DIGITAL EARTH AUSTRALIA AND
THE FINANCE AND INSURANCE INDUSTRIES

INVESTING IN THE BENEFITS OF EARTH OBSERVATION

MARCH 2022

FRONTIER SI

FOREWORD

Digital Earth Australia was established by the Australian Government to take advantage of the rapidly increasing availability and accuracy of satellite image data. It is a world-class digital infrastructure that places intelligence from Earth observation (EO) satellites in the hands of more Australians and equips policy and decision-makers with powerful insights.

Providing access to this rich and high-quality set of data and tools enables new applications and services to be developed that will boost the efficiency and productivity of Australia's economy.

The opportunities for EO data to drive growth and improvement within Australia's finance and insurance industry are extensive. Its potential to reduce risk, increase operational efficiency, improve reporting, and help businesses transition towards low-emission models, ultimately increasing profitability, is significant – but so is the gap in knowledge and awareness between technology providers and potential users.

This report is a step towards bridging this gap and encouraging finance, insurance and EO professionals to explore new opportunities. We welcome businesses, educators, innovators, and individuals into this conversation, and we look forward to hearing from you.

ABOUT FrontierSI AND DIGITAL EARTH AUSTRALIA

FrontierSI has been engaged by Geoscience Australia to conduct exploratory research into the potential application of EO data across key industry sectors, including agriculture, mining, finance and insurance, and construction and infrastructure. FrontierSI is a social enterprise that delivers significant benefits to governments, industry and the community using our deep expertise in Earth observation, mapping, data infrastructures, analytics, and location technologies. The Geoscience Australia Digital Earth Australia (DEA) program makes analysis-ready satellite imagery data and infrastructure accessible to industry, government, and researchers. This series of reports aims to provide further insights into the current and future challenges that face industry that may be addressed by applying EO data. It also provides direction on how the DEA program can be shaped so that EO can become an even more valuable tool for the industry than today.

This report reflects insights sourced from industry research, interviews, focus groups, conferences, and workshops conducted during 2021. It was funded by Geoscience Australia and published in 2022.

Graeme Kernich
CEO
FrontierSI

EXECUTIVE SUMMARY

The finance and insurance industry is one of the most significant contributors to Australia's economy. It is currently facing increasing challenges impacting business as usual operations, particularly the increasing frequency of natural disasters. Climate risk reporting, sustainable finance, and environmental and social governance are of high priority to shareholders and increasingly the Australian regulators. These challenges are currently at the front of the mind for companies, along with company boards and operations. Further to these challenges are the business as usual aims of existing organisations, such as improving customer experience through digital transformation and growing their market share under increasing pressures from new Fintech and Insurtech companies. Earth observation (EO) data can provide critical insights on many of these emerging issues, but is currently underutilised by the finance and insurance industry.

This report aims to identify the finance and insurance industry's critical business problems, operational activities, and diverse user groups, informing both technology and finance and insurance companies how investment in EO solutions can drive business returns.

OPPORTUNITIES

Notable opportunities for the growth of EO in the industry include:

- Assessing climate risk and reporting on Environmental, Social and Governance.
- Assisting with regulatory requirements and reporting.
- Helping companies maintain resilience through better knowledge of risk exposure.
- Helping to retain and grow the customer base through:
  - improved investment performance
  - competitively priced premiums and loan rates, and
  - new and innovative products to improve customer service.
- Reduced claim response times and improved event recovery.
- Detection of fraud on insurance claims.
- Remote valuation of assets.
- Provision of insights for increasing profits for the customer and the organisation.

CHALLENGES

Several significant challenges have been identified in increasing the uptake of EO products and services within the finance and insurance industry. These are:

- Specialist knowledge is required in EO data application to problems in the finance and insurance industry.
- The development of EO solutions requires organisational buy-in.
- Understanding appropriate use of EO data can be problematic for non-specialists.
- Finance and insurance institutions face stringent security protocols.
- Data needs a high level of management.
- High cost of high-resolution data limits adoption for applications in the industry.
- Geolocation of assets is required before organisations can realise the benefits of EO.

