services). In this way, smart recreational technologies can serve individual and urban happiness with their sustainable, meaningful, and functional nature. In cities where smart technologies are present, urban residents with a consciousness of leisure can establish a connection with technology through its sustainable and free structure, leading to happiness. The presence of this connection in many parts of the city contributes to the formation and development of happy cities.

Studies on leisure activities, especially those in a social context, have found that serotonin release occurs, leading to feelings of happiness. In other words, a strong relationship has been identified between serotonin release and happiness through leisure activities (Miller et al., 2024; Robertson, 2016).

Positive psychology defines frequent positive affect, high life satisfaction, and infrequent negative affect as the three main components of happiness (Lyubomirsky et al., 2005; Yan et al., 2023). Lyubomirsky et al. (2005) explain that the genetic component factor for happiness accounts for approximately 50% of the variation in happiness among individuals. This component remains stable over time. A person’s living conditions (such as place of residence, age, and factors arising from the individual's personal history) account for approximately 10 % of an individual’s happiness. The remaining 40 % determining a person's happiness is linked to voluntarily chosen leisure activities and practices.

Recreational activities play an important role in meeting individuals' needs and expectations, thereby enhancing their quality of life. Through recreational activities, people experience positive emotions by establishing social relationships and gain various additional skills and knowledge. According to Spiers and Walker (2009), recreational activities are among the strongest determinants of happiness. In today’s urban life, possessing knowledge about these recreational activities and producing solutions that facilitate participation in these activities can contribute to individuals’ quality of life.

In his 2015 study, Nijholt examined the concept of the "playable city." According to Nijholt (2015), "The Playable City is a city that allows urban residents and visitors to reconstruct and rewrite their life stories." The idea of making cities playable was first introduced in the city of Bristol (England). According to Nijholt (2015), a playable city requires smart technology adapted to a smart city environment. Sensors, applications, screens, smart tangible objects, and wearable devices can be used to improve city management efficiency (e.g., traffic, public transportation, security, public events) while also offering fun elements in the city. Playability brings forth the need for smart technology. From this perspective, the planning of recreation adapted to smart technologies is likely to contribute to transforming the city into a playable, enjoyable, and happy city

METHOD

Primary Research Question

Which smart technologies and technological applications can be beneficial for the existence of sustainable recreational technological spaces and activities in cities that can engage individuals, thereby contributing to the concept of a happy city?

Research Model

If an in-depth understanding of a topic and/or phenomenon is required, the qualitative research model may be appropriate as a research model. It can be said that qualitative studies are beneficial choices for the detailed examination and recognition of the research in an activity-focused manner (Strauss & Corbin, 1998).

Qualitative researchers should determine their research objectives after deciding on the appropriate design and then select data collection techniques that best allow them to examine these objectives. They should then orient themselves on how to analyze the data set they will collect. Although our research is shaped by fieldwork and interactions in interviews, we use the phenomenological research design, which seeks to convey to us "what" the

phenomenon is, "how" it is, "what it means," and "the common meanings by which it is represented by those who experience it" (Çelik et al., 2020).

First, analysis results were supported by observations accompanying video interviews. Second, as is suggested in many qualitative studies, consensus among advisors was utilized. Third, expert opinion was sought, with two PhD-level experts in recreation and smart city research confirming the themes and categories throughout the study. Fourth and finally, the member checking approach was used. The results of two interviews were shown to two participants from the sample group, and after they made minor corrections, the interview results were confirmed (Creswell, 2013; Malterud et al., 2016).

Sample Group

Qualitative researchers who tend to use non-probability purposive sampling methods seek expertise or interest in the focal subject rather than representation of the population (Neuman, 2012). If the selection of a sample depends on the researcher's knowledge of the population or the purpose of the study, this type of sampling is called non-probability (purposive) sampling (Marczyk et al., 2005). In this research, we used intensity sampling, a type of non-probability (purposive) sampling, which provides a rich description of the events and phenomena under investigation without going to extremes (Silverman, 2013). Intensity sampling focuses on the best or richest information without including unusual cases (Morgan & Morgan, 2008).

In our study, the sample group consists of individuals engaged in the smart technology and design sector, leisure and recreation activities, and the organization of happy city initiatives in four major cities (Istanbul, Indiana, Shanghai, and Amsterdam). Participation of research participants was based entirely on a voluntary basis. The sample included individuals aged 23-58, who are interested in the concepts mentioned above and work in smart technology and recreational city technologies, with 4 or 5 participants from each city, totaling 17 individuals. The purpose of this group's inclusion is to obtain information about recreational city technology studies from individuals who serve recreational city technologies and to examine their perspectives on urban technologies and urban happiness. All interviews have been completed.

The commonly used method for determining sample size is data saturation, also known as the saturation point. If adding a new sample does not produce any new findings or data in the research findings and if the research begins to repeat itself, this indicates data saturation. Various studies address data saturation. However, Bertaux (1981) suggested that a minimum of 15 could be appropriate. Mason's (2010) examination of doctoral theses showed that 80 % of the dissertations achieved data saturation at the sample size specified by Bertaux.

The strength of the sample depends on respondents' knowledge, experiences, or specific facts related to the research topic. In determining the sample size in this study, researchers applied saturation during data collection as a guiding principle (Glaser & Strauss, 2017). Since the collected data did not generate new insights on the subject, the data collection process in this study was concluded with 17 participants.

Designed according to the qualitative research method and using the semi-structured in-depth interview technique, all interviews were completed over approximately 12 months. Data were collected from September 2020 to September 2021.

Through the reference of academicians in the departments related to leisure and recreation at universities, interviews with the sample group in relevant countries were planned and conducted.

As part of the research, online video interviews were conducted with 17 participants from 4 different countries across 3 continents. Prior to the interviews, consent was obtained from participants for recording. Participants were assured that the data would only be used in this academic study. During the interviews, an environment was aimed to be comfortable and tension-free, with conversations and sharing before moving to semi-structured questions. The date and time of the interview were chosen by the interviewee. Each interview lasted a minimum of 50 minutes and a maximum of 77 minutes, with an average interview duration of 67 minutes.

Online video interviews with each participant were recorded using the Zoom program, and the audio and video recordings of the interviews were transcribed into text files, each consisting of 5-6 pages. Following interviews with the sample group, the raw transcripts totaled 102 pages, and after processing the raw interviews, the data file totaled 68 pages. Through content analysis, a thematic study was conducted in line with the sub-problems arising from the research problem.

The in-depth interview data collection technique, which involves asking open-ended questions, listening, recording responses, and asking additional related questions, allows for a detailed examination of the research topic and accurate information acquisition (Kümbetoğlu, 2008).

Analysis, Coding, and Interpretation

Content analysis was used to analyze the research data. The primary purpose of content analysis is to reach relationships that can present the data in the clearest manner. In content analysis, the data undergo a thorough coding process. To this end, the data are first coded. Codes are logically organized according to emerging concepts, and

themes are identified (Drisko & Maschi, 2016). The purpose of content analysis is to bring together similar codes within themes. Certain processes are carried out in conducting content analysis.

