Brief: Obstacles Facing Earth Observation Firms

December 8th, 2020

Findings

Rotoiti interviewed five experts in the Earth observation (EO) industry about common obstacles that hinder commercialization of EO data. This brief summarizes and builds off their views. The obstacles described below are surmountable if EO firms develop strategies to address them.

Common obstacles in terms of accessing and analyzing data

One obstacle to commercializing EO data is price points. EO data can be expensive, and users must oftentimes pay up front to acquire data before then processing and analyzing the data to make a solution that can be sold to customers. This is particularly an issue for firms that want to create EO-enabled solutions for customers but are short on capital. Especially for startups, needing to pay for data up-front can be a serious obstacle to advancing business. Up-front costs are even more of an issue for startups in countries with limited venture capital. In the United States, which has a well-developed venture capital sector, startups can garner funds from investors if their business plans merit investment. In countries with less developed venture capital sectors, startups have more difficulty raising funds to cover up-front costs.

- One issue that feeds high prices is licensing. Providers of data often impose stipulations on how data can be used, which may hinder the ability of firms to develop businesses around EO-enabled solutions. It is expensive to buy licenses without geographical restrictions, for instance; firms therefore often purchase geographically limited access. This stymies EO firms' ability to sell solutions to customers outside those regions; to expand to customers in other regions requires more up-front costs. Licenses also restrict reselling of data (raw pixels, not value-added), which drives up prices.

- Another issue that relates to high prices is existing distribution networks, which make accessing data difficult. There is no "Google" where firms can easily search through all EO data. Some providers sell data directly, while others prefer firms purchase data via middlemen firms. All this complicates the process of accessing data and drives up transaction costs. Even for accessing free data from publicly accessible data sources, firms must oftentimes create various accounts to access data.

Different sensors collect different sorts of data, which poses obstacles for using data to create EO-enabled solutions. This is because different resolutions and bandwidths of EO data allow different solutions; as an example, certain bandwidths can "see" through different sorts of materials while others cannot. One cannot simply mix and match different data sources to create solutions; the relevant types of data depend on the envisioned solution. EO data sources also differ in terms of resolution, both regarding imagery detail and also regarding the frequency of revisit rates ("temporal resolution"). High revisit rates are especially important for solutions that help customers make decisions in response to quickly changing environments.

Another obstacle regarding the idiosyncrasy of EO data sources relates to pre-processing. This means that, depending on the data source, data is formatted differently. Learning to use and make sense of data sources, given their formatting particularities, requires developing familiarity with them over time. This investment of time may hinder the development of EO-enabled solutions, since analysts are not familiar with all sources. Certain sources, particularly those with low revisit rates or limited geographic coverage, may not be seen as worth investing the time to learn; familiarity means it is easier to use certain sources more than others.

- If a satellite constellation has an uncertain future, analysts may resist spending time to familiarize themselves with it; it is better to be familiar with a constellation that has a strong legacy and is deemed likely to be around for many years to come.

Firms, especially startups, often underestimate how much time and money it takes to set up data processing pipelines. To build an EO-enabled solution for customers requires processing the data acquired from providers. Before creating a useful solution that analyzes data to provide insight, in other words, data must be processed to be analyzable. Such processing of data can be lengthy and requires significant in-house expertise. It can be a "painful" process to go through imagery and clean up the dataset to only see images without cloud cover, for instance. For other sorts of EO data like synthetic aperture radar, significant manpower must go into processing imagery to make it ready for analysis. Depending on the type of processing required, it can be difficult to find and hire relevant experts to process data in a timely manner.

- Another issue related to data processing pipelines is that EO data often needs to be fused with other data sources to provide useful products (e.g. drone imagery or land-based sensors). This requires further in-house technological expertise and increases the time and money required to set up a pipeline that delivers analyzable data.

Common obstacles in terms of selling solutions to customers

A common obstacle to commercializing EO data is imperfect understanding of the issues which customers face. Oftentimes, EO firms are driven by excitement about the potential of technological wizardry; EO data can almost magically provide insight about many phenomena. But to make a business of selling EO-enabled solutions, technological wizardry must match real customer concerns. What decisions are customers having difficulties making? How can EO help them? EO firms often focus on selling miraculous solutions, even if less miraculous (and cheaper) solutions may be all customers need in order to make smarter decisions.

To know what issues are of concern to customers and what appropriate solutions are, EO firms should have familiarity with the business areas they want to engage. They should have more than just technological expertise; they need industry expertise as well. Only in this way will an EO firm address a real problem. The premise of an EO firm should be based on a deep understanding of a real business dilemma. A common refrain from experts is: Start with a real-

world problem and then work out a solution which, if it makes sense, uses EO data. Let the EO solution flow from a concrete problem; do not create a solution and then look for a problem.

Firms need to be able to argue that EO-enabled solutions help customers make decisions more cost effectively than other solutions. Another common obstacle to commercializing EO data, even if one can explain how the EO-enabled solution helps customers make relevant decisions, has to do with customers' finances. Yes, an EO-enabled solution may be able to help customers behave more intelligently, but how does this solution compare in terms of costs and benefits to other potential solutions? What are the benefits of the EO-enabled solution and how do these benefits outweigh the costs? How do the net benefits of the EO-enabled solution compare to the net benefits of alternative solutions to which customers have access?

One obstacle to breaking into new customer segments relates to customer uncertainty. Even if a firm can convince customers that an EO-enabled solution will help them solve problems in ways that make financial sense, customers may still not trust a new technology with which they have little experience. They may feel more comfortable using other tried and true solutions. This is particularly the case if customers face consequences for even temporary disruptions in their ability to address whatever issues are relevant to them. In the realm of compliance, for instance, if a switch to EO-enabled solutions even temporarily disrupts monitoring abilities, customers may face fines. Customers may thus prefer to stick with less efficient but more comfortable solutions; it may be better from customers' perspectives to pay more for an inefficient compliance solution than to risk a fine and running afoul of a public authority.

A second obstacle in terms of breaking into new customer segments relates to the price tolerance of existing customers. This is because some of the most established customers for EO-enabled solutions (e.g. defense) are willing to pay high prices for those solutions. These established customers, often in the public sector, do not tolerate potential failures or disruptions. They are thus willing to pay high prices to ensure that EO-based solutions can reliably deliver. Established customers' price tolerance acts as a disincentive for any solution providers to expand into new customer segments; there is always a draw to instead sell to established customer segments, since such segments appear to offer greater potential profit.

- Existing customers' tolerance of high prices also relates to the high prices of accessing EO data. Since existing customers are willing to pay high prices, EO firms are thus willing to pay high prices to access EO data and turn that data into EO-enabled solutions for existing customers. This disincentivizes EO data providers from lowering prices they charge for EO data (e.g. by modifying licenses so that firms face less restrictions).