RECOMMENDATIONS

In response to these opportunities and challenges, recommended actions for EO providers are:

- Increase awareness of EO and application providers to problems in the finance and insurance industry.
- Clear communication of benefits and performance of EO solutions.
- Data security must be a high priority.
- Make EO easy to integrate into existing workflows.
- Provide EO data insights ready for decision making.

DIGITAL EARTH AUSTRALIA'S COMMITMENT

Digital Earth Australia (DEA) is committed to working with the finance and insurance industry to ensure EO is a key part of their digital transformation by:

- Increasing awareness of how EO can support decision making, customer understanding, and risk management.
- Building confidence in the use of EO in the industry to support Environmental, Social and Governance and regulatory reporting activities.
- Promoting data standards and interoperability to make it easier to share and collaborate with EO data.
- Supporting the commercialisation of EO products and services for the industry.
- Embedding EO in the toolkits of the next generation of professionals.

CONTENTS

EXECUTIVE SUMMARY iii

PART 1: INTRODUCTION 1

Background 1

Potential benefits of Earth Observation 1

Purpose 1

PART 2: THE FINANCE AND INSURANCE ECOSYSTEM 2

About the Finance and Insurance Industry 2

Key Categories Comprising the Finance and Insurance Industry 4

- Personal Banking 4
- Corporate Banking 5
- Insurance and Re-Insurance 6
- Managed Funds and Superannuation 7
- Capital and Derivative Markets 8
- Regulation 9

PART 3: USER PROFILES 11

User EO maturity levels 11

- The Data Analyst 12
- The Risk Analyst or Actuary 13
- Insurance Claims Officer 14
- The Lending Consultant 15
- The Customer 16
- Traders or Fund Managers 17
- The CEO 18
- The Tech Start-Up 19
- The Financial Regulator 20
- The Data SME 21

PART 4: OPPORTUNITIES 22

PART 5: CHALLENGES 25

PART 6: RECOMMENDATIONS 27

PART 7: CONCLUSION 28

FURTHER READING 28

ACKNOWLEDGEMENTS 28

PART 1: INTRODUCTION

BACKGROUND

On New Year's Day 2020, Australia awoke to Black Summer – a nation on fire. The Insurance Council of Australia estimated more than AU$2.26 billion in claims arising from the fires[1]. Two weeks later a 15-minute hailstorm caused havoc in Canberra. Fast forward to 2022, large areas of Queensland and New South Wales are being devastated by widespread flooding with a damage bill expected to exceed AU$2 billion[2].

As well as the significant impacts on communities, the environment, and major infrastructure, these events impacted Australia's largest financial asset, its AU$8 trillion worth of residential properties[3]. As fires and floods again threaten homes in 2022 the increased frequency of extreme events seems to be the new normal.

Predicting the future based on the past is essential for the finance and insurance industry. With the rise in the frequency of natural hazards in Australia over the past two years, questions are arising about insurance for whole communities affected by these events. How can the occurrence and severity of future events be predicted so damage and impact to customers is minimised? What is the risk for a bank when lending in a bushfire prone area? The answers to these questions can impact businesses and individuals, and must be answered to ensure the industry's ability to function and service their stakeholders. The answers to these questions are increasingly dependent upon data science and analysis.

POTENTIAL BENEFITS OF EARTH OBSERVATION

Earth observation (EO) provides important and actionable data-driven insights on past and present events. Having accurate historical and current spatially located information will become more important to the finance and insurance industry under future climate change scenarios. Even though more frequent and severe natural hazards are predicted, EO is currently estimated to contribute only 1-2% in economic value to the industry[4].

EO has many potential benefits to the finance and insurance industry. There is opportunity to incorporate EO into new products and service offerings that reduce risk and increase profitability. The industry could use EO to:

- unlock profits and revenue from new investment options or provide more timely information on commodity markets.
- manage portfolios, monitor assets and model risk.
- report on environmental and social governance (ESG).

This can be achieved either by increasing the use of EO in-house or engaging the services of a specialist third-party vendor.