These steps, as noted by Yıldırım & Şimşek (2013), are as follows:

- Coding of data
- Identifying themes
- Organizing and defining codes according to themes
- Interpreting the findings

The steps above are generally used in studies employing content analysis (Stemler, 2015). The steps in content analysis can be explained as follows:

Coding of Data: This is the most critical stage in content studies. Coding can be performed on elements like sentences, paragraphs, and images. Coding is defined as assigning a word or short phrase that is symbolically descriptive, attention-grabbing, essence-capturing, and/or evocative (Saldana, 2021). Data obtained in the coding process are examined, divided, compared, and related. Each piece of the conversation is analyzed for meaning, and sections that form a coherent whole are named and coded by the researcher with reference to the literature or an element most appropriate for that unit (Yıldırım & Şimşek, 2013). Although the study's conceptual and theoretical framework is taken into account during coding, codes not included in the study framework may emerge. The appearance of separate codes here is related to the data itself. Consequently, the coding stage of content analysis is the initial search, the meaningful segmentation of data, and the naming of what relevant sentences, paragraphs, and structures conceptually represent.

Identifying Themes: At this stage, commonalities among codes are sought. By identifying the similarities of emerging codes, related codes are brought together, and themes are identified. Themes differ from codes as they are represented by a more general concept that can represent the codes (Saldana, 2021). Creating themes, or thematic coding, is the second stage of content analysis.

Organizing and Defining Codes According to Themes: After the initial coding and theming processes, the researcher moves to organize and define codes according to themes. Here, the researcher associates the codes they created with the theme that represents them. As a result, the collected data is presented to the reader more systematically.

Interpreting Findings: In the first three steps, data are defined (coding), classified, and associated with specific themes. Especially in qualitative research, interpreting findings is important. In this step, the researcher provides detailed descriptions related to the results obtained, aiming to make sense of the research topic and explain the relationship between findings and make inferences from them. Coding and theming are frequently used in this stage, as research findings (codes and themes) are important parameters in interpreting findings.

Data obtained from interviews were analyzed using the Maxqda Analysis Program. Maxqda is software designed for text and multimedia analysis, suitable for qualitative and mixed-method data.

Validity and Reliability/Credibility of the Research

In the relevant literature, validity in the qualitative paradigm has been defined in various ways by different researchers, but these definitions have many common points. Researchers believe in the necessity of making objective observations to ensure validity in qualitative research (Yıldırım & Şimşek, 2013) and think that it is related to whether the research findings align with reality in the external world (Roberts & Priest, 2006). Validity is as important as reliability in qualitative research methods. Although validity is well-suited to quantitative research models and methods, validity should also be considered in qualitative studies where interview and observation models are applied. Maxwell (2005) proposes the application of 8 criteria to ensure validity. The following eight models, briefly defined for validity, have different levels of importance. These models were used to ensure the validity of the research, drawing from different levels (Maxwell, 2005; Korkankorkmaz, 2006):

- Intense and Long-Term Engagement: Besides providing sufficient information, intense and long-term engagement in the qualitative research method enables more direct access to sources and data through interviews and observations. This situation gives a beneficial impression in terms of validity.

- Rich Data: The deep involvement and expertise of the sample group on these subjects appear to be the correct method to reach rich data. Transcribing the analysis (transcription) of interviews as they are allows for more data to emerge. Observational forms, photos, and videos from 17 participants from 3 different continents and 4 different cities in this study are indicators of the presence of rich data.

- Respondent Validity: Having experts in the sample group is valuable for establishing a connection with the research topic. Receiving regular, encouraging feedback from the sample group on the data and results indicates respondent validity.

- Intervention: In some qualitative research, interventionist approaches may be necessary to clarify certain points and obtain deeper data. In this study, semi-structured in-depth interviews applied this method when needed.

- Investigating Different Evidence and Negative Cases: Analyzing different evidence or negative examples related to the subject is another stage of testing validity in qualitative research. Qualitative studies can present evidence about components that are not the main part of the topic or negative

elements when discussing examples related to the topic.

• Method Triangulation: Different types of data on the same subject can be presented to enhance the quality of the research and increase validity, as well as for understandability and data analysis (Mays & Pope, 2000). Method triangulation was a method used in this study.

• Statistical-Like Approach: Since qualitative studies mostly rely on inferential results, supporting the prevalence of a specific phenomenon with quantitative results like frequency or percentage can strengthen the interpretation of findings.

• Analogy and Comparison: Comparisons (e.g., between experiment and control groups) are widely used to assess validity in qualitative research. This method was used in the interpretation and evaluation of study results.

In qualitative research findings, criteria have been established to build the confidence of both the researcher and the practitioner in the quality of the research. Evaluating validity and reliability in quantitative research models may not be realistic in qualitative studies. Therefore, Denzin & Lincoln (1998), who proposed their list of four-point criteria for "natural research," indicated member check as the most important criterion. The purpose is to achieve trustworthiness through the member check process (Porter, 2007). Upon completing the content analysis, the data were verified by consulting 5 participants to enhance the "credibility" of the findings. The research findings were shown to 5 randomly selected participants to assess the degree of theme relevance and gain perspectives, thus achieving participant validity.

In this context, consistency was sought with the relevant literature, and attempts were made to find similar and different results in the research. In addition, during video conference interviews, participants' facial expressions, tones of voice, and response time were observed by the researcher, and relevant notes were taken for evaluation in the data analysis (Guba, 1981). One of the techniques that enables the researcher to understand what is fundamental or characteristic, "persistent observations," is used to identify common qualities and eliminate irrelevant features. Therefore, the researcher spent time in the field to support the interpretation of the research topic.

Inter-rater reliability can be calculated using various formulas and can also be done via software. The most common formula is the percentage agreement. Two individuals independently code the same interview, and the extent to which these two experts' coding results align is assessed. Agreement and disagreement are calculated using the formula Agreement/(Agreement + Disagreement)*100 via the Maxqda program (Sevilmis & Yildiz, 2021). In this study, attention was given to whether both coders assigned the same code in the document. Consequently, which codes would fit the research purpose was discussed by two academic personnel. Then the same interview was coded by two different experts, achieving agreement on 14 codes, while 2 codes remained unresolved. Based on the formula Agreement/(Agreement + Disagreement), 14/(14+2) * 100 = 87 % agreement was found, demonstrating inter-coder reliability (Sevilmis & Yildiz, 2021).

Linguistic Equivalence

For the questions to ensure semantic integrity in both languages, the questions were translated from Turkish to English and back to Turkish (back translation) by two academicians who have served in the field of sports management and recreation for many years and completed their undergraduate and graduate studies in English-speaking schools. Semantic integrity was found in both languages.

