



A Theoretical Perspective on New Generation Therapeutic Recreation Methods

Yeni Nesil Terapötik Rekreasyon Yöntemlerine Kavramsal Bir Bakış

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Öz

Terapötik rekreasyon, bireylerin duygusal, sosyal, fiziksel ve psikolojik refahını artırmayı amaçlayan ve insanların çok faktörlü gelişimine destek olan teknikleri içeren özel rekreasyon faaliyetleri olarak ifade edilmektedir. Bu çalışmanın yapılmasının amacı, dönüşen ve dijitalleşen yaşam biçimimizin bir yansıması olarak dönüşüm gösteren yeni nesil terapötik rekreasyon uygulamalarını belirlemek ve bu uygulamaları doküman analizi yöntemi ile inceleyerek mevcut alana dair bütüncül bir değerlendirme sunmayı amaçlamaktadır. Çalışma, geleneksel terapötik rekreasyon tanımlarından uzaklaşarak ruhsal, fiziksel, sosyal ve bilişsel iyilik hâllerini destekleyen multidisipliner bir alan olduğunu vurgulamayı amaçlamaktadır. Yapılan analizler kapsamında seçilen 65 uygulama örneği, hedef grup, uygulama türü, kullanılan dijital teknoloji ve amaçlara göre tematik olarak sınıflandırılmış ve tabloleştirilmiştir. Bu veriler ışığında özellikle VR, robotik sistemler ve yapay zekâ destekli dijital platformların yaygınlık gösterdikleri ve en fazla psikolojik sorunları olan bireyler ile yaşlı bireyler üzerinde ağırlaşmaları görülmüştür. Aynı zamanda küresel ve yerel pazar verileri ışığında terapötik rekreasyon pazarının hızlıca büyüyen stratejik bir hizmet olduğu sonucuna varılmıştır. Sonuç olarak, yeni nesil terapötik rekreasyon, teknolojiyle desteklenen kapsamlı bir dönüşüm geçiyor ve sağlık hizmetlerinin ötesine geçerek sosyal hizmetler, eğitim, turizm ve dijital medyaya kadar uzanmaktadır. Çalışma, yeni nesil terapötik rekreasyon uygulamalarının çeşitliliğini, potansiyelini ve uygulama alanlarını ortaya koyarak bu alanda yapılacak olan yeni çalışmalara ve uygulayıcılara yön göstermeyi hedeflemektedir.

Anahtar Kelimeler: Boş Zaman, Dijitalleşme, Teknoloji, Sağlık.

ABSTRACT

Therapeutic recreation is defined as special recreational activities that aim to improve individuals' emotional, social, physical, and psychological well-being and support people's multifaceted development. The purpose of this study is to identify next-generation therapeutic recreation applications that have emerged as a reflection of our evolving and digitalising lifestyle, and to provide a comprehensive evaluation of the current field through document analysis. This research aims to move beyond traditional definitions of therapeutic recreation by emphasising its nature as a multidisciplinary domain that supports mental, physical, social, and cognitive well-being. Within the scope of the analysis, 65 selected application examples were thematically classified and tabulated based on target groups, types of applications, utilised digital technologies, and objectives. The findings indicate a predominant prevalence of virtual reality (VR), robotic systems, and artificial intelligence (AI)-supported digital platforms, with a particular focus on individuals experiencing psychological difficulties and elderly populations. Furthermore, in light of both global and local market data, therapeutic recreation is concluded to be a strategically growing service sector with rapid expansion. In conclusion, next-generation therapeutic recreation is undergoing a comprehensive transformation fuelled by technology, extending beyond healthcare into social services, education, tourism, and digital media. This study aims to highlight the diversity, potential, and application areas of next-generation therapeutic recreation practices, thereby providing guidance for future research and practitioners in the field.

Keywords: Leisure Time, Digitalisation, Technology, Health

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INTRODUCTION

Traditionally recognized as a professional field dedicated to the social integration of individuals with disabilities, the elderly, and those with special needs, therapeutic recreation is currently regarded as a multidimensional application area aimed at enhancing overall quality of life (Ceyhan, 2022). The global expansion of the domains encompassed by therapeutic recreation has necessitated its evaluation as a strategic sector. Financial indicators support this shift; for instance, the physical therapy market, valued at USD 56.28 billion in 2023, is projected to reach USD 83.5 billion by 2030 (Maximize Market Research, 2024). Similarly, the elderly care services market is expected to nearly double, reaching USD 1,965.99 billion within a few years (Zion Market Research, 2024). Related sectors such as mental health, wellness tourism, and digital health are undergoing a parallel trajectory, with the global wellness economy anticipated to hit USD 6.75 trillion by 2030 (BioSpace, 2022). Within the Turkish context, the wellness market was estimated at USD 45 billion in 2022, and the medical tourism sector is forecasted to reach USD 7.18 billion by 2034 (Global Wellness Institute, 2024; Future Market Insights, 2023).

Despite this rapid growth and the accelerating digital integration across related industries like physical therapy and digital health (Grand View Research, 2024; Global Wellness Institute, 2024), a significant gap persists in the existing literature regarding the holistic evaluation and systematic classification of "next-generation" therapeutic recreation applications. This research problem stems from the rapid, multidisciplinary nature of digital transformation (Hess et al., 2016; Larjovuori et al., 2018) and the lack of an institutionalized framework for these services in many regions, including Türkiye. Consequently, centralized data collection remains highly challenging. Current digital interventions are scattered across disparate domains, lacking a unified conceptual structure. The primary objective of this study is to systematically consolidate these fragmented applications, thereby eliminating the existing theoretical ambiguity and providing a comprehensive guide for practitioners and researchers alike.

Conceptual Framework

According to Gartner's IT Glossary, the concept of digitalization refers to the conversion of non-digital (analog) tools, processes, and content into digital formats (Fichman et al., 2014; Larjovuori et al., 2018). This digital transformation can be viewed not merely as a technological change but as a comprehensive transformation that fundamentally alters service expectations, interaction styles, and everyday habits of individuals (Hess et al., 2016). Through information technologies, this phenomenon permeates societal structures in various ways, such as the automation of tasks, the personalisation of user experiences, and the acceleration of processes (Larjovuori et al., 2018).

