

## **Is Volunteered Geographical Information (VGI) a better option for developing countries like Panama than for developed countries like the United States?**

Recibido: 2 de septiembre de 2016  
Aceptado: 22 de septiembre de 2016

**Katherine Liévano<sup>1</sup>**

### **Resumen**

Este artículo examina las principales diferencias entre el sistema de información geográfica voluntaria y el sistema de posicionamiento global, específicamente como el sistema de información geográfica voluntaria puede ser útil para países en vía de desarrollo, tal es el caso de Panamá, más que en países como Estados Unidos.

### **Palabras clave**

Información Geográfica Voluntaria, Sistema de Posicionamiento Global, Países en vía de desarrollo, Países desarrollados, Waze.

### **Abstract**

This article examines the main differences between Volunteered Geographic Information (VGI) and Global Positioning System (GPS) and how VGI can be more useful for developing countries like Panama, rather than for developed countries like the United States. It focuses on the application Waze and how it contributes to mapping countries by using VGI.

### **Keywords**

Volunteered Geographic Information, Global Positioning System, Developing Countries, Developed Countries, Waze.

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<sup>1</sup> Estudiante de licenciatura de Quality Leadership University. Correo electrónico :

Have you ever tried giving directions in Panama? If you have, you will know it is nearly impossible as Panama lacks proper street addresses and directions. Everyone simply guides you by things that are supposed to be “common knowledge” such as the malls, hospitals or known places. Anyone new to Panama or even just a new driver will find it difficult to get around and, unlike in the United States, a GPS device in Panama will help you only as a paper weight because it will not get you around the city. Luckily, with the evolution of technology there is something called volunteered geographical information and that is where anyone who wishes to share their information through the internet may do so. They can share their location and contribute to traffic reports and can even edit maps through applications like Waze, where you can add street names, restaurants and any other location that hasn't been already added. Also,

if something is incorrect you can also fix it. It is a more interactive way to get around the city and it is a much more complete map in Panama. I believe applications such as Waze, run on volunteered geographical information, are better for developing countries such as Panama than for developed countries like the United States.

First, let's try to understand what VGI exactly is. The term volunteered geographic information (VGI) was coined by Goodchild in 2007; it describes the process of collecting spatial data by individuals, most times on a voluntary basis (Neis, P77 2014). “This information is collected in a database or a file system structure and is generally available for the other interested internet users” (Neis, 2014, p.77). With the increasing popularity of VGI-platforms, there are more and more users of VGI (Neis, P78). Many maps have been created to tailor different purposes such as skiing, hiking or public transportation, by rendering the collected information in a particular way (Neis, 2014).

Now that we know what VGI is, let's see why it works. The biggest difference between VGI mapping and other kinds of mapping is that to map through VGI is inexpensive as no large equipment is needed (Neis, P78). The only tools necessary to have are either a smartphone or computer and an internet connection (Neis, P78). This method of mapping helps developing countries where the government cannot spend the money needed to create sophisticated maps (Neis, 2014). Not only is it more inexpensive but at times it can be even more accurate. VGI is interactive and can help make more specific maps as people can edit it and always add new things. The people in that specific area know it best so who is better to create a map than the people that live there. Also, as many people contribute information rather than just one company it has better quality as the Linus' Law suggests that with a higher number of contributors, the quality of a product increases (Neis, P85).

The application has many contributors; that is why it is efficient. Waze uses data from all its users online at the moment. In Panama City, there are between 500 to 2,000 users actively using Waze at any given moment. Waze's goal is to contribute to the "common good out there on the road" ("How to use our Waze me there feature"). With the application, drivers can help each other by notifying whether there has been an accident, if a police trap is coming up or even that there is simply traffic. Also, if there is a roadblock, debris or a crash and it has been reported the application, it will warn users and find an alternate route if available. By doing this the drivers will save time on the road avoiding traffic.

This idea brings Linus' Law into account because if it is a day with only a few cars on the street, there will be fewer users and less information and if no one has reported an accident then you won't be able to avoid that traffic. Even if you do not contribute to the Waze map by adding accidents or warning where a cop is, as long as you have the application open you are contributing data. It is constantly being updated and you will contribute to the traffic or road data by the speed you are going. Also, if you are at home and want to contribute to Waze you can become an online map editor and check all the data of your community. In 2015, Panama ranked sixth place on the Wazeyness Index due to the amount of drivers that use Waze in Panama ("Index Drilldown by Country").