FINDINGS

The thesis writing is directly affected by the writing of significant sections, namely findings and discussion. The study was completed with 17 participants, 5 of whom are female and 12 male; 64 % are graduates, 18 % have postgraduate degrees, and 18 % hold doctoral degrees. Participants range in age from 23 to 58. Of the participants, 14 work in local governments, and 3 work in both local governments and universities.

The interviews, conducted to learn about the benefits that smart technologies and designs could provide in forming sustainable recreational spaces in the city that engage with individuals and contribute to the concept of a happy city, yielded the following findings through content analysis.

When Figure 1 is examined, it shows that the contribution of smart recreation technologies to happiness is organized into five sub-themes according to the participants in the study. These sub-themes are labeled "Saving Time," "Making Life Beautiful," "Making Life Easier," "Problem Solving," and "Connecting – Communication."

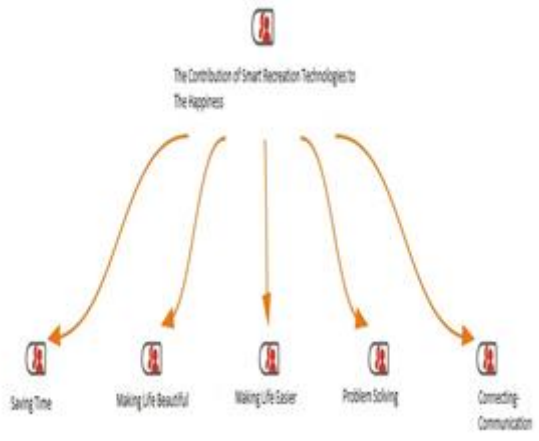

Figure 1. Contribution of smart recreation

technologies to happiness hierarchical code subcode model

Participants expressed their views on the "Contribution of Smart Recreation Technologies to Happiness" as follows:

Saving Time: "…By increasing time savings, a source of happiness is created. In return, it also indirectly rewards itself to some extent… Since they spend less time and have more time for themselves…" (I_H).

Making Life Beautiful: "…They experience greater efficiency in their own lives by establishing a sense of belonging and connection through these applications. For example, if we consider groups such as trekking or the concept of "Walk Istanbul" I mentioned earlier, you enable people to see different parts of Istanbul, you make them move, which itself is another source of happiness. By providing small rewards, you also create another source of happiness…" (I_H).

Making Life Easier: "…They help people stay safe and do everything quickly. An easier life leads to happiness…" (S_ZD).

Problem Solving: "For me, the most important thing is the ability of smart city products or applications to meet citizens' urgent needs. In traditional society, if there was a problem, people would ask the government, and this took a long time and a lot of effort. However, with the smart city, it is much easier for citizens to connect with each other and with the government. Problems are resolved more efficiently and easily, making citizens happier. For example, when problems are solved easily through smart technologies and applications, people are happy, and this contributes to the happiness of the city" (S_WG).

Connecting-Communication: "…However, with the smart city, it is much easier for citizens to connect with each other and with the government…" (S_WG).

When evaluating participants' opinions on the contribution of smart recreation technologies to happiness by city:

In Istanbul, the main factors contributing to happiness were seen to be the facilitation of life, saving time by allowing people to spend less time on certain tasks and more time on themselves and their loved ones. Other sources of happiness mentioned included socialization, opportunities for activities, rewards, physical activity and mobility, relaxation and stress relief in green spaces, and establishing a sense of belonging and connection.

In Shanghai, it was found that the efficient and easier resolution of citizens' urgent needs and problems, along with easy access to government and local administration, contributed to both the happiness of citizens and, as a result, to the happiness of the city. It was noted that online healthcare, hospital, and doctor applications provided time savings for residents. It was also highlighted that artificial intelligence (AI) applications and robots in public places such as terminals, train stations, parks, airports, and hotels brought convenience and added color to public spaces. Talking with robots was especially noted as a source of happiness for children. Additionally, residents' ability to connect easily with each other and the sense of security provided by monitoring, control, and tracking systems were also cited as factors contributing to happiness.

In Amsterdam, smart technologies were associated with easy, sedentary lifestyles, excess weight, obesity, and unhealthy eating habits. Accordingly, there was a preference for technologies that support work compatible with nature (such as tree planting and bike trails) over those focused on technology-based solutions. It was also noted that a mobile application cannot replace the physical reality of an activity with spatial grounding. While examples of technology use exist, it was emphasized that more attention should be given to the importance of activity and recreation concepts than to technology itself. Additionally, concerns regarding individual rights and freedoms, such as moving in public space without surveillance, and privacy were highlighted. The sale of personal data to private companies was another criticism evaluated within an ethical framework.

In Indiana, it was stated that the integration of technology into recreational spaces contributes to the happiness of the city. Life-facilitating applications, such as internet-based applications related to recreational programs, GPS-based route map applications, instant access to information and services, and environmentally friendly applications that promote active living (e.g., stationary cycling that allows mobile phone charging through generated kinetic energy) play a significant role in city happiness. Recreational activities were associated with less stress and a better mood. The value of parks and the concept of recreation was emphasized with particular importance in this city sample.

When Figure 2 is examined, the participants' views on smart city design and applications are organized into seven sub-themes. These sub-themes are labeled "Clean Energy," "Smart Traffic and Public Transport Systems," "Smart Garbage Collection," "Online Appointment and Registration," "Smart Transit," "Smart Meteorological Measurement System," and "Digital Kiosks."

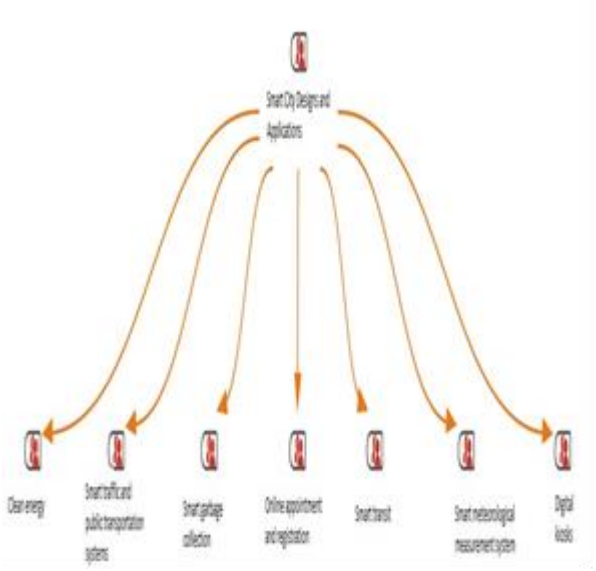

Figure 2. Smart city design and applications hierarchical code subcode model

Participants expressed their opinions regarding "Smart City Design and Applications" as follows:

Clean Energy: Another example: Clean mobility is a big issue at taxi stands in Amsterdam. Cameras are used to scan plates and electric taxis. Green taxis are prioritized. They block taxis that are more polluting. This is an example provided by the use of cameras and technology (A_CD).

