Tourism and quality of life in smart cities: A research study of Budapest[1]

A turizmus és életminőség kapcsolata az okos városokban: egy budapesti vizsgálat eredményei

Authors: Melanie Kay Smith[2] – Songling Chang[3] – Gábor Michalkó[4]

This study examines tourism's impact on quality of life (QoL) in smart cities, focusing on Budapest. While smart city QoL research often prioritizes transport, safety, and sustainability, tourism remains underexplored. This resident-focused study addresses that gap by analyzing how tourism affects perceptions of QoL, particularly regarding leisure, culture, and smart service use. Based on a representative questionnaire from all city districts, the study compares subjective attitudes within a broader QoL framework. Findings show that residents appreciate Budapest's cultural and leisure offerings, though concerns persist over housing, healthcare, and education. Tourism is mostly viewed positively, especially for cultural assets and infrastructure, but negative views are noted in over-touristed areas like the "party quarter." Smart services related to transport and e-ticketing are well received, though use is mainly utilitarian. While many support smart development, a gap may exist between intention and actual use. The study calls for urban strategies balancing tourism and resident wellbeing, highlighting the potential of smart tools to manage tourist flows and improve urban liveability.

A tanulmány a turizmus életminőségre gyakorolt hatását vizsgálja az okos városokban, kitüntetetten Budapesten. Míg az okos városok életminőség-orientált kutatásai leggyakrabban a közlekedést, a biztonságot és a fenntarthatóságot helyezik előtérbe, a turizmusra sokkal kevesebb hangsúlyt helyeznek. A helyi lakosságra fókuszáló tanulmány ezt a hiányosságot igyekszik pótolni azzal, hogy feltárja hogyan befolyásolja a turizmus a budapestiek életminőségről alkotott képét, különösen a szabadidő, a kultúra és az intelligens szolgáltatások használata tekintetében. A lakóhelyre (Budapest kerületeire) reprezentatív kérdőívezés alapján a tanulmány a szubjektív attitűdöket egy tágabb életminőség modellben hasonlítja össze. Az eredmények azt mutatják, hogy a lakosság nagyra értékeli Budapest kulturális és szabadidős kínálatát, ugyanakkor a lakhatással, az egészségügyi ellátással és az oktatással kapcsolatban aggodalmát fejezi ki. A turizmus megítélése többnyire pozitív, különösen a kulturális kínálat és az infrastruktúra tekintetében, de negatív véleményekkel találkozunk a nemkívánatos mértékű turizmus által sújtott városrészekben, például a bulinegyedben. A tömegközlekedéssel és az elektronikus jegyértékesítéssel kapcsolatos intelligens szolgáltatások kedvező fogadtatásban részesültek, használatukkal sok idő és energia megspórolható. Sokan támogatják az intelligens fejlesztéseket, a szándék és a tényleges használat közti rés feltétlenül szűkítendő. A tanulmány olyan városi stratégiákat szorgalmaz, amelyek egyensúlyt teremtenek a turizmus és a lakosság jólléte között, kiemelve az intelligens eszközökben rejlő lehetőségeket a turistaáramlások irányítására és a városi élhetőség javítására.

Beérkezett/Received: :2025. 04. 24. Elfogadva/Accepted: 2025. 09. 19.

Keywords: smart city, quality of life, resident perceptions, urban tourism, Budapest.
Kulcsszavak: okos város, életminőség, helyi lakosság észlelése, városi turizmus, Budapest.

1. Introduction

There have been numerous studies that examined the domains and indicators that form part of

1 The research was supported by National Research, Development and Innovation Office (OTKA K 134877 project)
2 associate professor, Budapest University of Economics and Business, smith.melanie@uni-bge.hu
3 PhD-student, Corvinus University of Budapest, songling.chang@stud.uni-corvinus.hu
4 scientific advisor, HUN-REN CSFK Geographical Institute; professor, University of Pannonia, michalko.gabor@csfk.org

quality of life (QoL) in smart cities, yet relatively few include tourism. The role of tourism in QoL has become an increasingly important topic given the exponential growth of tourism in the pre-Covid era, especially in cultural cities. Despite a relatively short period of 'under-tourism', many urban destinations are slowly returning to pre-Covid numbers of tourists, but with the added complication of housing crises and rampant inflation. This has had an unprecedented negative impact on the lives of many local residents leading to widespread protests, especially in Spain. It was hoped that smart solutions and tools might be able to solve some of the problems of overtourism in terms of diversification of products or the diversion of tourist flows. They are also playing an increasingly important role in the everyday lives of citizens and in the services that are used by residents and tourists alike (e. g. transport, leisure, culture). In our study, we argue that tourism is closely connected to leisure and culture, and tourists make use of several infrastructural elements that are important also for residents (e. g. transport systems). The primary data collection undertaken in the Hungarian capital city of Budapest focuses on residents and their perceptions of and attitudes to QoL domains, which includes tourism.

We aim to answer the following questions:

- Where does tourism feature in the definitions that are used to describe QoL in smart cities?
- Where does tourism fit in the domains and indicators that are used to measure QoL in smart cities?
- Which other domains of QoL in smart cities are inter-connected to tourism?
- What are the attitudes of local residents towards QoL and tourism in an emerging smart city (Budapest)?
- What is the level of technology acceptance and readiness of residents in a smart city QoL study (Budapest)?