Recreation, on the other hand, encompasses activities undertaken by individuals during their leisure time with the aim of mental and physical renewal, such as resting, entertaining themselves, engaging in personal development, and travelling (Karaçar, 2016). For example, listening to music for relaxation, taking walks, reading books for self-improvement, camping to find peace in nature, or engaging in sports to maintain health can all be considered recreational activities. Thus, when the concept of recreation is evaluated within the context of "therapy" for health promotion or preservation, it gains a deeper meaning (Daşkıran, 2019). Also referred to as recreational therapy, this approach includes structured activities intended to support individuals' mental, emotional, and physical well-being (Stanborough, 2020). Leisure time, in this context, should not only be considered

a period of rest or entertainment but also an opportunity for maintaining or regaining health and enhancing the quality of life.

Therapeutic recreation refers to specialized recreational activities aimed at enhancing individuals' emotional, social, physical, and psychological well-being (Demir & Duman, 2019). These activities are defined as techniques that support individuals' multidimensional development (Carter et al, 1985). The primary objective is to improve health functions, enhance quality of life, and strengthen social interaction (Şen & Aktaş, 2023). Programs specifically designed for disadvantaged groups such as the elderly, individuals with disabilities, and patients aim to promote well-being through enjoyable and motivating approaches (Karaküçük, 2012). Grounded in scientific principles, therapeutic recreation contributes to treatment by improving multidimensional wellness and emphasizes the positive effects of leisure activities on health (Sevil, 2015).

Although therapeutic recreation services have shown significant development on a global scale, they have not yet achieved an institutionalized structure in Türkiye. Consequently, obtaining direct data in this area is quite challenging. Due to the multidimensional nature of the field, it is necessary to make indirect inferences through related domains such as elderly care, physical therapy, medical tourism, home-based rehabilitation, wellness tourism, psychosocial support, nature-based programs, art and animal-assisted therapies, and digital health solutions. These related areas are observed to serve the fundamental objectives of therapeutic recreation, such as reducing stress and supporting physical and mental functions. Within this framework, the current situation in Türkiye, the scope of service areas, and future potential are presented based on the data outlined below.

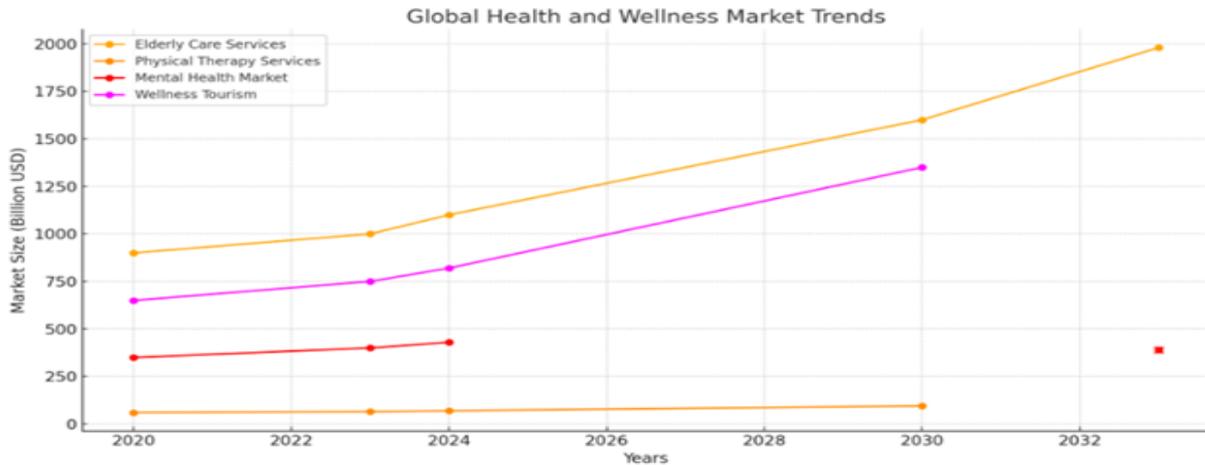


Figure 1. Growth Trend of Global Markets Related to Therapeutic Recreation (2020–2033)

Source: Grand View Research, 2024

The growth trends of four major global markets associated with therapeutic recreation—elderly care, physical therapy, mental health, and wellness tourism—between 2020 and 2033 are illustrated in Figure 1. According to data from Grand View Research (2024), the physical therapy market reached USD 47.6 billion in 2024 and is projected to grow at a compound annual growth rate (CAGR) of 4.6% between 2025 and 2030. A similar growth trend is also expected within the United States (Grand View Research, 2024). Maximize Market Research (2024) reported that the global physiotherapy market was valued at USD 56.28 billion in 2023 and is expected to reach USD 83.5 billion by 2030, with a CAGR of 5.8%.

The elderly care market is also showing remarkable growth. According to BEBKA (2022), the market was valued at USD 976.2 billion in 2019 and demonstrated an average growth rate of 6.2%. Zion Market Research (2024) forecasted that this figure would reach USD 1,025.43 billion in 2023 and is

projected to rise to USD 1,965.99 billion by 2032, growing at a CAGR of 7.5%. This expansion is accompanied by diversification in services such as home care, telehealth, and nursing homes.

Similarly, home rehabilitation services are on the rise. According to Report Ocean (2023), this market was valued at USD 99.6 billion in 2019 and grew with a CAGR of 6.5%. The increase is largely driven by the adoption of digital health solutions.

The mental health market is also experiencing an upward trend. GlobeNewswire (2024) stated that the market was worth USD 410 billion in 2023 and is projected to reach USD 573 billion by 2033, with a CAGR of 3.4%. Following the COVID-19 pandemic, there has been a surge in demand for digital therapy, psychiatric medications, and psychosocial support services (Tuzcu & Bademli, 2014; Pekcan, 2022; Koç & Polat, 2006).

Lastly, wellness tourism has emerged as a significant component of therapeutic recreation. Gore (2025) reported that the wellness tourism market was valued at USD 815 billion in 2024 and is expected to grow at a CAGR of 7.5% until 2031. BioSpace (2022) noted that the general wellness market was valued at USD 4 trillion in 2020 and is projected to reach USD 6.75 trillion by 2030, with a growth rate of 5.2%. The wellness economy encompasses not only tourism but also healthy nutrition, meditation, fitness, and digital platforms.