Now that we have understood VGI and how Waze uses that technology lets see the other way to map and that is GPS. Now how does GPS work? Global Positioning System or GPS for short "is a satellite-based navigation system made up of a network of 24 satellites placed into orbit by the U.S. Department of Defense." Its original use was for military applications, but in the 1980s, the United States government made it available for civilian use. ("What is GPS") To use GPS you need a device. Now it can be found not only built in cars but also on phones and other electronic devices. To update it you need to connect to internet and do updates and in certain cases even buy the different maps of different areas on microchips; this can all be quite a hassle trying to find everything. The company from whom you buy the GPS has its team of developers who update the maps. Yet, you as an individual cannot edit them on your own.

A GPS system is very costly as it requires a constellation between 24 and 32 solar-powered satellites that orbit the earth at an altitude of over 20,000 kilometers. To manage GPS there is a master control station and four control and monitoring stations. Additionally, you need

a GPS receiver that is usually a device specifically to use GPS but now some cellphones and computers include it. The way it works is that the satellites in orbit send out microwave signals to a receiver where the built-in computer uses these signals to work out your precise distance from each of the four satellites and triangulates your exact position ("How does GPS work? - Mio Technology").

To decide which is better, let's see the main differences between Global Positioning System and Volunteered Geographical Information. The biggest difference is who can edit it. In VGI anyone can edit it as long as they have a device that can connect to the internet. GPS, however, cannot be edited by just anyone; it has to be someone who has the permission to do so and must have that job. Second difference is the cost. To actually begin to start mapping GPS needs satellites in space which are extremely expensive while VGI simply needs an internet connection. Finally, the devices they use are a point of comparison. Nowadays GPS comes built in in most electronic devices from cars to phones and even computers and on those same devices you can usually just download an application to use VGI mapping.

My hypothesis is that Volunteered Geographical Information works better than Global Positioning System in Panama than in the United States. I argue this because even though VGI can work really well in the United States due to more internet access and more smartphones it can be more useful to those in Panama. The United States has the money to invest and the companies that map there such as Google maps. Google maps uses a car to take shots of street view; in order to do this it takes lots of time and effort and the Google car stays within the United States the longest. Very rarely does the Google car come to Panama and that is why our street view is not accurate (Petronzio, 2012). Not only is GPS more cost effective but it is a way for the map to be more accurately done than by satellites. Panama is unpredictable when it comes to knowing what street is one way or specific things like that through a satellite. That is why the citizens can create their own map.

Additionally, GPS was created by the United States Department of Defense so it is made more specifically for them. Also, because GPS is done by satellite and not by the citizens, it doesn't see how the streets are. Panama is not the most planned city and it is really difficult to understand from the ground, so from the sky it can only be more of a challenge. VGI run applications such as Waze can help guide the users around Panama much better as they can edit it without it being too much of a hassle. If one was to complain about a street in a GPS run device it could take a really long time to fix and most people are too lazy to do so.

Waze is a better map for Panama because it gets its information from its users through volunteered geographical information. Knowing how VGI works and what it is we can see the benefits of Waze for developing countries without the resources to create sophisticated maps. Waze gives developing and even developed countries the opportunity to have a well-built map that can be easily edited, it is cost efficient and most importantly can help its users in more ways than simply getting them around.

Other than just because of cost reasons, Waze is the best system for developing countries because it is the best map to conquer the unique challenges of navigating in countries like Costa Rica and Panama. Urbina, a Costa Rican who was part of a group of volunteers that mapped the Waze teams, when asked why he helped map out the streets he said “Most of our streets don’t have road names so a lot of the addresses end up being very much next to some kind of landmark associated with it, and that’s how we give directions”. “There’s never been good maps generated to be able to get to where you’re trying to go” (McFarland, 2014). He, along with other volunteers, spent more than 50 hours a week for over 2 years helping to map their country. Also, they helped not only map Costa Rica but also Nicaragua, Cameroon, St. Helena Island, Panama and Trinidad and Tobago (McFarland, 2014).

Although they were never paid, they found it extremely rewarding to see how so many Costa Ricans were using Waze thanks to their help. Costa Rica has over 300,000 active users (McFarland). All these developing countries like Panama which lack the resources that lack the monetary resources to create sophisticated maps that are able to be understood by its citizens are needed. These countries already lack an organization in street names so Waze offers them a way to get around in an easy way by allowing anyone who wants to edit something to be able to actually do it. All these edits are supervised and only approved if a certain amount of users have agreed to that content. It is like Wikipedia in that sense, that a prank edit will be corrected almost instantly.

Technology is changing and adapting to the broken rules. As countries such as Panama and Costa Rica and other developing countries still lack organization on an infrastructural level due to a lack of organization when the country was founded and lack of planning the growth of our cities, the citizens need a map that is adaptable to these needs and Waze is exactly that. A map made by citizens for their country to save them time and get them to their destination. That is why it is more useful for developing countries than for already developed ones

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