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An Exploration of Volunteered Geographic Information Stakeholders

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Abstract

Volunteered Geographic Information (VGI) has huge potential for influencing the use of geographic information systems. However, there is a wide range of individuals involved in this process, each with their own motivations for contributing and using volunteered data. This paper investigates the range of stakeholders involved with VGI, their relationships and the main tensions and issues involved. The research was based on a series of detailed interviews and theory-driven coding of data. From this, a Rich Picture (Monk, Howard 1998) was developed to graphically present and relate stakeholder relationship information. The findings have implications for how stakeholder groups may be described, and how VGI can lead to enhanced products and services.

1. Introduction

Neogeography, the process of combining third party data with base maps to produce a mashup for a plethora of applications has - as Scharl and Tochtermann (2007) noted - had a profound impact on managing individual and organizational knowledge. While Neogeography may comprise entirely of professional information, a trend for including volunteered aspects arose around 2006, leading Goodchild (2007) to coin the term Volunteered Geographic Information to describe the creation of geographic information by largely untrained volunteers.

One of the key issues identified through analysing current research relative to the human issues of neogeography is *'how VGI maps and mashups are produced and used, and how do involved stakeholders interact'* (Rouse, Bergeron & Harris 2007, Harding et al. 2009). This paper illustrates how VGI is contributed and utilised by different individuals in terms of map choice, use of information, trust, influence, community, concerns, tensions, idealism and relationships.

2. Supporting Literature

The net of users connected to VGI, and those who have an influence on mashup design requirements may be considered stakeholders (Sommerville 2001). As Preece et al. (2002) demonstrated, the net of stakeholders is really quite wide, so it is useful to consider different categories of stakeholder, or as Coote and Rackham (2008) categorised: consumers, special interest [mapping] groups, local communities and professionals. Although VGI stakeholders may not be mutually exclusive (i.e. a stakeholder may be only a *consumer*, or also a *consumer* and also a *producer* of VGI) the simplified 'purist' model allows a more effective exploration of stakeholders than would otherwise be achievable

in this paper.

The theoretical framework for this article is based on the unidimensional perspective of value to the stakeholder groups (Sweeney, Soutar 2001, Sheth, Newman & Gross 1991). This describes how consumer value is constructed from emotion, function, knowledge, legal and cost dimensions. This framework was selected due to its ability to demonstrate user perceptions that can influence adoption.

3. Methodology

This paper is based on detailed qualitative analysis of the *stakeholders* of VGI, focussing on OpenStreetMap, Ordnance Survey and 'Google My-Maps'. The study was conducted by interviewing lead users, discovered via '*snowball' non-probability* sampling (Robson 2002) through mailing lists, personal contacts and open advertisements. Topics covered included background ecology, involvement in VGI and intergroup interaction.

Interviews were recorded, transcribed and '*open coded'* (Robson 2002) under a thematic analysis approach (Aronson 1994, Braun, Clarke 2006) using NVivo 8 qualitative analysis software. Salient themes were collated to reflect topics delivered by the participants before being further reduced to best demonstrate interactions, concerns and perceptions of each stakeholder group (axial coding). This information was used to generate a Rich Picture by grouping respondents' transcriptions into stakeholder groups, and then drawing a 'Rich Picture' to graphically express the stand points of each stakeholder category. A Rich Picture provides a broad, high-grained view of the problem situation focusing on structure, process and concerns of the stakeholder (Monk, Howard 1998) – and is used to illustrate the main findings from this study.

Table 1. Breakdown of Study Respondents

Mapping Project	*Consumers*	*SIMGs*	*LCs*	*VGI Professionals*	*PGI Professionals*
OpenStreetMap		6	1	1	
Google My Maps	3			1	
Ordnance Survey					2
TOTAL	**3**	**6**	**1**	**2**	**2**

While the number of respondents in this investigation was limited, the network of users who these respondents relate to is potentially quite wider. This causes the study to reflect on a much wider net of users than the total number of respondents.

4. Data Analysis & Results

Figure 1 identifies stakeholders alongside relationships, flow of information or influence (arrows), tensions (crossed swords) and concerns (thought bubbles) as described by Monk and Howard (1998).