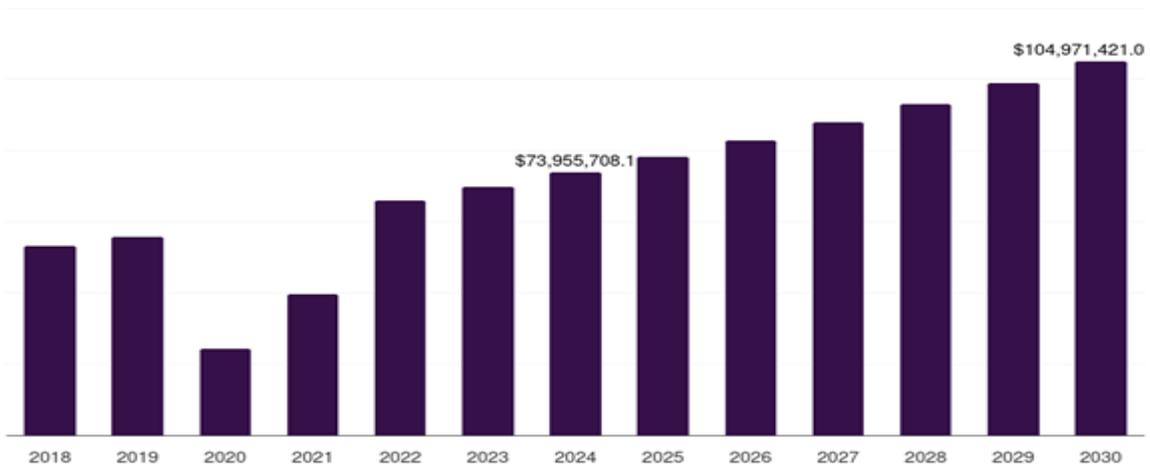


Figure 2. Market Size of Medical Rehabilitation Services in Europe (2018–2030)

Source: Grand View Research, 2024

According to Figure 2, therapeutic recreation and rehabilitation services are on the rise across Europe. Due to population aging, rising quality standards, and the development of health tourism infrastructure, the medical rehabilitation market is estimated to have reached USD 73.96 billion in 2024 and is projected to grow to USD 104.97 billion by 2030. Germany (USD 269 billion) and the United Kingdom (USD 224 billion) currently lead the wellness market (Global Wellness Institute, 2024).

Although there is no direct data on therapeutic recreation in Türkiye, the expanding medical tourism infrastructure and increasing wellness investments indicate significant growth potential. The Global Wellness Institute (2024) reported that Türkiye's wellness economy reached USD 45 billion between 2020 and 2022. According to Future Market Insights (2023), the country's medical tourism market was valued at USD 3.97 billion in 2023 and is expected to grow at a CAGR of 6.1%, reaching USD 7.18 billion by 2034. Thermal spas (Güncan, 2020; Ankara Health and Thermal Tourism, 2024), luxury wellness hotels (Six Senses Kaplankaya, 2023), rehabilitation centers (Üsküdar İstanbul, 2024),

nursing homes, and special education institutions (Nezih Retirement Home, 2024; Turkish Spastic Children's Foundation 2024) all contribute to this growth.

In the United States, therapeutic recreation is widespread and encompasses education, certification, nature therapy, art therapy, and animal-assisted interventions (ATRA, 2024; NCTRC, 2024; U.S. Bureau of Labor Statistics, 2024). For example, the U.S. Army provided services with a therapy dog named "Major Butch" (U.S. Army, 2013). The art therapy market is expected to grow from USD 1.83 billion in 2025 to USD 4.87 billion by 2032 (Coherent Market Insights, 2025). As of 2023, there were approximately 16,600 certified therapeutic recreation specialists employed in the U.S., and the field is projected to grow by 4% over the next decade, creating about 700 new positions (U.S. Bureau of Labor Statistics, 2024).

Over the past decade, technologies such as virtual reality (VR), augmented reality (AR), robotic rehabilitation, and mobile health applications have expanded the reach and effectiveness of therapeutic recreation (Grand View Research, 2024). Valuates Reports (2025) indicated that the global VR therapy market was valued at USD 1,116 million in 2024 and is expected to reach USD 1,626 million by 2031, growing at a CAGR of 5.6%. The U.S. digital therapeutics market increased from USD 1.8 billion in 2022 to USD 2.2 billion in 2023 and is projected to grow by 25.4% annually, reaching USD 10.5 billion by 2030 (Grand View Research, 2024). The robotic rehabilitation market, valued at USD 428.9 million in 2022, is expected to grow at a CAGR of 15.2%, reaching USD 1.76 billion by 2033 (Future Market Insights, 2023).

Additionally, the U.S. Department of Veterans Affairs (VA) provides home-based chronic pain therapy using over 1,200 VR headsets across more than 50 centers. Developed in collaboration with AppliedVR, this system significantly contributes to patient rehabilitation processes (Bailey, 2023; Landi, 2023).

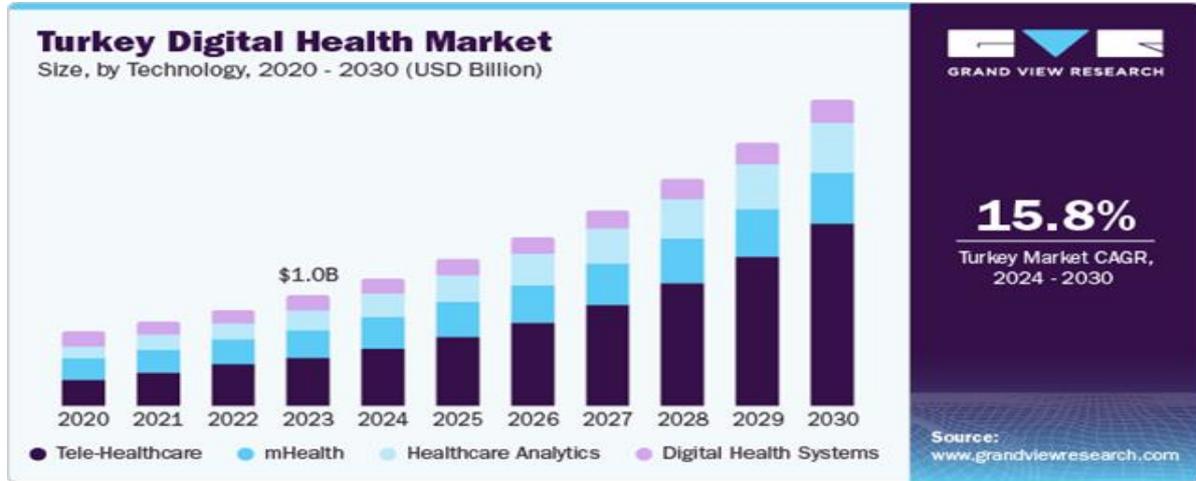


Figure 3. Annual Growth of Türkiye's Digital Health Market (2020–2030)

