Smart and Happy Cities: Towards a Definition and a Methodology for Evaluating the Emotional Perception of Happiness

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Abstract. This research examines the concept of the human-scale city, developing a technique applicable to neighbourhoods to enhance their sustainability, liveability, walkability, well-being, and the happiness perceived by residents. This study aims to show the importance of an interdisciplinary approach by addressing the methodological gap prevalent in traditional literature that underscores the division between the examination of urban infrastructures, typically within the engineering domain, and the analysis of social dynamics, a focus in a sociology domain. This separation has historically limited the comprehension of the complex processes that influence cities and the experiences of their residents. The methodology adopted for assessing proximity and urban happiness combines qualitative approaches with quantitative studies, including the establishment of indices and indicators directly associated with neighbourhood liveability. This work facilitated the integration of empirical data with the subjective perceptions experienced by users of urban places regarding proximity, safety, comfort, well-being, and pleasure experienced at urban spaces. The application of this approach examined in the San Benedetto neighbourhood of Cagliari (Italy) highlighted the importance of the emotional dimension in evaluating the design effectiveness of an urban environment, aiding in the conceptualisation of an ideal "Happy City" model. This study demonstrates the model's applicability in many urban contexts, emphasising that the realisation of a "A Smart, and Happy City" requires a comprehensive and coordinated spatial approach.

Keywords: Happy City · Smart City · Healthy City · Accessibility · Walkability · Emotions · Proximity · Urban Happiness · Measuring Happiness · Pedestrianisation · Urban Planning · Cagliari

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1 Introduction

The expansion of population and enhanced connectivity among cities connected in networks, together with the evolution of these cities alongside technological and digitalisation processes, has significantly influenced the notion of smartness, impacting both urban and human development [1–3].

It has exacerbated issues such as congestion, environmental pollution, food scarcity and energy crises, as well as presenting challenges for urban governance related to development planning, definitions of more pedestrian areas, more city operations, and urban management processes [4, 5]. However, if these issues have intensified, numerous experiments and studies designed to mitigate them have emerged, employing not only information and communication technologies (ICTs) to transform urban infrastructures, public and private services, and governmental operations, but also by articulating diverse aspects of the quality of human-scale of urban smart life that are associated with sustainability, circularity, and proximity, as well as health, safety, culture, social cohesion, and participation [6].

A further issue identified in the scientific literature is considering in a broaden way the notion of smartness, which has been consistently criticised for adhering to economic rationale and commercial interests rather than advocating beneficial measures for the community [7–12]. This emphasises the lack of a connection between the smart paradigm and social well-being, defined not only as the quality of life of inhabitants but also as happiness in living in a certain place [13, 14]. From these premises, there is a need for examining smartness via a renewed human perspective, linking the notion of the city on a human scale with a framework focused on the evaluation of happiness.

On the one hand, numerous recommendations have been developed to guide urban policy towards the human-scale revitalising of cities. Over time, several theorists have contributed to the development of the concept of the human-scale city – such as Ildefonso Cerdà, Jane Jacobs, Jan Gehl, Christopher Alexander, Léon Krier, Jeff Speck, Salvador Rueda and Carlos Moreno – emphasising the importance of prioritising human and environmental well-being in urban planning to enhance quality of life.

On the other hand, an evaluation of the urban happiness is more difficult to locate in the literature. One of the first documents that recognises the first indications on the regulation of the concept of happiness as the main factor for promoting sustainable development and achieving the Millennium Development Goals [15] is the UN General Assembly [16]. In 2011, it recognised the need for "a more inclusive, equitable, and balanced approach to economic growth that promotes sustainable development, poverty eradication, happiness and well-being of all peoples" [16, p. 1]. The subsequent year, after the inaugural UN High Level Meeting, the report titled Wellbeing and Happiness: Defining a New Economic Paradigm was released, linking happiness and well-being to effective spatial planning practices [17]. In the most recent United Nations documents [18, 19], the word "happiness" is not expressly used. However, expressions representing notions of happiness, such as "healthy, fulfilling lives", "physical and mental health", "health and quality of life", and "human health and well-being" are included. Utilising the Treccani Dictionary's definition of happiness as "a measure of individual well-being" [20]. It is feasible to assert that human happiness is established as a goal in recent United

Nations texts, particularly in the New Urban Agenda, and is profoundly linked to human health and quality of life.