2. Quality of Life in Cities

Numerous studies have explored quality of life (QoL) in cities, using terms like wellbeing, life satisfaction, or liveability. Common indices include the Economist Intelligence Unit's Global Livability Index, Mercer Quality of Living City Ranking, Monocle's Most Livable Cities Index, Numbeo QoL Index, Oxford Economics' Global Cities Index, and the Global Liveable and Smart Cities Index. This study adopts the term 'quality of life' as it is most widely used in smart cities literature (CHANG–SMITH 2023), although many indicators used also reflect residents' perceptions of wellbeing, satisfaction, and liveability. Urban liveability is defined as a city's capacity to create conditions that enable residents to thrive and enjoy a high QoL (DEL MAR MARTÍNEZ-BRAVO et al. 2019). Liveable cities are typically evaluated across domains such as healthcare, education, housing, public transport, safety, sustainability, cultural opportunities, and community support (TENNAKOON–KULATUNGA 2019). They also promote business, work, and leisure, while prioritising social as well as economic and environmental aspects (LLOYD et al. 2016, AHMED et al. 2019). Despite methodological differences, these systems share a focus on the availability and quality of basic amenities (SHEIKH–VAN AMEIJDE 2022). According to SHEIKH and VAN AMEIJDE (2022), liveability concerns services and amenities, while QoL considers how these shape human experience. ZHU et al. (2022) distinguish between 'livability of environment' – referring to natural, built, and social conditions – and 'life-ability of person', meaning the potential for self-development and enjoyment, including leisure and culture.

QoL metrics and rankings have faced criticism. Some argue that they rely on objective indicators for benchmarking, while overlooking residents' everyday experiences (LLOYD et al. 2016). Variability in rankings can also stem from differing methodologies or weighting systems (SHEIKH–VAN AMEIJDE 2022). Balancing objective and subjective aspects – such as service provision versus user satisfaction – remains challenging, as does comparing distinct domains like healthcare and social interaction (AHMED et al. 2019). This study focuses specifically on subjective resident perceptions, addressing a gap in earlier smart city QoL research (CSUKÁS–SZABÓ 2022, CHANG–SMITH 2023).

2.1. TOURISM, CITIES AND QUALITY OF LIFE

ZHANG and REN (2024) suggest that subjective assessments of liveability are typically shaped by perceived satisfaction and overall happiness with living conditions. Several studies discuss liveability in tourism contexts, highlighting tourism's potential to enhance it through infrastructure, economic growth, and environmental preservation (CROES et al. 2024). Tourism can positively influence urban atmospheres, as PAIVA (2023) notes, while KANG et al. (2022) emphasize the role of cultural ambience in shaping residents' liveability. However, the concept of liveability – rooted in social interaction (AHMED et al. 2019) – can be strained in tourism hubs due to overcrowding, social exclusion, and inequality. Thus, researchers are re-examining host-guest dynamics, particularly in the context

of overtourism. While tourism can enrich city atmospheres, PAIVA (2023) cautions that it may also negatively affect liveability and cause tensions between tourists and locals.

In Sopot, Poland, for instance, residents acknowledged tourism's economic benefits (e.g., jobs, income), but viewed its cultural, social, and environmental impacts less favorably (CROES et al. 2024). TANG et al. (2022) found that tourism's positive effect on liveability diminishes as its intensity rises, potentially becoming negative once thresholds of specialization or visitor density are exceeded. KANG et al. (2022) similarly argue that popular tourist cities are not always highly liveable: "a good tourist city is not necessarily a very liveable one" (p. 11). ZHANG and REN (2024) add that rising living costs – especially housing – along with deteriorating infrastructure and parking shortages, further reduce urban quality for locals: "Locals see their cities transforming in ways that cater more to tourists than to the long-term sustainability of the community" (p. 2).

UYSAL et al. (2025) reviewed two decades of QoL and tourism research, highlighting growing interest in resident wellbeing. This study contributes by examining resident attitudes toward tourism – how people perceive and respond to tourism growth. Although broader QoL dimensions are included, they are not always directly tourism-related. Importantly, many residents in large cities have limited contact with tourists—except those living near major attractions. Our study captures these spatial disparities.

2.2. SMART CITIES AND QUALITY OF LIFE

Smart cities are expected to be responsive to communities and enhance quality of life (QoL) (DEL-REAL et al. 2023, WANG–ZHOU 2023). GIFFINGER et al. (2010) identified six core dimensions: smart economy, mobility, environment, people, governance, and smart living. These have become widely accepted in smart city research. Smart living is often considered synonymous with QoL or its most critical domain, with QoL as its primary objective (OZKAYA–ERDIN 2020, SHAMI et al. 2022, SMITH et al. 2024). A recent review listed housing, healthcare, safety, leisure, culture, and tourism as key elements of smart living (CHANG–SMITH 2023). While our study covers these elements, we focus here on findings related specifically to tourism.

Tourism is included in the 'soft domain' of smart cities alongside education, culture, innovation, and social inclusion (JI et al. 2021), seen as vital to fulfilling citizens' higher needs. ORTEGA-FERNANDEZ et al. (2020) include tourism with other domains like housing and cultural facilities, proposing that smart city platforms should integrate services across governance, mobility, environment, wellbeing, and tourism—such as Valencia's example. Similarly, CANTUARIAS-VILLESSUZANNE et al. (2021) frame tourism as part of smart living, arguing for "co-creation of value between tourists and residents" (p. 7).

Both ORTEGA and MALCOLM (2020) and CSAPÓ and VÉGI (2023) focus on smart tourism destinations (STDs), which aim to enhance sustainability, improve visitor conditions, and ensure equitable benefit distribution among locals. They suggest integrating information and communication technology (ICT) into tourism infrastructure to support resource allocation, information access, and improved experiences. While studies often assess tourists' tech readiness—such as in Budapest (CORONEL PADILLA–SMITH 2023) – similar attention should be paid to residents who also rely on e-ticketing and booking systems in daily life.

