



IN-HABIT – INclusive Health And wellBeing In small and medium size ciTies

D7.4 – Ongoing IHW impact assessment report

Project Number	869227	Acronym	IN-HABIT
Full Title	INclusive Health And wellBeing In small and medium size ciTies		
Project URL	https://www.inhabit-h2020.eu/		
Document Type and Name	Deliverable, D7.4, Report on IHW-1		
Project Coordinator	University of Cordoba		
Project Call and Funding Scheme	SC5-14-2019 – Visionary and integrated solutions to improve well-being and health in cities H2020-SC5-2019-2 (IA)		
Date of Delivery	30/08/2024		
WP, WP Leader	WP7, UNITO and CCA		
Status	Final draft		
Dissemination level (confidentiality)	Public		



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VERSION HISTORY

Version	Status	Date	Contributor/partner	Summary of changes
1	Final	30/08/2024	UNITO, CCA	



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LIST OF ACRONYMS

CA	Consortium Agreement
DECO	Dissemination, Exploitation, Communication & Outreach
DC	Dissemination & Communication
EC	European Commission
EU	European Union
GA	Grant Agreement
GDEI	Gender, Diversity, Equity, Inclusion
H2020	Horizon 2020 projects
IHW	Inclusive Health and Wellbeing
KLC	Key Local Contact
LCA	Local Community Activator
PC	Project Coordinator
PP	Project Partner
RTD	Research, technology and development
SMSCs	Small and medium sized cities



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WP

Work Package



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PARTNERS' SHORT NAMES

AVUE	Neighbourhood Association of Las Palmeras
BOT	Book on a Tree
BSC	Baltic Studies Centre
B4B	Bridge for Billions
CCA	Collegio Carlo Alberto
CORD	Ayuntamiento de Córdoba
DFC	Design for Change Spain
HIDE	Hidepark Civic Association Triptych
KQ	Kalneciema Quarter
LABORELEC	Engie Laborelec
LCREA	Lucca Crea
LUCCA	Comune di Lucca
NITRA	Mesto Nitra
PUJ	Pontificia Universidad Javeriana
RIGA	Riga Planning Region



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SUA	Slovak University of Agriculture in Nitra
TSR	Tesseræ
UCO	University of Cordoba
UNIFI	University of Pisa
UREAD	University of Reading
UNITO	University of Turin
CCA	Collegio Carlo Alberto
WTG	WellnessTechGroup



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FOREWORD

Deliverable 7.4, produced by the research team at the University of Torino (UNITO) and the Collegio Carlo Alberto (CCA), presents the findings of the ongoing impact assessment of the implemented VISs on inclusive health and well-being in the IN-HABIT project cities.

This deliverable is a continuation of the ongoing impact assessment conducted by UNITO-CCA in collaboration with the four city partners. It follows D7.7, which employed a survey of local stakeholders to assess the impact of the Visionary and Integrated Solutions (VISs) on inclusive health and well-being (IHW) in the four cities.

The current deliverable expands upon the previous survey by targeting both residents and stakeholders to evaluate the project activities' impact on mental health, socioeconomic well-being, and healthy lifestyles in each pilot city. It also refines the evaluation framework proposed in D7.1 and re-elaborated in D7.7, incorporating feedback from the EC and insights from the joint efforts of the cities and UNITO-CCA partners.

The data collected by local city activators (LCAs) through the mixed-methods questionnaire has been analyzed using both qualitative and quantitative techniques. Notably, the analysis includes innovative text mining and natural language processing (NLP) to discern patterns of emotional meaning and sentiment in the open-ended responses.

The overall activity involved three steps: drafting the questionnaire based on the D7.7 questionnaire and EC feedback, distributing the questionnaires through city partners and local activators, and, finally, collection and analysis of the responses by the UNITO-CCA team.

This report presents the results of the analysis, highlighting the strengths and weaknesses associated with the ongoing implementation of the VISs in the four cities. While acknowledging the inherent limitations of the empirical analysis, the report emphasizes that the evidence gathered from stakeholders and residents offers valuable insights into best practices and areas for improvement.



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EXECUTIVE SUMMARY

Deliverable 7.4, titled "Ongoing IHW Impact Assessment Report," details the current evaluation of the influence exerted by the implemented Visionary and Integrated Solutions (VISs) on inclusive health and well-being (IHW) within the four IN-HABIT project cities (Cordoba, Riga, Lucca and Nitra).

The initial part of the document summarizes the conceptual framework underlying the activities carried out within the context of the project.

The second Section introduces the refined impact assessment framework, establishing the foundation for the deliverable and outlining the methodological approach employed in the evaluation. This framework, initially detailed in Deliverable 7.1, "Inclusive Impact Assessment Plan," is adapted and expanded to suit the requirements of the ongoing impact assessment. Notably, the ongoing evaluation centers on five key dimensions, as elaborated in Section 1.1: subjective well-being, spatial and environmental well-being, social well-being, healthy lifestyles and economic well-being. Section 1.2 delineates the methodology, which encompasses a mixed-methods approach utilizing data gathered through a survey administered to local stakeholders and residents across the four cities (Section 1.2.1). This approach incorporates both standard statistical techniques and advanced text analysis techniques, as elucidated in Section 1.2.2.

The third Section of the document provides a comprehensive overview of the survey. Designed by UNITO-CCA researchers and implemented by city partners in each location, the survey involved respondents selected by city members. The questionnaire comprises a combination of multiple-choice and open-ended questions.



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The fourth Section presents the analysis of the questionnaire responses. It begins by characterizing the sample and discussing the statistical analysis of the multiple-choice questions (Section 4.1). Next, it presents and discusses the text analysis performed on the open-ended questions (Section 4.2). Tables, charts, and graphs visually enhance the presentation of the analysis findings. The section concludes with a presentation and discussion of summary statistics by city (Section 4.3).

The final section of the deliverable focuses on the overarching conclusions of the deliverable. It includes a concise summary of the key results, acknowledges the limitations of the analysis, and outlines future plans for the ex-post evaluation of IN-HABIT activities.

The overall results, obtained analyzing the questionnaire, indicate a generally positive impact of the VISs initiatives implemented on social well-being, subjective well-being, spatial and environmental well-being, healthy lifestyles and economic well-being.

As showed in Section 3.1, the sample includes over 130 interviewees aggregating the 4 involved cities. With respect to Deliverable D7.7, the sample size has been increased in order to allow generalization of the results and increase reliability.

It is important to note that while the analysis revealed the presence of a few contrasting opinions (including adverse comments such as "people complain" or "negative feedback"), the general perception is positive, in particular with respect to the healthy lifestyle, subjective well-being and spatial and environmental well-being dimensions, as denoted by positive comments such as "Engaging memories" and "excellent condition".

The questionnaires revealed the highest levels of satisfaction among Lucca and Nitra respondents, but also very good outcomes in Cordoba and Riga. In addition, the economic dimension was positively evaluated in all the involved cities. Indeed, similarly to the results illustrated and discussed in Deliverable D7.7, respondents found the VISs beneficial for enhancing professional networks, acquiring new job-related skills and discovering vocational training opportunities.



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1 The IN-HABIT Conceptual Framework

The IN-HABIT project is developed in four European peripheral small and medium-sized cities (SMSCs) - Cordoba (Spain), Riga (Latvia), Lucca (Italy) and Nitra (Slovakia) and is focused on the testing of visionary and integrated solutions (VIS) to foster Inclusive Health and Well-being (IHW) with a focus on gender, equity, diversity and inclusion (GDEI).

The conceptual approach is grounded on the concepts of inclusivity, health, and well-being in urban areas and stresses that IHW is a collectively generated resource that goes beyond the simple aggregation of individuals' personal well-being. IN-HABIT consider IHW as co-created common pool resources (CCPR), i.e. as resources that are owned, managed, and used by the community but have characteristics of a private good that is rival in consumption (community well-being depletes if citizens do not invest in it and are not concerned with the well-being of others) on the one hand, and of a public good that is non-excludable (living in places of high well-being is beneficial to anyone who moves there) on the other hand. In this scenario, the most vulnerable and fragile groups have underserved needs.

The 4 IN-HABIT pilot cities differ in terms of size, demography, and position in the settlement hierarchy of their respective countries and prevailing and emerging challenges in terms of health and well-being. Also, each pilot targets a different urban scale in the area of intervention and works with different vulnerable collectives.

IN-HABIT pilots are developed through the so-called VIS for IHW. Visionary because they leverage existing locally undervalued resources, such as culture, food, human-animal bonds, environment and art, to boost IHW, overcoming the limited health and well-being provision for these collectives. Integrated because they combine 'soft' solutions based on social and cultural actions with 'hard' solutions based on NBS solutions, infrastructures and digital tools. Inclusive because the project is developed with a gender, diversity, equity and inclusion approach.



