

## The case for inclusive area profiling applied in geographic information systems

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*Published in:*  
Proceedings of the ICE - Municipal Engineer

*DOI:*  
[10.1680/jmuen.17.00024](https://doi.org/10.1680/jmuen.17.00024)

*Publication date:*  
2018

*Document Version*  
Author accepted manuscript

[Link to publication in ResearchOnline](#)

*Citation for published version (Harvard):*  
Giupponi, N, Thomson, C & Gibson, L 2018, 'The case for inclusive area profiling applied in geographic information systems', *Proceedings of the ICE - Municipal Engineer*, vol. 171, no. 3, pp. 173-182.  
<https://doi.org/10.1680/jmuen.17.00024>

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2 **Introduction**

3 *The re-emergence in contemporary planning of community representation and consultation*

4 The principle of building cities reflecting human needs goes as far back as the rise of modern civilisations  
5 with Ibn Khaldun understanding in 12<sup>th</sup> Century Egypt that “the purpose of (building towns) is to have places  
6 for dwelling and shelter and (to ensure) that harmful things are kept away from the towns and that useful  
7 features are introduced and all the conveniences are made available to them” (Ibn Khaldun, 1969). A  
8 thousand years later, planning is still trying to keep ‘harmful things’ away and introducing ‘useful features’  
9 such as better housing, efficient drainage systems, road networks and so on. The question arises, to what  
10 distinguishes contemporary planning from planning in 12<sup>th</sup> century Egypt? Although planning still seems to  
11 deal with timeless tasks like the one of addressing the spatial problems associated with a growing or  
12 declining population, planning theory has evolved in such a way that it does not solely attempt to address the  
13 relationship between socio-economic development and the natural and built environment but, through a  
14 series of transformations which occurred in the 21<sup>st</sup> century, it also attempts to help society articulate its own  
15 needs, especially the needs of the most disadvantaged and marginalised groups. As Hall (1988) narrates:  
16 “The change can be caricatured thus: in 1955, the typically newly graduated planner was at the drawing  
17 board, producing a diagram of desired land use; in 1965 s/he was analysing computer output of traffic  
18 patterns; in 1975 , s/he was talking late into the night with community groups in the attempt to organize  
19 against hostile forces in the world outside. ” (Hall, 1996:334)

20  
21 In the 1960’s, the idea of including people, their daily lives and routines in the design and development of  
22 cities, echoed with the failure of top-down large scale housing projects in the United States and Europe. As  
23 Marris (1998) explains: “for the sake of clearing slums or fostering economic development, governments  
24 regularly disrupted the ties of kinship, work and reciprocity which attached people to particular place”. As a  
25 reaction to this, Marris adds, “planning became associated with advocacy on behalf of those whose needs the  
26 welfare state did not meet and with the defence of communities, as places in which vital networks of  
27 relationship are embedded” (Marris, 1998) giving birth to a new generation of planners and a new theory of  
28 planning.

29  
30 The contrast between the top-down and bottom up approaches to planning as practiced by the planners  
31 responsible for the slum clearance and the planners involved in advocacy planning, is the result of two  
32 different theoretical frameworks, and associated mind-sets, exemplified by Sandercock (1998) distinction  
33 between the conceptualisation of good planning as delivered by a ‘heroic planner’ and the conceptualisation  
34 of good planning as achieved by “working for social transformation in community based organizations”.  
35 These two approaches have also been recently discussed in details by Rydin (2013) who instead focused  
36 more on the ‘growth based’ and ‘community based’ dimensions of planning.

1 This paper wants to shed more light on how, within the context of contemporary planning, the skills, tools  
2 and knowledge of planners could be brought to bottom up planning and used to engage and empower citizens  
3 in “making their voices heard creating radical ways of doing, knowing and acting” (Sandercock, 1998).

4

#### 5 *Community planning in the UK*

6 When US planning schools were elaborating theories for advocacy and radical planning, bottom-up planning  
7 practitioners in Europe were developing their own participatory approaches to urban design and development  
8 , spanning from Habraken’s work on the role of participation in mass social housing schemes in the  
9 Netherlands (Habraken, 1972), to Community Technical Aid Centres (CTACs) helping tenants refurbishing  
10 and designing housing schemes in the UK (Jenkins, 2010).