Source: Grand View Research, 2024

According to Figure 3, Türkiye's digital health market is projected to reach 3.05 billion USD by 2030, growing at a CAGR of 15.8% from 2024 to 2030 (Grand View Research, 2024). Since the introduction of telehealth regulations in 2022, investments in robotic physiotherapy and VR-based rehabilitation have increased, aiming to secure a share of the global market. These developments, alongside wellness trends, aging populations, digital health innovations, and expanding health tourism, suggest a global annual growth of 5–8% in therapeutic recreation and related sectors over the next decade. In Türkiye, the diversification of therapeutic recreation applications—supported by public-private

partnerships—presents strong potential for increased market share. Ultimately, the advancement of sustainable health and wellness services positions Türkiye for significant local and global sectoral growth.

1. Methodology

The initial phase of the research is grounded in document analysis, a qualitative research technique that facilitates the systematic examination of written materials containing information about the phenomenon under investigation (Yıldırım & Şimşek, 2016). Document analysis was specifically selected because therapeutic recreation services in Türkiye have not yet reached a level of institutionalization, making direct data collection challenging; thus, this method allows for indirect inferences through related fields. The data for this process were gathered from academic sources, industry reports, institutional websites, and digital platform content, following a procedure of accessing documents, verifying authenticity, comprehension, and data analysis. The collected data were categorized using thematic analysis and classified by application type, area of use, target group, and objective.

The variables addressed in this study consist of parameters aimed at understanding the development and current status of next-generation applications, including the chronological distribution of applications, the diversity of digital tools utilized (e.g., VR, AI, robotic systems), the demographic and health profiles of target audiences, and the primary objectives of the applications. Furthermore, economic indicators such as global and local market data, Compound Annual Growth Rate (CAGR), and market volume were included as variables to determine the strategic significance of the sector.

The research sample comprises 65 next-generation therapeutic recreation applications, selected to reflect the diversity of existing literature while avoiding redundancy. This sample set encompasses a broad technological spectrum, ranging from virtual reality and artificial intelligence to robotic pets and mobile health applications. To enhance the representativeness of the research, applications were selected to address a wide array of users with diverse needs, including individuals with psychological disorders, the elderly, neurodivergent individuals, the physically disabled, and general users.

2. Findings

2.1 Classification of Next-Generation Therapeutic Recreation Applications by Category and Purpose

Table [1] provides a comprehensive overview of next-generation therapeutic recreation applications by classifying them according to their areas of use, target groups, technological types, and primary objectives. This classification facilitates a detailed perspective on current practices and emerging developmental trends within the field.

Table 1. Classified Therapeutic Recreation Applications.

Source	Area of Use	Application Type	Target Group	Objective
Endel (n.d.)	Attention deficit, stress	Personalized soundscapes	Individuals with ADHD, general users	Reduce stress, increase focus, improve sleep quality
Deepgram. (n.d.)	Meditation, stress	Artificial Intelligence (AI)	Individuals with mobility	Visualize physiological effects of meditation,

	management, mindfulness	and Augmented Reality (AR) based mobile application	impairments, disadvantaged groups	increase mindfulness, reduce stress
Murphy Cares (n.d.)	Pet therapy, psychological support	Digital pet therapy	Individuals experiencing stress, anxiety, and loneliness	Alleviate stress, anxiety, and loneliness, support psychosocial well-being
Nolan, (n.d.)	Mental health	EEG-based video game interaction	Neurodivergent individuals	Interaction through brain waves, enhance social participation and cognitive skills
SuperBetter (n.d.)	Mental health, resilience building	Gamified digital platform	Individuals with mental health issues, disadvantaged groups	Reduce depression and anxiety, increase resilience and motivation
Ekso Bionics (n.d.)	Rehabilitation	Robotic exoskeleton (EksoNR)	Stroke survivors	Regain walking and standing ability
Winssolutions (n.d.)	Emotional support, social interaction, cognitive stimulation	Robotic pets (Jennie, Paro)	Dementia patients	Reduce loneliness and anxiety, enhance emotional and cognitive well-being
Ev Okulu Derneği (n.d.)	Emotional support, expressive skills, play therapy	Online play therapy	Children	Support emotional well-being, enable emotional expression through play, overcome spatial-temporal barriers
Koruncuk Vakfı (n.d.)	Play therapy training, digital therapeutic approaches	Online play therapy training	Therapists, professionals working with children	Improve therapists' digital therapy skills, strengthen parent-child relationship
Eddra (n.d.)	Physical activity, stress reduction, emotional relaxation	Virtual Reality Game (Beat Saber VR)	Youth, individuals proficient with digital technology	Combine therapy with entertainment, develop motor skills, reduce stress, provide accessible home therapy
Bigumigu (n.d.)	Social communication, language development, academic skills	Educational and communication applications	Individuals with autism	Provide interactive digital solutions to support social interaction, language development, academic skills, and daily living skills (e.g., visual storytelling, communication aid, matching, math,