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The 4 cities are very different, and so are the VIS deployed and the collectives targeted, but in all of them, the activities have been based on the same conceptual framework for inclusive urban change and the same working methods. This approach allows for stressing complementarities among the contexts, offering a broad catalogue of solutions, experimenting in different contexts and working with different collectives to deliver evidence of the results of our VIS and methods to other SMSCs in Europe and beyond.

IN-HABIT has co-created an Impact Assessment Framework grounded in an interdisciplinary and multidimensional approach that integrates top-down and bottom-up approaches to measure Health and Well-being. Central to the framework is the understanding that health and well-being are influenced by a combination of individual, social, and environmental determinants, a concept strongly supported by the World Health Organization (WHO) and the Organisation for Economic Co-operation and Development (OECD). The WHO's Social Determinants of Health (SDH) framework emphasises that health outcomes are shaped by the conditions in which people are born, grow, work, live, and age, as well as by the broader systems and policies that influence these conditions.

The IN-HABIT framework also incorporates the subjective experience of well-being, drawing on both hedonic and eudaimonic perspectives. Hedonic well-being is associated with constructs such as happiness, positive affect, and life satisfaction, while eudaimonic well-being focuses on positive psychological functioning and human development (Diener, 1984; Orden & Bradburn, 1969; Ryff, 1989; Waterman, 1993). Subjective well-being is thus a multifaceted construct that includes general psychological well-being, life satisfaction, and the absence of mental distress (Kessler et al., 2003; Topp et al., 2015).

The following five dimensions form the cornerstone of the IN-HABIT assessment of IHW (Figure 1). The framework guides both Participatory Action Research (PAR) methodologies and the development of hard and soft VIS, ensuring that interventions are grounded in the lived experiences and needs of the community. By aligning assessment and intervention strategies



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with local conditions, the VIS can significantly enhance the effectiveness of health and well-being initiatives, ultimately leading to more resilient and thriving communities.

- **Subjective Well-being:** This dimension considers personal perceptions of psychological well-being, happiness and life satisfaction.
- **Spatial and Environmental Well-being:** This includes the quality of physical surroundings, green spaces, and environmental health.
- **Social Well-being:** This addresses social cohesion, community engagement, and social support networks.
- **Healthy Lifestyles:** This dimension focuses on behaviours such as physical activity, diet, and substance use.
- **Economic Well-being:** This encompasses income levels, employment status, and economic security.

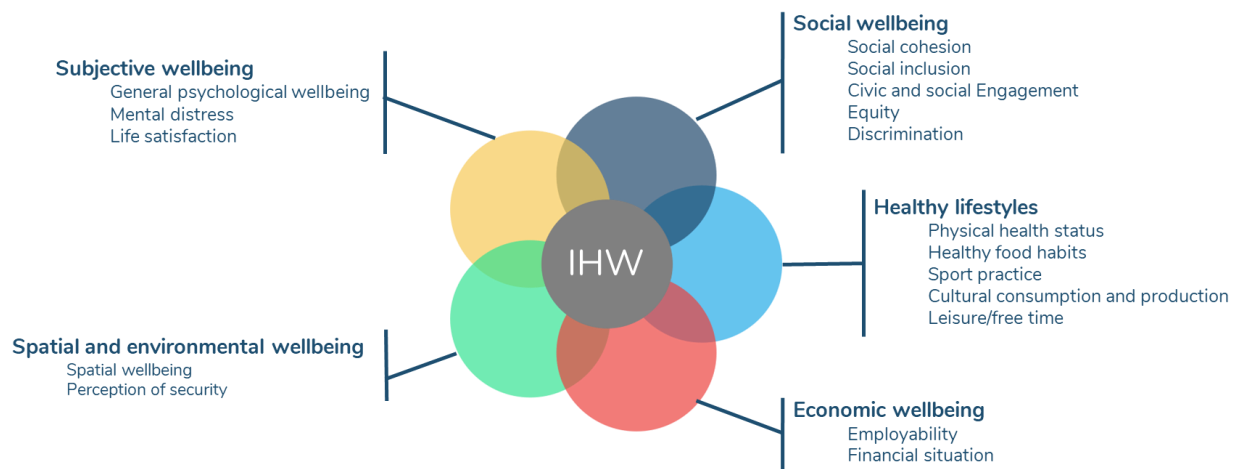


Figure 1 - The IN-HABIT impact evaluation framework.

The significance of this methodology lies in the recognition of health and well-being as co-created common pool resources influenced by the collectivity and the environment in which individuals reside and not exclusively linked to the individuals. Consequently, the metrics for



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assessing health and well-being must be adaptable to the distinct characteristics of different urban settings. This hypothesis is particularly important when considering small and medium-sized cities, which often face unique challenges and circumstances that larger metropolitan frameworks may not properly address. IN-HABIT framework has common indicators for the 4 cities, and some are more specific for each city's needs and context, supporting our CO-assessment.



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2 IHW evaluation

2.1 Background: the IN-HABIT impact assessment framework

The EC defines the evaluation activity in the following terms: “(Evaluation) looks at whether the changes are due, at least in part, to the intervention and why an intervention has been more or less successful in achieving its objectives”. It is following this definition that the aim of this activity can be better specified according to the following elements:

- It aims at isolating the change that can be attributed to the visionary and integrated solutions (VISs) implemented in each city according to the city-specific IN-HABIT theme;
- It aims at measuring the quality and quantity of the alleged impact of the city-specific VISs in order to assess the success of the implemented policies on people’s inclusive health and well-being;
- It tries to account for the expected, as well as the unexpected, impacts of VISs.

Health and well-being can be considered as co-created common pool resources (CCPR) that benefit the entire community and require the investment of the entire community to be administrated and preserved. Common pool resources (CPR) are resources owned, managed and ultimately used by the whole community but they are generally affected by low excludability and high subtractability condition that characterize common goods. A proper definition of health and well-being (H&W) is necessary to understand the main scope of the assessment itself. As stated in D7.1:

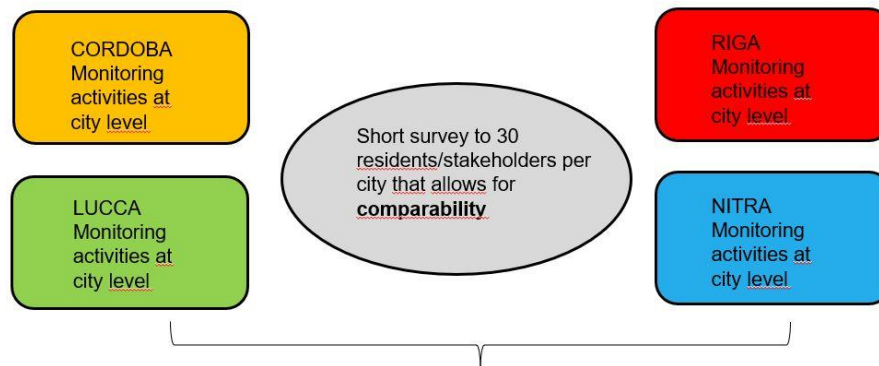
- Well-being, despite its multi-dimension composition, includes, at minimum: satisfaction with life, fulfillment and positive functioning, and the absence or low presence of negative emotions like depression and anxiety (Andrews and Withey 1976, Ryff & Keynes 1995, Frey & Stutzer, 2002).
- Health, that *latu sensu* could be also included in the general concept of “well-being”, can be divided in physical and social well-being including the economic sphere and



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psychological or subjective well-being referring to, for example, to emotional well-being and life satisfaction. (Kaplan, Anderson et al., 1993, Diener 2000, Frey and Stutzer 2002, Keyes 2002, Kahneman, Krueger et al. 2004, Strine, Chapman et al. 2008, Veenhoven 2008).



D7.4 Ongoing IHW impact assessment report: mid-term report presenting the main findings of the ongoing impact assessment activities in the cities as well as the results of the surveys allowing for comparability across cities

Figure 2 - Impact assessment framework

The evaluation framework is structured on two levels: the city level and the cross-country level. The city level evaluation is carried out by each IN-HABIT involved city with specific monitoring activity such as: mini surveys, focus groups, storytelling. This part of the evaluation process is independently structured and analyzed by each city partner. The results of the city-wide evaluation process would not allow for a comparison since the activity are not centrally determined.



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The willingness to increase the comparability of the implemented Visionary and Integrated Solutions on inclusive health and well-being required the introduction of a second level of evaluation, namely the cross-city level. In this deliverable the assessment analyzes the results obtained issuing the same questionnaire to a sample of 30 volunteers (expanded with respect to the first survey) in each of the four cities included in the IN-HABIT project.

Furthermore, it has been necessary to modify the D7.7 IHW indicators and targets in order to increase the results reliability. This survey will focus on the 5 dimensions introduced in Section 1, namely: Social well-being, Healthy lifestyles, Subjective well-being, Spatial and Environmental well-being and Economic well-being.¹ Each of these dimensions will target both individuals and community. It must be acknowledged that every dimension is strictly related to the others.