11

12 Nevertheless, in the late 80’s, CTACs and the broader community architecture movement started to decline  
13 as a result of a changing political and economic context in which a strong market orientated vision to urban  
14 development was being implemented to ensure economic growth in the British Cities struggling to fully  
15 recover from the blight of deindustrialisation (Spatial Agency, 2017). As recollected by Jenkins et al. (2010):  
16 “when Max Hutchinson took over from Rod Hackney as President of the RIBA in 1989, he promptly  
17 declared community architecture was dead: “It was not simply killed, it was overkilled. It was a PR exercise  
18 masquerading as a crusade”(cited in Towers, 1995: 217)”. Nonetheless, in 1995, Towers, a British planner  
19 notorious for his commitment to participatory planning explained that “Community architecture may be  
20 dormant but it is not dead.”, adding: “properly promoted, its revival (of community architecture) could do  
21 much to stimulate the development of alternative values; for the inner cities still characterised by social  
22 disintegration and physical decay, the revival of community architecture has never been more urgent”.

23

24 In line with Towers’ view, over the past decade, concerns have in fact re-emerged around the negative  
25 implications of failing to effectively include and consult communities in the design and planning of cities  
26 and this has resulted in the promotion of new concepts, practices as well as legal framework like the  
27 Community Empowerment (Scotland) Act 2015. A popular concept in the contemporary world of bottom up  
28 planning is the ‘place-making’ principle, a multi-faceted concept often associated to the critical work carried  
29 out in the 60’s by Jane Jacobs, William Whyte and Kevin Lynch. In design and architecture we are  
30 increasing hearing the use of ‘pop-up architecture’ as a new mean to deliver social objectives by getting  
31 communities involved in temporary design projects creating public spaces with the aim of facilitating social  
32 interactions (The Guardian, 2013; Madanipor, 2017).

33

34 Participatory and community oriented approaches to planning like place-making and pop-ups, however, are  
35 not exempt from critical appraisals with common criticisms that, when present, they could be tokenistic,  
36 reproduce existing power struggles, displace communities and fail to successfully engage with them (White,

1 1996; Friedmann, 2010; Monno V. & Khakee A, 2012; Pollock& Paddison 2014; Fincher et al. 2016;  
2 Schaller S. & Guinand S., 2017).

3

4 Despite the criticisms, it has to be recognised that such practices have seen the value of community  
5 consultation and the inclusion of the marginalised being again publicised and, with the introduction of new  
6 legislation, policies and strategies (Scottish Parliament, 2014 ; Scottish Government 2015; Scottish  
7 Government 2016a; Local Government Association, 2017), they will represent, at least for the near future,  
8 some of the key issues that planning practitioners will have to deal with.

9

10 In the context of Scotland, for example, the idea of place making has filtered down to local planning policies  
11 (Glasgow City Council, 2017), with Charrettes, a collaborative design strategy originally developed in the  
12 1960's, now being promoted by the Scottish Government to ensure communities are included in the shaping  
13 of our cities (Scottish Government, 2016b); another place making tool, the Place Standard Tool, has also  
14 been recently recognised for its contribution to better addressing people's needs and concerns about the  
15 places where they live (Scottish Government, 2017).

16

17 This paper will bring attention to a participatory tool/activity understood to enhance dialogues with  
18 communities during consultation processes: community mapping. In particular, it illustrates how community  
19 mapping carried out during consultation events could be integrated to Geographic Information Systems and  
20 subsequently used during traditional neighbourhood profiling (Scottish Government 2014; Scotland Census,  
21 2017).

22

### 23 **Rationale and overall aim of research**

24

25 This research recognises that community consultation activities where communities and citizens are asked to  
26 either reflect their knowledge and understandings of the place or state preferences over different spatial  
27 scenarios, have (re)-gained importance in urban regeneration processes. Consultation facilitators and  
28 mediators employ a range of community participation tools and techniques which are seen to be evolving  
29 rapidly with the introduction of new technologies. From simple Q&A sessions, brainstorming, sketching and  
30 paper mapping, to more sophisticated tools like Participatory Geographic Information System (PGIS), 3D  
31 modelling and digital or non-digital gaming techniques, the range of tools used during consultation processes  
32 vary by type and kind. It is acknowledged that guidelines already exists on how to carry out community  
33 consultation with a portfolio of methods (Scottish Executive, 2007) and that new technologies like ESRI  
34 Community maps and Story Maps are being increasing used for engaging with citizens. In addition to this,  
35 previous research on asset mapping for community development in the non-profit sector has also explored  
36 the challenges and principles of community mapping (Mathie & Cunningham, 2003 ; Brundley et al. 2017).

1 However, more research is required to identify the strengths and limitations of specific tools and techniques  
2 (Kheir, 1999; Brown & Kyttä, 2014).