Numerous fields, including psychology, neuroscience, philosophy, economics, and social policy, have endeavoured to quantify and delineate the concept of happiness throughout the years [21, 22]. However, as Ballas argues [23], even though its potential, the concept has not been thoroughly examined in urban planning and geography, even though there is a growing acknowledgement of the opportunity for social and behavioural scientists to incorporate a spatial dimension by identifying urban characteristics that influence subjective happiness and well-being metrics (p. 47). Allal et al. [24] contend, cities must prioritise satisfying the human being and enhancing his/her quality of life (p. 182) from a developmental standpoint. To achieve this, various challenges must be addressed to ensure that cities offer high quality, healthy, and sustainable living environments (p. 183).

The integration of happiness and proximity principles with the Smart City framework requires a complete evaluation approach. Starting from this point of view, the focus of this document is to examine the emotional dimension, specifically studying how the urban structure of a human-scale approach affects the emotions and emotional well-being of its citizens. The examination of the San Benedetto neighbourhood in Cagliari will facilitate the analysis of how proximity to outstanding amenities and spaces contributes to the formation of an urban environment that enhances happiness, mitigates stress, and cultivates a strong sense of community.

The paper has five sections: after this introduction, Sect. 2 presents the notion of Happy City, whilst Sect. 3 delineates a methodological approach for evaluating and quantifying the urban happiness. Section 4 tests the applicability of a new index for evaluating the emotional perception of the degree of happiness, by considering a quantitative and qualitative analysis (Sect. 5). The findings applied in the case study and future prospectives for the study are addressed in Sects. 7 and 8.

2 A Smart and Happy City: An Effort in Defining It

Planning processes designed for establishing a proximity city fundamentally seeks to enhance the quality of life for its inhabitants [25], by fostering their inclination to engage with places. It is important to delineate the differences underlying the concepts of happiness and quality of life, as well as the methodologies used to examine and measure happiness, defined as life satisfaction and subjective well-being [14, 26]. Consequently, the authors reflect on: what is happiness and what does it signify? The same concept of happiness linked to a geographical reality is difficult to articulate unequivocally. On the one hand, happiness is associated with well-being and quality of life; on the other hand, happiness is an emotional feeling of well-being, and when applied to a physical location, it may be viewed as a place that provides long-lasting (positive) feelings. From this viewpoint, the happy city can be perceived as a place that promotes persistent positive emotions (through a eudaimonic lens, as opposed to short-term happiness rooted in hedonistic concept generation), enhancing the community's awareness of both collective and individual spaces, as well as their sense of belonging to that specific environment.

The dual identity of the quality-of-life concept is evident: it is both interpreted objectively and measurable, but also subjectively assessed in relation to the individual's

aspirations and social setting. Consequently, recognising the purely subjective nature of happiness, it is reasonable to explore this aspect by posing direct enquiries to those involved using interviews, questionnaires, or surveys. The literature analysis indicates that a happy city is a healthy urban conglomeration designed on a human scale, where the urban structure is smartly reorganised to promote walkability as a superior choice to various forms of mobility. Consequently, it is increasingly recognised that the temporary or permanent pedestrianisation of streets or entire neighbourhoods, defined as an intervention that restricts vehicle circulation, except for emergency services and specific limitations, enhances urban life quality with beneficial global effects [27]. Moreover, it plays a crucial role in urban regeneration by transforming underutilised areas into vibrant and appealing spaces, thereby positively influencing the local economy. Indeed, an engaging environment motivates citizens to visit and remain, enhancing their opportunities for social interaction and consumption. From this perspective, proximity to services, opportunities, and points of interest is an essential aspect in enhancing quality of life and fostering urban happiness. Moreover, proximity fosters walking or cycling, enhancing not only an active and healthy lifestyle, but also social interactions, incidental encounters, and the formation of neighbourhood relationships, which strengthen the social feeling of community and emotional connections to places. In this context, residents should experience security, comfort, engagement, remembering, and a sense of belonging during their journeys, independent of their destination or purpose [9, 28]. Citizens should feel positive emotions via noise emissions, thermal sensations, and the presence of flora, which together have beneficial impacts on biodiversity and human biological cycles. This type of city, therefore, is defined by the authors as a smart and happy city including not only all the previously mentioned characteristics, but also similar and vital peculiarities such as equity, justice, and inclusion, even if the authors are aware that the combination of all these characteristics cannot consistently guarantee citizens' happiness, but it may contribute to its achievement.

Considering all of these factors, it becomes especially important to examine the empirical relationship between happiness and the quality of one's living environment, in order to identify locally measurable factors that, while not necessarily indicative of happiness, are commonly observed among people who report high levels of happiness:

i) Job opportunities: defined as the availability of financial resources, economic autonomy, and satisfaction in selecting a profession that aligns with the individual's aspirations and passions [29]; (ii) Security [30]; (iii) Civic engagement and social relationships [31]; (iv) Physical and psychological health [27]; (v) Access to and quality of services [32]; (vi) good time: Reconciling professional and personal life minimises stress, strengthens profound connections, and enables dedication to personal interests [27].