				literacy)
Bölge Hastanesi (n.d.)	Physical rehabilitation, neurological treatment	Robotic rehabilitation	Stroke survivors	Neurological rehabilitation, regain physical abilities
Çakar (n.d.)	Motor skills, independence	Robotic therapy applications	Individuals with walking and arm-hand coordination impairments	Support motor skills, increase independence, enhance treatment motivation
Kawashima and Yoshida (2007)	Tremor suppression, motor function improvement	Robotic exoskeleton (WOTAS)	Individuals with neurological disorders	Assess and suppress tremors, improve motor function
Nouchi et al. (2013)	Cognitive function development	Brain training game (Brain Age)	Young adults	Enhance executive functions, working memory, and processing speed
Goffer (2014)	Mobility and independence	Robotic exoskeleton (ReWalk)	Paraplegic individuals	Enable walking for individuals with paraplegia
Singh et al. (2017)	Psychological well-being, motor skills	VR games	Physically disabled adults	Improve psychological well-being and upper extremity functions
Gomes GCV et al. (2018)	Physical and cognitive functionality	Interactive video game (Nintendo Wii Fit Plus™)	Frail and pre-frail older adults	Demonstrate that interactive video games are safe and effective therapeutic tools for older adults
Karasu et al. (2018)	Stroke treatment, physical rehabilitation	Virtual reality-based game	Stroke patients	Support physical and psychological recovery, make treatment enjoyable
Afridi et al (2018)	Balance and mobility training	Wii Fit Plus training	Elderly individuals	Improve balance and mobility, promote independence
Digitale, E. (2018)	Autism spectrum disorder, social interaction	Google Glass technology	Children with autism	Recognize facial expressions, develop social skills, gamify learning
Gomes, et al. (2018)	Physical therapy, exercise	Wii Fit Plus training	Frail elderly adults	Improve posture control and gait, provide physical independence
Huberty et al. (2019)	Stress management, mindfulness, personal development	Mobile mindfulness meditation app	University students	Reduce stress, increase mindfulness and self-compassion, support personal development
Fernandes et al. (2019)	Physical rehabilitation	Digital games	Individuals with upper limb	Support rehabilitation process, contribute to

			disabilities	treatment
MIT News (2019)	Social isolation, aging	Virtual reality	Elderly individuals	Increase social interaction, support mental health
Harmonic Bionics (2019)	Upper extremity rehabilitation	Robotic exoskeleton (Harmony)	Individuals with upper extremity functional loss	Support shoulder and scapula movement for rehabilitation
Faric et al. (2019)	Physical activity, exercise, user experience	VR exercise games	General users	Examine the potential of VR exercise games to promote physical activity and user experience
Mic. (2020)	Exercise, motivation	Zombie-themed game	General users	Make physical activity fun to increase participation, improve physical and mental health
Fakhro et al. (2020)	Balance training, physical functionality	Wii Fit training	Elderly individuals	Improve dynamic and static balance, enhance physical functionality
Temizkan and Ekici Çağlar (2020)	Physical education, balance training	Virtual reality-based balance training	Geriatric individuals	Promote independence, develop balance skills, improve functional independence
Bigumigu (2021a, September 13)	Movement support, comfort	Wearable chair (Chairless Chair 2.0)	Individuals who stand for long periods, those with musculoskeletal pain	Facilitate standing, reduce pain, provide comfort
Bigumigu (2021b, September 13)	Movement support, independence	Bionic walker (Zeen)	Individuals with movement difficulties	Increase mobility, promote independence, enhance social interaction opportunities
Bigumigu (2021c, September 13)	Movement support, musculoskeletal function	AI-supported bionic suit (Neural Sleeve)	Individuals experiencing movement difficulties	Improve musculoskeletal function, reduce pain, increase mobility
Bozkurt, (2021)	Education, social skill development	Virtual Reality (VR) applications	Individuals with Autism Spectrum Disorder (ASD)	Develop social skills, provide innovative educational methods
Bentz vd., (2021)	Fear therapy, acrophobia (fear of heights)	Virtual Reality (VR)-based exposure therapy	Individuals with fear of heights	Reduce fear and avoidance behaviors, treat fear of heights
Safe In Our World (2021)	Anxiety reduction, relaxation	Virtual Reality (VR) meditation game (Deep VR)	Individuals struggling with stress	Reduce stress and anxiety through breath control

			management	
Vajawat B, Varshney P, Banerjee D (2021)	Psychiatric disorders	Digital games and virtual reality	Individuals with ADHD, autism spectrum disorders, depression, dementia	Investigate the effects of digital games and VR on psychiatric disorders and increase their therapeutic use
Tao et al. (2021)	Physical activity, rehabilitation, pain management	HMD-VR health game	Individuals needing physical exercise	Support therapeutic interventions, increase user engagement, enhance interaction through game design
Gazi University (2022, 26 December)	First aid training, elderly individuals	Augmented Reality-Based Training Module	Elderly individuals	Provide first aid knowledge, improve physical and cognitive skills in older adults
Türkiye Hospital (2022, September 29)	Psychotherapy, anxiety treatment	Virtual Reality (VR) therapy	Individuals with anxiety disorders and phobias	Make psychotherapy sessions more accessible and effective
Wingenbach and Yossi (2022)	Social interaction, life satisfaction, physical activity	Mobile augmented reality game (Pokémon Go)	Individuals experiencing loneliness, social anxiety, young adults	Reduce social isolation, promote physical activity, increase life satisfaction and psychological well-being
Yee and Sng (2022)	Psychological support, digital escape	Video game (Animal Crossing: New Horizons)	Individuals isolated during the COVID-19 pandemic	Support basic psychological needs and protect mental health during quarantine
Fuchs, (2022)	Mental health, meditation	Virtual Reality (VR) meditation applications	General users	Facilitate relaxation, increase mindfulness, and provide an entry point for meditation through VR meditation apps
Sousa et al. (2022)	Physical activity, cognitive performance	Active Video Games (AVR)	Sedentary university students	Increase physical activity and support cognitive performance with active video reality (AVR)
Bigumigu (2022)	Sensory integration, stress management, psychological relaxation	Hug sensation OTO chair	Individuals with autism, neurodiverse individuals	Respond to sensory needs, provide a sense of safety and calm, increase body awareness
Polechoński et al. (2022)	Physical activity,	AVRG (Beat Saber) +	General users	Increase exercise intensity, make