3

4 This research is based on the assumption that community mapping should eventually inform decision  
5 making, improve sense making activities as well as problem framing, by reflecting the spatial representations  
6 of people's life worlds which are not accessible through traditional area profiling based on Census data  
7 (Scotland Census, 2017). Without discussing the extent to which this is achieved or not in the contemporary  
8 world of practice, this paper focuses on how this could be achieved and explores the role of design and  
9 modelling in facilitating the use of community mapping in decision making processes.

10

11 The utilisation of information technologies in top down and bottom up planning as well as the functionalist  
12 approaches of geodemography and GIS in neighbourhood targeting has been demonstrated in the work of  
13 Nedovic-Budic Z (2000), Deas (2003), Rydin (2007), Harris et al. (2005), Crampton (2006), Longley (2012)  
14 and many others. Although decision makers have access to a consistent set of indicators (like the Index of  
15 Multiple Deprivation) applied for comparative purposes when making funding decisions, criticisms have  
16 grown that these indicators lacked the ability to engage with subjective representations of spatial realities as  
17 perceived by individuals living, for example, within an area undergoing regeneration because they tend to  
18 focus on objective data such as unemployment, crime etc. As a consequence, this research investigates  
19 whether, within the current 'planning fashion' for bottom up planning, there may be a need for integrating,  
20 using design principles, subjective and objective representations of spatial realities by decreasing the  
21 distances between what Lefebvre described as the 'lived space' of communities and the 'abstract space' of  
22 planners and developers (Lefebvre, 1991).

23

## 24 **Research strategy and methods**

25 This research adopts a pragmatic approach to the study of planning support system as offered by  
26 Brömmelstroet (2016) and follows Kolb's learning cycle (Kolb,1984) by a) combining theory and practice  
27 and b) expanding the traditional stages of research from 'observing and reflecting' and 'forming abstract  
28 concepts', to 'testing in new situations' and gaining 'concrete experience'.

29

30 After having identified the problems with existing community mapping techniques using i) a literature  
31 review, ii) seven semi structured interviews to senior planners from five local authorities across the West of  
32 Scotland and iii) two observational studies, the paper based community map called *Submap* (Giupponi and  
33 Thomson 2016) was developed. Nineteen Gorbals residents were then asked, using different sampling  
34 methods, to use *Submap* to illustrate their life worlds in relation to their neighbourhood and a GIS relational  
35 database was ultimately developed to store the content of the maps.

36

1 The testing of this mapping procedure (design, sampling, data entry, visualisation) was used to explore the  
2 potential and challenges of storing community mappings in GIS with the aim of relating them to existing  
3 objective area profiles extracted from Census statistics such as the IMD. It is finally argued that the  
4 integration ‘by design’ of spatial representations of subjective life worlds to traditional GIS, could aid  
5 inclusive area profiling by decreasing the distances between expertise and experience.

6  
7 The following five different stages of research are illustrated in the next sections:

- 8 1) Literature review to establish the context in which area profiling of communities has evolved and the  
9 challenges it has encountered;
- 10 2) Interviews with seven senior urban planners across five different local authorities in West of  
11 Scotland to investigate existing practices and perspectives over the use of mapping and different  
12 datasets to represent communities;
- 13 3) Observational studies and engagement with community mapping groups;
- 14 4) Submap: The design and modelling of a new community mapping procedure
- 15 5) Establish Lessons for the future and conclusions

## 16 **Literature review**

17

### 18 **Planning Support Systems and area profiling**

19 Area profiling is a function of contemporary information technologies aiding spatial decision making in  
20 urban planning, known in the literature as Planning Support System (PSS). PSS include visualizations,  
21 impact analysis, outcomes quantification, indicators and scenario development and evaluation (Lieske &  
22 Hamrlink 2012); the Index of Multiple Deprivation (IMD) is, for example, an indicator based PSS which is  
23 often used for area profiling to prioritize regeneration areas and allocate funding.

24 Previous work has criticized the exclusive use of IMD for area profiling as the aggregate indicators are  
25 weighted using, for the most, economic domains (Deas et al. 2003) which do not capture the social  
26 dimension of communities. Nevertheless the lack of a specific agenda in PSS has left research in this area  
27 unstructured and unsystematic until recently when efforts have put focus on the need of PSS to “redirect  
28 means to goals, cooperate with planning practice, pay attention to the context of PSS application and the  
29 methodological and conceptual research, move from a case study to real world planning and fit the  
30 application of PSS to application specific characteristics” (Geertman, 2009, 2013).