Smart Traffic and Public Transport Systems: In smart cities, we are primarily working on systems that can make life easier for people, enabling them to use their time more efficiently. Systems like signaling. When we talk about signaling, it applies to both rail and road transportation (I_H).

Smart Garbage Collection: …We have an app for waste collection. You receive reminder notifications about which bin to take out according to the day. Separate bins and days are designated for the recycling of paper, plastic, glass, vegetable greens, and general waste (A_B).

Online Appointment and Registration: Our city makes extensive use of technology: computers, software, and applications are used for registering for every program, reserving a facility in our department, or purchasing a gym membership. Bill payments can be made online (I_C).

Smart Access: Every building has facial recognition entries—facial recognition systems (S_SD).

Smart Meteorological Measurement System: Second, there are meteorological measurement points. Results such as wind and air temperature have been turned into applications. Early ice warning systems on highways, for example, inform about icy spots in certain locations early, allowing drivers to ensure safe driving. Most of the applications we discussed are actually fundamental smart city applications (I_H).

Digital Kiosks: The municipality conducts surveys. This is done through a white desk. It collects requests, complaints, and satisfaction feedback. It doesn't only collect complaints; it also collects positive feedback. Although the white desk may appear to be a complaint system, it also collects positive feedback. For instance, for any given topic or investment in a certain place, the municipality can make decisions based on these comments or ask the public's opinion on the matter (I_SM).

I would like to contribute comments on the findings related to this theme:

For Istanbul, examples of basic smart city solutions, such as traffic navigation systems, meteorological measurements, signaling systems, public transportation, smart meters for water and natural gas consumption, and renewable energy applications like solar/wind/waste energy, were mentioned. Additionally, examples were given under the categories of human, economy, environment, governance, life, mobility, and energy, including robotic and coding courses, open data for participatory governance, online education, card applications for aid, and video panel applications for tobacco use.

In Shanghai, it was mentioned that platforms monitor the environment in urban spaces, such as traffic and environmental conditions, using cameras and screen displays (e.g., bus stops), providing information flow regarding the environment. In this sense, monitoring, tracking, supervision, and control-focused public order and safety applications are predominant. Additionally, smart parks based on smart landscaping and lighting within park automation, autonomous driving applications, facial recognition entrance technology in buildings for security purposes, and recreation-focused facial (emotion-based interaction) and motion recognition technologies (such as sculpture parks) are also in use. Robotic applications for information, service, and entertainment purposes are present. In this context, technologies such as 5G, the Internet of Things (IoT), and Artificial Intelligence (AI) are used more heavily. Sharing-based economy applications (e.g., bicycles, umbrellas) and sports applications (shared gym platforms and street kiosks with QR codes for exercise) are also noted.

In Amsterdam, interviewees mentioned applications for waste collection for the recycling of paper, plastic, glass, vegetables, greens, and general waste, as well as solar panels on buildings. Within the framework of clean mobility, cameras are used to manage vehicles entering the city, identify older polluting vehicles, and specifically scan electric/green taxis. Bicycling (e.g., rental bikes) is one of the prominent concepts within the framework of green and clean mobility in this city. In this sense, we see that eco-friendly applications are prioritized

in the Amsterdam sample. Establishing connections among people, spending leisure time together, engaging in physical activity or sports activities are considered important for motivation, and relevant websites and applications have been mentioned. Accordingly, applications such as community biking events for activities are highlighted as examples of smart technology. The city card application, providing access to gyms, football, or swimming, indicates the importance given to physical activity. Another point to highlight is that, based on examples of environmental and green movement, high technology is not always considered necessary. There is no tendency to bring high technology into the city; rather, simple smart solutions compatible with nature are considered sufficient.

In Indiana, it was noted that technology usage that facilitates daily tasks, communication, and duties is more prominent. Thus, web-based software, Zoom meetings, YouTube educational videos, social media, and internet applications are mentioned for registering facilities, memberships, and services, paying bills, and obtaining information about programs. Interviewees emphasized the importance of solar panels, energy plants converting waste into usable materials, renewable energy sources, collecting rainwater on building roofs for irrigation, and environmentally friendly applications such as eco-scooters based on apps as alternative transportation tools to prevent fossil fuel use, thereby reducing carbon footprint. The use of technology to monitor existing street trees and adaptation programs for climate change, considering the city's designation as a "tree city," was also noted. In a similar vein, biological surveys (BioBlitzes) conducted to record species using the mobile app iNaturalist are valued in terms of the environmental concept. Numerous BioBlitzes aim to increase public and volunteer participation in recognizing, protecting, and informing about biodiversity to foster interest in biodiversity. In addition, the web-based JobForm for outdoor volunteer programs for parks and recreation, and the internet-based uReport warning/problem reporting program are other applications mentioned to involve the public in processes to protect natural resources and the environment and to encourage care for nature.

When Figure 3 is examined, the participants' descriptions of their cities are organized into seven sub-themes. These sub-themes are labeled as "Having Many Alternatives," "Fast, Complex, Tiring," "Natural," "Safe and Livable," "Comfortable," "Having a Pleasant Time," and "Live."

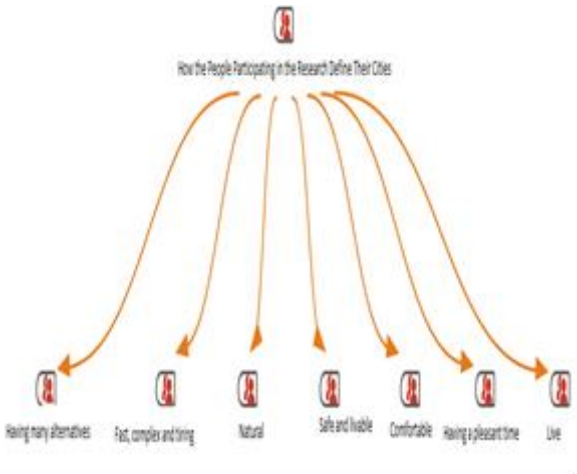

Figure 3. How would you describe your city hierarchical code subcode model

Participants expressed their views on "How they would describe their city" as follows:

Having Many Alternatives: You can do many things—from leisure activities to sports, culinary experiences, or visiting tourist sites like Madame Tussaud, Amsterdam Dungeon, or museums like the Rijksmuseum and Van Gogh Museum (A_B).

Fast, Complex, Tiring: It's a city with an intense work life. People spend most of their time commuting, working, and returning from work. People have limited leisure time. It's a city where life moves very fast (I_H).

Natural: A city rich in everything, in terms of its population, culture, nature, and plant diversity (I_Ş).

Safe and Livable: A magnificent city. The buildings are splendid. Very safe (A_D).

Comfortable: Metropolis/lots of people/ exciting/ yet the comfort level is relaxed (S_ZD).