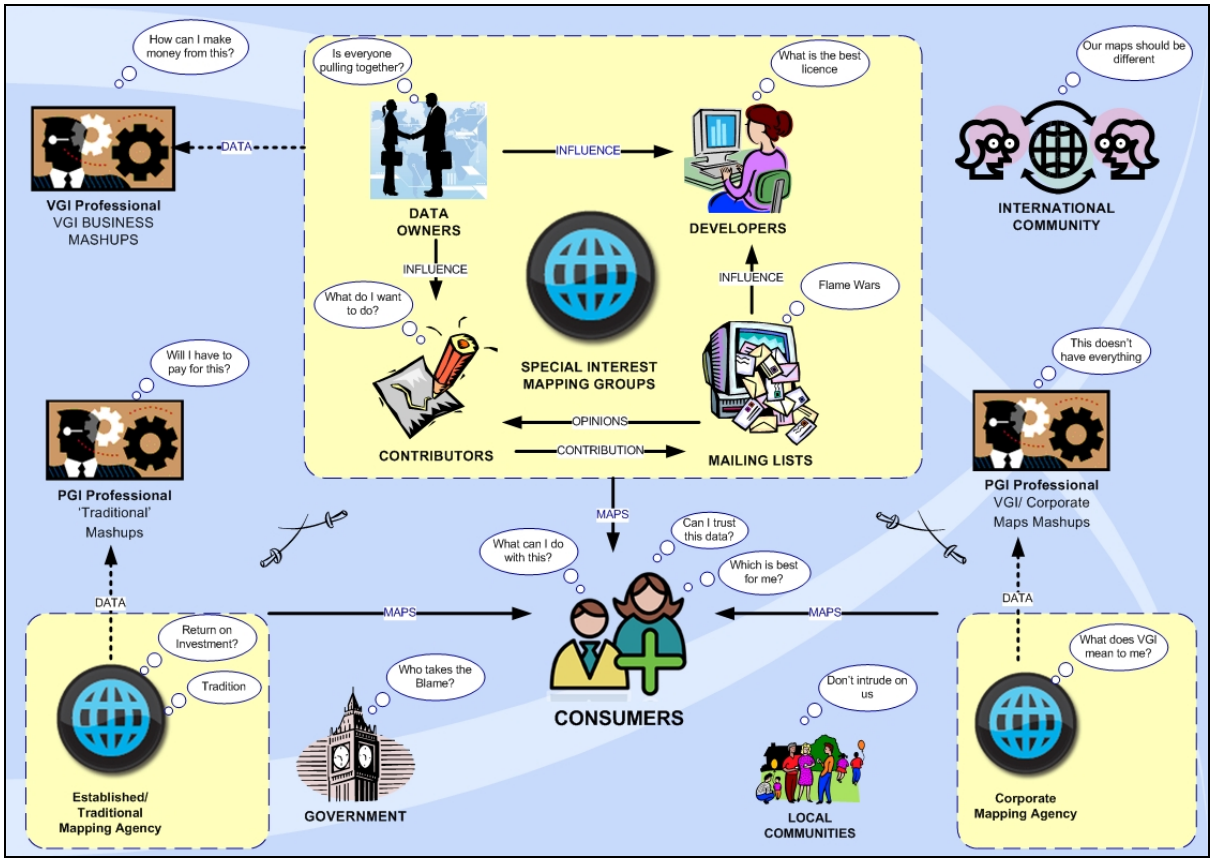


Figure 1. A Rich Picture of VGI Stakeholders

The following is a summary of the key points from the study.

Consumers select their map product to best fit their circumstances with little loyalty to the brand; as one respondent commented:

> *Apart from using it like everybody does in terms of looking for places and directions, I've used Google My Maps, at the moment mainly for my own use... I've used it in a work context because I was trying to organise a meeting.*

Special Interest Mapping Groups (SIMGs), *contributors* (SIMGCs) and *professionals* are particularly vested in the use of their groups' map; as one respondent commented:

> *I'll often check out to see if the local CTC has a website [same map project involved in] to see what's on there. And being able to find where the tea places are in the locality is quite useful.*

Consumers use their chosen map to fit their requirements within the usability boundaries set by the product's interface. *SIMGCs* produce data for group members and external parties to use their data; as one respondent commented:

> *It's mainly just a project to collect data... we hope other people will use it for whatever they feel free to use it for.*

Professionals aim to take the SIMGCs data and combine it with proprietary data as long as it enhances their business position.

Consumers are concerned about the accuracy of data within their map. *SIMGCs* are less concerned about inaccuracies as they have a vested interest in improving the data - seeing gaps as opportunities; as one respondent commented:

It has its faults but there are no glaring errors... It's very much if you don't like it you can fix it yourself which appeals to my, well, sense of working I suppose.

Professionals are concerned about data validity and how inaccuracies may hurt their business position, as well as concern over what VGI actually means to their customers; as one respondent commented:

If I'm dispatching ambulances, and I know that I need to get to the patient within 7 minutes, can I trust the volunteer captured information?

Although these reflections on user perception of accuracy may be suggested from this study, further research is required to produce more definite statements about the origin and in-depth user perception of VGI accuracy.

Consumers have little influence on their chosen product's development due to their position outside of the project, and return little or no data to the *SIMG*. *SIMGCs* have a direct and democratic influence on how data is produced and utilised within their project, shown by their position inside the *SIMG* and data transfer to other members via the mailing lists and wiki's. Professionals have limited or no influence on the production of the VGI they utilise; as one respondent commented:

All we can do is we can influence the direction this takes by offering suggestions

Consumers are not necessarily part of any mapping related community. Both SIMGCs, professional and local communities have wide networks of associates with which they collaborate; as one respondent commented:

It's just a way of computer geek socialising at the end of the day

Consumers displayed little or no tension between different map products during their interviews. *SIMGs* and *professionals* can be in constant tension with each other as their agendas and ideologies do not necessarily fit with each other.