### 31 **Socio technical design and the principles of compatibility, congruence and minimal criteria** 32 **specification**

33 In order to better understand the development of PSS like the IMD in planning, information system design  
34 theories such as socio-technical design, user experience and user centred design, appreciate how users and

1 their goals are placed at the centre to the design of the information system. In relation to area profiling,  
2 Reeve & Petch (1999) helped to re-think the design of GIS in the context of Local Authorities using a socio-  
3 technical approach. Original socio-technical approaches like Soft System Analysis and ETHICS were used in  
4 the 80's and 90's to investigate problems of complex human activity and introduce an ethical basis to  
5 system design (Reeve & Petch 1999). The first principles of socio-technical design are defined in Cherno  
6 (1976) and three of these (compatibility, congruence and minimal criteria specification) are found to be  
7 particularly relevant to the design and implementation of area profiling tools for bottom up planning. These  
8 are:

- 9 • Compatibility: The process of design must be compatible with its objectives
- 10 • Minimal Critical Specification: no more should be specified than is absolutely essential; but the  
11 essential must be specified
- 12 • Congruence: systems of social support must be designed to reinforce the desired behaviour.

13 Lessons drawn from the literature review, interviews and observational studies will be summarised in the  
14 context of these three different principles. In this way, concerns from the world of practitioners will be  
15 addressed according to existing socio-technical design principles, bringing theory and practice to the same  
16 table.

### 17 **Previous challenges identified in representing communities in GIS**

18 Previous work dealing with the challenges in representing and profiling communities was identified. In Ham  
19 et al (2013), an extensive review of the challenges associated with the representation of neighbourhood is  
20 presented. Ham et al. (2013) explain how, in order to represent a neighbourhood, one should deal with the  
21 representation of the relationship between the built environment and the subjects of the neighbourhood;  
22 moreover, both the consideration of the Temporal variable (people's and places' histories) and the broaden  
23 of the neighbourhood's horizon (multiple scale) to include other spatial contexts, are to be considered. In  
24 other words, what Ham et al. (2013) suggest, is the abandonment of representations of neighbourhoods as  
25 bounded, static and a-temporal phenomena as recalled in other community and neighbourhood related  
26 studies. Kwan (2012) presented such methodological challenges as the uncertain geographic context problem  
27 (UGCP), which arises because of "the spatial uncertainty in the actual areas that exert relevant contextual  
28 influences on each individual under study", and the modifiable area unit problem (MAUP), in which  
29 "analytical results are biased by the zoning scheme" (Kwan, 2012)

### 30 **Interviews**

31 Seven semi-structured interviews with senior planners working at five different Local Authorities in the  
32 West of Scotland were carried out and used to gather experiences of different practices surrounding area  
33 profiling. In two of the five Local Authorities, it appeared that community mapping helped planners to  
34 access the negative perspectives of a specific demographic group over what was identified by the planners

1 themselves as a positive environmental feature. As one of the planners said “without any doubts, it  
2 (community mapping) helped us understand that a space which was perceived as a good space by planners,  
3 for the kids (the same space) was perceived as unsafe”. When asked whether they digitize the maps they  
4 collected, the same planner replied: “Sometimes we do, sometimes we don’t. If we think some information  
5 might be used for other departments (e.g. Health) then we might share it with them”. The interviews also  
6 found that consultation processes are designed to collect subjective spatial information using a wide range of  
7 methods (questionnaire, surveys, public hearing, Charrette etc) which could be carried out by employees  
8 from Local Authorities and/or external agencies. However, regardless of who is responsible for the mapping,  
9 the interviews revealed that subjective spatial information collected via community mapping during  
10 consultation processes or capacity building activities, is usually not stored in GIS of Local Authorities  
11 preventing this information from being retrieved in the future. In relation to the possibility of storing the  
12 community maps gathered during consultation events, one of the planners stated that: “It could be useful and  
13 beneficial and maybe it’s what should be done, but we have neither the time nor the resources for this”,  
14 suggesting that staffing and resources may represent one of the causes to the loss of subjective spatial  
15 information collected throughout consultation processes.

16 From the interviews it was apparent that, at present, no procedure exists for scanning and digitizing the  
17 community maps and that the potential existed to develop this.

