HOW THE EVOLUTION OF SPATIOTEMPORAL SYNCHRONICITY CULMINATES IN EFFECTIVE LAND REFORM

The â€˜Whereâ€™ is the Disruption

Few people think about how time relates to location and spatial awareness. Tools for measuring time and space form the foundation of geography and are critical to connecting people to the land they use, according to Esri's Brent Jones in his recent column in *GIM International*. Consider the documentation of land tenure, which is a necessary precondition of a successful economy. He believes that geographic information system technology (GIS) can begin reviving economies, starting right now with the tools we already have and that are easy to configure. To help us understand how we got to this point, he takes us on a dive into the history of precision as it relates to time and space.

Time

A thousand years ago, the only way we could tell the time was by using the sun and a sundial. Not everyone had one, so the primitive clocks were included on the facades of public buildings and churches so that everyone could know what time it was. This simple device effectively synchronised society – during the day, at least. Then came the pendulum clock. This worked 24 hours a day and was a multimedia device, with a swinging visual centrepiece and chimes that signalled the passage of full, half and quarter-hours. Interestingly, China rejected it as a gimmick but the Western world, whose labour output equalled China's at that time, adopted the clock to more precisely measure, organise and improve productivity. But there was a problem for the West: pendulum clocks didn't work on ships due to the swell of the sea. Between the 15th and 17th centuries hundreds of European ships crashed along the east coast of the Americas, all because of the inability to calculate longitude. (As you probably know as a reader of *GIM International*, determining longitude requires the measurement of time between two points on the Earth's spheroid, which comes down to minutes and seconds.)

The development of the spring-powered clock came next and changed the world, not just in terms of navigation to calculate longitude, but also in manufacturing, transportation and virtually every other area. It was a true disruptor. Because it was designed to be portable, it brought innumerable efficiencies in measuring and synchronisation. In the 1970s, it became digital. Timekeeping chips that were even more accurate than Rolexes became cheap enough to put in everything from wristwatches to microwaves. Another disruption took place with GPS: the 'Casio watch' of positioning.

Space

We organise, synchronise and measure space in parallel with time, so a similar evolution took place with how we measure on Earth. Take surveying instruments, for instance. When President Clinton turned off selective availability (the intentional degradation of GPS signals) in May 2000, few people understood the profound effect it would have. Before that moment, accuracies were up to 100 metres for an autonomous position; this was immediately halved. Later, augmentation services took it to under 10 metres. Today, just like the digital clock, single-centimetre positioning using correction services has become affordable and ubiquitous – largely thanks to GPS manufacturers that rapidly responded with all kinds of solutions and devices. At some point, we'll have GPS and other location devices on all our important assets and be able to know where everything is. Once it becomes digital, it can be produced smaller, faster and more cheaply.

The challenge now is the next wave of disruption – not the data we collect, nor its accuracy, but what we do with it and the technologies we use. We have the necessary tools to organise, analyse, visualise and deeply understand problems and meet economic challenges. Open standards and formats now allow us to collect data, store it in the cloud and share it openly and globally in free data libraries such as Esri's Living Atlas. The Living Atlas is one of the best sources of no-cost data because it includes transportation, streets, imagery, boundaries, topography and everything else needed to enact initiatives and coordinate large-scale projects. It not only provides the base map data but

also real-time services for traffic, weather and much more.

Application: Land Reform

If you're a regular reader of *GIM International*, you'll know that at least a billion people live on just USD2 per day, and there is a lack of documentation on land tenure for more than 70% of the world. You'll also be aware of the value of good land administration in alleviating poverty and developing land markets. The economic proof is shown in post-war cadastral systems in Japan, Taiwan and South Korea. Those three national economies were a shambles until economist Wolf Ladejinski helped reform their registries and connect people to land. That act of remediation effectively unlocked the capital tied up in their real estate and turned those struggling nations around in a short space of time.

We're now in the position to use GIS to accelerate land reform in the same way timekeeping chips and GPS boosted the evolution of precision. Because of the way GIS technology is built today, data and services that land agencies typically consume are available anywhere and can be used on any device. That ability makes GIS the perfect platform to help repair and build developing nations' systems of record and enfranchise citizens. All the tools exist to interconnect current disruptive technologies like high-accuracy GPS, inexpensive Android smartphones, the cloud and modern GIS tools.

We don't need to keep reinventing the wheel; we can take advantage of the standards and interoperable tools that make projects easier to deploy. All the benefits of precision can be realised using GIS. The 'where' is the disruption.

More information:

Esri's Living Atlas of the World: http://arcg.is/2qjyS3A

Land Reform, Wolf's Way, Esi Insider http://arcg.is/2qh70ui

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