While EO only makes a small contribution to the finance and insurance industry at present, a review of the emerging opportunities suggests there are many more untapped opportunities which can drive EO use in the short, medium, and long term.

PURPOSE

This report highlights current and potential uses of EO in the finance and insurance industry. It aims to increase the uptake of EO by identifying current and emerging opportunities for increased use. It was produced by FrontierSI for Geoscience Australia, from desktop research and a series of one-on-one interviews. Its intended audience is companies operating within the finance and insurance industry, and spatial companies wishing to develop new product and service offerings for the industry.

1 *Insurance Council of Australia. House of Representatives Economic Committee Inquiry into Australia's General Insurance Industry Opening Statement: Rob Whelan, CEO, Insurance Council of Australia. (2020).*
2 *Australian Financial review, 'Flood damage bill set to top $2b', https://www.afr.com/politics/floods-damage-bill-set-to-top-2b-20220302-p5a0z5 (2022). Accessed 10 March 2022.*
3 *Australian Bureau of Statistics, Residential Property Price Indexes: Eight Capital Cities. (2021).*
4 *Australian Government. Current and Future Value of Earth and Marine Observing to the Asia-Pacific Region. (2019).*

PART 2: THE FINANCE AND INSURANCE ECOSYSTEM

ABOUT THE FINANCE AND INSURANCE INDUSTRY

The finance and insurance industry makes up approximately 9% of Australia's Gross Domestic Product[5]. It was the second-largest industry in Australia for Gross Value Added (GVA) in 2020, contributing 9.4% of GVA to the Australian economy[6]. Australia has the world's 8th largest investment fund asset at US$2.2 trillion (September 2020), including superannuation and managed funds. The financial sector has grown on average over 9% per year over the past 20 years[7]. It also has one of the world's largest private banking markets, despite the nation's relatively small population, with more high net worth individuals than Hong Kong and Singapore combined[8]. For the Australian insurance sector, the occurrence of natural hazard events combined with higher reinsurance costs and volatile market conditions is contributing to a decrease in profits. As an indication, in the year to 30 June 2020 the insurance industry in Australia experienced a 48.31 percent decrease in profits to AU$2.274 billion[9].

In recent years, fintech and insurtech companies have taken off in Australia. With their focus on applying technology to the industry, they cover a wide range of services across all parts of the finance and insurance ecosystem. Australia currently has over 800[10] companies identified as fintech and an unknown number of insurtech companies (Insurtech Australia has 66 listed members[11]).

The industry is complex and overseen by five different regulatory bodies. Broadly it can be broken down into the following categories[12] (Figure 1), with some businesses participating across multiple categories:

1. Personal banking
2. Corporate banking
3. Payments
4. Insurance and re-insurance
5. Managed funds and superannuation (including financial planning)
6. Capital and derivative markets
7. Financial regulators

As the focus of this report is on informing technology and finance and insurance companies how investment in EO solutions can drive business returns, while we acknowledge the important role 'Payments' play in the industry we do not include further detail on this category as we do not see a stand out value proposition for EO at present.

It is also important to note that we recognise 'Venture Capital' as an important category within the industry. However, we have not included it in the list above as from the perspective of this report it is viewed as a potential funding source which can be leveraged for the development of EO-based products and services of value to the industry, as opposed to being a category where such products and services may find application and create business value.

5 *Reserve Bank of Australia. Composition of the Australian Economy – Snapshot 5 March 2021. (2021).*
6 *Australian Trade and Investment Commission. Why Australia Benchmark Report 2021. https://www.austrade.gov.au/benchmark-report/resilient-economy.*
7 *Australian Trade and Investment Commission. Why Australia Benchmark Report 2021. https://www.austrade.gov.au/benchmark-report/resilient-economy.*
8 *Australian Trade and Investment Commission. Financial Services. https://www.austrade.gov.au/international/buy/australian-industry-capabilities/financial-services (2021).*
9 *KPMG. Responding to a Changing Landscape. General Insurance Industry Review 2020. https://assets.kpmg/content/dam/kpmg/au/pdf/2020/general-insurance-industry-review-2020.pdf (2020).*
10 *Fintech Australia. What is Fintech? https://www.fintechaustralia.org.au/learn/ (2021).*
11 *Insurtech Australia. https://insurtechaustralia.org/ (2021).*
12 *Australian Government. Australian Industry Capabilities Financial Services. Austrade https://www.austrade.gov.au/international/buy/australian-industry-capabilities/financial-services.*