## 18 **Observational studies**

19 Community mapping is increasingly being deployed to support community planning activities both  
20 formal and informal. The research identified instances of community mapping taking place within Glasgow  
21 and conducted two observational studies to learn and also evaluate its potential. The first author participated  
22 in a training course for community research provided by a Scottish Faith Group working with deprived  
23 communities nationwide. In here the researcher was introduced to a ‘community research toolkit’ in which  
24 community mapping was showcased. In addition to this, the researcher was involved in community mapping  
25 for a Glasgow based charity where she developed an online mapping tool to facilitate the sharing of  
26 information between people with special needs.

27 These studies clearly showed that community mapping is a popular tool used both in planning as well as  
28 in the third sector for capacity building and that a variety of ‘mapping methods’ were employed: from  
29 sketching on blank paper, to drawing on printed maps or using specific web based applications. As part of  
30 one of the consultation exercises, Participatory Geographic Information Systems (PGIS) were promoted by  
31 one specific group of facilitators funded by Future City Glasgow, a government programme promoting  
32 digital innovation (Future City 2016a; Future City 2016b) but analogue mapping methods were perceived to  
33 be more widespread and predominant in informal exercises stemming from communities (bottom-up). This  
34 was confirmed during the training on community research in which digital mapping tools were not presented  
35 as an option for aiding engagement.



# 1 **Submap: The design and modelling of a new community mapping procedure**

## 2 **Addressing the limitations of existing techniques**

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### Figure 1 *Submap* procedure

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8 The literature review, interviews and observational studies identified different problems relating to  
9 community mapping. These are summarised in the seven points outlined below and categorised according to  
10 the socio-technical design principles on which they have been developed. The attempt to resolve these seven  
11 different issues through better design and modelling, have led to the development of a six step procedure for  
12 the design and modelling of *Submap* (Fig.1).

### 13 COMPATIBILITY

- 14 1) SPATIAL AND TEMPORAL SCALE: The literature review identified that multiple scales and  
15 temporal dimensions should be considered during the design of community maps (Ham et al. 2013)  
16 but observational studies demonstrated traditional community mapping procedure fail to do so. In  
17 Giupponi and Thomson (2016), it is showed how *Submap* addressed these issues by including four  
18 different scales in four different quadrants on a A2 paper while capturing temporal data like  
19 residential history and willingness to move.
- 20 2) GENERALISATION: Generalisation is a cartographic design principle which entails the  
21 identification of the elements of spatial reality which are to be represented. This process is better  
22 illustrated in Giupponi and Thomson (2016) and it essentially justify the selection of the different  
23 elements 'to be mapped during community mapping'. In other words, generalisation processes  
24 establish which, out of all the elements of subjective lived space, are to be mapped; for example, it  
25 would not be possible to represent all the aspects of the road network because that would be the road  
26 network itself. Maps are a simplification of spatial realities and deciding which elements are to be  
27 excluded from this representation is an essential aspect of community mapping design which is  
28 thought to have been overlooked as the selection of elements to be mapped should be tailored to the  
29 purpose of the map and its audience rather than a standard set of elements.
- 30 3) REPRESENTATIVENESS: One of the main stages in the process of testing *Submap* was the  
31 sampling of data: how to gather a representative sample of community maps within a specific  
32 community? Different sampling methods were tested and direct participation to community events  
33 and postal survey resulted to be, respectively, the most and least successful ones. In order to mirror  
34 the scientific rigour of traditional neighbourhood profiles, a representative sample is expected to  
35 reflect the demography of the community which is to be represented; by gathering information about  
36 the individuals participating to community mapping, each community map can be associated to a

1 specific anonymous ID which will relate to an attribute table (e.g. age, education, gender, ethnicity,  
2 income) and this will effectively illustrate the representativeness of specific community mapping  
3 processes.

#### 4 MINIMAL CRITERIA SPECIFICATION

- 5 4) INTEGRATION: Following socio-technical design principle of minimal criteria specification, it is  
6 understood that innovative consultation procedures should not be disruptive rather, they should be  
7 integrated to what is seen as common practice; the requirements for the adoption of new  
8 technologies should either be minimal or support should be provided to the users of the new system.  
9 Following the two observational studies, this meant recognising that, at present, paper mapping may  
10 be an easier technique to implement than any other digital format. However, the potential advantages  
11 of using digital technologies should not be neglected and, depending on the mapping objectives, the  
12 application of digital technologies may well be seen as favourable.
- 13 5) ACCESSIBILITY: The interviews demonstrated that community maps are not digitized and securely  
14 stored and, as a consequence, information is lost. The digitized community maps and the points,  
15 lines and polygons associated to the different individuals who participated to community mapping  
16 should then be accessible and retrievable by decision makers in existing GIS.