JI et al. (2021) place tourism-related questions in the smart living domain, e. g., online tourism information. Smart living is widely equated with QoL and regarded as the key smart city domain (OZKAYA–ERDIN 2020). Although tourist attractions may be considered less vital than safety, they still contribute to QoL. Tourism's role has at times been underrepresented in QoL studies, but recent concerns about overtourism—rising costs, resident displacement, wellbeing impacts—have highlighted its importance. These issues have been documented in Budapest before and after Covid19 (SMITH et al. 2019, PÉREZ GARRIDO et al. 2022).

3. Budapest: Quality of Life and Tourism in an Emerging Smart City

According to the OECD Better Life Index (2019), Hungary performs well in work-life balance and social connections but lags in income, education, health, environmental quality, and life satisfaction. The EUROPEAN COMMISSION (2023) reported relatively low satisfaction in Budapest from 2019–2023, especially in healthcare, housing, air pollution, and interpersonal trust. Nonetheless, the ECONOMIST INTELLIGENCE UNIT (2024) ranked Budapest 32nd globally, praising its stability, healthcare, culture, environment, education, and infrastructure. It was labeled "the most liveable city in Eastern Europe," scoring 92/100, though still behind Vienna (98.4) and Copenhagen (98).

Despite more than a decade of smart city initiatives, Budapest ranked below the regional

average in smart city development (CSÉCSEI 2020, CSUKÁS–SZABÓ 2021). Earlier critiques pointed to insufficient understanding of local needs (CSUKÁS–SZABÓ 2021), and a later study highlighted the lack of citizen perspectives (CSUKÁS–SZABÓ 2022). The 2017 Smart City Vision of Budapest aimed to create a sustainable, inclusive, and digitally supported city (MUNICIPALITY OF BUDAPEST 2017). Hungary's 2018 Digital Tourism Strategy promoted digital transformation across public and private sectors (HAPP–IVANCSÓ-HORVÁTH 2018). Government and municipal efforts focused mainly on e-government, health, mobility, and air quality (CSUKÁS–SZABÓ 2022). Numerous apps were introduced to assist tourists, especially for transport and wayfinding (BERENDE 2015), and private smart parking solutions emerged (SMART LYNX 2021). CORONEL PADILLA and SMITH (2023) found tourists primarily use smart tools for practical purposes like navigation and information.

Smart city research in Budapest still lacks comprehensive data on citizen needs. To address this, the present study centers on resident perceptions of QoL and tourism. Previous research noted problems in affordability, infrastructure, pollution, cleanliness, and safety (FEKETE 2023), and found that while 83% of citizens used smart tools (CENSUS 2022), only 40% understood the concept of a smart city. Another study linked wellbeing to gentrification and overtourism (NAMAZ–TVERGYÁK 2023). Like ours, that research included tourism as a QoL domain alongside leisure and culture, supported by infrastructure such as transport and environment.

Budapest is well known for cultural tourism, but pre-Covid studies found that cheap nightlife increasingly rivaled heritage attractions. This led to overtourism in Districts VI and VII – the so-called "party quarter" (SMITH et al. 2019). The district's ruin bars became hotspots for disruptive tourist behavior and were linked to the highest density of Airbnb units (PÉREZ GARRIDO et al. 2022). Locals, particularly over 50, reported night noise, intoxication, litter, and public urination. Some (18%) considered relocating (SMITH et al. 2019). In 2019, tourist numbers were estimated at double the optimum level (PÉREZ GARRIDO et al. 2022). More recent trends show a shift toward gastronomy and atmosphere over museums and monuments, though culture remains a primary motivator (SMITH et al. 2023). City Park (Liget), undergoing redevelopment since 2015, aims to boost green space and cultural leisure for both residents and tourists. Its role in urban wellbeing is now being studied (SMITH et al. 2024).

Governance in Budapest is fragmented across 23 districts, the central municipality, and the national government – often causing coordination issues. Regulations vary across districts, for instance regarding closing hours of bars. Smart tools could help manage tourism more evenly, steering visitors away from overcrowded zones. PÉREZ GARRIDO et al. (2022) suggest using centralized systems to collect tourist data and regulate flow, optimize parking and attraction capacity, and even support housing and traffic management.

4. Research Methods

A questionnaire was designed for local residents in Budapest following the example of other smart city and QoL researchers (e. g. OH 2020, CHEN–CHAN 2021, JI et al. 2021, SHAMI et al. 2022). Building on previous smart city and QoL studies, 6 smart city domains (after GIFFINGER et al. 2010), 24 QoL indicators using 37 related statements and 17 smart services were identified that could be used to measure resident QoL in smart cities. FEKETE (2023) noted that only 40% of residents in Budapest were familiar with the concept of a smart city and even fewer could name any smart solutions. For this reason, the researchers firstly listed a number of smart tools that are commonly used in cities and asked respondents which of these were most important for a smart city. This already gave them some ideas about what smart tools or solutions exist, thus making the second and third questions easier to answer. These were adapted from CHEN and CHAN (2023):

- The development of Budapest as a smart city is important to me
- I would like to use more smart services in Budapest

A 5-point Likert scale was used for the statements. The questionnaire was designed in Hungarian, English and Mandarin Chinese to also capture data from Budapest's foreign population (5.8%) and largest minority (1.8% Chinese) (HCSO 2023).