These criteria will provide the basis for outlining the methodological approach to the pursuit of happiness, with the aim of addressing the question: "what is the rationale for evaluation, and what methods can be employed for the evaluation of urban happiness? The authors will provide a practical methodology to measure happiness (Sect. 3), identifying the Index "Emotional perception of the degree of happiness" (Sect. 4), followed

by the description of the case study of the San Benedetto district in Cagliari on which the method is tested (Sect. 5).

3 A Methodological Approach for Evaluating and Quantifying the Urban Happiness

The methodological approach primarily emphasises the need of envisioning a simultaneously smart and happy city, seeking to address the inquiry: what is the rationale for evaluation, and what methodologies might be used for the assessment of the urban happiness? The current literature presents many methodologies for its evaluation. Richard Layard [33] asserts that measuring happiness requires directly querying people, assuming they are not in a state of absolute poverty.

Other authors attempt to mitigate errors and biases inherent in subjective judgements by establishing quantitative indicators more general [29, 34, 35], or primarily associated with economic situations, security, political engagement [36, 37]. Claudio Marciano highlights Bhutan's initiative to compile a report on the happiness of its citizens using a statistical survey that utilises a range of qualitative and quantitative indicators. The study primarily examines residents' perceptions of the nation and their self-image [38].

Consequently, the authors in this research endeavour to adopt both quantitative and qualitative methodologies to identify and convert locally measurable factors into indices and indicators, which do not necessarily imply happiness but are observed as common parameters among happy people.

The methodology depends on the analytical purpose of assessing urban happiness, ranging from the idea of proximity, which may be measured both qualitatively and quantitatively. The efficacy of an approach that incorporates both quantitative and qualitative analysis is extensively shown in several reputable academic publications [39, 40]. Consequently, the methodology was organised into the following phases: (i) A comprehensive framework encompassing all empirical variables and contributions that affect the relationships between human beings, the environment, and happiness. (ii) A definition of the index "Emotional Perception of the Degree of Happiness," along with its associated indicators and sub-indicators at the neighbourhood level. (iii) A deep investigation of approaches; standardised urban planning tools and software (QGIS, DepthmapX); techniques for selecting and computing quantitative sub-indicators. (iv) Definition of qualitative analysis to support and validate the outcomes of the calculation method for the "Emotional Perception of the Degree of Happiness" index, which may also highlight the needs, desires, and essential concerns identified by users of the case study area. (v) A comparison of the outcomes from the quantitative and qualitative analyses.

4 A New Index for Evaluating the "Emotional Perception of the Degree of Happiness"

The emotional perception of happiness is determined by the emotions elicited by a place regarding security, pleasantness, sociability, manifestations of joy, and stress. To analyse these factors, it is important to delineate and examine the physical components

along the pathways and the surrounding areas that provide the framework for conducting the quantitative evaluation. To estimate each parameter, a grading scale of normalised scores was established to evaluate the appropriateness of each indication and facilitate the comparison and integration of the data. Table 1 shows the indicators ("Security", "Pleasantness", "Sociability", "Manifestations of joy" and "Stress") and sub-indicators that help define the "Emotional perception of the degree of happiness".

The index is expressed in formula 1:

$$Ieph = \frac{(Ia + Ib + Ic + Id + Ie)}{5} \tag{1}$$

The index "Emotional perception of the degree of happiness" (*I*) is given by the average of the indicators "Security" (Ia), "Pleasantness" (Ib), "Sociability" (Ic), "Manifestations of joy"(Id) and "Stress" (Ie).

(a) *"Security"* is evaluated by spontaneous observation, allowing for the attribution of a particular level of felt safety, which may be determined by analysing the seven sub-indicators outlined in Table 1 and described as follows: (i) the "visibility of buildings" reflects the degree to which a place is observable from neighbouring structures, so enabling the assessment of its spontaneous surveillance, considering also the "*type* and height of such *buildings"*.

The pedestrian "*Level of Service*" sub-indicator quantifies the frequency of pedestrian presence in places, determined by the number of people there.

The "presence of signs of degradation" is determined by averaging the condition of the elements present (Sce) in relation to their functioning and the overall degradation condition (Scd) of the site, which includes the presence of rubbish, graffiti, or evidence of drug use. One other important sub-indicators for assessing felt safety is the "*proportion of functioning light points*" to the total number installed.

The adult attitude of holding children's hands implicitly conveys a feeling of trust in allowing them freedom of movement within neighbourhood pathways and areas.