The social well-being dimension is likely to be influenced by the IN-HABIT VISs because it is tied to the concept of well-being as CPR. The social aspect cannot be overlooked since its impact on health and well-being is non-negligible. This dimension can be divided into two sub-dimensions, namely Social Cohesion and Discrimination.

The former encompasses, among other things, satisfaction with personal relationships in the neighborhood or living area or the trust in others. The latter can be understood as a social stressor that has physiological effects on individuals that, compounded over time, can lead to long-term negative health outcomes. Discrimination can occur both at individual and macro-level (i.e. residential segregation) and can cause extremely strong harm to the individuals. If this dimension is not safeguarded individuals are more susceptible to depression, drug use, anxiety, hostility and feelings of hopelessness, impacting physical health (WHO, 2012).

¹ With respect to D7.7, Mental health has been separated by physical health. The former has been articulated in two dimensions, i.e. Subjective well-being (individual sub-dimension) and Spatial and environmental well-being (community sub-dimension). The latter is included in the Healthy lifestyles dimensions.



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Subjective well-being is the second dimension taken into consideration. It encompasses general psychological well-being, life satisfaction (positive measures) and mental distress (negative measure). The subjective well-being is highlighted in extensive research and it is underscored as a human right by the European Pact for Mental Health and Well-being (2008) and WHO.

At the community level, subjective well-being translates into a third dimension, i.e. spatial and environmental well-being. Actually, it is probably the most interconnected dimension since it can be influenced by individual, socio-economic and environmental attributes (Kaplan, Anderson et al. 1993, Keyes, 2002, Dahlgren & Whitehead, 2021). Within these attributes one can find emotional intelligence or spirituality for the individual factor, social support or safety and trust for the socio-economic factor and violence or physical environment for the environmental factor.

The fourth dimension regards the Healthy lifestyle that, within the proposed analysis includes aspects that are more likely to be influenced by the project specific solutions. Two sub-dimensions are identified: physical health status (perceived physical health, sports practice, eating habits, human-animal interaction, social and cultural habits) and leisure/free time. As reported in EEA (2019) positive change on this dimension can reduce chronic disease rates with physical activity and social interaction that has been recognized as the major pathways to health.

Economic well-being is the fifth dimensions considered within this framework of analysis. Following OECD (2011), income and financial situation are essential components of the overall well-being of individuals and society as a whole. Positive change on this dimension allows individuals to fully fulfill their needs. Furthermore, job and skills satisfaction and employment perception are positively correlated to well-being (WHO, 2003). The identified indicator for this dimension within this framework will be the occupational situation change both individually and community wide.

In its essence, the analysis integrates social, physical, mental and economic dimensions, emphasizing the interconnected nature of health and well-being. By aligning with established framework and addressing heterogeneous aspects, the ongoing assessment strives for a holistic understanding of the factors influencing individual and community well-being.



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Table 1 - IHW Dimensions for Impact Assessment

Dimension	Sub-dimension	Target
Social Well-being	Social cohesion	Individual
	Discrimination	Community
Subjective well-being	Positive emotions	Individual
Spatial and Environmental well-being	Positive emotions	Community
Healthy lifestyles	Physical health status	Individual
	Leisure and free time	Community
Economic well-being	Employment	Individual
	Employment	Community

2.2 Methodology

2.2.1 Survey to local stakeholders

The ongoing evaluation of the IN-HABIT actions presented in this deliverable is based on a survey to local stakeholders and residents located in the four cities. A wider survey, mainly



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directed to citizens, will be part of the ex-post evaluation analysis to be implemented at the end of the project. The rationale of this analysis is the following:

The ongoing evaluation of IHW, focusing on local stakeholder and residents' perception, aligns with the Practical Participatory Evaluation (P-PE) methodology, characterized by stakeholder involvement in the evaluation process. According to Cousins and Whitmore (1998), P-PE has three main uses: instrumental (decision support), conceptual (educational or learning function), and symbolic (persuasive or political use to reaffirm decisions or promote an agenda). Stakeholder participation enhances the relevance and objectivity of the evaluation.

The survey aims to capture the state of VIS implementation at a specific point in time, considering the varying pace of development and implementation across cities. As of July 2024, the four cities showed diverse levels of VIS implementation. To avoid underestimating the potential of not-yet-implemented VISs and overestimating the impact of implemented ones, the evaluation focused on collecting perceptions regarding both individual and community-level impacts of IN-HABIT actions.

Given the varied implementation and potential for incomparable results, the evaluation opted for broad questions about IN-HABIT actions, allowing respondents to think about specific VISs. This approach, aligned with city team suggestions, aimed to maintain survey generality and result comparability.

It is acknowledged that the small sample size cannot be considered as representative of the whole population. However, the structure of the survey allows the proper collection of residents' and stakeholders' perception of the on-going VISs' impacts. In addition, sample size has been increased substantially with respect to the previously administered survey.

The questionnaire includes both multiple choice (Likert scale) and open-ended questions. The results have been analyzed through standard statistical techniques and advanced text analysis techniques. While standard statistical techniques employed to analyze the multiple-choice Likert scale question are widespread and well-known, text analysis techniques deserve an in-



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depth description, which has been provided in D7.1 but is also reported in the following subsection for the sake of clarity.

2.2.2 Text analysis

An important purpose of text mining and natural language processing is to discover the most important words/topics in a document. One measure of a word's importance is its term frequency (*tf*), that is a measure of how frequently a term occurs within a document. This is usually calculated after removing the so-called “stop words” that recur several times in a text but are not important for identifying topics or sentiments, such as “the”, “is”, and so on. An additional measure used in text analysis is the inverse document frequency (*idf*), which allows to decrease the weight of commonly used words and increase the weight of little-used words in a set of documents. Mathematically:

$$idf(term) = \ln \left(\frac{\text{no. documents}}{\text{no. documents containing the term}} \right)$$

In other words, *idf* is the natural logarithm of the ratio of the total number of documents divided by the documents in which the word appears.

The *tf-idf* statistic, obtained multiplying the *tf* and *idf*, allows to measure the importance of a word within a document in a collection (or corpus) of documents. Although information theorists have struggled to reconcile this approach with the available theory, *tf-idf* has proven to be a formidable tool in many applications, such as search engines and recommender tools (Beel et al., 2015).

The *tf-idf* statistics can be used to rank words by importance but also by *n*-grams. An *n*-gram is a set of *n* successive elements in a text document that can include words, numbers, symbols, and punctuation. *N*-gram models are useful in many text analysis applications where word



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sequences are relevant, such as in sentiment analysis, text classification, and text generation. In our analysis, we compute bi-grams (or simply, bigrams), namely word pairs, where couples of terms are ranked by importance through the *tf-idf* measure.

Topic modelling is a branch of unsupervised natural language processing that is used to represent a text document throughout different topics, which can better explain the underlying information in a particular document. To find these topics, we use the Latent Dirichlet Algorithm (LDA). This is a machine learning algorithm that finds topics that are not known *a priori* and are hidden in the data. It is based on the Dirichlet distribution and assigns topics to documents and document words to topics. In fact, the algorithm considers each document as a mixture of topics and each topic as a mixture of words. The three stages of the algorithm are:

Step 1. The term distribution b is determined by

$$b \sim \text{Dirichlet}(d).$$

Step 2. The proportions θ of the topic distribution for the document w are determined by

$$q \sim \text{Dirichlet}(a).$$

Step 3. For each of the N words w_i the algorithm

(a) chooses a topic $z_i \sim \text{Multinomial}(q)$

(b) chooses a word w_i from a multinomial probability distribution conditioned on the topic z_i : $p(w_i | z_i; b)$, with β being the term distribution of topics and contains the probability of a word occurring in a given topic.

The purpose of the algorithm is to estimate unknown parameters using data (text), that is, to estimate which words are important for which topic and which topics are important within a given document. We use the LDA-Gibbs algorithm that is based on Gibbs sampling. The algorithm examines each document and randomly assigns each word in the document to one of the K topics using Gibbs sampling. For this reason, we set a seed before running the algorithm in order to reproduce the results. The seed used in this word is 1, using the *R* function `set.seed(1)`. All the elaborations are produced using the programming language *R*.



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3 The questionnaire for ongoing evaluation

3.1 The questionnaire

The questionnaire, originally drafted by researchers at UNITO and CCA after consultations with the city partners (in July 2023) has been revised following the EC suggestions and feedback. The city partners took care of collecting, anonymizing and translating the responses, before sending them to UNITO and CCA researchers.

The questionnaire is divided into three sections:

- **Section A (personal information):** It collects demographic information about participants (gender, age, city of residence, ethnicity, disability).
- **Section B (Likert scale questions):** It includes 8 Likert scale questions (0-5) to assess respondents' perception of the impact of a specific VIS (mentioned at the beginning of the section) on social well-being, subjective well-being, spatial and environmental well-being, healthy lifestyles, and economic well-being, both individually and at the community level. This section was significantly revised to meet the requirements of the European Commission, reducing the number of questions from 14 to 8 and eliminating the distinction between B.I and B.II that was present in the D7.7 questionnaire
- **Section C (open ended questions):** Contains 2 open-ended questions. The first asks participants about their perceptions of IN-HABIT activities in which they were involved (actively or indirectly). The second question asks them to report feedback received from other people in the community.