Expert researchers provided feedback on the questionnaire and a pilot study was undertaken with 30 respondents (as recommended by PERNEGER et al. 2015) in the three languages. A quota sampling technique was adopted as far as possible based on the most recent Census data (HCSO 2022) for demographic characteristics.

Data was collected online using distribution via the researchers' personal networks with snowball sampling, and the questionnaire was posted several times on Budapest's district forums and expatriate networks in three languages. More than

half of the responses were gathered online, after which the researchers observed imbalances in the sample according to the Census (HCSO 2022), e. g. a relatively lower response from men, older residents and citizens from different districts of the city. An attempt was made to redress the imbalance as far as possible by distributing the questionnaire in public places using paper copies and QR codes (e. g. in the largest City Park). In addition, the European Football Championships were taking place in the city at that time, which represented an opportunity to question more men in outside spaces near big screens before and after matches. The sample demonstrates a relatively balanced gender distribution; however, individuals aged 65 and above are under-represented. All 23 districts are included in the sample, though representation varies significantly—from 1% in District XXIII to 9% in District VIII. Overall, central districts are more prominently represented than suburban or peripheral areas. Additionally, the sample exhibits a higher level of educational attainment compared to the national average. For this study, we selected the domains, indicators and statements that were most relevant to tourism using 4 domains of smart cities, 11 QoL indicators with 22 related statements and 12 smart services. These included: smart living (tourism, leisure, culture, safety); smart environment (cleanliness, sustainability, green spaces); smart mobility (public transport, parking, cycling); and smart people (friendliness, atmosphere, image). The data cleaning and analysis was done using Power BI, Excel and Python.

5. Findings

In terms of overall QoL (24 QoL indicators), respondents are least satisfied with the cost of housing (only 24% rated it 4 or 5), the healthcare system (28% rated it 4 or 5), education (35% rated it 4 or 5), and the salary level compared to the cost of living (40% rated it 4 or 5). Responses to environmental issues (which were ranked quite low in Budapest in OECD 2019 and FEKETE 2023) were somewhat mixed in our findings: 46% find the air quality quite good (rated 4 or 5); 44% find the city quite clean, but older residents and women are less satisfied with cleanliness. 60% are satisfied with the green spaces and 65% are unconcerned about noise. 66% of respondents find the city safe (although it was highlighted as a problem by FEKETE 2023), but it should be noted that female respondents feel less safe than males (rated 3.3 compared to 3.91). Men also find the city friendlier than women (3.3 compared to 2.98), with 46% of respondents overall finding the city open and friendly. 55% of respondents seem to find the city fairly sustainable and luckily, only 1% of respondents thought that Budapest's status as a sustainable city was "Not relevant to me".

Foreign respondents represented 15% of the sample (around 68 residents). Their responses were broadly similar to those of the Hungarian residents with the exception of the education system (many foreigners pay for private schools because of language barriers). They share the same concerns about housing, but express even higher satisfaction with public transport, the cleanliness of the streets the image of the city. They also show a greater appreciation for the green spaces (it should be noted that many expatriates live closer to the Buda hills).

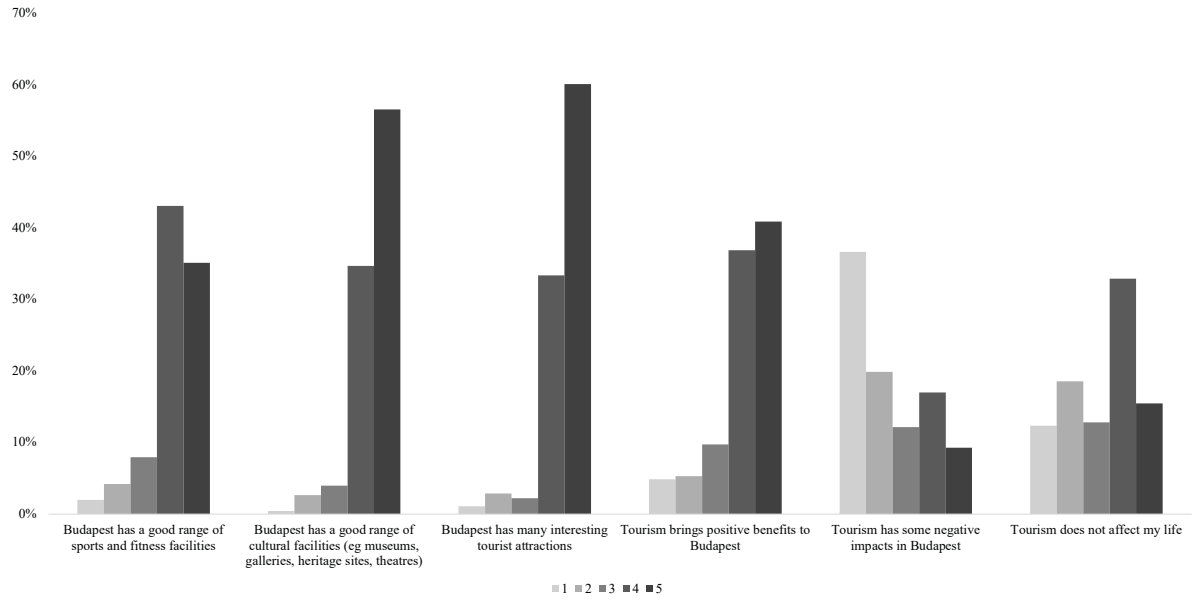
Respondents are very positive about transport overall, with more than 70% finding it easy to get way around using efficient, reliable and affordable public transport. 41% think there are enough bike lanes. Parking was rated lower with only around 15% finding it adequate and only 21% finding it affordable. In terms of atmosphere, image, culture, leisure provision and tourism, the results are very positive. 75% of respondents have a positive image of Budapest, 65% of respondents agree that the city has a good atmosphere, and 61% feel a sense of community. As the results were slightly mixed regarding the friendliness of the city (as noted above), it is assumed that atmosphere and image perceptions are derived from other factors too (e. g. environment, culture). 91% of respondents agree that Budapest has a good range of cultural facilities such as museums, galleries, heritage sites and theatres and 93% thinks that the city has many interesting tourist attractions. Residents also consider that Budapest has a good range of sports and fitness facilities (78% rated this statement with 4 or 5). Older residents and women are slightly more positive about cultural and tourist attractions. *Figure 1* shows the results of these questions, as well as some of the general data about tourism, which is discussed in more depth below.