FIGURE 1: THE CATEGORIES OF SERVICE OFFERING WITHIN THE FINANCE AND INSURANCE INDUSTRY

KEY CATEGORIES COMPRISING THE FINANCE AND INSURANCE INDUSTRY

PERSONAL BANKING

Personal or retail banking provides financial services to individuals. It is a two-sided market where customers supply funds in the form of deposits, and demand funds in the form of personal loans or mortgages. Services offered include savings accounts, checking accounts, mortgages, personal loans, credit cards, currency exchange, investment advisory services and personal trading accounts for the stock market. There are currently 138 authorised deposit-taking institutes (ADIs) in Australia. Four banks in Australia hold most of the market share[13] (Westpac Banking Corporation (WBC), Commonwealth Bank of Australia (CBA), National Australia Bank (NAB) and Australia and New Zealand Banking Group (ANZ)) and accounted for 72% of the personal savings share in April 2021[14].

Emerging opportunities for the use of EO in personal banking:

- Providing additional information to **customers** purchasing property so they better understand the local amenities and services, site-specific information such as past land use, and climate-related risks such as flooding and bushfire.
- Allowing **property valuers** and **loan approvers** to better understand the risks associated with providing a loan for a property by identifying climate and bushfire risks.
- Providing automated property valuation reports, removing the need for site-specific visits by **property valuers**. For agricultural property, past production estimates can be used as an estimate of future income for **property valuation**.
- Allowing **data analysts** to assess land management practices and value natural capital to inform green mortgage rates or bonds through land use classification, vegetation cover changes over time, biodiversity attributes or soil carbon.
- Providing data for a **risk analyst** to produce a summary investment understanding of portfolio assets about risk exposure, allowing the **executive team** to make strategic decisions.

CASE STUDY: GEOSCAPE AUSTRALIA – G-NAF

Geoscape Australia is a provider of national location data backed by the governments of Australia. It proves a comprehensive representation of the built environment. The GNAF dataset contains all physical addresses in Australia. Over 30 million contributed addresses are distilled into more than 15 million G-NAF addresses. Geoscape data is used by businesses in the finance and insurance industry to visualise and download building outlines, heights and address data for input to analytics and platforms and risk modelling. **https://geoscape.com.au/**

13 *Productivity Commission. Competition in the Australian Financial System. https://www.pc.gov.au/inquiries/completed/financial-system/report/financial-system.pdf (2018).*

14 *Australian Prudential Regulatory Authority. Monthly Authorised Deposit-taking Institution Statistics. Monthly Authorised Deposit-taking Institution Statistics https://www.apra.gov.au/monthly-authorised-deposit-taking-institution-statistics April 2021 (2021).*

CORPORATE BANKING

Corporate or business banking provides services to corporate customers that range in size from small to medium enterprises (SMEs) to large global corporations. Corporate banking services are offered by many of the banks who operate in the personal banking market. The services offered include credit (loans) to help companies grow, and deposit taking from corporate customers. They also offer a range of other services related to financing and managing business opportunities including portfolio analysis, debt and equity restructuring, payroll facilities, capital asset financing, and currency conversion.

Emerging opportunities for the use of EO in corporate banking:

- Helping **risk analysts** understand the risk associated with a loan through past land use and current state of the land and infrastructure.
- Providing data for **risk analysts** to produce a summary investment understanding of portfolio assets in relation to risk exposure.
- Helping **customers** understand the carbon footprint of products and services.
- Documenting ESG compliance and supporting **loan approvers** to offer alternative options where ESG is not transparent.
- Supporting **executives** to adopt an ESG reliant lending strategy to attract new **shareholders**.
- Tracking company activities like operations, production, and supply chain operation.