Table 2 below presents the questionnaire.

Table 2 Questionnaire for ongoing evaluation.

IN-HABIT Questionnaire for ongoing evaluation
Introduction



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We would be grateful to you if you could assist us by participating in answering the following questionnaire. The results will be analysed by the University of Turin (Italy) for the purposes of assessing the ongoing impact of the IN-HABIT project.

Completing the questionnaire takes around 20 minutes.

IN-HABIT is a research and innovation project coordinated by the University of Cordoba. The objective of the project is to foster Inclusive Health and Wellbeing (IHW) in four small and medium size cities (Cordoba, Lucca, Riga, Nitra) through visionary and integrated solutions, based on the mobilisation of undervalued resources (culture, food, human-animal bonds and environment), with a focus on gender and diversity. The project has received funding from the European Union's Horizon 2020 Programme under Grant Agreement n.869227.

Your participation in this survey is completely anonymous and voluntary.

Local partner

Date: [DD/MM/YYYY]

Partner City: [Cordoba/Lucca/Nitra/Riga]

Section A. Respondents' data

1. Are you: [male/female/nonbinary/other/prefer not to say]
2. Age: []
3. City of residence: [same as IN-HABIT solutions' location/other]
4. Do you belong to any ethnic minority in your city? [YES/NO/prefer not to say]
5. Do you have any form of disability? [YES/NO/prefer not to say]

Section B. Respondents' perception

Please report to what extent you agree with the following statements on a scale from 0 to 5, where 0 = strongly disagree and 5 = fully agree. Please think about the INHABIT implemented solutions in the past 18 months, when answering the questions.

The implemented solution/s:

1. Improved social relations in the city/neighbourhood
[0 1 2 3 4 5]
2. Helped reducing social discrimination in the city/neighbourhood
[0 1 2 3 4 5]
3. Has/have been associated with a positive and emotional personal feeling



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[0 1 2 3 4 5]

4. Has/have been associated with a positive atmosphere and emotional feeling in the neighbourhood

[0 1 2 3 4 5]

5. Has/have been associated with physical wellness

[0 1 2 3 4 5]

6. Provided the community with additional opportunities to participate in healthy activities

[0 1 2 3 4 5]

7. Provided opportunities for job finding/upgrading

[0 1 2 3 4 5]

8. Enriched the professional networking relationships

Section C. Respondents' open questions

1. Have you been involved (either directly or indirectly) in one (or more) of the IN-HABIT activities? [YES/NO]

If YES:

- Which activity/ies have you been involved to?
- Tell us your overall perception.
- Tell us something specific that you remember, either positive or negative, in relation to the solution/activity.

If NOT: go to question 2

2. Did you receive any direct/indirect feedback from someone in the community who participated to one or more of the INHABIT activities? [YES/NO]

If YES:

- Could you tell us something about the people involved (individuals; business owners; young people; kids; elderly; etc.)?
- Did you receive positive or negative feedback? Could you tell us about that?



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- Tell us your overall perception.

If NOT: end of questionnaire

End of questionnaire

Thank you!

Table 2 Illustrates how each targeted dimension is broken down into 2 sub-dimensions. The latter are recognized to take into consideration two different levels of aggregation, namely: the individual-wide level and the community-wide level.

In the Social Well-being dimension, the addressed sub-dimensions are “Social Cohesion” and “Discrimination”, targeted to individuals and community respectively. In this deliverable, the chosen indicator for the social cohesion aspect is identified as the enjoyment of positive personal relationship within the respondents’ neighbourhood. In practical terms, through question B.1 of the questionnaire, the analysis tries to assess if the implemented VISs have improved the quality of respondent’s personal relationships within her own living area.

On the other hand, the selected indicator for the discrimination aspect is the respondents’ perception of discrimination within the neighbourhood. Accordingly, every interviewed has to answer question B.2 considering the other local citizens’ inclination to negatively judge minority groups seeing them as dangerous, dishonest, criminal, unreliable or bad neighbours.

As stressed above, subjective well-being and spatial and environmental well-being can be considered as two faces of the same coin. Yet they are treated as separate dimensions that map respectively on individual and community targets, for which the addressed sub-dimension is “Positive emotions. Question B.3 and B.4 of the questionnaire are based on the same indicator



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that is represented by the “feeling of cheerfulness and good spirit”. This indicator is developed taking into consideration both the positive and emotional personal feeling (on the individual aspect: subjective well-being) and the positive atmosphere and emotional feeling in the neighbourhood (on the community aspect: spatial and environmental well-being).

The Healthy Lifestyle dimension is broken down into two sub-dimensions, “Physical health status” at the individual level and “Leisure and free time” at the community level. Question B.5 investigates the possible impact of implemented VISs on the level of physical health reported by every respondent. The aim is to address the possibility that VISs provided occasions to experience physical wellness or to improve general physical condition. Question B.6 investigates the impact that the implemented VISs could have on the possibility to get engaged in more healthy activities during leisure/free time (i.e. providing infrastructure or sparking interest in healthy activities).

The Economic Well-being dimension is addressed considering the same sub-dimension for both individual and community level, namely “Employment”. The used indicator refers to the job market condition and introduces in the survey strictly the economic aspect. Question B.7 investigates the extent to which the implemented VISs provided opportunity to find a job or switch job to a better salary or job environment while question B.8 addresses the possibility that the VISs enriched the professional networking relationship within the neighbourhood.

Table 3 Dimension of IHW evaluation and questionnaire's questions from Section B.

Dimension	Sub-dimension	Target	Questions from section B	Indicator
Social Well-being	Social cohesion	Individual	1. Improved social relations between people in the city/neighbourhood.	Satisfaction with personal relationships in the neighbourhood
	Discrimination	Community	2. Helped reducing social discrimination in the city/neighbourhood.	Perception of discrimination in society



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Subjective well-being	Positive emotions	Individual	3. Has/have been associated with a positive and emotional personal feeling	Feeling cheerful and in good spirit
Spatial and environmental well-being	Positive emotions	Community	4. Has/have been associated with a positive atmosphere and emotional feeling in the neighbourhood	Feeling cheerful and in good spirit
Healthy lifestyles	Physical health status	Individual	5. Has/have been associated with physical wellness	Self-reported health status
	Leisure and free time	Community	6. Provided the community with additional opportunities to participate in healthy activities	Practice of healthy leisure
Economic well-being	Employment	Individual	7. Provided opportunities for job finding/upgrading?	Opportunity to find a job in the city
	Employment	Community	8. Enriched the professional networking relationships in the city/ neighbourhood	Opportunity to find a job in the city



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4 Analysis of the results

4.1 Questionnaire sections A and B

Section A aims to collect basic information about our respondents. The whole sample includes 133 interviews completed by 90 female respondents and 40 male respondents (the others did not disclose their gender), with an average age of 46 (sd = 16). 19 respondents identified as being part of an ethnic minority, and 12 respondents declared having some form of disability. A detailed analysis of the summary statistics of the basic information by city is presented in section 3.3. Section B aims to understand the impact of the proposed solutions on social, health and economic factors. One question of the questionnaire aims to identify which IN-HABIT activities the respondent was actively involved in. Even though this question is in Section C, we report it here for convenience. We summarize this information in Table 4. To extract this information from the interviews, we constructed bigrams from the question “Which activity/ies have you been involved to?” and ordered the replies by tf-idf (term frequency, inverse document frequency, see section 1.2.2). In Cordoba, respondents who actively participated in the actions took part to socio-cultural visits and dancing activities; respondents in Lucca participated to city visits and used the animal lines created for pet owners; Nitra’s respondents participated mostly to the community garden while respondents in Riga participated in activities such as the community kitchen activity.

Table 4 “Which activity/ies have you been involved to?”. Bigrams ranked by tf-idf.