(b) "Pleasantness" is assessed based on the memorability a space evokes in the user, which includes the presence of distinguishable and aesthetically pleasing, organic, and coherent elements. This is quantified as the average of: the presence of distinctive elements, gradients, human-scale elements. Speck [27] observes that cities such as Rome may initially seem entirely unwelcoming to pedestrians and without of standard features aligned with soft mobility. Nonetheless, these cities are regarded as some of the finest cities for walking, not due to pedestrian comfort, but rather because of the visual allure presented by the urban landscape. Gradients signify the enhancement of a spatial quality in a specific direction, facilitating the natural differentiation of our motions' orientation. Human scale is the incorporation of features proportionate to the human body, using combinations and contrasts among structures, furniture, and ornamentation, including trees, flower boxes, and seating.

(c) "Sociability" is assessed by observing citizens' behaviour in communal areas, specifically through direct observation of seniors socialising, adolescents and or children engaging in play, and the presence of young people.

Table 1. Definition of the Index of "Emotional perception of the degree of happiness"

Index	Indicators	Attributes	Sub-Indicators	Calculation Methods
Emotional perception of the degree of happiness	a) Security	Perceived Security	Visibility of buildings [41]	Visible = 1 Partly visible = 0.6 Not visible = 0.1
			Building Type [41]	Building > 9 floors = 1 Building 4–8 floors = 0.8 Building 1–3 floors = 0.6 Single Family Homes = 0.3 Isolated building/total absence of buildings = 0.1
			Presence of functions with extended service hours [41]	Yes = 1 No = 0.1
			Pedestrian Level of Service (LOS) (fruin) [41]	Very busy = 1 Average busy = 0.5 Slightly busy = 0.1
			Signs of degradation [41]	(Condition of the present elements + General condition of degradation)/2 = (Sce + Scd)/2
			Proportion of functioning light points [41]	Light points = Nfunctioning/Ntotal
			Adults' attitude to holding children's hands	Percentage of children held by the hand
	b) Pleasantness	Recognisable, notable, conspicuous, articulated spaces	Presence of distinctive elements [42, 43]	Yes = 1 No = 0.1

(*continued*)

Table 1. (*continued*)

Index	Indicators	Attributes	Sub-Indicators	Calculation Methods
			Gradients [42, 43]	Yes = 1 No = 0.1
			Human scale [42, 43]	Yes = 1 No = 0.1
	c) Sociability	Socially attractive spaces	Seniors socialising with peers	Number of elderly ≥ 5 = 1 5 > Seniors ≥ 3 = 0.6 Seniors < 3 = 0.1
			Adolescents and/or children playing	Adolescents and/or children ≥ 5 = 1 5 > Adolescents and/or children ≥ 3 = 0.6 Adolescents and/or children < 3 = 0.1
			Adolescents and/or children attending spaces	Adolescents and/or children ≥ 8 = 1 8 < Adolescents and/or children ≥ 3 = 0.6 Adolescents and/or children < 3 = 0.1
	d) Manifestations of joy	Perception of serenity	Serene adults	Number of serene adults/ number of adults
			Serene Adolescents or children	Number of happy adolescents or children/ number of adolescents or children
	e) Stress factors	Perception of discomfort	Waiting time for crossings [44]	t < 60s = 1 t = 60s = 0.5 t > 60s = 0.1

(d) similarly, "Manifestations of joy" are assessed about the notion of serenely seen in adults and youngsters crossing the neighbourhood streets. The evaluations of the sub-indicator estimates were conducted across a complete week, including weekdays, to avoid restricting the studies to a singular time frame.

(e) The literature review identified "Stress factors", especially the time citizens expend navigating urban environments. Consequently, assessing vehicular traffic and the

time pedestrians spend at road crossings is acknowledged as crucial for understanding perceptions of discomfort and stress. The waiting time for pedestrian crossings is expressed numerically as a function of the waiting time considered excessive at a pedestrian traffic light (> 60 s) [44, 45].

5 Qualitative Analysis

Quantitative analyses were integrated with qualitative analyses, a procedure acknowledged in the literature as effective [46–51]. Consequently, a questionnaire titled "Degree of Perceived Happiness, Accessibility, and Neighbourhood Seurity" was developed based on a review of the scientific literature [52, 53] and insights from Sect. 2. As a result, the surveys addressing economic well-being and health were omitted, although recognising their significance.

The questionnaire comprises thirty-two questions, organised into 3 sections to facilitate subsequent comparison with quantitative analysis results: 1) accessibility to neighbourhood services and movement; 2) perceived security; 3) comfort, pleasantness, sociability and happiness. The authors provide 9 of the 32 questions that focus mainly on the assessment of happiness:

1) How would you rate the ease of walking to neighbourhood services? (Please provide a rating from 1 to 5; 1 = Difficult; 5 = Easy). Briefly indicate the reason.