CASE STUDY: SENTIENT HUBS

Sentient Hubs is a decision support platform that supports businesses to make informed decisions about their assets exposed to climate change related risks and quantify the full financial, environmental and social implications of planned decisions. It uses physical modelling and artificial intelligence to assess, visualise and quantify complex inter-dependencies. Optical EO data are merged with climate and other spatial data to conduct complex modelling in a system agnostic environment.

https://www.sentient-hubs.com

INSURANCE AND RE-INSURANCE

Insurance provides guaranteed compensation for loss or damage of an asset, illness, or death in return for the payment of a specified premium. It covers events such as theft, and may cover natural disasters such as flooding, fire, and storms. As well as covering assets such as houses and cars, it may also cover loss of crops or financial loss when events impact product quality or price. Banks often require companies or individuals to take out insurance on loans to reduce their risk should the client default.

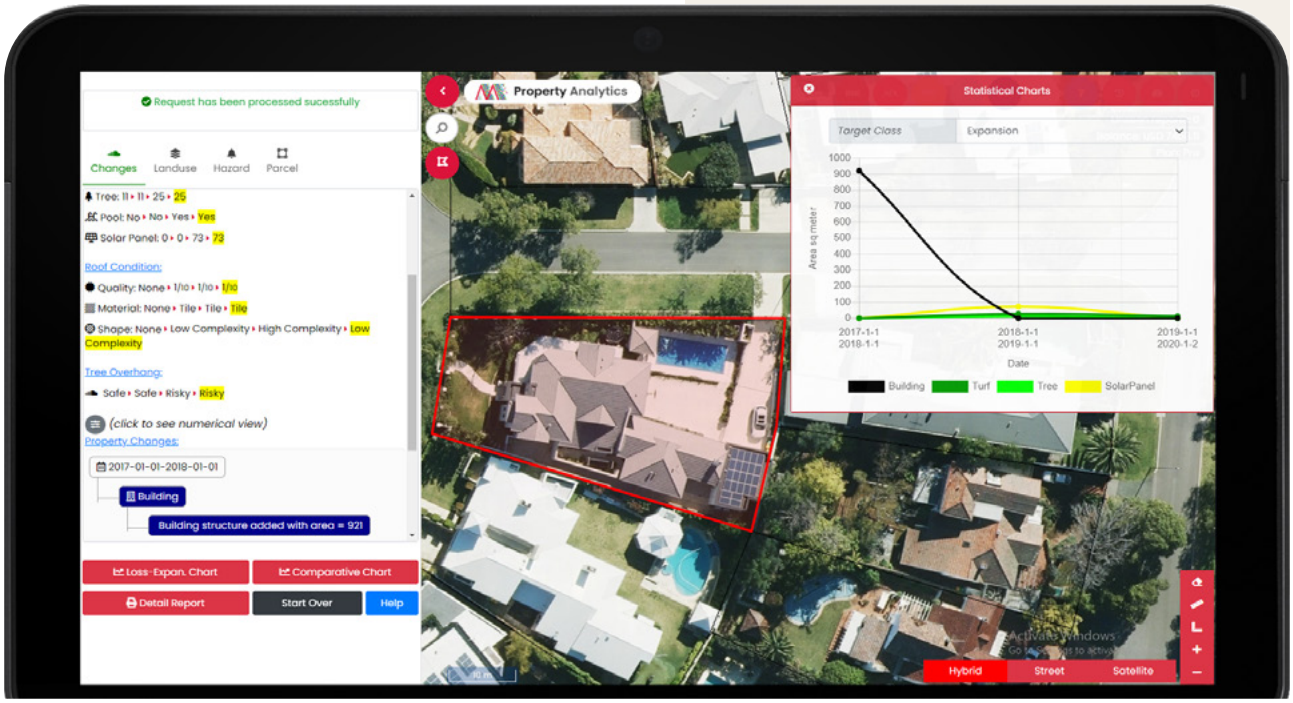
Re-insurance is where another company takes on the risk portfolio of the primary insurer and acts to balance the risk for the insurance company. It is effectively insurance cover for insurance companies. There are 93 insurers operating in Australia as at 31 March 2021.