	exercise intensity	handheld weight (HHW)		physical activity more effective
Hiwell (2023)	Mental health, therapeutic counseling	AI-powered online therapy platform	Individuals seeking mental health support	Provide psychological support, recommend appropriate therapists
Heppi (2023)	Mental health, stress management	AI-powered mental health platform	Stressed individuals, those with sleep disorders, and mood changes	Monitor stress levels, offer personalised content and expert guidance
Terappin (2023)	Mental health, therapeutic counselling	AI-powered online therapy platform	Individuals seeking psychological awareness	Perform emotion analysis, provide individual therapy support with therapist matching
Moodcare (2023)	Mental health, meditation, mindfulness	AI-powered meditation and therapeutic application	Individuals seeking emotional awareness	Enhance emotional well-being with meditation suggestions and mindfulness exercises
Ruhuna İyi Bak (2023)	Mental health, psychological support	AI-powered psychological support platform	Individuals with mental health issues	Deliver content tailored to personal psychological needs, and provide online therapy support
Heltia (2023)	Mental health, nutrition, and personal development	AI-powered holistic health platform	Individuals seeking holistic health	Support psychological and physiological recovery, provide personalised diet recommendations
Kadayı and Güven (2023)	Psychological aid, mental health	Mobile psychological aid applications	Individuals seeking psychological help	Support mental health, make therapeutic process more accessible, address ethical and legal issues
Woebot Health (2023)	Psychological support, mental health	AI-based digital psychological support	Individuals experiencing depression, anxiety, and stress	Reduce symptoms of depression, anxiety, and stress, and increase psychological well-being
Kilmer et al. (2023)	Social participation, trust	Minecraft therapeutic groups	Neurodivergent youth	Develop social skills, increase peer interaction
Kokorelias et al. (2024)	Recreational activities, social interaction	Technology-supported leisure activities	Elderly adults with dementia or cognitive impairment	Increase social interaction, improve cognitive functioning and overall well-being
Kokorelias et al. (2024)	Cognitive impairment, ageing	Technology-supported recreational activities	Elderly individuals with cognitive impairment	Improve mood, cognitive functions, and social interactions

Chan et al. (2024)	Balance and muscle strength enhancement	Video game-based exercise (Nintendo Ring Fit Adventure™)	Elderly individuals with a history of falls	Increase balance and muscle strength, reduce risk of falls
Polechoński J et al. (2024)	Physical activity, user satisfaction	VR exercise (BoxVR)	General users	Increase exercise intensity with elastic resistance bands and evaluate user satisfaction
Polechoński et al (2024)	Physical activity, satisfaction, flow	Immersive VR exercise	General users	Examine higher satisfaction and flow when cycling in VR environments compared to traditional physical activities
Polechoński et al. (2024)	Physical activity, therapeutic exercise	VR-based boxing training	Wheelchair users	Provide moderate home exercise, examine the therapeutic effects of VR-based training
Özlav and Rona (2024)	Physical rehabilitation, communication	Brain-Computer Interface (BCI)	Physically disabled individuals	Enable interaction with the environment, increase independence and quality of life in individuals with mobility restrictions
Frenkel et al. (2025)	Emotion recognition, emotion regulation	Robot-assisted therapy (RAT)	Children on the autism spectrum	Develop emotion recognition and regulation skills, make the therapeutic process accessible
Tohum Otizm Vakfı (2025, May 8)	Education, digital literacy	Minecraft-based game education	Children with autism	Use digital games in education, improve social skills and literacy development

2.2 Frequency Analysis By Year

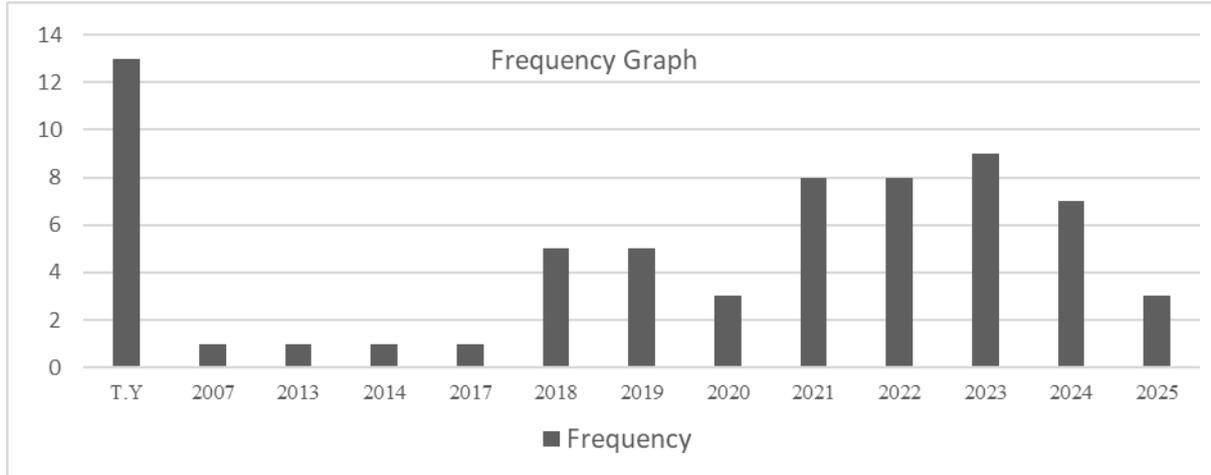


Figure 4. Frequency Graph by Year.

The graph shows the yearly distribution of 65 selected next-generation therapeutic recreation applications from current literature. The earliest study dates back to 2007, with single studies also appearing in 2013, 2014, and 2017. The highest number of studies occurred in 2023 (9), followed by 2021 and 2022 (8 each), and 2024 (7), reflecting increasing academic and industry interest in technology- and digital-based therapeutic recreation over the past five years. Additionally, 13 studies lacked publication year information but are generally recent, likely due to reliance on digital platforms and institutional websites where exact dates can be unclear.

2.3 Target Group Frequency Analysis

Table 2. Distribution of Next-Generation Therapeutic Recreation Applications by Target Group Categories.