In terms of tourism, almost half of the respondents do not feel that tourism actually affects their life (shown as 'Tourism personal impact' in *Figure 2*), but deeper analysis revealed that this depended on which area of the city they are living in. 78% consider that tourism brings positive benefits compared to only 26% who consider the impacts of tourism to be negative (rated 4 or 5). The gender differences are minimal, with women feeling slightly more negative about the impacts of tourism. However, residents living in districts that are located in the so-called 'party quarter' discussed earlier (e. g. VI and VII) and in the heavily visited districts of V (where the

Parliament building is located), I (the Castle area), and the increasingly popular District VIII (e. g. where the Hungarian National Museum is located) often rated the impacts as tourism as more negative. This is especially true of District VII (see *Figures 2 and 3*). On the other hand, these areas showed the highest ratings for cultural facilities and attractions (above 4.5).

Figure 1

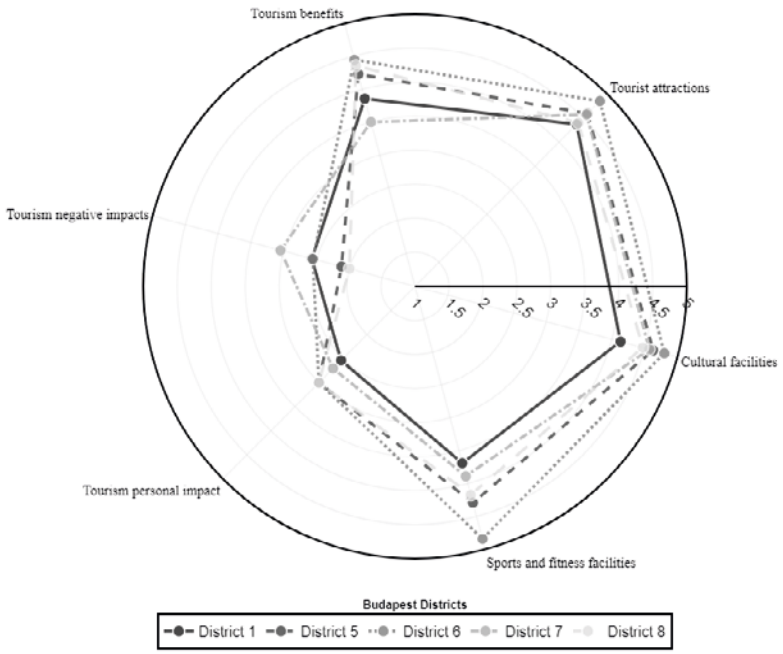
Attitudes to Leisure, Culture and Tourism in Budapest



Source: own editing

Figure 2

Opinions about leisure, culture and tourism in the most heavily touristed districts of Budapest



Source: own editing

Figure 3

Positive impacts of tourism by district

Source: own editing

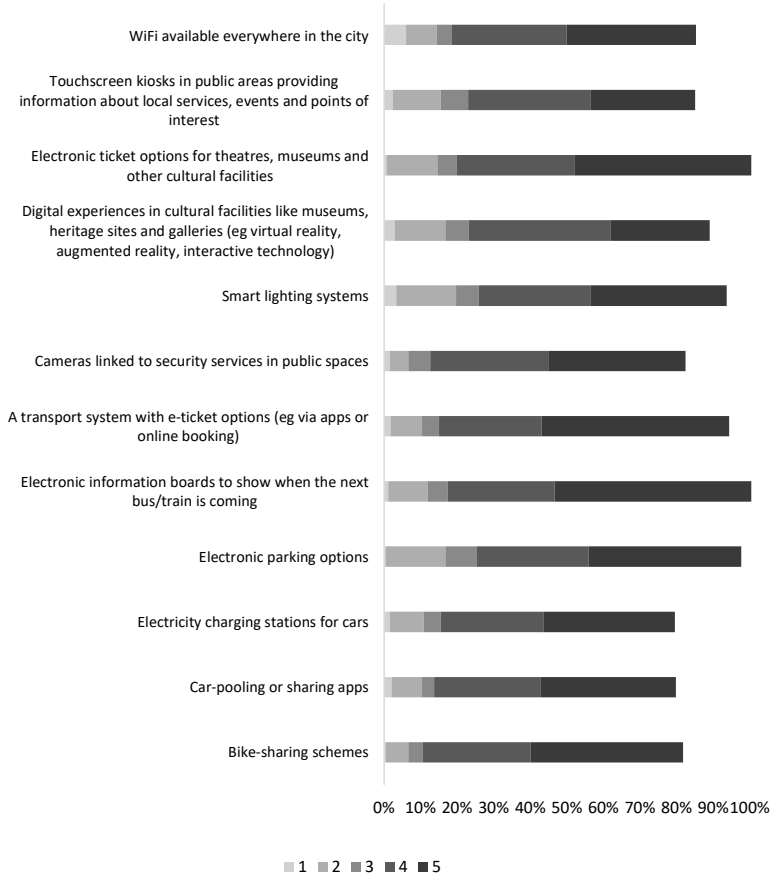
Respondents were asked about their attitudes to Budapest becoming a smart city with the following results:

- 74% of respondents rated the statement 4 or 5 that Budapest becoming a smart city was important to them
- 73% said that they would like to use more smart services in Budapest

Although there were no significant gender differences for these statements, women rated every statement for smart city services higher than men (but it should be noted that this response does not measure actual usage). For example, older residents were more positive about Budapest becoming a smart city, but they did not necessarily want to use more smart services! This suggests a gap between perceptions and actual behaviour, which would require further research. Foreign residents seem to be less interested or involved in smart services (possibly because of language barriers), as more than half responded 'not relevant to me'.

Figure 4

Attitudes to the smart services that are most relevant to tourism



Source: own editing

This was especially true of e-mobility (transport, parking, car pooling, electric car charging), smart lighting and security surveillance, and e-ticketing for cultural and leisure amenities.

It should be noted that our listed services were mostly utilitarian (functional/practical) rather than hedonistic (relating to enhanced enjoyment). Interestingly, the one statement that could be considered to be more hedonistic and connected to experience creation ('Digital experiences in cultural facilities like museums, heritage sites and galleries') was the one that was rated quite low. Figure 4 shows the results for the smart services that are most relevant to tourism. It can be seen that the most positive responses relate to transport information provision and e-ticketing for transport and cultural attractions, as well as bike-sharing schemes and e-parking.

6. Conclusion

The results of this study partly concur with previous studies, for example, the OECD (2019) also noted under-performance in income and health; housing and healthcare problems were mentioned in the EUROPEAN COMMISSION's (2023) quality of life report; and FEKETE (2023) emphasized the housing issue. In this study, housing was rated lowest (over 50% of respondents rated this aspect below the median score of 3, especially the working population). This issue should be given some attention given the protests about overtourism in Spain, which are mainly focused on unaffordable housing.

The ECONOMIST INTELLIGENCE UNIT (2024) report on liveability had noted Budapest's advancement in recent years. Although the exact details of the scoring were not made public, in addition to healthcare and education, the criteria include environment, infrastructure, stability and culture. In our study, healthcare and education were not rated very highly and responses to the environment were mixed (e.g. less than 50% viewed the city as clean, but more than 60% of residents appreciate the number of green spaces and do not suffer much because of noise levels). A relatively high number of respondents find the city safe, although perceptions of safety were rated lower amongst women and older residents. Despite mixed opinions about the friendliness of the city (especially among women), more than 60% of residents feel a sense of community, and the image of the city is mainly positive.

Interestingly, those domains of QoL that are most closely related to tourism, i.e. transport, leisure, culture, atmosphere and positive benefits of tourism were rated higher than any others. This is especially true of cultural and tourist attractions, which were rated positively by over 90% of respondents. Even in those districts where the impacts of tourism were considered to be more negative, residents still appreciate the leisure and cultural offer of the local area. This suggests that any concerns about the negative impacts of tourism are mainly confined to certain districts in the centre of the city and need targeted management.

In terms of smart services, the study mainly focused on utilitarian or functional tools, which facilitate information finding, transport systems or e-ticketing. Smart solutions for safety and security are less likely to be visible to residents. Interestingly, the one tool that was more hedonic in nature relating to digital experience creation in cultural facilities was rated lower than most others. The responses to Budapest becoming a smart city were largely positive, including the perception of using more smart services. This bodes well for future developments in Budapest and the shift towards smarter approaches to improving QoL.

The sample for this study was relatively well balanced in comparison to the city CENSUS Data (2022), however, older residents were under-represented, certain districts of the city were over-represented, and the sample was quite highly educated, which might bias their responses. The questions that were asked about perceptions of Budapest as a smart city and associated tools only captured perceptions rather than usage. Respondents tend to over-state their intentions, so further research would be needed to measure their actual behaviour. It would also be important to question a broader sample of residents from the most heavily touristed districts of the city to understand better how the impacts of tourism should be managed.

References

AHMED, N. O. – El-HALAFAWY, A. M. – AMIN, A. M. (2019): A Critical Review of Urban Livability. *European Journal of Sustainable Development.* 8(1). pp. 165–182. Doi: 10.14207/ejsd.2019.v8n1p165

CANTUARIAS-VILLESSUZANNE, C. – WEIGEL, R. – BLAIN, J. (2021): Clustering of European Smart Cities to Understand the Cities' Sustainability Strategies. *Sustainability.* 13(2). 513. pp. 1–20. https://doi.org/10.3390/su13020513

CHANG, S. – SMITH, M. K. (2023): Residents' Quality of Life in Smart Cities. *Land.* 12(4). 876. pp. 1–17. https://doi.org/10.3390/land12040876

CHEN, Z., – CHAN, I. C. C. (2023): Smart cities and quality of life: A quantitative analysis of citizens' support for smart city development. *Information Technology & People*. 36(1). pp. 263–285. https://doi.org/10.1108/ITP-07-2021-0577

CORONEL PADILLA, M. F. – SMITH, M. K. (2023): Technology Acceptance and Readiness among different Generations of Urban Tourists. *Marketing & Menedzsment.* 57(1). pp. 37–48, https://doi.org/10.15170/MM.2023.57.01.04

CROES, R. – SHAPOVAL, V. – RIVERA, M. – BĄK, M. – ZIENTARA, P. (2024): Promoting residents' happiness through a human-centric approach to tourism city development. *International Journal of Tourism Cities.* 10(3). pp. 905–924, DOI 10.1108/IJTC-05-2023-0105.