City	Bigram	Frequency	tf-idf
Lucca	animal assisted	24	0.574
Lucca	assisted intervention	24	0.574
Riga	cep te	3	0.154
Cordoba	perol gourmet	19	0.107
Riga	creation kitchen	2	0.103



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Riga	rent agreement	2	0.103
Lucca	nursing home	4	0.0956
Cordoba	cantarranas neighborhood	13	0.0730
Cordoba	la milla	13	0.0730
Cordoba	neighborhood picnic	13	0.0730
Cordoba	sociocultural visits	13	0.0730
Cordoba	square perol	13	0.0730
Cordoba	weekly workshops	13	0.0730
Cordoba	healthy recipes	12	0.0674
Cordoba	christmas party	11	0.0617
Nitra	community garden	22	0.0616
Cordoba	milla cantarranas	10	0.0561
Riga	attended events	1	0.0513
Riga	budget planning	1	0.0513
Riga	collective developed	1	0.0513

To measure respondents' perceptions of VIS, they were offered 12 statements to be ranked on a 0-5 scale (where 0 = strongly disagree and 5 = completely agree). Summary statistics are shown in Table 5. The general perception of the respondents is positive, as both median and mode are always 4 and 5, but the presence of 0 as the lowest value also shows the strong disagreement of some respondents. The highest level of agreement was on the items "Has/have been associated with a positive and emotional personal feeling", "Has/have been associated with a positive atmosphere and emotional feeling in the neighbourhood", and "Provided the community with additional opportunities to participate in healthy activities". This shows that the implemented solutions have had a significant impact on health indicators and subjective well-being. The implemented solutions seem to have a great positive impact on individual health factors because the most recurrent score (mode) is 5, the highest possible score, and on two items we have the highest median of the entire Section. The weakest results are on economic indicators since for item 7 we recorded the lowest values of this part of the questionnaire.



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Although the proposed solutions were not very helpful in finding or improving a job, they proved useful in building a professional network, as item 8 shows very high scores.

The remaining part of the questionnaire was focused on open-ended questions, which we analyzed using text mining. The summary statistics for each city are provided in Section 3.3.

Table 5 Summary statistics of Likert scale questions 1-8 (0 = strongly disagree, 5 = fully agree).

Question	Min	Mode	Median	Max
1. Improved social relations in the city/neighbourhood	0	5	4	5
2. Helped reducing social discrimination in the city/neighbourhood	0	4	4	5
3. Has/have been associated with a positive and emotional personal feeling	0	5	5	5
4. Has/have been associated with a positive atmosphere and emotional feeling in the neighbourhood	0	5	5	5
5. Has/have been associated with physical wellness	0	5	4	5
6. Provided the community with additional opportunities to participate in healthy activities	0	5	5	5
7. Provided opportunities for job finding/upgrading	0	3	3	5
8. Enriched the professional networking relationships	0	5	4	5



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4.2 Questionnaire section C

4.2.1 Overall perception of those who participated in one or more IN-HABIT actions

After removing all stop words, the texts collected on this question in the four cities were analyzed to find the most recurrent words. Table 6 shows that the most recurrent words were “people” in Nitra, “activity” in Lucca, “positive” in Riga, and “neighborhood” in Cordoba. Riga also had the highest number of respondents who did not respond to this part of the questionnaire as shown by the high number of missing observations (NA) and the lowest total of words.

Table 6 Word ranking per city. “Total” indicates the total number of words collected per city in the responses to this question considering all respondents.

City	Word	Frequency	Total
Nitra	people	28	950
Nitra	community	18	950
Nitra	project	16	950
Nitra	activities	15	950
Riga	NA	14	133
Cordoba	neighborhood	13	177
Nitra	workshop	13	950
Nitra	children	12	950
Nitra	involved	11	950
Nitra	positive	11	950
Nitra	impression	10	950
Nitra	life	9	950
Cordoba	people	8	177
Cordoba	positive	8	177
Nitra	space	8	950



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Nitra	spaces	8	950
Riga	positive	8	133
Lucca	activity	7	129
Nitra	city	7	950
Nitra	dražovce	7	950

Before proceeding with the text analysis models, we checked whether these texts followed the usual empirical facts of language to work with the usual machine learning tools. This analysis is reported in Appendix (Figures A1-A2).

To rank the words, we calculated the tf-idf (term frequency, inverse document frequency) statistic, used to measure the importance of a word in a document in a collection (or corpus) of documents. In our application we intend to check the importance of a word in the four cities. The results are shown in Figure 3.

It emerged that the most relevant words predict the VIS that was implemented in each city. For example, in Cordoba the proposed VIS were perceived relevant to the local community, as the words with the highest tf-idf were “neighborhood” or “neighbors”. In Lucca, where the VIS focused on animals, there are words such as “animals” or “dogs”. The VIS seems to influence the local community as many words recalling the idea of groups are present in each city.



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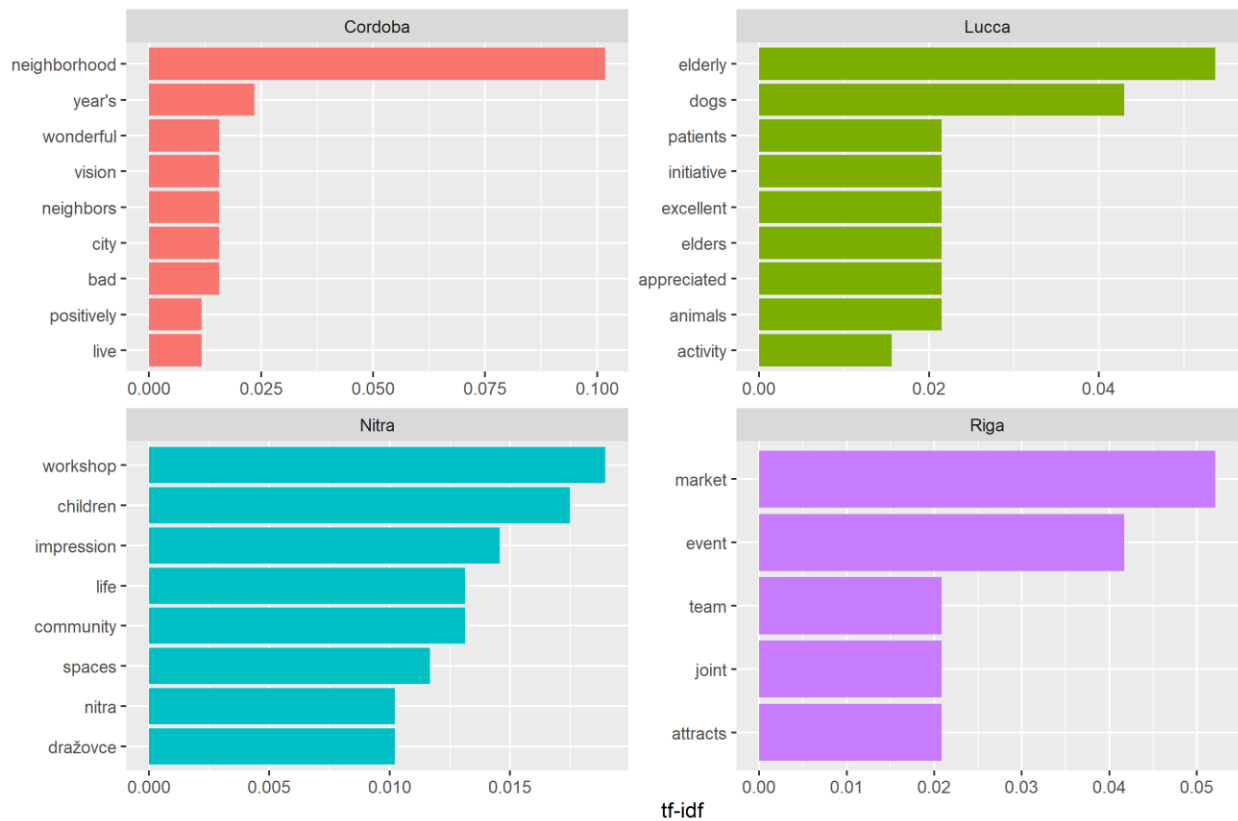


Figure 3 - Top words by tf-idf statistic for each city.

To better understand the relationships between words, we proceed to analyze bigrams. The analysis of higher n -grams is of limited usefulness due to the limited amount of text. In Table 7 these bigrams are ordered by tf-idf. There are interesting patterns emerging from the analysis of bigrams. In Cordoba the community is at the center of the experience, as bigrams such as “encourages coexistence”, “neighborhood participation” or “neighbourhood relations” clearly indicate that the VIS influenced the capability of individuals to build ties with other members of the community. In Lucca the core is represented by the relationship between humans, especially elderly, and animals, with many bigrams pointing towards a positive perception of the VIS. For



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Nitra the main sentiment was related to the community and the environment, while for Riga cooking appears to be the common denominator between the different bigrams.

Overall, the sentiment seems to be positive, but to double check we also performed an additional sentiment analysis on the most frequent words that were preceded by “not” and were associated with a sentiment. Sentiment analysis is used to determine if the emotional tone of a text is positive, negative, or neutral. The two bigrams obtained using this analysis are “not bad”, and “not stupid”, which do not denote any negative sentiment.

Table 7 Bigrams ranked by tf-idf. In bold bigrams commented in this section.