Target Group Category	Frequency
Individuals Experiencing Psychological Issues (Depression, Anxiety, Stress, Social Anxiety, Loneliness, and Those Seeking Mental Health Support)	17
Older Adults / Geriatric Populations (Dementia, Frailty, Cognitive Impairment, Fall Risk)	11
Neurodiverse Individuals (e.g., Autism, ADHD, Neurodivergence)	10
Individuals with Physical Disabilities (e.g., Paralysis, Gait Disorders, Limb Loss, Mobility Impairments)	9
Youth, Children, and University Students (Targeted as Specific Groups, Not General Users)	7
General Users (A Broad User Group Without Any Specific Disorder or Characteristic)	7
Mindfulness / Meditation / Wellness Focused (Users Focused on Mindfulness, Emotional Awareness, and Holistic Health)	3

The thematic analysis categorizes the target groups of next-generation therapeutic recreation applications identified in the literature. Individuals with psychological issues (e.g., depression,

anxiety, stress, social anxiety, loneliness) represent the largest group. They are followed by elderly individuals (11 instances), neurodiverse populations such as those with autism spectrum disorders and ADHD (10), physically disabled individuals (9), specific age groups like youth (7), general users, and those focused on mindfulness and wellness (3). These findings suggest that technology- and digital-based therapeutic recreation applications extend beyond clinical settings to serve a wide range of users seeking cognitive and mental well-being improvements.

2.4 Category-Based Distribution

Table 3. Category-based distribution of therapeutic recreation applications (generated by authors).

Application Category	Application Examples	Frequency
Virtual Reality (VR)	VR meditation games, VR therapy, Beat Saber VR, BoxVR, VR exercise games, VR-based balance training, digital games and virtual reality applications	19
Robotic Support	Robot-assisted therapy (RAT), robotic exoskeletons (EksoNR, WOTAS, Harmony, ReWalk), robotic rehabilitation, robotic pets (Jennie, Paro), and robotic treatment applications.	13
Game-Based	Pokémon Go, Minecraft therapeutic groups, Animal Crossing, Wii Fit, zombie-themed games, video game-based exercise, and gamified platforms.	13
Artificial Intelligence-Based	AI-driven digital psychological support, AI-assisted online therapy platforms, AI-supported meditation and therapeutic applications.	9
Mobile Applications	Mobile augmented reality games (Pokémon Go), mobile mindfulness meditation apps, mobile psychological aid applications, and AI & AR-based mobile applications.	5
Wearable Technology	Google Glass, wearable wheelchair, bionic walker (Zeen), and bionic suit (Neural Sleeve).	4
Other/Supportive	EEG-based video game interaction, brain-computer interface, personalised soundscapes, educational and communication applications.	5

As shown in the table 3, digital technologies are the most frequently used category in therapeutic recreation applications, with 19 instances. This dominance reflects the effectiveness of virtual reality (VR) in promoting psychological relaxation and physical rehabilitation. Robotic support applications follow with 13 instances, valued for enhancing motor skills, motivation, and mobility. Artificial intelligence (AI) applications rank third with 9 instances, signalling a new era by enabling remote psychological support, personalised therapy, and emotion analysis. Mobile applications and other supportive digital tools each account for 5 instances; although less frequent, their accessibility and user-centric designs make them important complementary resources. Wearable technologies are the least represented (4 instances) but include innovative examples like chairs simulating a hugging sensation. Overall, these findings indicate that next-generation therapeutic recreation is increasingly

diversified, technology-driven, and tailored to individual needs, evolving into a more flexible and multidisciplinary field.

CONCLUSION AND RECOMMENDATIONS

This study systematically explored the influence of technological advancements and digitalization on therapeutic recreation, revealing an ongoing diversification and enhancement in both scope and effectiveness. The analysis of 65 applications shows that therapeutic recreation has evolved beyond traditional practices into a multidimensional field incorporating robotic systems, virtual reality, and AI-driven platforms to support individuals' physical, cognitive, social, and mental well-being. A significant focus is on psychological support, with digital therapeutic recreation proving valuable in addressing stress, depression, and anxiety. Applications have expanded to serve diverse populations, including older adults, physically disabled individuals, neurodiverse groups such as those with autism, and youth, promoting accessibility and inclusivity. While traditional literature often frames therapeutic recreation primarily within clinical settings or traditional physical rehabilitation frameworks (Carter et al., 1985; Karasu et al., 2018), our results reveal a clear paradigm shift. By comparing our findings with existing studies, it is evident that modern applications have heavily pivoted towards artificial intelligence and virtual reality to address cognitive and psychological well-being, rather than solely focusing on physical ailments (Vajawat et al., 2021; Fakhro et al., 2020). Globally, sectors connected to therapeutic recreation—physiotherapy, mental health, wellness tourism, and eldercare—are growing rapidly, underscoring the field's industrial significance. Furthermore, consistent with market projections that forecast massive growth in digital health and wellness tourism (Grand View Research, 2024; Global Wellness Institute, 2024), our findings confirm that digital therapeutic recreation is rapidly expanding into social services and daily life. In Türkiye, while therapeutic recreation remains emergent and comparatively limited, related sectors are steadily developing. In conclusion, next-generation therapeutic recreation is undergoing a comprehensive transformation fueled by technology, extending beyond healthcare into social services, education, tourism, and digital media. To align with global trends, Türkiye must prioritize expert training, public-private collaborations, infrastructure enhancement, robust academic research, and supportive policy frameworks. The primary contribution of this study is the comprehensive mapping and systematic classification of a previously fragmented field. Ultimately, this study contributes to the literature by providing a novel, unified conceptual framework that bridges the gap between rapid technological innovation and therapeutic practice, offering a structured baseline for future multidisciplinary research.

Compliance with Ethical Standards

1. Conflict of Interests

The author(s) declare that they do not have a conflict of interest with themselves and/or other third parties and institutions, or if so, how this conflict of interest arose and will be resolved, and author contribution declaration forms are added to the article process files with wet signatures.

2. Ethics Committee Permission

In this article, ethics committee approval is not required, and a consent form affirming that a wet-signed ethics committee decision is not necessary has been added to the article process files on the system.

3. Generative Artificial Intelligence (GAI) Usage Statement

Artificial intelligence has been used in some parts of our work.

4. Funding Disclosure:

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EXTENDED SUMMARY

Research Problem

The primary objective of this study is to define next-generation therapeutic recreation (TR) applications and provide a systematic evaluation through document analysis. By analyzing 65 selected applications, the research transcends traditional clinical definitions to present TR as a multidisciplinary field supporting holistic well-being. This consolidation aims to eliminate theoretical ambiguity and provide a structured guide for practitioners and researchers.