Having a Pleasant Time: You can enjoy good times, thanks to numerous cultural activities along with quality healthcare and social systems (A_C).

Live: Very lively. Many things are happening (A_B).

When looking at the descriptions of the cities:

For Istanbul, the city descriptions appear diverse. Each participant evaluated the city based on different aspects and characteristics. Besides being a cosmopolitan metropolis with an intense work life and the involvement of various socio-economic and ethnic groups, it stands out for its historical,

architectural, cultural elements, and natural features.

Shanghai is mostly characterized as a large and modern city associated with economic and job opportunities but with few or limited green spaces.

Amsterdam is described as a vibrant city within the context of leisure, cultural activities, and fine arts museums.

Indiana, on the other hand, is highlighted for its green spaces, geographic features, natural resources, and recreational vision, underscoring its identity as a "forest city." It is also described as a lively and social city, owing to its status as a university city.

When Figure 4 is examined, the participants' views on the concept of the smart city are organized into four sub-themes. These sub-themes are labeled as "Applications that Provide Convenience," "User-Friendly Technologies," "Smart Living Space and Conditions," and "A Comfortable and Good Life."

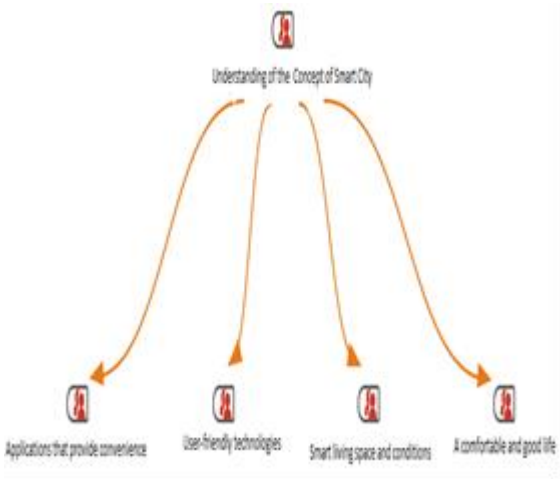

Figure 4. Views on the smart city concept hierarchical code subcode model

Participants expressed their views on the "Smart City Concept" as follows:

Applications that Provide Convenience: A smart city is a smart way of life; a smarter lifestyle. It means that if you need something, you can easily find it in some electronic devices, networks, or information technologies. A smart city means smarter living conditions (S_WG).

User-Friendly Technologies: A city that uses sustainable technologies to function better. I think of Singapore as the smartest city, using sustainable technology and green energy. A smart city uses technology to function (I_RS).

Smart Living Space and Conditions: For me, the most important aspect of a smart city is not its infrastructure. The city should make its residents feel better, empower them, make the environment more suitable for people's lives, and create more opportunities for people of all ages (S_ZW).

Comfortable Living: However, using technology to make people more comfortable or to make life easier for those living there and for visitors would be an advancement (A_B).

In this theme, functional features such as life-facilitating, comfort-providing, and user-friendly applications, systems, and technologies emerged as the primary shared language among all cities. The ultimate goal, emphasized across all cities, is to use technology to raise the standard of living, add value to the city, and improve services and experiences for residents' well-being, making them efficient and accessible.

In Istanbul, the terminology of essential smart city services is notable, focusing on the central management of urban dynamics based on data, such as transportation networks, traffic density, monitoring of meteorological and natural events, core life components (water, electricity, natural gas), and managing human circulation (controlling foot traffic).

In Shanghai, a technical language focused on hardware and software (such as network/device or computer language) is more predominant, with an emphasis on the idea of social governance and security. The focus is on delivering the philosophy of happiness through recreation (happy city) via software. Additionally, inclusive and varied applications for different needs, addressing everyone, were highlighted as another aspect of the smart city concept.

In Amsterdam, more focus is on applications that bring people together, such as bike rental/drop-off, choosing a gym, and mobile apps focused on physical activity or nutrition for a healthy lifestyle.

In Indiana, both eco-friendly applications (green energy use, rainwater management, electric cars, etc.) and sustainability for continuous efficiency are emphasized. The focus is on not only preserving natural areas but also raising public awareness of nature through environmental education programs and applications. The use of online technology to communicate with local governments was also highlighted as another important point.

When Figure 5 is examined, participants' views on how technologies used in recreation and leisure areas in their cities interact with the public are organized into four sub-themes. Participants provided examples such as "Cultural and Arts Websites," "User-Friendly Technologies," "QR Codes," "Safety Applications," "Museum Applications," "Rental Applications," "Online Reservation Applications," "Zipline," "Job Form," "Zoom," "Fitness Garden," "Charging Applications," "Bombay," and "Map Applications."

These sub-themes are labeled as "Social Media," "Parks and Gardens," "Sports and Recreational Activities," and "Mobile Applications."

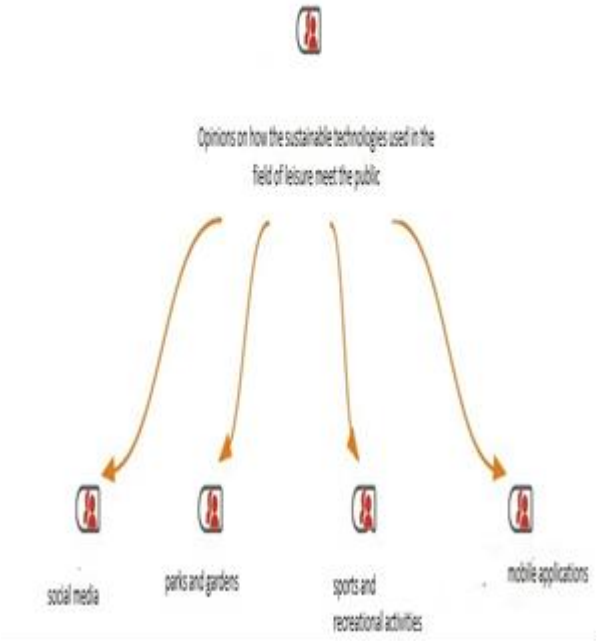

Figure 5. How do the technologies used in recreation and leisure in your city meet with the public hierarchical code subcode model

Some of the participants' views on "How technologies used in recreation and leisure areas in their city interact with the public" are expressed as follows:

Mobile Applications: "Bike sharing could be an example. There is an app across Shanghai that you can use on your phone, and with a QR code, you can rent and park bikes anywhere. Payment is made automatically via the app" (S_Z). / "We have a social mobile app provided by the city that connects people and encourages them to exercise by utilizing the city's open sports infrastructure" (A_C). / "There are cultural and arts-related websites of the municipality that announce cultural and arts events to citizens. If interested, residents can download it as an app on their phones; there are also websites. Many websites offer online reservations and sales" (I_SM).

Sports and Recreational Activities: "Projects were carried out to encourage people to exercise more in parks and create entertainment and interaction at the stadium's arena boulevards, with the involvement of the University of Applied Sciences" (A_C). / "We have examples at the airport of riding a bike while charging your phone" (A_C).