#### 17 CONGRUENCE

- 18 6) RELATEDNESS: According to the socio-technical design principle of congruence (Cherns, 1976), a  
19 new information system should be designed “in a way to support the desired behaviour”. It is then  
20 crucial to clarify which is the desired behaviour associated with ‘inclusive area profiling’. Findings  
21 from the interviews revealed that area profiles are created by GIS technicians and capable planning  
22 practitioners using different datasets often stored in a Spatial Database Engine (SDE). However,  
23 from the interviews it was understood that no datasets with subjective representations of  
24 neighbourhoods are stored in such folders. Inclusive area profiling would therefore relate subjective  
25 mappings to the existing data sets used for area profiling. The data extracted from community  
26 mapping (as well as other multimedia collected during consultation processes, representative of  
27 spatial representation of lived spaces) can be related to the same geographic unit used for developing  
28 area profiles in Local Authorities: the datazones. By doing so, both objective (quantitative) and  
29 subjective (qualitative) spatial information are integrated in a single database accessible by multiple  
30 users.
- 31 7) VISUALISATION: The community maps should be visualised in GIS to promote sense making  
32 during activities. Visualisation is a pivotal aspect of mapping as it enhances sense making and  
33 improve communication (MacEachren & Brewer, 2004). One of the planners interviewed iterated  
34 that “all we do is visual, everything is about maps”; this is why it is essential to think about the  
35 visualisation component and how this could aid sense making.

## 1 ***Submap* and the development of the GIS relational database: strengths and limitations**

2

### 3 **Figure 2 *Submap* ArcGIS relational geodatabase: conceptual modelling**

4 After having discussed the nature of the seven problems of contemporary community mapping practices as  
5 identified from primary and secondary data, the *Submap* GIS relational geodatabase (Fig. 2) was conceptually  
6 and physically modelled to store community mapping data extracted from community mapping activity using  
7 *Submap* and addressed issues of accessibility (5) and relatedness (6). A geodatabase is a collection of spatial  
8 and non-spatial datasets of various types (vector, raster, table, BLOB) in which the data is held in a common  
9 file system folder. The ArcGIS relational database as illustrated in Fig. 2 was then developed to ensure that  
10 community mapping activities carried out during consultation processes could be stored and retrieved by  
11 different users and the relationships with other spatial datasets could be interrogated using spatial queries and  
12 elements selected by attributes (e.g. 'select dangerous places by gender'). The paper map *Submap* (Giupponi  
13 and Thomson 2016) was used to carry out the community mapping from nineteen different individuals living  
14 in the same community. Community maps were collected using different sampling methods in the Gorbals,  
15 Glasgow which demonstrated the challenges of gathering a representative sample and investigate  
16 representativeness (3). Details about the design of *Submap* and how it included different spatial and temporal  
17 scales (1) through generalisation and composition, are discussed in Giupponi and Thomson (2016) where the  
18 design of an A2 sized paper map including four different scales (local, city, national and world wide) and  
19 attribute data (residential history, willingness to move, attachment, demographic data etc) was presented.

## 20 **Summary of findings**

21

22 The results from this work into the potential of GIS in facilitating better area profiling based on community  
23 mapping did not simply lead to the development of a procedure or a map but sketched out a methodological  
24 approach made of some theoretical assumptions, procedures, tools and limitations for community mapping.

25 Firstly, there is the paper map *Submap*, used to systematically collect subjective spatial data at different  
26 spatial scales and relate them to the respondent attributes through careful cartographic design; Secondly,  
27 there is *Submap* mapping activity in which social research methods are required to collect a representative  
28 sample of the community; Thirdly, we have developed *Submap* geodatabase, used to store community based  
29 spatial data in existing GIS enterprises and relate it to existing datasets for the same output area. Fourthly,  
30 *Submap* visualisation techniques were recognised to be key to communicate community based profiling.  
31 Finally, there is *Submap* procedure, developed as a result of this process for individuals willing to implement  
32 *Submap* (Fig. 1).

33 Limitations to the implementation of the procedure are anticipated and relate to the skills required for the  
34 digitization and storage of community maps in GIS including the georeferencing of scanned maps, editing  
35 and general data input. Professionals involved in consultation processes using paper based community  
36 mapping as a tool to gather community perspectives would be required to follow a systematic procedure

1 starting with the selection of the different scales and the different elements to map and ending (whether the  
2 same person or someone else will depend) with the digitization and storage of such information in GIS in  
3 order to make it retrievable by other GIS users using spatial queries. Problems around sample  
4 representativeness (3) and visualisation techniques (7) will be discussed in future publications by presenting  
5 the challenges faced to gather a representative sample of the community in the Gorbals and the different  
6 visualisation techniques that could effectively enhance sense making and communication (MacEachren &  
7 Brewer, 2004) as introduced below in Figure 3 and Figure 4.