Emerging opportunities for the use of EO in insurance:

- Enabling **risk analysts** to better understand an organisation's asset portfolio.
- Downscaling risk modelling outputs to the property level for **risk analysts**.
- Simplifying **new customer** application processes by automatically extracting building and property features.
- Tailoring insurance products for **new customers** by automatically assessing an asset's status and value.
- Providing **actuaries** a higher confidence in risk assessments, leading to lower premiums for **customers**.
- Delivering observations of the physical state of assets enabling **claims officers** to rapidly validate natural disaster claims.

CASE STUDY: MAPIZY AUTOMATED BUILDING FOOTPRINT AND CHANGE DETECTION FOR INSURANCE

Mapizy provides a cloud-based Software-as-a-Service (SaaS) solution for insurance, real-estate, and banks. Artificial intelligence image classification is used to classify building attributes from high-definition aerial imagery and combined with change analytics and risk factors from the surrounding environment. The platform provides insurance companies with information to evaluate premiums and assess claims, at both the property and regional levels. **https://mapizy-studio.com**



MANAGED FUNDS AND SUPERANNUATION

A managed fund pools investors' money to buy investments on behalf of all investors in the fund. It allows investors to gain access to opportunities that they could not access without pooling funds. The investor can choose different investment strategies with different levels of associated risk i.e. high yield growth or balanced.

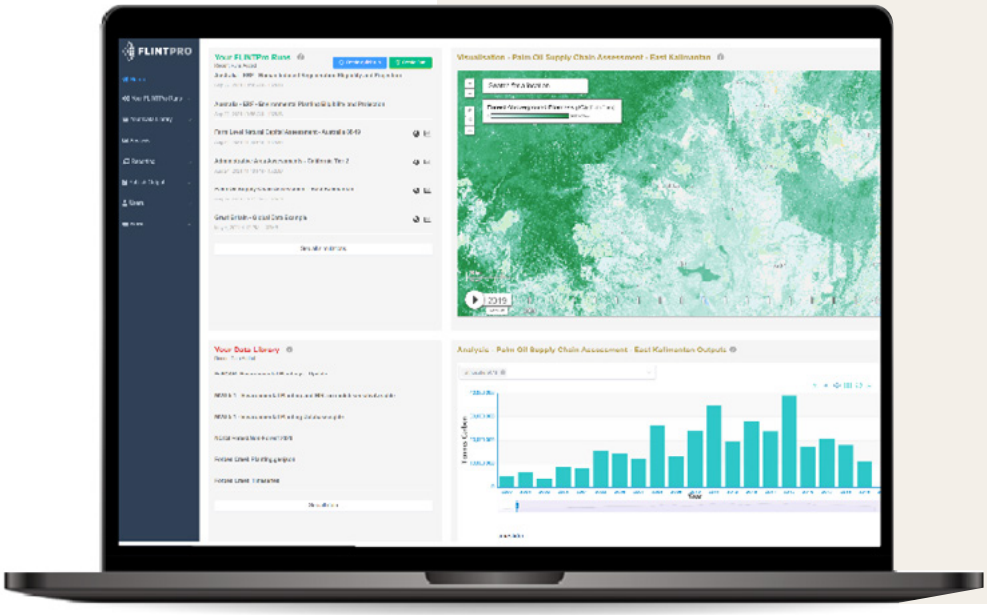
Superannuation (or 'super') is a compulsory system where employers place a minimum percentage of employees' income into a managed fund to support their financial needs in retirement. In 2020 the amount of funds invested in superannuation was US$2.3 trillion, giving Australia the 5th largest retirement savings scheme in the world[15].

Emerging opportunities for the use of EO in managed funds and superannuation:

- Enabling **fund managers** to advise **customers** on appropriate investment strategies based on their ESG preferences, e.g. reducing net carbon footprint.
- Enabling **fund managers** to track performance of investments against ESG expectations.
- Allowing **risk analysts** to understand risks (Transition risk, Physical Risk, Liability Risk[16]) associated with an investment and support **fund managers** to make better investment decisions.
- Assisting **fund managers** to analyse commodity markets at scale to better understand the stocks and flows of assets at a regional, national, or global scale.