Social Media: "These days, we have to use technology and social media to promote these events. Using Facebook and Instagram is our number one way to reach the public" (I_R).

Parks and Gardens: "In parks and gardens, they use sensors to know a child's location. For safety purposes, they use GPS and report to the police" (S_Zhiang). / "There's a simple Fitness Garden that emerged during the Corona period for people to exercise in public spaces" (A_C).

My observations on the views of participants on how technologies used in recreation and leisure areas in their cities engage with the public, by city, are as follows:

For Istanbul, although it is noted that such technologies are not very widespread, examples focused on sports and mobility as well as culture and arts were provided. Barcode applications in recreational green spaces, app-based walking events encouraging a competitive spirit and rewarding with points/benefits, orienteering route applications, exercise equipment in coastal/sports/outdoor areas, energy generation through equipment use, camping organizations, culture and arts websites, online reservation/ticket sales websites, and mobile applications were mentioned.

In Shanghai, mobile applications are also prominent. Interviewees mentioned QR code-based applications. Sensor-based safety measures for children, GPS-based smartwatches, and button applications for the safety of the elderly were also highlighted. Such applications could be considered important technologies to ensure the safety of children's recreation and leisure time.

In Amsterdam, mobile applications were also mentioned, including public transportation apps, museum applications, a "trash hunt" app, and canal tours. An example of an initiative that connects people through sports using the city's open sports infrastructure is the SportySpots social app. Other examples include a regional bike route designed to connect different municipalities, with applications that allow users to control lighting in tunnels and along routes beyond commuting. Managing crowd/traffic density was another point raised. Examples included RFID technology bracelets used at festivals and a Fitness Garden equipped with lighting algorithms for smart distance measurement, density monitoring, control, and warning during the COVID period to ensure safe exercise in public spaces. Programs for open data and open map applications, park projects using Bluetooth beacons for instant messaging and device-to-device communication to encourage more exercise in parks (Fitness Garden), and airport-based stationary bikes for charging phones, data collection, and innovative data-driven technologies were also mentioned.

In Indiana, the pandemic brought forth virtual races, where people competed on their own and later recorded their times in a database, and programs such as fitness and yoga classes on Zoom with instructors to enroll people in programs. Technologies used for simple tasks, such as supervising playgrounds, entering information into

databases, and virtual experiences and applications based on remote access, such as social media, were among the topics mentioned by participants.

In terms of recreation and entertainment spaces, interviewees noted mobile applications like Outerspatial, which manages parks, trails, and other outdoor locations and provides a recreation information library. Parks Mobile App was also mentioned, as it connects parks, the community, and park users, facilitating communication about routes and traffic conditions to parks. Other examples include internet-based applications like JobForm, developed in collaboration with the company Image Matters to create curated tours for learning about wildlife, offering another way to interact with people in parks.

When Figure 6 is examined, the participants' views on the drawbacks of using smart technologies in recreation areas are organized into six sub-themes. These sub-themes are labeled as "Electromagnetic Fields and Negative Impact on Health," "High Technology Investment," "Causing Communication Breakdown," "Technical Malfunctions and Maintenance Requirement," "Threat to the Security of Personel Data," and "Inequality of Opportunity in Accesibility Access to Technology."

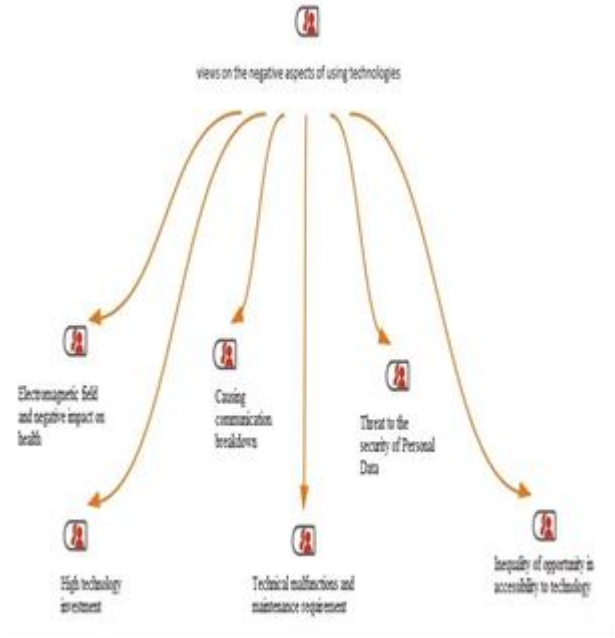

Figure 6. Negativities of using smart technologies in the field of recreation hierarchical code subcode model

Participants expressed their views on the "Drawbacks of Using Smart Technologies in Recreation Areas" as follows:

Electromagnetic Fields and Negative Health Impacts: "Is there a balance between being very smart as a population and looking at blue-light screens all day, and filling public spaces with these kinds of things? I wouldn't advocate putting more technology on the streets. Just as there are adverse outcomes for children who don't exercise enough or eat healthily, there are also obesity-related consequences. This issue is primarily seen among immigrant families in poorer areas of the Netherlands. I think smart technology is making people overweight" (A_E).

High Technology Investment: "Technology belongs to large companies. It's a major investment. Being owned by big companies is challenging" (S_Zheng).

Causing Communication Breakdown: "There are disadvantages of technology. It keeps people more at home; for instance, young people using technology to avoid going out into public spaces and not communicating with each other. In their private lives, they do everything online at home" (I_H). / "I definitely see the decrease in social interaction as a negative" (I_J).

Technical Malfunctions and Maintenance Requirement: "Let's say you can see the schedule at the bus stop, but from my personal experience, sometimes there's an issue with the smart system, you're waiting there, and there's no one to ask. And you feel deceived. You lack face-to-face communication. So you shouldn't rely too much on a smart city. Or if the power is out, that's a big problem" (S_W).

Threat to the Security of Personel Data: "In Amsterdam, I think we discuss privacy and ethics a lot because we don't want to adopt China's state surveillance model. / Also, we don't want your personal data (American model) sold to private companies. / An important issue is that you may not be aware that you are allowing the use of technologies like thermal imaging and Wi-Fi monitoring. Therefore, people need to be informed about how these technologies are used. / Crowd management is a hot topic; because in Amsterdam, we already have a system, but there are many questions about privacy and ethics. How do you inform people that data about them is being collected in public spaces?" (A_C).

Inequality of Opportunity in Accesibility Access to Technology: "If I'm in a place without good Wi-Fi or if I don't have a smartphone or the economic means to participate, this is obviously a disadvantage. It can widen the gap between people who can afford things and those who cannot" (I_L).