It kind of annoys me that Google are potentially using the same kind of idea. [OpenStreetMap SIMGC]

Between professional bodies, business rivalry may exist but they work alongside each other. Internally, *SIMGs* have many disputes over fundamental issues such as licensing, application of their VGI and future directions; as one respondent commented:

I will be chatting to my opposite number at Microsoft, and my opposite number at Google... we shouldn't even be friendly for Christ's sake according to the old fashioned rules of how you do business, and those old fashioned rules don't really apply any more.

5. Discussion and Conclusions

The semi structured interviews and the subsequent production of the rich picture have highlighted the main stakeholders in VGI from a user-centred design perspective. The main outcome from this research has been that while stakeholders of VGI may often share common perceptions (e.g. *SIMGs*, *SIMGCs* and *professionals* having a vested in the use of their groups' map), often different stakeholders will perceive elements of VGI very differently, based on which stakeholder group they may be identified with. The greater outcome of this study has been the examination of how and to what extent these similarities and differences occur.

Although this study was based upon value theory, determining a stakeholder collective perception of value is an elusive concept (Zeithaml 1988). However, if considering value as the improvement to a

stakeholder's condition through utilising VGI (Menou 1995), then a salient increase in stakeholder value can be observed in all functional and work related perceptions.

The Rich Picture provided a visual framework to identify the interaction of stakeholders in terms of information flow between stakeholders; and inter-group tensions. The Rich Picture effectively provided context to the research outcomes and represented stakeholder relationships in an easily accessible fashion.

The implication of this work should be to provide a framework of VGI stakeholders to be utilised within future user-centred VGI research. This may take the form of deciding which stakeholder group(s) to target, or being able to relate their experiences to directly associated stakeholder groups. Additionally non user-centred GI research may be able to relate to the VGI end-user base in terms of which stakeholders may utilise their outcomes.

Future research will further investigate the multidimensional stakeholder perspectives on VGI for stakeholder groups, focusing on specific stakeholders and particular problem spaces.

6. References

Aronson, J. 1994, "A pragmatic view of thematic analysis", *The Qualitative Report,* vol. 2, no. 1, pp. 1-3.

Braun, V. & Clarke, V. 2006, "Using thematic analysis in psychology", *Psychology,* vol. 3, pp. 77-101.

Coote, A. & Rackham, L. 2008, "Neogeography Data Quality - is it an issue?", *AGI Geocommunity '08*Association for Geographic Information (AGI), http://www.agi.org.uk/SITE/UPLOAD/DOCUMENT/Events/AGI2008/Papers/AndyCoote.pdf.

Goodchild, M.F. 2007, "Citizens as Sensors: The world of Volunteered Geography", *GeoJournal,* vol. 69, no. 4, pp. 211-221.

Harding, J., Sharples, S., Haklay, M., Burnett, G., Dadashi, Y., Forrest, D., Maguire, M., Parker, C.J. & Ratcliff, L. 2009, "Usable geographic information – what does it mean to users?", *Proceedings of the AGI GeoCommunity '09 Conference*AGI GeoCommunity, http://www.agi.org.uk/SITE/UPLOAD/DOCUMENT/Events/AGI2009/papers/JennyHarding.pdf.

Menou, M.J. 1995, "The impact of information—II. Concepts of information and its value", *Information Processing and Management,* vol. 31, no. 4, pp. 479-490.

Monk, A. & Howard, S. 1998, "The Rich Picture: A Tool for Reasoning About Work Context", *Interactions,* vol. 5, no. 2, pp. 21-30.

Preece, J., Rogers, Y. & Sharpe, H. 2002, *Human-computer interaction,* John Wiley & Sons, United States of America.

Robson, C. 2002, *Real World Research,* Second edn, Blackwell Publishing, Oxford.

Rouse, L.J., Bergeron, S.J. & Harris, T.M. 2007, "Participating in the Geospatial Web: Collaborative Mapping, Social Networks and participatory GIS" in *The Geospatial Web: How Geobrowsers, Social Software and the Web 2.0 are shaping the Network Societ*y, eds. A. Scharl & K. Tochtermann, Springer, , pp. 153-158.

Scharl, A. & Tochtermann, K. (eds) 2007, *The geospatial web: how geobrowsers, social software and the Web 2.0 are shaping the network societ*y, Springer Verlag.

Sheth, J.N., Newman, B.I. & Gross, B.L. 1991, "Why we buy what we buy: a theory of consumption values", *Journal of Business Research*, vol. 22, no. 2, pp. 159-170.

Sommerville, I. 2001, *Software engineering*, 6th edn, Addison-Wesley, Harlow, UK: Addison-Wesley.

Sweeney, J.C. & Soutar, G.N. 2001, "Consumer perceived value: The development of a multiple item scale", *Journal of Retailing*, vol. 77, no. 2, pp. 203-220.

Zeithaml, V.A. 1988, "Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence", *The Journal of Marketing*, vol. 52, no. 3, pp. 2-22.

7. Biography

Christopher J. Parker is a second year PhD Research Student at Loughborough University, focusing on the stakeholder perceptions of volunteered geographic information from a human factors perspective. Andrew May and Val Mitchell are Research Fellows interested in user-centred design of new technologies.