What is your level of comfort with walking alone in the neighbourhood streets? (Please provide a rating from 1 to 5; 1 = Very Unsafe; 5 = Very Safe): _____.

Specify the reasons (multiple responses are permitted): ☐ Good/poor lighting ☐ Adequate/insufficient signage and condition of pedestrian paths ☐ Presence/absence of spontaneous surveillance (linked to the simultaneous presence of people in an area) ☐ Presence/absence of crime episodes ☐ Well-regulated/chaotic vehicular traffic ☐ Deep/poor knowledge of neighbourhood areas ☐ Other: _____.

3) How would you assess the overall noise level in the neighbourhood streets you frequently visit? (Please provide a rating from 1 to 5; 1 = little noise; 5 = excessive noise): _____.
4) Are you aware of any initiatives or organisations that promote social engagement within the neighbourhood? (many responses may be indicated):

☐ Volunteer associations ☐ Children's activities ☐ Senior activities ☐ Artistic and cultural workshops ☐ Sports activities ☐ I do not know ☐ I am aware of those not specified ☐ Specify whether you think there are more activities and/or organisations that facilitate your social engagement in the neighbourhood, which were not mentioned in the previous question: _____.

5) Did you see yourself as actively engaged in the changes that happened in the neighbourhood? (Please provide a rating from 1 to 5; 1 = I experienced exclusion at every phase; 5 = Completely engaged) _____.

Were you satisfied with the work that impacted the neighborhood's streets? Why?

_____

6) For residents: do you like living in the neighborhood? (Please provide a rating from 1 to 5; 1 = Not much; 5 = A lot) _____ Briefly indicate the reason: _____.
7) For residents: to how much does living in your neighbourhood enhance your happiness? (Evaluate on a scale from 1 to 5; 1 = Little; 5 = Significantly) _____ Briefly indicate the reason: _____.
8) With a view to a future redevelopment of the neighborhood and transportation reorganisation, would you support the pedestrianisation of certain streets? _____ What concerns would you have about this?

☐ Adequate parking availability ☐ Public transportation efficiency ☐ Residential accessibility ☐ Reduced speed ☐ Other: _____.

9) Is there a specific place or street in the neighbourhood that evokes a good or negative emotion in you (joy, positive expectations, anger, discomfort, melancholy, etc.)? Specify the street(s) in close proximity that you contemplate, the feeling it evokes, and the rationale for it. _____.

The subsequent section delineates the case study under examination, followed by a comprehensive presentation of the quantitative and qualitative analyses conducted, demonstrating the integration of both methodologies resulting in a holistic understanding of urban happiness within the neighbourhood chosen as a case study.

6 The Case Study of the San Benedetto Neighbourhood in Cagliari (Italy)

Cagliari is situated in the southern region of Sardinia (Italy), overlooking the Tyrrhenian Sea and covering an area of around 86.05 square kilometres [54]. The population of Cagliari is around 150,679 people [55]. The selected research area for method implementation and validation is San Benedetto, a vibrant neighbourhood situated in the eastern part of Cagliari (Fig. 1).

In 2022, the neighbourhood's resident population was 7,921, representing around 5% of Cagliari's total population, with an average density of 18,929 inhabitants per square kilometre. Consequently, the layout of this neighbourhood provides an optimal basis for debates and studies on walkability, accessibility, social dimensions, and the subjective well-being of residents. It is, in reality, one of the neighbourhoods with the greatest diversity in primary and secondary services, including various shops, educational institutions, a theatre, a tribunal, a market, and public transportation choices, including the metro-tram service. Additionally, a substantial flow of pedestrians is attracted by the commercial services, the historical significance of particular locations, and the presence of two major urban attractions, the Civic Market and the Cagliari Metro Station. These elements are promising factors in the context of a potential partial pedestrianisation of the neighbourhood, an important initiative outlined in the Strategic Master Plan of the Metropolitan City of Cagliari [56].

In this context, future scenarios impacting the San Benedetto neighbourhood may serve as an exemplary pilot model to guide further urban redevelopment initiatives aimed at transforming the whole municipality of Cagliari into a smart and happy city of proximity.