The significance of the study lies in its strategic value for both academic literature and sectoral development. As related global markets—such as physical therapy, elderly care, and wellness tourism—project massive growth, evaluating TR as a strategic service sector becomes essential. The research highlights a paradigm shift toward artificial intelligence, virtual reality (VR), and robotic systems, specifically noting the effectiveness of VR in psychological rehabilitation. Furthermore, in the context of Türkiye’s lack of institutionalized TR data, this study establishes a scientific foundation for local professional training and public-private partnerships

Research Questions

Hypothesis 1: It is hypothesized that traditional therapeutic recreation (TR) practices are rapidly evolving into technology-oriented next-generation methods as a direct consequence of the global digitalization process.

Hypothesis 2: It is predicted that the utilization of virtual reality, artificial intelligence, and robotic systems in next-generation TR applications provides a functional diversity that optimizes both physical rehabilitation and psychological support processes.

Hypothesis 3: It is posited that digitally-based interventions render rehabilitation processes more accessible and personalized for disadvantaged populations, particularly the elderly, neurodivergent individuals, and those with physical disabilities.

Hypothesis 4: It is hypothesized that the integration of therapeutic recreation with rapidly expanding global markets, such as digital health and wellness tourism, establishes the field as a high-value strategic service sector.

Introduction & Literature Review

1. **Context and Relevance:** Therapeutic recreation (TR) is a multidisciplinary specialized field aimed at enhancing the physical, social, and psychological well-being of individuals. The rapid

global expansion of interrelated sectors such as elderly care, physical therapy, and wellness tourism has positioned TR as a strategic service sector; for instance, the global wellness economy is projected to reach USD 6.75 trillion by 2030. Currently, digitalization is fundamentally transforming the delivery of these services, paving the way for "next-generation" applications.

2. **Gaps or Problems:** Despite the rapid growth in related industries, a significant gap persists in the existing literature regarding the holistic evaluation and systematic classification of "next-generation" therapeutic recreation applications. The multidisciplinary nature of digital transformation often results in these interventions remaining scattered across disparate domains, leading to theoretical ambiguity. Furthermore, in regions such as Türkiye, the lack of an institutionalized framework for these services complicates centralized data collection and the establishment of a standardized practice framework.
3. **Significant Works:** The theoretical foundations of this research are built upon the work of Ceyhan (2022), who defines therapeutic recreation as a multidimensional application area enhancing quality of life, and the pioneering work of Carter et al. (1985), who grounded the field in scientific principles. To analyze the economic and strategic dimensions of the field, global market reports from Grand View Research (2024) and Maximize Market Research (2024) were utilized. The technological paradigm shift was evaluated in light of studies by Vajawat et al. (2021) and Fakhro et al. (2020), which focus on virtual reality and digital interventions.
4. **Purpose Link:** This study aims to eliminate the existing theoretical ambiguity by consolidating the fragmented structures within the literature. The systematic classification conducted through the document analysis of 65 diverse application examples provides a comprehensive guide and conceptual framework for both practitioners and researchers, thereby extending the current body of literature into the digital era.

Methodology

The methodology of this study is built upon document analysis, a qualitative research technique, to overcome the challenges of direct data collection due to the current lack of institutionalization of therapeutic recreation services in Türkiye. The research framework follows a systematic procedure encompassing the access, authenticity verification, comprehension, and analysis of documents, drawing from valid data sources such as academic publications, industry reports, and corporate websites. The data, analyzed through thematic coding, are classified according to application type, field of use, target group, and objective. The study variables include the diversity of digital tools such as virtual reality (VR), artificial intelligence (AI), and robotic systems; the demographic and health profiles of target audiences; the chronological distribution of applications; and strategic economic indicators such as market volume and CAGR. The research sample consists of 65 unique next-generation applications, curated to reflect the technological spectrum and user diversity (e.g., elderly, neurodivergent individuals, and the physically disabled) within the literature while eliminating redundancies.

Findings

The findings reveal a significant technological paradigm shift in therapeutic recreation, with a marked increase in digital applications over the last five years. Virtual Reality (VR) emerged as the most prevalent technology (19 instances), followed by robotic support and game-based interventions (13

instances each), and artificial intelligence (9 instances). While traditional literature focuses primarily on physical rehabilitation, these results highlight a modern pivot toward cognitive and psychological well-being; the largest target group consists of individuals experiencing psychological issues such as anxiety and depression (17 instances), followed by geriatric populations (11 instances) and neurodiverse individuals (10 instances). These findings align with global market projections, such as the wellness economy reaching USD 6.75 trillion by 2030, confirming that therapeutic recreation is evolving into a flexible, multidisciplinary field spanning healthcare, social services, and digital media

Discussion

The results confirm a significant technological paradigm shift in therapeutic recreation, moving from traditional clinical physical rehabilitation toward a multidisciplinary framework focused on cognitive and psychological well-being. The high prevalence of Virtual Reality (19 instances) and Artificial Intelligence (9 instances) supports the hypothesis that digital transformation is fundamentally altering service delivery. These findings align with global wellness economy projections, showing that therapeutic recreation has expanded into social services, education, and tourism. A primary limitation of the study is the lack of institutionalized data in Türkiye, requiring indirect inferences from related sectors. Ultimately, this systematic classification bridges the gap between technological innovation and therapeutic practice, providing a structured baseline for future research and policy development.

Conclusions

- 1. Main Conclusions:** Next-generation therapeutic recreation has transitioned into a technology-driven, multidisciplinary field that integrates robotic systems, virtual reality (VR), and artificial intelligence (AI) to support physical, cognitive, and psychosocial well-being.
- 2. Implications:** The shift toward digital interventions, particularly in addressing psychological issues like stress and anxiety, highlights the sector's growing industrial and strategic significance within the global wellness and digital health markets.
- 3. Limitations:** A primary limitation is the current lack of institutionalized data and formal frameworks for therapeutic recreation in Türkiye, which required the study to rely on indirect inferences from related sectors such as medical tourism and elderly care.
- 4. Recommendations:** To align with global trends, it is recommended that Türkiye prioritizes expert training, public-private collaborations, and robust academic research to establish a supportive policy framework for this emerging field.