Cordoba bigrams	Lucca bigrams	Nitra bigrams	Riga bigrams
addition relations	excellent initiative	public spaces	market team
bad image	7 days	pleasantly surprised	aesthetically pleasing
beautiful garden	activities proposed	positive impression	attracts people
encourages			
coexistence	activity reducing	activities carried	attracts visitors
green plants	animals people	community garden	community centre
hire people	beautiful space	community life	cooking activities
neighborhood			
participation	beneficial action	edible greenery	cool joint
neighbourhood			
relations	cognitive deficit	organized activities	creation kitchens
participation			
improvement	consolidate relationships	safe space	dinner event
personal level	curious satisfied	wide range	easily understand
psychological level	develope emotionality	absolutely fantastic	emotions opportunities
sound positively	elderly affected	academic sector	enjoy culture
taking care	elderly engaged	actively involved	enjoyed meeting
vegetable garden	elderly people	activists volunteers	environment attracts
weekly activities	emotionally involved	added specifically	experience taking
wonderful experience	excellent projects	artistic elements	extended joint



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year's activities	feel judged	aspiring professionals	fantastic atmosphere
year's workshops	involve subjects	attended workshops	joint cooking
	medium cognitive	barrier free	joint dinner
	mild medium		lift operational

It is also interesting to see how all the words in the four cities eventually relate to each other. For this reason, we built a network using our bigrams to check the existence of potential linkages between the words. In Figure 4 we keep only the most common combinations ($n \geq 2$). If we restrict our attention to words that are more common (they appear at least twice), the emerging links highlight the fact that the general impression is positive.

Finally, we used the Latent Dirichlet Allocation-Gibbs (LDA-Gibbs) topic model to individuate if there is some common topic in our data. This is important because it makes it possible to highlight common ideas or feelings among the respondents. We opted for the minimum number of topics ($k = 2$) given the limited text available. The results are shown in Figure 5 in the form of word clouds. The most important words in the text are “people”, “activities”, “community”, “positive” and “good”. We can also see that in both topics positive words are recurring and important. This indicates that our respondents were mostly satisfied with the project in which they were involved.



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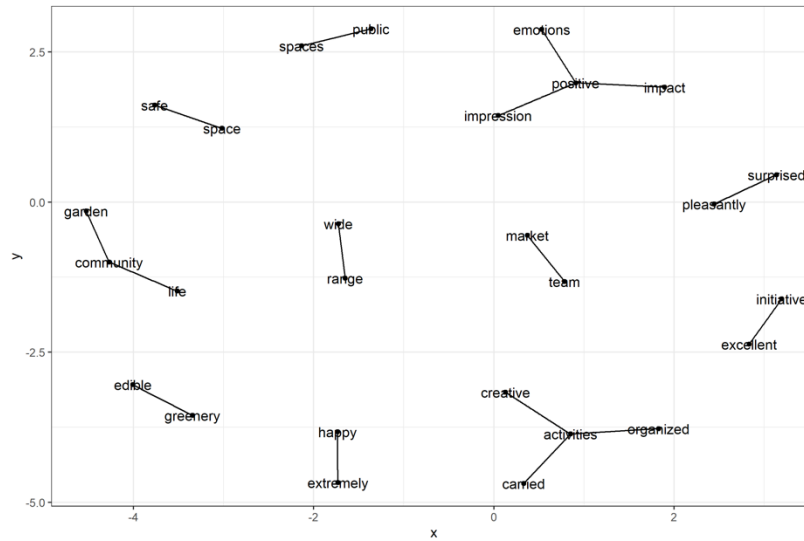


Figure 4 - Graph of the bigrams ($n \geq 2$) of the four cities.



Figure 5 - Word clouds of the two topics

Note: (topic 1 on the left, topic 2 on the right) obtained with the LDA-Gibbs algorithm. Bigger words indicate more important words.



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4.2.2 “Tell us something specific that you remember, either positive or negative, in relation to the solution/activity”

We repeat the analysis for the question “Tell us something specific that you remember, either positive or negative, in relation to the solution/activity” asked to the individuals involved in the IN-HABIT actions. Table 8 shows many of the words already discovered in the previous section. In Lucca and Riga, we recorded the lowest response rate. The word “positive” appears in almost all cities, while in Nitra also the word “negative” has a high frequency, evidencing contrasting opinions in that city.

Table 8 Word ranking per city.

City	Word	Frequency	Total
Nitra	people	29	750
Nitra	activities	14	750
Nitra	community	14	750
Riga	NA	14	187
Cordoba	neighborhood	13	185
Nitra	positive	13	750
Cordoba	people	12	185
Nitra	negative	10	750
Nitra	project	10	750
Cordoba	positive	9	185
Lucca	NA	9	177
Nitra	hidepark	8	750
Nitra	involved	8	750
Lucca	positive	7	177
Nitra	children	7	750



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The bigrams in Table 9 show that, coherently with the previous comments, in Cordoba the VIS had an impact over the community favoring integration. In Lucca the word “negative” appears in the list near to “experience”. In Nitra some people were dissatisfied as the bigram “negative experiences” is on top of the list. However, we also document contrasting sentiments with the presence in the list of positive bigrams such as “positively evaluate” or “absolutely amazing”. These contrasting sentiments emerge also by looking at the analysis of graphs (Figure 6).

Table 9 Bigrams ranked by tf-idf. In bold bigrams commented in this section.

Cordoba bigrams	Lucca bigrams	Nitra bigrams	Riga bigrams
activities courses	3 associations	negative experiences	community stage
city makes	active participation	community garden	community kitchen
courses workshops	activities involving	pecha kucha	accessibility ramp
de dentro	activity allowed	pumpkin parade	artist's fish
dead hours	activity level	multicultural club	catering enterprises
dentro pa	animal's abilities	people involved	cep te
design workshops	beneficial effect	positively evaluate	change people's
entrepreneurial activity	building stories	slovak majority	cool people
events related	creating shapes	absolutely amazing	create cohesion
involved creates	creative activities	it's	excursion organised
learning training	day center	active people	favourite moment
love learning	deep emotion	activities carried	finally sorted
marginal neighborhood	diy building	activities workshops	fish soup
neighborhood			
involvement	dog interacting	actual implementation	habit project
outdoor union	dog negative	amazing experience	habits people
pa fuera	dogs involved	architect drew	instance serve
participated directly	dogt hat	it's	kitchen operates
people live	elderly lady	behavioral games	kitchen temporarily
people participate	elderly person	biggest experience	market's approach



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The LDA-Gibbs model allows us to formulate some other considerations on the overall feedback of our respondents (Figure 7). Indeed, in Topic 1 it seems that respondents were satisfied with the adopted solutions, as words like “positive” slightly dominates over “negative”. Topic 2 highlights that a main theme in our participants’ feedback was the “community” with the word “people” as the central one in the second topic.