Fig. 1. San Benedetto Neighbourhood in Cagliari, Italy (authors' elaboration)

7 Results

The integration of quantitative and qualitative study enabled to delineate the happiness level inside the San Benedetto neighbourhood. In particular, the quantitative analysis performed using QGIS indicates the following results:

a) Security (Fig. 2): the degree of perceived security changes between "adequate" and "good". The "adults' attitude towards holding children's hands" was the most significant sub-indicator, the assessment of the other sub-indicators is mostly favourable, particularly evident in the closeness of squares and along the main roads.

b) Pleasantness (Fig. 3): Evaluations of the neighbourhood routes show significant variability, with scores spanning from poor to optimal levels; specifically, the streets that evoke the highest memorability are those including notable buildings and identity assets of renowned historical and cultural significance.

c, d) Sociability (Fig. 4.a)/Manifestations of joy (Fig. 4.b): direct observation of users in communal spaces has revealed a heightened inclination among adults, adolescents, and children to congregate harmoniously in proximity to squares and main roads significantly influenced by commercial and food services.

e) Stress Factors (Fig. 4.c): Surveys conducted to assess waiting times at pedestrian crossings revealed that pedestrians are compelled to wait over a minute only on the most congested routes with traffic lights.

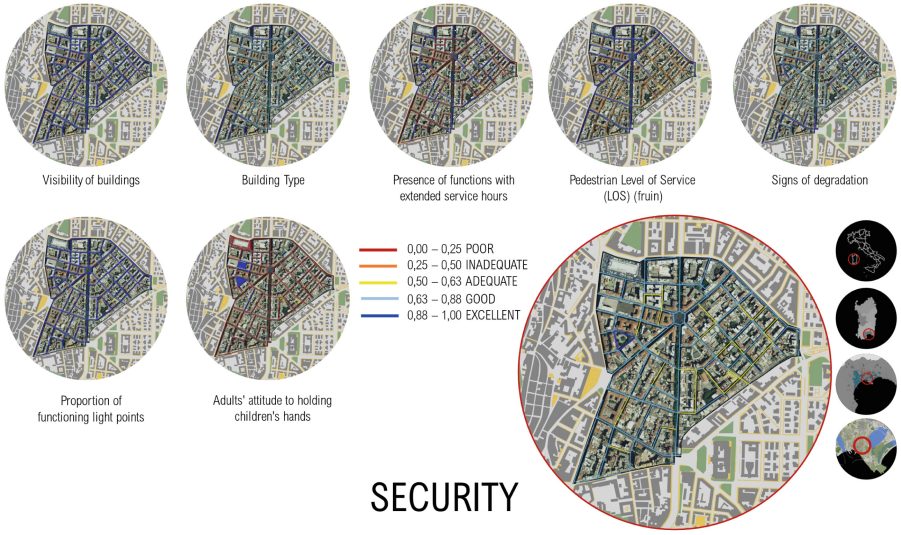

Fig. 2. "Security" indicator and related sub-indicators (authors' elaboration)



Fig. 3. "Pleasantness" indicator and related sub-indicators (authors' elaboration)

The index of "Emotional perception of the degree of happiness" shows an adequate general evaluation (Fig. 5).

The results derived from the quantitative analysis may be juxtaposed with the responses to the questionnaire titled "Degree of Perceived Happiness, Accessibility, and Security of the Neighbourhood," which was conducted to citizens of the San Benedetto neighbourhood in Cagliari.

The questionnaire, distributed over approximately 30 days, received a total of 117 responses. The authors analysed in this research the most representative. The responding population sample demonstrates diversity in age distribution: 33.3% are aged 31–45 years, 30.8% are 46–60 years, 21.4% are 18–30 years, and only 14.5% are over 60 years. Notably, there is a predominance of women, comprising 76.1% of respondents.

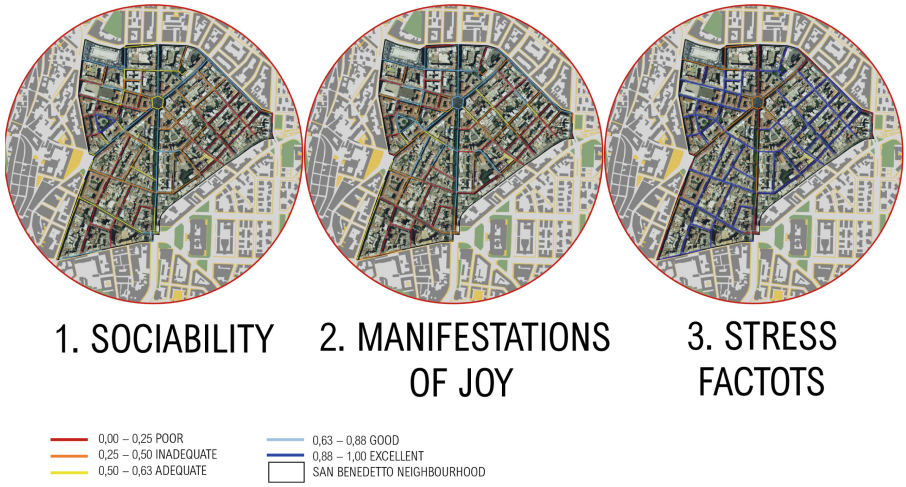

Fig. 4. Indicators "Socia*bility*" (1.), "Manifestations of joy" (2.) and "Stress factors" (3.) Source: Authors' elaboration.