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22 **Figure 3 Visualisation of *Submap* 'My Shops' (triangles) , 'My People' (circles),**  
23 **'My perceived neighbourhood' (polygons) using a Baseline map.**

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Fig. 4 Visualisation of *Submap* polylines (daily routes) without a baseline map

20 **Lessons for the future and conclusions**

21 In discussing radical planning, Sandercock (1998) suggested that “an epistemology of social learning and of  
22 multiplicity will require the development of new ways of knowing and acting”. This piece of research on  
23 community mapping offered a new way of doing community mapping which could have different effects on  
24 both the world of planners and the world of practitioners. On one side, communities would be required to be  
25 systematic in generating their ideas so that community based information could fit existing spatial  
26 information structures. On the other side, planners and the other stakeholders involved in consultation as well  
27 as area profiling for urban regeneration, would have to welcome subjective maps to existing information  
28 structures. This transformational approach recalls radical planning principles positioning itself with  
29 Friedmann’s idea of a productive tension: by providing communities with an exact procedure that would  
30 allow their own mappings be included in the common file folders accessed by planners for community  
31 profiling, the state and its government technologies are not seen as an adversary to the process of radical  
32 planning and planners are able to maintain a critical distance without becoming absorbed in the everyday  
33 struggle of radical practice (Sandercock, 1998).

34 Secondly, this research revealed the methodological weakness of contemporary consultation tools like  
35 community mapping and critically ask whether transforming a mix of incoherent and methodologically  
36 flawed techniques for consulting communities into more systematic procedures could really aid bottom up  
37 planning or whether this will just result into another kind of bureaucratic burden. Would it be unreasonable

1 to ask the actors involved in organising four days' Charrettes to gather community perspectives using a  
2 representative sample and store it in a format which can be digitized and retrieved in GIS? If yes, why are  
3 we, in the era of digital transformation (Cabinet Office, 2017), treating spatial information created by  
4 different groups differently? Why community based spatial is treated different than the spatial data generated  
5 for a drainage impact assessment or a transport assessment?

6 To summarise, investigation into the very marginal aspect of community mapping in consultation processes  
7 revealed important questions about the practical implications of moving beyond the qualitative and  
8 quantitative chasm of geography (DeLyser & Sui, 2013) in the context of community based planning; the  
9 main research contribution is not the innovative community mapping activity itself but it is the attempt to  
10 ultimately include the data produced during consultation activities (from community maps to Place Standard  
11 diagrams, multimedia etc.) in the same GIS database used for traditional area profiling by decision makers.

12 Whether reducing distances between datasets could really decrease distances between the subjective and the  
13 objective worlds, the informal and the formal and the expertise and the experience, remains a question to  
14 answer which will not only require only more testing and learning (Brömmelstroet, 2016) but it may require  
15 new philosophies in which "the elements of planning, these non-human things, can be used to theorize  
16 planning" (Beaurigard, 2016).