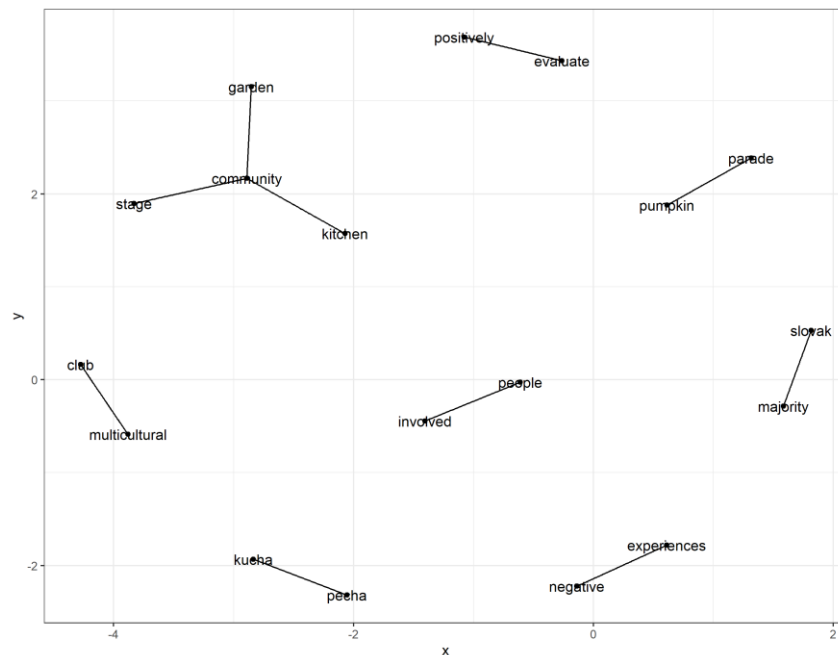


Figure 6 - Graph of the bigrams ($n \geq 2$) of the four cities



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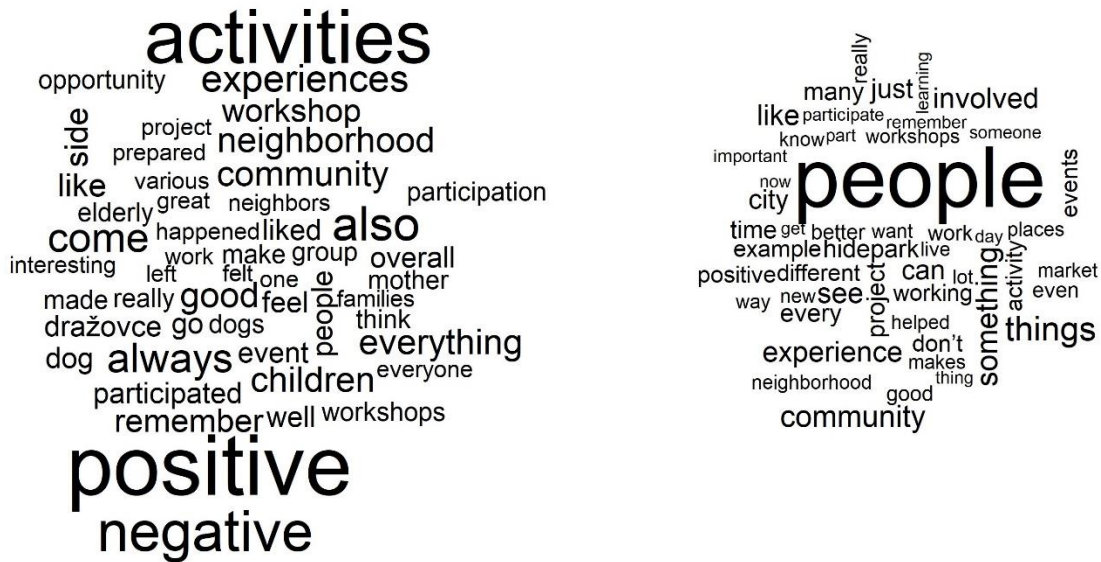


Figure 7 - Word clouds of the two topics

Note: topic 1 on the left, topic 2 on the right) obtained with the LDA-Gibbs algorithm. Bigger words indicate more important words.

4.2.3 Feedback received by the respondent from someone in the community who participated to one or more of the INHABIT activities

The last part of the questionnaire aimed at gathering feedback obtained from the respondents from other individuals involved in the proposed solutions. It was not possible to produce a bigram for the city of Cordoba due to the low response rate. The analysis for the bigram of the other cities (Table 10) highlights contrasting opinions, given the presence of bigrams such as “elderly negative”, “negative feedback” or “people complain” contraposed to bigrams such as “engaging memories” or “excellent condition”.



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Table 10 Bigrams ranked by *tf-idf*. In bold bigrams commented in this section.

Cordoba bigrams	Lucca bigrams	Nitra bigrams	Riga bigrams
	elderly people	cheap labor	accessibility ramp
	nursing home	community garden	acquaintances
	activated engaging	community oriented	educational
	alzheimer's appreciated	conduct workshops	community centre
	associations proposed	deeply ingrained	essential life
	daily life	easily addressed	events organised
	dogs reactions	elementary school	feel left
	elderly guests	excellent condition	free time
	elderly negative	feedback directly	gain essential
	emotions socialized	immediately told	inclusive activities
	engaging memories	includes comments	life skills
	expressed emotions	koza community	market facilities
	feedback elders	negative feedback	market functions
	people living	oz pre	mixed people
	positive dogs	pecha kucha	neighbourhood
	proposed similar	people appreciated	association
	reactions discovering	photo exhibition	one's personality
	similar activities	pleasant feeling	operating lift
	surprised watching	positive reaction	organises events
	tripod dog	pre dražovce	people complain
			people expected
			permanent solution



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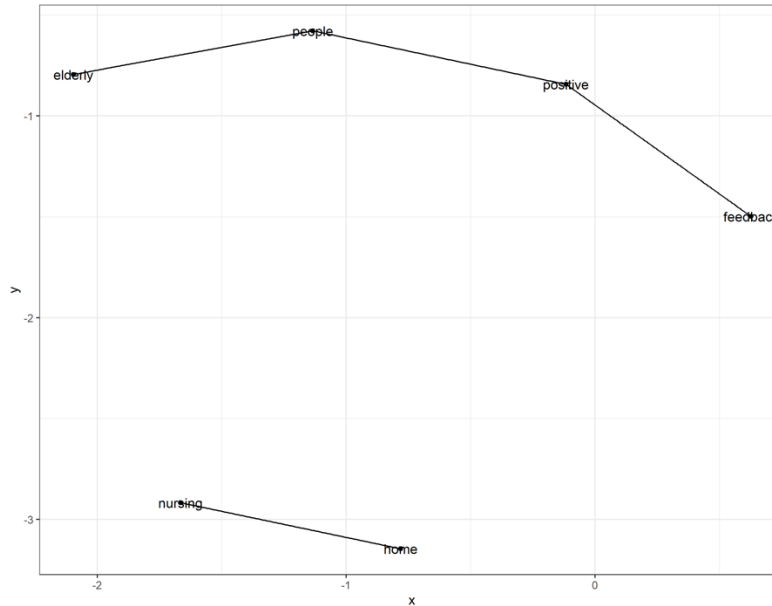


Figure 8 - Graph of the bigrams of the four cities

To understand if there is one dominant sentiment in the responses, we performed again the network (Figure 8) and LDA analysis (Figure 9). The empirical evidence suggests that the dominant feedback was positive, as one of the two graphs that emerged shows a positive feedback from the elderly, while Topic 1 of LDA shows as central ford “positive” and “feedback”.



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Figure 9 - Word clouds of the two topics

Note: Topic 1 (on the left) and topic 2 (on the right) are obtained with the LDA-Gibbs algorithm. Bigger words indicate more important words.

4.3 Summary statistics by city

4.3.1 Cordoba

The sample consists of 30 respondents (11 men; 19 women), including 4 persons with a disability; 6 respondents identified themselves as minorities in their city. The average age is 49 years old (sd = 14), with a minimum of 25 and a maximum of 73. Table 11 reports the summary statistics of 12 statements that were evaluated by the respondents on a 0-5 Likert scale.



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Given that the median and mode are always 4 or 5 and that no one expressed a value of 0 or 1 shows that the respondents felt that the proposed VIS was very effective in promoting the dimensions described in the 8 items. The lowest scores were recorded on the economic dimension (items 7 and 8). There is at least one very dissatisfied respondent for each item as the minimum value is always zero.

Table 11 Summary statistics of Section B (Likert scale: 0 = strongly disagree, 5 = fully agree).

Question	Min	Mode	Median	Max
1. Improved social relations in the city/neighbourhood	0	5	5	5
2. Helped reducing social discrimination in the city/neighbourhood	0	4	4	5
3. Has/have been associated with a positive and emotional personal feeling	0	5	5	5
4. Has/have been associated with a positive atmosphere and emotional feeling in the neighbourhood	0	5	5	5
5. Has/have been associated with physical wellness	0	5	5	5
6. Provided the community with additional opportunities to participate in healthy activities	0	5	4	5
7. Provided opportunities for job finding/upgrading	0	3	3	5
8. Enriched the professional networking relationships	0	3	4	5



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4.3.2 Lucca

The sample consisted of 32 respondents (6 men; 24 women, and 2 who did not respond), including 5 persons with a disability, and one respondent identifying as minorities. The average age is 55 years old (sd = 18). Table 12 reports the summary statistics of 12 statements that were evaluated by the respondents on a 0-5 Likert scale.

The median and mode for most of the items is between 4 and 5, hence showing that the respondents felt that the proposed VIS was effective in promoting the dimensions described in the 8 items. However, some respondents were very dissatisfied with the items measuring social and economic wellbeing, given the presence of zeros as answers. Subjective and spatial wellbeing and healthy lifestyles items received the highest scores given that the minimum is higher than zero.

Table 12 Summary statistics of Section B (Likert scale: 0 = strongly disagree, 5 = fully agree)

Question	Min	Mode	Median	Max
1. Improved social relations in the city/neighbourhood	0	5	4,5	5
2. Helped reducing social discrimination in the city/neighbourhood	0	5	4	5
3. Has/have been associated with a positive and emotional personal feeling	3	5	5	5
4. Has/have been associated with a positive atmosphere and emotional feeling in the neighbourhood	3	5	5	5
5. Has/have been associated with physical wellness	3	5	5	5
6. Provided the community with additional opportunities to participate in healthy activities	2	5	5	5
7. Provided opportunities for job finding/upgrading	0	3	3	5
8. Enriched the professional networking relationships	0	5	4	5



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4.3.3 Nitra

The sample consists of 41 respondents (17 men; 23 women; one did not respond), including two persons declaring a disability and 12 belonging to an ethnic minority. The average age is 32 years old (sd = 15), with a minimum of 18 and a maximum of 73. Table 13 reports the summary statistics of the 8 statements that were evaluated by the respondents on a 0-5 Likert scale.

The results in Nitra are the best one in terms of minimum score, as only for the economic dimension the minimum score was zero. Satisfaction with the proposed solution was very high for all the dimensions except for item 2 and 7, given that the median was lower relative to the other items.