CSAPÓ, J. – VÉGI, S. (2023): Seasonality Research in the Context of Smart Tourism – Evidence for an Empirical Research Gap. *Modern Geográfia. 18*(3). pp. 105–112. http://doi.org/10.15170/MG.2023.18.03.07

CSUKÁS, M. – SZABÓ, R. (2021): The many faces of the smart city: Differing value propositions in the activity portfolios of nine cities. *Cities.* 112. 103116. https://doi.org/10.1016/j.cities.2021.103116

CSUKÁS, M. – SZABÓ, R. (2022): What are the conditions to become smart? A systematic analysis of the smart city strategy and smart city development activities of Budapest. *Információs Társadalom*. 22(2). pp. 9–26. https://dx.doi.org/10.22503/inftars.XXII.2022.2.1

DEL REAL, C. – WARD, C. – SARTIPI, M. (2023): What do people want in a smart city? Exploring the stakeholders' opinions, priorities and perceived barriers in a medium-sized city in the United States. *International Journal of Urban Sciences.* 27(1). pp. 50–74. https://doi.org/10.1080/12265934.2021.1968939

DEL MAR MARTÍNEZ-BRAVO, M. – MARTÍNEZ-Del-RÍO, J. – ANTOLÍN-LÓPEZ, R. (2019): Trade-Offs among Urban Sustainability, Pollution and Livability in European Cities. *Journal of Cleaner Production*. 224. pp. 651–660. https://doi.org/10.1016/j.jclepro.2019.03.110

FEKETE, K. A. (2023): Budapest Residents' Views on Smart City Developments as Revealed by a Questionnaire Survey. *Modern Geográfia.* 18(2). pp. 17–33. https://doi.org/10.15170/MG.2023.18.02.02

GIFFINGER, R. – GUDRUN, H. – GUDRUN – HAINDLMAIER, G. (2010): Smart Cities Ranking: An Effective Instrument For The Positioning Of The Cities. *ACE: Architecture, City and Environment*. 4(12). pp. 7–26. https://doi.org/10.5821/ace.v4i12.2483

HAPP, É. – IVANCSÓ-HORVÁTH, Z. (2018): Digital tourism is the challenge of future – a new approach to tourism. *Knowledge Horizons – Economics.* 10(2). pp. 9–16.

JI, T. – CHEN, J. – WEI, H. – SU, Y. (2021): Towards people-centric smart city development: Investigating the citizens' preferences and perceptions about smart-city services in Taiwan. *Sustainable Cities and Society.* 67. 102691. https://doi.org/10.1016/j.scs.2020.102691

KANG, L. – YANG, Z. – DANG, Y. – ZHANG, W. – Liu, C. (2022): Can Tourism Development Make Cities More Livable? Investigating 40 Cities in China. *International Journal of Environmental Research and Public Health.* 19. 472. pp. 1–17. https://doi.org/10.3390/ijerph19010472

LLOYD, K. – FULLAGAR, S. – REID, S. (2016): Where is the 'Social' in Constructions of 'Liveability'? Exploring Community, Social Interaction and Social Cohesion in Changing Urban Environments. *Urban Policy and Research.* 34(4). pp. 343–355. https://doi.org/10.1080/08111146.2015.1118374

NAMAZ, L. – TVERGYÁK, K. K. (2023): Uncovering deep place meanings in the context of urban wellbeing: The case study of Budapest. *City and Environment Interactions.* 17. 100095. https://doi.org/10.1016/j.cacint.2022.100095

OH, J. (2020): Smart City as a Tool of Citizen-Oriented Urban Regeneration: Framework of Preliminary Evaluation and Its Application. *Sustainability.* 12(17). 6874. pp. 1–20. https://doi.org/10.3390/su12176874

ORTEGA, J. – MALCOLM, C. (2020): Touristic Stakeholders' Perceptions about the Smart Tourism Destination Concept in Puerto Vallarta, Jalisco, Mexico. *Sustainability.* 12(5). 1741. pp. 1–18. https://doi.org/10.3390/su12051741

ORTEGA-FERNÁNDEZ, A. – MARTÍN-ROJAS, R. – GARCÍA-MORALES, V. J. (2020): Artificial Intelligence in the Urban Environment: Smart Cities as Models for Developing Innovation and Sustainability. *Sustainability.* 12(19). 7860. pp. 1–26. https://doi.org/10.3390/su12197860

OZKAYA, G. – ERDIN, C. (2020): Evaluation of smart and sustainable cities through a hybrid MCDM approach based on ANP and TOPSIS technique. *Heliyon.* 6. 05052. pp. 1–22. https://doi.org/10.1016/j.heliyon.2020.e05052

PAIVA, D. (2023): The paradox of atmosphere: Tourism, heritage, and urban liveability. *Annals of Tourism Research.* 101(July). pp. 1–10. 103600. https://doi.org/10.1016/j.annals.2023.103600

PÉREZ GARRIDO, B. – SEBREK, S. S. – SEMENOVA, V. – BAL, D. – MICHALKÓ, G. (2022): Addressing the Phenomenon of