My findings regarding the participants' views on the drawbacks of using smart technologies in recreation areas are as follows:

In Istanbul, concerns were raised about negative impacts on human health, such as electromagnetic fields and blue light exposure. It was also mentioned that guiding and influencing people can dull their intellectual and creative abilities. Other downsides included the possibility of being non-

functional/effective, obstructing flow in public transport spaces with urban furniture and related technologies, durability issues, the threat of turning the city into a mass of sensors, and unnecessary high-tech investments instead of simple solutions.

In Shanghai, participants highlighted the need for secure use of personal data, good protection from large corporations, and government guarantees. Concerns included people staying at home more, not communicating with each other, and an isolated society, along with technical malfunctions in smart systems (e.g., power outages, system component failures), and the substantial power private companies hold to reshape society in smart city production and design within public-private partnerships. It was suggested that the government itself, rather than private companies, should directly operate in this field.

In Amsterdam, within the framework of individual rights, freedoms, privacy, and ethics, discussions focused on the use of technologies such as thermal imaging, cameras, and online surveillance for crowd management. Topics included the right of individuals to move in public spaces without surveillance, the possibility that people may not be aware they are consenting to be monitored, the obligation to inform people about how these technologies are used, personal data protection, and concerns over data being sold to private companies.

In Indiana, negative impacts on health, such as disruption of concentration due to blue light exposure, and the elimination of face-to-face communication needs leading to more isolated living and mood disorders, were highlighted. Other concerns included lack of universal access to technology, deprivation of internet capabilities when access is unavailable, the barrier between those who can afford technology and those who cannot, reduced social interaction, and a disconnection from the rest of society.

When Figure 7 is examined, the participants' views on the concept of a happy city are organized into nine sub-themes. These sub-themes are labeled as "Social Bond," "Respect to Adversity Differences," "Health Services," "Physical Activity Programs," "Clean and Green City," "Inclusive Applications," "Time to Spare for Private Life," "Fun," and "Reliable."

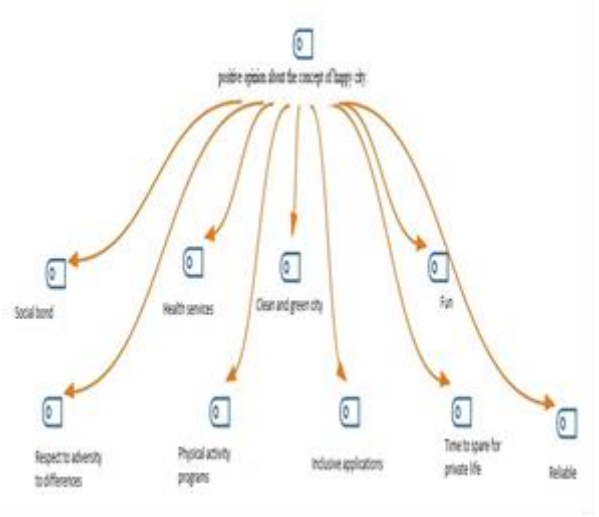

Figure 7. Happy City Concept hierarchical code subcode model

Participants expressed their views on the "Concept of a Happy City" as follows:

Social Bond: "We're known for organizing numerous community events; that's why we're building an amphitheater. Events in our community have grown. People love going out and meeting neighbors" (I_C).

Respect to Adversity Differences: "We also consider all types of people in our community. Not just people with children. Not just for the elderly or young adults" (I_R).

Health Services: "This is part of our work; we are certainly aiming to create a happy city. Making it a place where people are happy, where they can raise healthy children, and have access to healthy lifestyles and services. Good schools and healthcare services are essential to provide the best environment and the best community" (I_L).

Physical Activity Programs: "There are programs that encourage activity and sport. Additionally, there's an entire department working to promote sport and better nutrition habits as a way to prevent obesity, particularly in immigrant communities, to address the issue of obesity" (A_C).

Clean and Green City: "People are happier when they have high-quality green parks and facilities where their children can play" (I_C).

Inclusive Applications: "The most important feature of a happy city is that it cares not only for yourself but also for others. You should care about others and make everything accessible to them: healthcare, sports activities, and entertainment" (A_D).

Time to Spare for Private Life: "Giving people a chance to enjoy life outside of work. So how can people stay happy? By finding hobbies and ways to enjoy themselves when not at work, which then

makes them a better employee. If you consider your mental health, it will also make you a better person in society. Stop and enjoy life's moments, whether it's taking a walk outside or playing bocce" (I_R). / "A work-life balance, a place where people work hard but then go out and have fun. More people are realizing that life should be this way" (I_S).

Fun: "The meaning of life is happiness. Bloomington understands how important parks and recreation are to people's happiness. So, we believe we are mature or educated enough to know that getting out and having fun is important" (I_S).

Reliable: "Regarding the concept of happiness, I think more about smart applications in terms of security, control, and speeding things up" (S_Zheng).

My findings on the participants' views on the concept of a happy city are as follows:

In Istanbul, the importance of the concept of a happy city is notably high. Participants mentioned a happiness approach ranging from the micro to the macro level: from individual happiness to community happiness, and from community happiness to city happiness. The idea of a productive city was also mentioned, where if services are delivered well and quickly, and people have time for themselves and their private lives, they will be happy. Inclusive applications that can cater to different expectations and needs were highlighted by all participants, and they stated that a city able to fulfill these would be close to the definition of a happy city. Given the significant traffic issues in this city, reducing the time between home and work and/or making this time enjoyable with recreational applications was stated to contribute significantly to the happiness of the city.

In Shanghai, the concept of a happy city was cited as the ultimate goal. Participants described the concept of a happy city as one that is safe and fun.

In Amsterdam, participants defined a happy city as one that is clean, provides opportunities for leisure and recreational activities, creates opportunities for residents to participate in recreation, makes healthcare, sports, and entertainment accessible, and plans programs that encourage green living, physical activity, and sports. It was described as a livable and sustainable city.

In Indiana, a happy city was defined as one with a high quality of life, equal access to health and education, rich in recreational parks, connecting people, and respecting everyone regardless of their differences.

RESULTS

Istanbul

Within the framework of the relevant concepts, Istanbul offers a broad range of applications and examples in areas based on smart technology, including transportation, traffic, governance, human interaction, nature, environment, energy, entertainment, and events. Accordingly, Istanbul holds promising potential for smart recreational technologies and does not appear to be limited to specific areas of application.

In 2016, the Istanbul Metropolitan Municipality (IMM) established the Smart City Office. The first project introduced by IMM's subsidiary, ISBAK, was smart recycling containers. Based on the amount of waste collected, rewards are transferred to the Istanbul card as monetary credits. This initiative fosters environmental awareness and reduces pollution, while also creating a connection between the individual and the city (Smart Cities White Paper, n.d.). Increasing these connections contributes to individual value and, ultimately, community value, thereby enhancing individual, community, and city happiness.

To mitigate the city's traffic problems, IMM offers the "IMM Traffic" and "Traffic Density Map" applications, enabling residents to view traffic conditions and estimate their travel time. These applications also provide information on accidents, weather, and parking availability (Şener, 2019).