Table 13 Summary statistics of Section B (Likert scale: 0 = strongly disagree, 5 = fully agree)

Question	Min	Mode	Median	Max
1. Improved social relations in the city/neighbourhood	1	4	4	5
2. Helped reducing social discrimination in the city/neighbourhood	1	4	3	5
3. Has/have been associated with a positive and emotional personal feeling	3	5	5	5
4. Has/have been associated with a positive atmosphere and emotional feeling in the neighbourhood	3	5	5	5
5. Has/have been associated with physical wellness	3	5	5	5



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6. Provided the community with additional opportunities to participate in healthy activities	3	5	5	5
7. Provided opportunities for job finding/upgrading	0	3	3	5
8. Enriched the professional networking relationships	0	5	4	5

4.3.4 Riga

The sample consisted of 30 respondents (6 men; 24 women), with one person with a disability and no ethnic minorities. The average age is 39 years old (sd = 11), with a minimum of 18 and a maximum of 67. Table 14 reports the summary statistics of the 8 statements that were evaluated by the respondents on a 0-5 Likert scale.

For Riga, despite the low minimum values, the modal and median score are high, revealing a high level of agreement with the 8 items proposed. The economic dimensions was evaluated with lower score than in the other cities, as the median is 2,5 for item 7 and 3 for item 8.

Table 14 Summary statistics of Section B (Likert scale: 0 = strongly disagree, 5 = fully agree)

Question	Min	Mode	Median	Max
1. Improved social relations in the city/neighbourhood	0	5	4	5
2. Helped reducing social discrimination in the city/neighbourhood	0	4	4	5
3. Has/have been associated with a positive and emotional personal feeling	2	5	5	5



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4. Has/have been associated with a positive atmosphere and emotional feeling in the neighbourhood	1	5	5	5
5. Has/have been associated with physical wellness	0	4	4	5
6. Provided the community with additional opportunities to participate in healthy activities	0	5	4	5
7. Provided opportunities for job finding/upgrading	0	3	2,5	5
8. Enriched the professional networking relationships	0	3	3	5



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5 Conclusions

Overall, the analysis of the results shows that the respondents agree that the proposed VIS affected the dimensions evaluated throughout the Likert scale questions from Section B of the questionnaire. Notably, both the median and mode of their responses are always around 4 and 5 (5 being the highest possible value on the scale), but the presence of few zeroes as the lowest value in some instances mirrors the disagreement of some respondents. The strongest level of agreement was for the item “provided the community with additional opportunities to participate in healthy activities”, given that mode, median and maximum values are equal to 5. Our analysis revealed that the VISs had a remarkable impact on subjective and spatial well-being and healthy lifestyles, as the highest scores were recorded for items 3 to 6, while the weakest effect was on the economic well-being dimension, for which the lowest scores were recorded for item 7. Although most respondents agreed that the effect of VISs on the supply of job opportunities was weak, the activities were still helpful in enriching professional networking relationships, especially in Nitra and Lucca, while this effect was relatively moderate in Riga, for which we recorded the lowest scores on the economic dimension. Many positive aspects also emerged from the text analysis. In addition, network analysis using graphs revealed interesting connections, such as those between “safe,” and “space,” or “creative”, and “activities”, or even “elderly”, “people”, “positive” and “feedback”, showing a positive impact of the initiative.

Text analysis generally provided positive results, although it also revealed some concern among participants, as the word “negative” came up in both graph analysis and topic modelling. Many individuals were involved in the project, such as neighbours, children, business owners, youth, the elderly or business owners. This shows that the scope of the VISs was broad enough to ensure sufficiently heterogeneous participation in terms of age, gender, and even professional background. For these subjects we collected mostly positive feedback on the proposed VISs, although in this case the feedback is only indirect, as information is provided by the respondent. There were some critical responses, as evidenced by the presence of the “elderly negative”, “negative feedback” or “people complain” bigrams. Yet, it should be underlined that topic modelling shows that positive feedback tends to prevail over negative ones.



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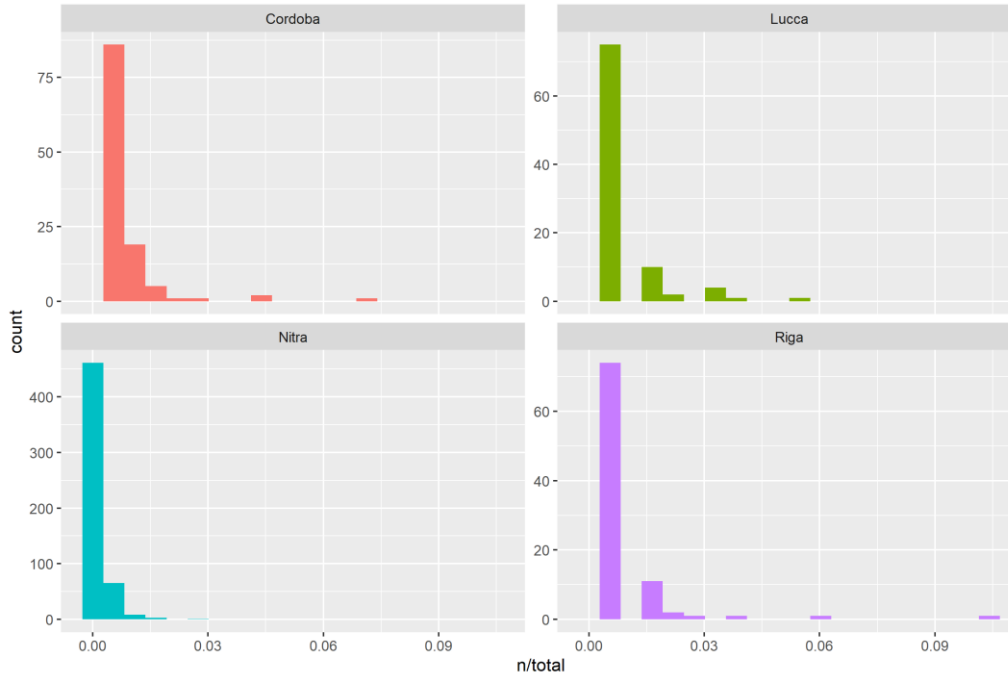


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Appendix A

Figure A.1 Distributions of term frequencies in each city – Overall perception of those who participated in one or more IN-HABIT actions



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Figure A.2 Zipf's law for the texts of the four cities (log-log coordinates). Colours defined as in Figure A.1. – Overall perception of those who participated in one or more IN-HABIT actions

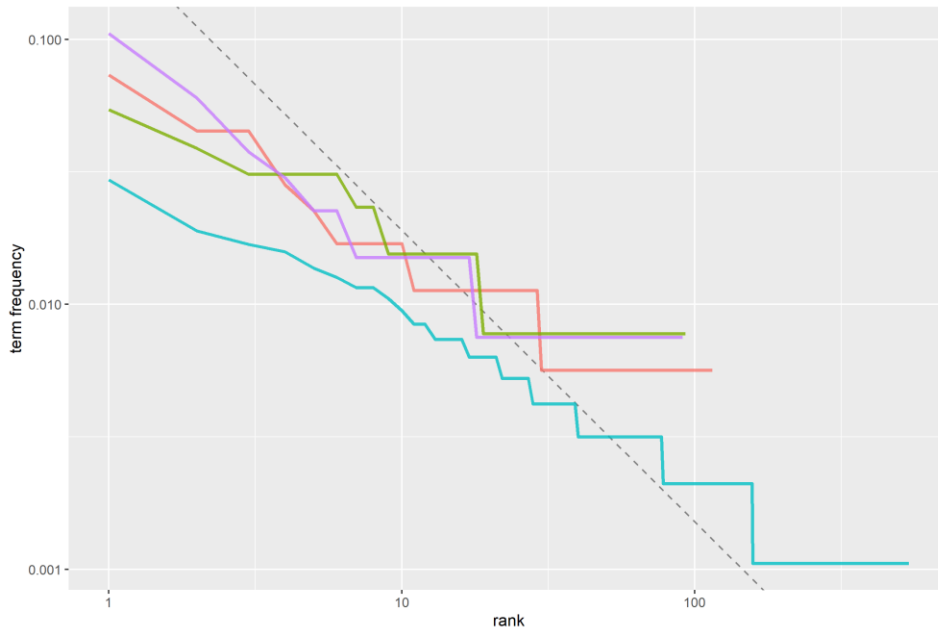


Figure A.1 shows the distributions of term frequencies in each city. These distributions are generally skewed, with a long tail to the right and a peak near zero. This is the case in our sample, that is to say, only a few words are particularly important for each community.

The second empirical fact to be verified is Zipf's law, namely that the frequency of occurrence of a word is inversely proportional to its rank. If this is the case, the graph of word frequency versus rank should show a negative slope. This seems to be the case for our texts (Figure A.2), although there are some deviations, due to the limited amount of text and the presence of rare words. Having detected no anomalies, we proceeded with the usual analysis.



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