

Spatial finance and the future of ESG

We are collecting more geospatial data than ever before. New generations of tiny satellites are flying overhead in low earth orbit taking high resolution images of every point on planet earth every single day. These constellations, the largest of which currently consists of over [140](#) “cube sats” (at 10cm x 10cm x 30cm in size), allow us to see planetary-scale change on a daily basis. These are combined with larger and often more specialised platforms and earth observation “missions” often funded by governments, for example, US Landsat Missions and the EU Copernicus Programme. We are also seeing the widespread use of drones (large and small) to complement traditional forms of aerial observation.

When combined with artificial intelligence to automatically scan and interpret this vast amount of visual data on the ‘cloud’ unprecedented capabilities are becoming available. These rapidly growing data mountains can then feed increasingly sophisticated predictive models to generate more and more insights and results.

This is a virtuous cycle. The underlying technologies keep getting better and better, and cheaper and cheaper. Higher resolutions, smaller and lighter instruments, lower launch costs (think SpaceX), more processing power, new algorithms, and better predictive models mean that year after year capabilities are improving.

We are only at the beginning of understanding all the possible use cases. These technologies will enable new ways of doing things that can help governments, regulators, companies, investors, and civil society tackle a wide variety of challenges around the world. In terms of research, geospatial data and analysis enabled by these technologies will almost certainly allow us to (re)examine a vast range of hypotheses with big implications for almost every academic discipline in the social and physical sciences. It allows us to see the scale of the problem, how it is changing, what is working, and what is not.

‘Spatial finance’ is the integration of geospatial data and analysis into financial theory and practice. This year four leading institutions – [The Alan Turing Institute](#) (the UK national laboratory for data science and artificial intelligence), the City of London Green Finance Initiative (now the [Green Finance Institute](#)), the [Satellite Applications Catapult](#) (an accelerator focused on commercialising space technology), and the University of Oxford – launched the [Spatial Finance Initiative](#) (SFI). SFI has been established to “mainstream geospatial capabilities enabled by space technology and data science into financial decision-making globally.”

This mission has only become possible in the last few years as these result of rapid developments in data capture (cheaper sensors and platforms, particularly new satellite constellations with much more regular revisit periods) and data processing (developments in AI and cloud-based computing to scan and interpret imagery quickly), as well as continuous improvements in predicative modelling (that help to turn geospatial data into insights).

In the realm of finance, these capabilities will allow us to upend the current information asymmetries that exist between companies and their investors, and between financial institutions and their regulators. Spatial finance has the potential to transform the

availability of information in our financial system. This creates a significant opportunity for the financial services industry, including but not limited to the effective implementation of ESG practices.

Information is the lifeblood of financial markets. The systems that collect, collate, and disseminate financial market information are a key component of well-functioning capital markets. Geospatial data and analysis will have profound implications for these information markets and associated systems. They will add an incredibly rich, customisable, and much more robust third dimension to existing data currently used to understand the performance of companies and portfolios. It will complement traditional financial reporting, as well as recent developments in integrating reporting and climate-related risk disclosure.

The current focus on companies disclosing more and better information, for example, as recommended by the Task Force on Climate-related Financial Disclosures (TCFD), is often framed as an attempt to remedy information asymmetries for climate-related risks (and opportunities). Such efforts should be lauded, but the idea that we will secure comprehensive or accurate disclosures globally any time soon is naïve. It will take many years to achieve anything like global coverage for some of the most basic disclosures requested, and even then, these are not the data points needed for fundamental and objective third-party analysis of the exposure of companies to climate-related risks. The TCFD is much more important as a process for getting companies and their management to assess climate-related risks systematically and comprehensively, rather than as a vehicle for collection and distribution of objective data.

The only plausible pathway for securing the data required for such analysis is not from disclosure, but from these developments in spatial finance. Bottom up approaches to analysing climate-related (and broader environment-related) risks, impacts, and opportunities based on accurate and timely asset-level data is already possible for key polluting sectors. The work can be easily accelerated and made much more readily available.

Not only will actors within the financial system then be able to see the environment-related risks and opportunities facing sectors globally and what impact listed and non-listed companies (and portfolios) are having on the global and local environment, it would also allow regulators, policymakers, and civil society to see what is happening and what that means for their respective responsibilities.

The resulting “ultra-transparency” will be transformative for aligning finance with sustainability. SFI’s vision is to have the world’s largest asset owners, asset managers, banks, and financial regulators all using spatial finance to assess risks, opportunities and impacts across different aspects of financial sector decision-making. This will be driven by a vibrant ecosystem of spatial finance providers and products.

It cannot come soon enough. To realise sustainable finance, we need better data. In particular, we need to understand i) the impacts that investments will have on the local and global environment, as well as on sustainable development and ii) the stranded asset risks investments face from different physical and transition risks related to

environmental change, particularly climate change. Spatial finance is the key to unlocking these insights for the financial system.

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