Another transportation application, "ITaksi," enables central monitoring of taxi system quality. This project aims to reduce empty taxi circulation, decreasing traffic congestion and making taxis easier to find, thus saving time. The application also integrates Istanbul card payments, expanding the card's use (Baraçlı, 2017).

IMM's "Istanbul Senin" application provides easy, centralized access to various services, including cultural and arts events. Users can add credit cards and Istanbul cards to the digital wallet within the app, which supports bill and debt payments, as well as shopping and transportation (Istanbul Senin, n.d.).

The "Walk Istanbul" project promotes activity, city exploration, sustainable tracking, and recreational socialization, contributing to urban happiness and public health. As a part of IMM's 2021 "Sports Master Plan," this initiative exemplifies technology's transformation, aiming to create an active, happy, and healthy community with a strong sports culture (Sports Master Plan, n.d.).

These applications aim to enhance social life by promoting public participation in events and interactions, connecting people with similar interests, and offering data analysis capabilities. They highlight transparent and participatory governance through open data, interactive feedback, gamified applications, and citizen satisfaction measures. These applications enable residents to

better use and enjoy their time, leading to greater happiness.

In a city like Istanbul, which attracts large populations, urban growth and transformation emphasize not only technological needs but also human-centered and managerial approaches. Sustainable smart city applications require coordinated efforts among central and local governments and stakeholders.

Shanghai

In 2020, Shanghai won the "World's Smartest City" award from the Smart City Expo World Congress (SCEWC), attributed to its advanced use of technology across various sectors. The city is distinguished by its surveillance, monitoring, and intervention technologies for security, as well as its interactive sensing-based technologies for providing information, services, and feedback.

Shanghai envisions itself as a global digital city, driven by big data for smart city management and public services supported by extensive telecommunication infrastructure. In 2017, fiber coverage was achieved citywide (Boz & Çay, 2019).

The "Citizen Cloud" system in Shanghai offers 104 public services across six categories, including personal information, medical and health services, transportation, social security, and community life. With over 7.6 million registered users, the platform aims to provide rapid, reliable, and easy access to public services (Smart Cities, n.d.).

A comprehensive traffic management network in Shanghai includes road traffic information, public transportation, and public park information services. The shared-bike company "Ofo" provides location and distribution data to city management, enabling the optimization of bicycle redistribution in crowded areas (Boz & Çay, 2019).

Additionally, more than 1,600 LCD screens and 1,700 solar electronic station signs have been installed at bus stops to inform passengers about real-time bus arrivals. Ongoing developments aim to allow passengers to purchase metro and bus tickets using facial recognition technology (Smart Cities, n.d.).

Amsterdam

Despite being environmentally conscious and prioritizing renewable energy, waste management, green/clean mobility (electric cars, taxis, and bike paths), climate adaptation, and tree planting, Amsterdam is cautious about the overuse of technology. Nature-friendly solutions are prioritized over excessive use of technologies like sensors.

Amsterdam's smart city applications have accelerated over the past 20 years. Established in 2007, the "Amsterdam Smart City Program" aims to address the city's environmental challenges and create a sustainable environment through information and communication technologies (ICT). Amsterdam Smart City Platform (ASC), developed as a social platform, promotes over 100 projects in economic development, mobility, circular economy, governance, education, citizen engagement, and quality of life (Smart Cities White Paper, n.d.).

To facilitate innovation, Amsterdam has launched platforms such as Datapunt, which manages data sharing for city innovation, and Transformcity, an online tool for sustainable and inclusive urban development (Smart Cities, n.d.).

Amsterdam's smart lighting poles can adjust brightness via sensors and provide traffic, parking, and pollution information. The Smart Traffic Management Project enables collaboration among stakeholders, while IoT Living Lab supports local economic initiatives by fostering the development of IoT innovations. City-Zen, an EU-funded FP7 project, seeks to design a fossil fuel-free city, integrating new energy solutions like solar, wind, biomass, and geothermal energy into daily life (Smart Cities White Paper, n.d.).

Indiana

Indiana, like Amsterdam but on a larger scale, emphasizes environmental sustainability with eco-friendly applications. A participant noted that "natural resources have been a driving force for more sustainable designs." The state promotes public education on biodiversity, environmental protection, and active citizen engagement through programs like BioBlitzes and volunteer initiatives focused on parks and recreational spaces.

Indiana uses technologies such as solar panels, waste-to-energy plants, and eco-friendly e-scooters. In addition, Indiana promotes environmental awareness through apps like iNaturalist, which tracks biodiversity, and JobForm, used for volunteer-driven park and recreation programs.

Indiana highlights the importance of leisure time in the context of work-life balance, pointing out that high living standards are not solely defined by hard work or financial gain. Quality of life is associated with recreational parks and facilities that allow people to connect with one another.

Suggestions

Smart applications vary in purpose, with individual technologies for public transportation, metro, taxis, weather updates, and online healthcare appointments widely used in all cities.

Mobile applications (especially QR code-based) are the most commonly used technologies in both smart city and recreational areas. However, Shanghai's public security surveillance systems,

which use cameras, are not met with criticism there. In contrast, in Amsterdam and Indiana, concerns about personal rights and privacy arise.

The broad scope of the smart city concept encompasses evolving goals, with recreational sustainability as a fundamental strategic objective. Meeting the unlimited needs of cities with limited resources requires proper resource management and precise identification of needs.

This study examines the contribution of smart recreational technologies to urban happiness. Its primary motivation is to pave the way for new research on the growing use of technology in cities. Future studies could include broader samples by involving users of recreational technology applications.

This research provides practical insights and applications for city managers on how smart recreational technologies contribute to urban happiness. Local government officials in departments such as parks, recreation, and smart and happy city initiatives are encouraged to develop projects focusing on smart recreational technologies.

Smart recreational technologies that focus on social connections, engagement, playability, safety, respect for diversity, clean and green environments, inclusive and connecting applications, entertainment, and physical activity should be prioritized. City managers should plan smart technologies to foster the happy city concept and contribute to human and community well-being.

Limitations

This study is to explore the application of smart recreational technologies in four different cities. However, it has its limitations. The study involved volunteers, which is noteworthy considering the challenging circumstances in interviewing deicicon makers in 4 different cities.

The structure of the online interviews was designed to include decision makers and implemeters but wider participation was somewhat limited. Therefore, it is recommended to develop this topic wth a wider participation embracing the whole city, students, chidren, etc. as well.

This study draws on previous work in different fields and highlights the potential for smart recreational technologies. However, further research and measurement-based studies are needed to scientifically support the relationship between these two important disciplines. To better understand the impact of smart recreational technologies, field measurements on a wide range of activities are necessary.This section includes research findings.

Conflict of Interest

No potential conflict of interest was reported by the authors.

Ethical Approval

For this type of study, formal consent is not required.

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