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Figure 1: Submap Procedure

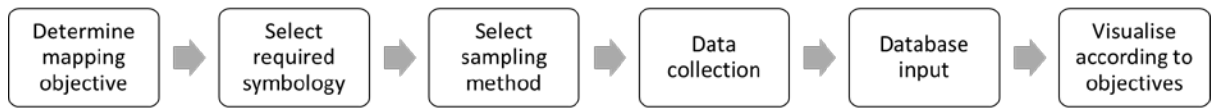


Figure 2: Submap ArcGIS relational geodatabase: conceptual modelling

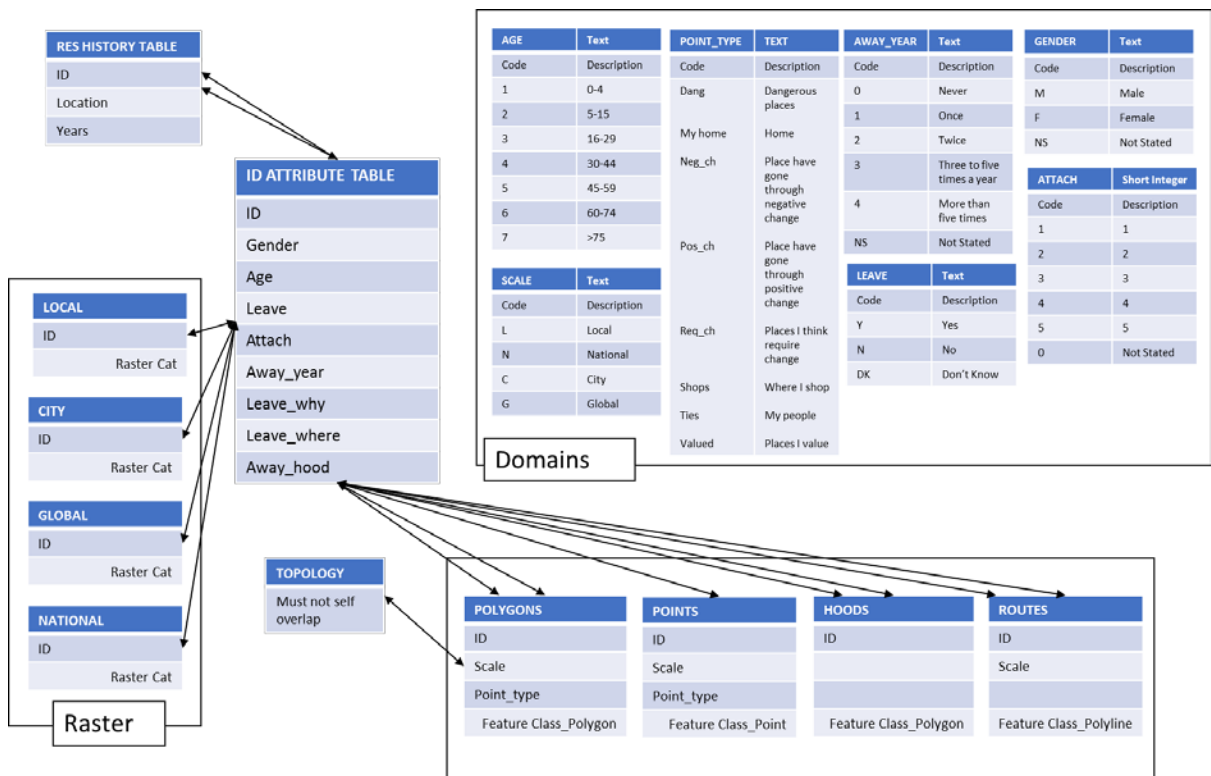


Figure 3: Visualisation of Submap 'My Shops'

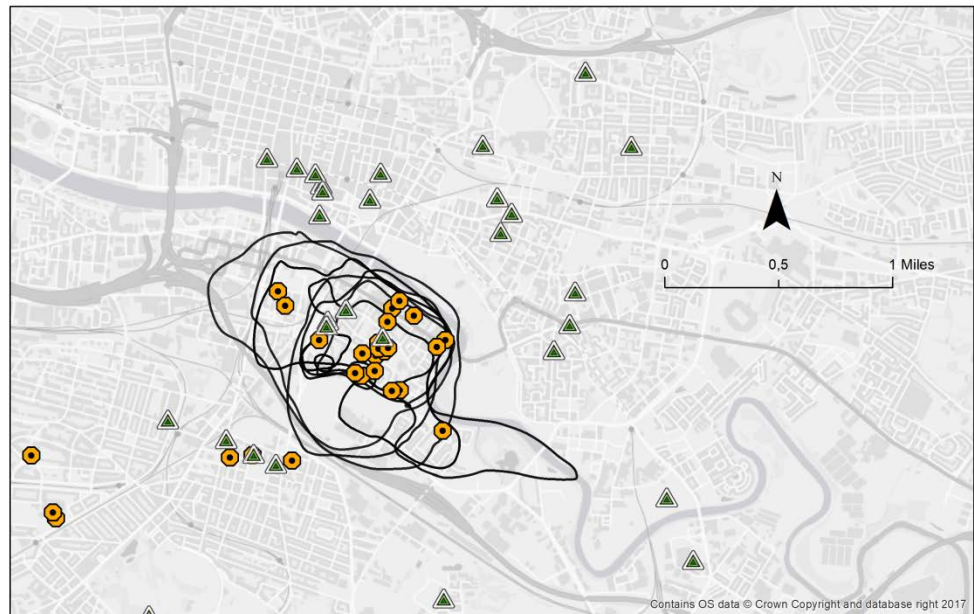


Figure 4: Visualisation of Submap polylines (daily routes) without a baseline map