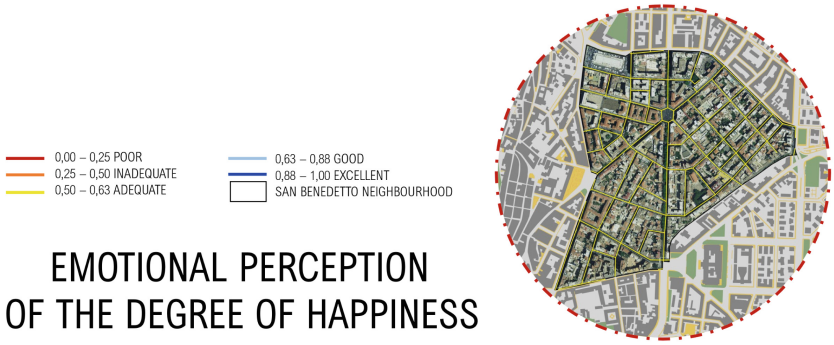

Fig. 5. Index of "Emotional perception of the degree of happiness" (authors' elaboration).

The majority of participants reside in the San Benedetto neighbourhood (57.3%), followed by those who visit for shopping, dining, or utilising community spaces (18.8%), those employed in the area (12%), and individuals who transit through the neighbourhood (9.4%). A mere 2.6% expressed a general attraction for this part of the city.

The poll indicated that accessing the services on foot is extremely simple (scale 5, 52.2% of respondents) and easy (scale 4, 35.7% of respondents).

The predominantly good security level identified in the quantitative research is supported by the respondents' subjective perceptions. Moreover, the adults' firm attitude to guide children by the hand along the analysed routes may be associated with significant automobile traffic, a concern identified as an important stressful factor by the respondents. The overall high security level is further reinforced by the predominance of users identifying as female, a circumstance that may have negatively influenced perceptions.

The survey revealed that, overall, residents felt rather safe (scale 5, 23.1% of respondents) and safe (scale 4, 47% of respondents) while walking alone through the neighbourhood streets. Concurrently, citizens experience significant insecurity, with 2.6% feeling very uncomfortable (scale 1), 6% feeling somewhat uneasy (scale 2), and 25% feeling a bit safe (scale 3).

The unpleasant perception mostly originates from women under 45, who mention chaotic traffic, inadequate illumination and spontaneous surveillance, poor state of pathways, insufficient pedestrian signs, and report occurrences of crime. A female user aged 31 to 45 underscores the absence of police surveillance, which is subsequently represented in a common need.

One interesting result from the survey is that the neighbourhood is rich in activities and organisations, although lacking sufficient recognition. Indeed, the majority of respondents (70.9%) indicate that they are unaware of any activities or associations that facilitate social engagement within the neighbourhood. Only 18.8% are aware of sports activities, 14.5% are conscious of children's activities, 12% of voluntary associations, 6% of artistic and cultural workshops, and 5.1% of activities for the elderly.

An additional aspect revealed by the survey relates to the degree of citizen engagement in the changes impacting different areas of the city throughout the years. The emotions elicited in the interviewees concerning the interventions undertaken thus far in San Benedetto were examined, specifically in response to the question, "Did you perceive yourself as an active participant in the changes that have transpired in the neighbourhood?" 44.4% reported feeling excluded in every phase (scale 1), 26.5% felt excluded (scale 2), 24.8% did not feel excluded but also not included (scale 3), 4.3% felt involved (scale 4), and 0% felt fully involved (scale 5).

Concerning the satisfaction level with the street improvements in the neighbourhood, the most pertinent feedback includes: "I observed an enhancement in convenience (increased space and seating at urban transport stops) as well as improved order on the streets". "I am dissatisfied; they have diminished the availability of parking".

"I observed a deterioration in traffic conditions".

Additionally, it is evident that 60.7% of users support the pedestrianisation of some streets. Support for pedestrianisation does not imply the absence of concerns, which, according to users, primarily pertain to the quantity of parking spaces (57.3%), access to residences (43.6%), the efficacy of public transport (41%), and reduced speed (14.5%).