Overtourism in Budapest from Multiple Angles Using Unconventional Methodologies and Data. *Sustainability.* 14(4). 2268. pp. 1–19. https://doi.org/10.3390/su14042268

PERNEGER, T. V. – COURVOISIER, D. S. – HUDELSON, P. M. – GAYET-AGERON, A. (2015): Sample size for pre-tests of questionnaires. *Quality of Life Research.* 24(1). pp. 147–51. https://doi.org/10.1007/s11136-014-0752-2

SHAMI, M.R. – RAD, V.B. – MOINIFAR, M. (2022): The structural model of indicators for evaluating the quality of urban smart living. *Technological Forecasting and Social Change.* 176. (March). 121427. pp. 1–11. https://doi.org/10.1016/j.techfore.2021.121427

SHEIKH, W. T. – Van AMEIJDE, J. (2022): Promoting livability through urban planning: A comprehensive framework based on the "theory of human needs". *Cities.* 131(December). pp. 1–18. 103972.

SMITH, M. K. – CHANG, S. – MICHALKÓ, G. (2024): Smart Living and Quality of Life: Domains and Indicators. *Journal of Urban and Regional Analysis.* 16(2). pp. 159–190. https://doi.org/10.37043/JURA.2024.16.2.1

SMITH, M. K. – PINKE SZIVA, I. – OLT, G. (2019): Overtourism and Resident Resistance in Budapest. *Tourism Planning and Development.* 16(4). pp. 376–392. doi:10.1080/21568316.2019.1595705

SMITH, M. K. – PINKE-SZIVA, I. – BEREZVAI, Z. (2023): The relative importance of culture in urban tourism: implications for segmentation. *Consumer Behavior in Tourism and Hospitality.* 18(2). pp. 157–173. https://doi.org/10.1108/CBTH-01-2022-0026

SMITH, M. K. – PINKE-SZIVA, I. – PUCZKÓ, L. (2024): Urban green spaces and resident wellbeing: Foundations of sustainable city tourism. In: Maxim, C. – Morrison, A. M. – Day, J. – Coca-Stefaniak, J. A. (eds.): *Handbook on Sustainable Urban Tourism.* Edward Elgar. pp. 133–145. https://doi.org/10.4337/9781803926742.00018

TANG, J. – CAI, C. – LIU, Y. – Sun, J. (2022): Can Tourism Development Help Improve Urban Liveability? An Examination of the Chinese Case. *Sustainability.* 14. 11427. pp. 1–27. https://doi.org/10.3390/su141811427

TENNAKOON, T. M. M. P. – KULATUNGA, U. (2019): Understanding liveability: Related concepts and definitions. In: Sandanayake, Y.G. – Gunatilake, S. – Waidyasekara, A. (eds): *Proceedings of the 8th World Construction Symposium.* Colombo, Sri Lanka. pp. 578–587.

UYSAL, M. – BERBEKOVA, A. – WANG, J. (2025): Quality-of-life: A critical examination of research progress. *Tourism Management.* 107. 105070. https://doi.org/10.1016/j.tourman.2024.105070.

WANG, M. – ZHOU, T. (2023): Does smart city implementation improve the subjective quality of life? Evidence from China. *Technology in Society.* 72. 102161. pp. 1–13. https://doi.org/10.1016/j.techsoc.2022.102161

ZHANG, X. – REN, X. (2024): Design Dilemma between Urban Tourism and Quality of Life: Assessment of Livability Barriers in Different Contexts. *Sustainability.* 16. 4897. pp. 1–31. https://doi.org/10.3390/su16124897

ZHU, H. – SHEN, L. – REN, Y. (2022): How can smart city shape a happier life? The mechanism for developing a Happiness Driven Smart City. *Sustainable Cities and Society.* 80(May). pp. 1–15. https://doi.org/10.1016/j.scs.2022.103791

Online sources

BERENDE, P. (June 17, 2015): "6 handy mobile apps to help you navigate Budapest". *We Love Budapest*. https://welovebudapest.com/en/toplist/6-handy-mobile-apps-to-help-you-navigate-budapest (May 6, 2023)

CENSUS (2022): *Hungary*, https://nepszamlalas2022.ksh.hu/en (April 9, 2025)

CSÉCSEI, N. (2020): *Smart City Index 2020: Budapest among the most underdeveloped cities in the region.* https://dailynewshungary.com/smart-city-index-2020-budapest -among-the-most-underdeveloped-cities-in-the-region (May 5, 2020)

ECONOMIST INTELLIGENCE UNIT (2024): *The Global Liveability Index 2024.* https://www.eiu.com/n/campaigns/global-liveability-index-2024 (April 9, 2025)

EUROPEAN COMMISSION (2023): *Report on the Quality of Life in European Cities.* Luxembourg: Publications Office of the European Union. https://ec.europa.eu/regional_policy/information-sources/maps/quality-of-life_en (April 9, 2025)

HCSO (2022): https://nepszamlalas2022.ksh.hu/en/database (October 26, 2023)

HCSO (2023): *Foreign citizens residing in Hungary by country of citizenship and sex.* https://www.ksh.hu/stadat_files/nep/en/nep0023.html (October 26, 2023)

MUNICIPALITY OF BUDAPEST (2017): *Smart Budapest: The Smart City Vision of Budapest.* www.budapest2024.org (April 9, 2025)

OECD Better Life Index (2019): *Hungary.* https://www.oecdbetterlifeindex.org/countries/hungary (April 9, 2025)

SMART LYNX (2021): *5th District of Budapest*, 14 April. https://smartlynx.hu/en/5th-district-of-budapest (April 9, 2025)