USE CASE: MULLION GROUP – FLINTPRO

FLINTpro supports the information needs of the growing global climate finance industry. The data analysis platform provides consistent, accurate and accessible information to rapidly calculate, track and forecast greenhouse gas emissions from changes in land use. FLINTpro's online software-as-a-service platform, derived from decades of real-world experience, improves an organisations' ability to manage land-sector resource use and cost effectively report and monitor on ESG. **https://flintpro.com**



15 *Australian Trade and Investment Commission. Why Australia Benchmark Report 2021. https://www.austrade.gov.au/benchmark-report/resilient-economy.*
16 *Commonwealth Superannuation Corporation. Climate Risk https://www.csc.gov.au/Superannuation/Investment/Investment-quality-and-sustainability/Climate-risk*

CAPITAL AND DERIVATIVE MARKETS

Capital and derivative markets provide companies of all sizes the ability to trade their financial holdings. The capital market allows exchange of capital between investors and businesses or governments. The most common form of capital markets are the share (or stock) market, the bond market, and currency and foreign exchange markets.

The derivative market allows market participants to fix today the prices at which trades will be made in the future. The derivatives market has a significant focus on products produced by primary industries. For example, a wheat farmer may choose to use a futures contract to ensure they receive the current trading price for their next crop if they expect the price will decline in the meantime.

Emerging opportunities for the use of EO in capital and derivative markets:

- Allowing **traders** to forecast commodity prices by understanding current operating capacity of smelters, mining stockpile volumes, predicted crop yields, or location of ships to transport commodities.
- Enabling **traders** to forecast demand for raw materials based on current and predicted urban or industrial development.
- Allowing **traders** to forecast the value of a business based on observations of physical assets and activity, for example the number of cars identified in the car park, or new exploration activity on a mining tenement.
- Allowing **data analysts** to understand the supply chain and logistics of a business.

CASE STUDY: EARTH-I MONITORING COPPER PRODUCTION – SAVANT

Earth-I and Marex analyse data using artificial intelligence techniques to create indices of copper smelter activity and detect periods of shutdown or inactivity at the global, regional, and individual smelter levels. The data to create the index is from several different Earth observation satellites and is updated daily to give consistent results. The indices are used to assist commodity brokers in forecasting copper prices on the global market. **https://earthi.space**

REGULATION

There are five financial government regulatory bodies that govern Australia's finance and insurance industry (Figure 1, page 8):

- The **Australian Prudential Regulation Authority (APRA)** is responsible for the legal framework that balances financial safety, efficiency, competition, contestability, and competitive neutrality of Authorised Deposit-Taking Institutions (ADI) (personal banking) and general insurance and superannuation.
- **The Australian Securities and Investments Commission (ASIC)** is responsible for market regulation and consumer protection across capital markets, personal banking (but not lending), insurance and superannuation.
- The **Reserve Bank of Australia (RBA)** is responsible for monetary policy, and regulation of financial system stability in Australia.
- The **Australian Competition and Consumer Commission (ACCC)** acts to ensure companies and individuals comply with fair trading and consumer protection laws.
- **The Australian Transaction Reports and Analysis Centre (AUSTRAC)** collects financial reports and information to detect, disrupt, and prevent criminal abuse of the financial system.

Emerging opportunities for the use of EO in regulation:

- Allowing **data analysts** to identify what activity has not been disclosed in relation to business activities, and report this to **regulators**.
- Support for **financial regulators** to standardise the measurement of value for some asset types for valuation and depreciation.
- Providing an evidence base for **regulators** monitoring green financial instruments such as soil carbon credits or green bonds.
- Enabling **regulators** to validate emerging approaches to risk modelling using new FinTech and InsurTech products.
- Providing supporting evidence for the transition to the sustainable finance paradigm.