The analysis of neighbourhood happiness concludes with enquiries about the feelings and sensations elicited by the utilisation of spaces among the statistical population. 65.2% of the sampled residents reported great satisfaction with their neighbourhood (scale 5), 23.2% of them stated satisfaction (scale 4), attributing it to the availability of services, tranquilly, social connections, strategic location, and overall quality of life.

Overall, for the surveyed residents, residing in the San Benedetto neighbourhood significantly enhances their happiness, in a very significant way (for 28.6%, scale 5), in a significant way (for 46%, scale 4), in a non-significant but not even significant way (for 15.9%, scale 3), a little (for 6.3%, scale 2) and finally very little (for 3.2%, scale 1). The final inquiry in the questionnaire pertains to the sentiments and emotions elicited by specific streets or areas in the subjects, depicted on a map categorised

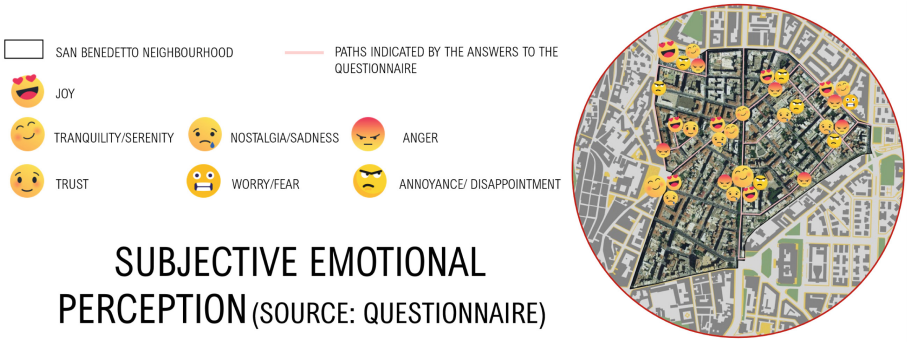

Fig. 6. Subjective emotional perception in response to "Is there a particular area or street in the neighbourhood that evokes a positive or negative feeling in you? Indicate the street(s) in the area you think of the emotion it evokes, and the reason" (authors' elaboration).

as: joy, tranquility /serenity, confidence in the future, nostalgia/sadness, worry/fear, annoyance/disappointment, and anger (Fig. 6).

8 Discussion and Conclusions

This study and the analysis of the scientific literature in urban, sociological, and architectural domains indicate that, regardless of territorial, spatial, economic, and sociocultural disparities, the key components of any sustainable and human-scale urban model must include proximity and walkability, which significantly influence the subjective perceptions of users involved in the qualitative study.

The research underscores a key aspect: the subjective experience of urban environments is as relevant to examine as quantitative assessments. While the overall convergence of the analytical information supports the notion that the physical attributes of an urban environment affect quality of life, the observed gaps indicate that effective urban planning does not naturally ensure a favourable response from residents.

In fact, the questionnaire indicates that negative emotions associated with a location predominantly originate from memories, experiences, and past sensations, thereby reinforcing the notion that spatial perception is shaped by social and cultural influences, including personal experiences, expectations, values, and interpersonal relationships.

Consequently, it is advantageous to enhance urban surveys with methodologies that examine individual and collective perceptions of a particular space in relation to personal and socio-cultural factors, thereby understanding how to change the perception of a place, not only by improving it physically but also by fostering positive experiential relationships with users.

From this viewpoint, a well-designed outdoor game could be an effective analysis tool to transform the subjective perception of a place, both individually and collectively. By engaging the player's senses, the outdoor game may facilitate the creation of emotionally resonant memories, foster the exchange of experiences that enhance a feeling of belonging and identity, and promote a profound understanding of the location, making it safer and more valued.

Urban planning should recognise the significance of both direct and indirect collection of subjective data, as well as the active engagement of citizens in the design of urban environments, to guarantee solutions that address their needs and expectations, while not neglecting elements that may be ignored in a non-participatory design approach.

The qualitative research indicates that people are inclined to accept soft mobility as their primary method of transportation and are receptive to initiatives aimed at pedestrianising certain routes, suggesting a clear favourable disposition towards this significant transition. Nonetheless, the issues that arose illustrate the challenges of meeting people's requirements by altering their habits and facilitating natural adaption to new lifestyles without competing alternatives.

Finally, the analysis conducted in this paper highlighted a strong link between happiness and proximity. For this reason, the authors propose as future research to deepen the analysis of the level of proximity at the neighbourhood level, using the same methodology, but also adding in the same analysis indices that measure accessibility, functionality of spaces and the social perception of citizens. These indices could constitute a "Global Index for Measuring Urban Well-Being" by considering together the proximity, the smartness and the happiness inside an urban environment [57].

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