CASE STUDY: CLIMATE RISK REGULATION IN NEW ZEALAND

New legal frameworks are being developed to regulate sustainable finance. Monitoring of activities is crucial to ensure compliance with the Environment, Social and Governance (ESG) and, increasingly, Sustainable Development Goals (SDGs) which prescribe the activities and methodologies which constitute sustainable practices. In October 2021, New Zealand introduced legislation on climate-related reporting requirements for large financial entities. The Financial Industry (Climate-related Disclosure and Other Matters) Amendment Bill will "make climate-related disclosures mandatory for around 200 organisations, including most listed issuers, large registered banks, licensed insurers and managers of investment schemes"[17].

New Zealand is the first country in the world with legislation of this nature.

17 *New Zealand Government. New Zealand Becomes World Frist in Climate Reporting. (2021). https://www.beehive.govt.nz/release/nz-becomes-first-world-climate-reporting*

TABLE 1: MATRIX LINKING FINANCE & INSURANCE ACTIVITIES TO THE RELEVANT USER PROFILES AND CASE STUDIES

			RELEVANT USER PROFILES									
	EO can be used		The Data Analyst	The Risk Analyst and Actuary	The Insurance Claims Officer	The Lending Consultant	The Customer	Traders and Fund Managers	The CEO	The Financial Regulator	The Tech Start-up	The Data SME
Corporate Banking												
Business bank accounts			■				■		■	■		
Business loans	■		■	■		■	■		■	■	■	■
Business investment	■		■	■			■		■	■	■	■
Personal Banking												
Personal bank acounts			■				■		■	■		
Personal loans			■			■	■		■	■	■	■
Housing loans	■		■	■		■	■		■	■	■	■
Personal trading	■		■				■	■		■	■	■
Capital and Derivative Markets												
Trading of commodities	■		■	■			■	■	■	■	■	■
Trading of listed companies			■	■			■	■	■	■	■	■
Trading of futures and options	■		■	■			■	■	■	■	■	■
Trading of other stocks	■		■	■			■	■	■	■	■	■
Managed Funds and Superannuation												
Investment & fund management	■		■	■			■	■	■	■	■	■
Payments												
Electronic funds transfer			■				■		■			
Point of sale			■				■		■			
International currency			■	■			■		■			
Insurance & Reinsurance												
Provision of insurance and reinsurance	■		■	■	■	■	■		■	■	■	■
Financial Regulation												
Regulatory activities	■		■	■			■		■	■		

PART 3: USER PROFILES

USER EO MATURITY LEVELS

The outcomes of this report's industry consultation have been summarised as a series of generic user profiles. These group users into personas, then explain a range of characteristics about that persona and maturity level concerning EO data usage.

EARTH OBSERVATION USER MATURITY LEVELS

EO User Maturity Levels	Description of user
UML 0 Non-user	Has never had any interest in EO.
UML 1 EO Explorer	Has never made use of EO but is aware of it and may have planned occasional tests to assess its potential benefits.
UML 2 Ad-hoc user	Has used EO on an ad-hoc basis but without an explicit interest in repeated usage.
UML 3 Pilot/Experimental tester	Has already used EO in one or more trials and is considering its integration within standard practices.
UML 4 Confident user	Has confidently used EO and is working to incorporate it as part of operational activities.
UML 5 Operational user	Has adopted EO operationally and has integrated it within standard operational processes. Related resources such as staff, budget and resources are either allocated or readily deployable.

Adapted from the EC/ESA publication "The Ever-Growing Use of Copernicus across Europe's Regions."

THE DATA ANALYST

EO Maturity Level: 0-5

0 1 2 3 4 5

Meet Rose

Rose loves working with data. Data can be from any reliable, understandable source, but must be able to be easily combined with existing standard business data as well. EO data is just another data source to her. Rose will happily use EO if it will be of use, but she is unlikely to be a spatial or EO expert.

As a Data Analyst:

"I want to produce data products that others in my organisation can use to make decisions. I will use any type of data, but it needs to be easily accessible, well-described, and easy to explore and analyse so I know exactly what it is and how I can use it. Tools that bring different datasets together make my job easy."

Ecosystem category:

Personal Banking, Corporate Banking, Managed Funds and Superannuation, Capital Markets, Insurance and Re-Insurance

Role in the industry:

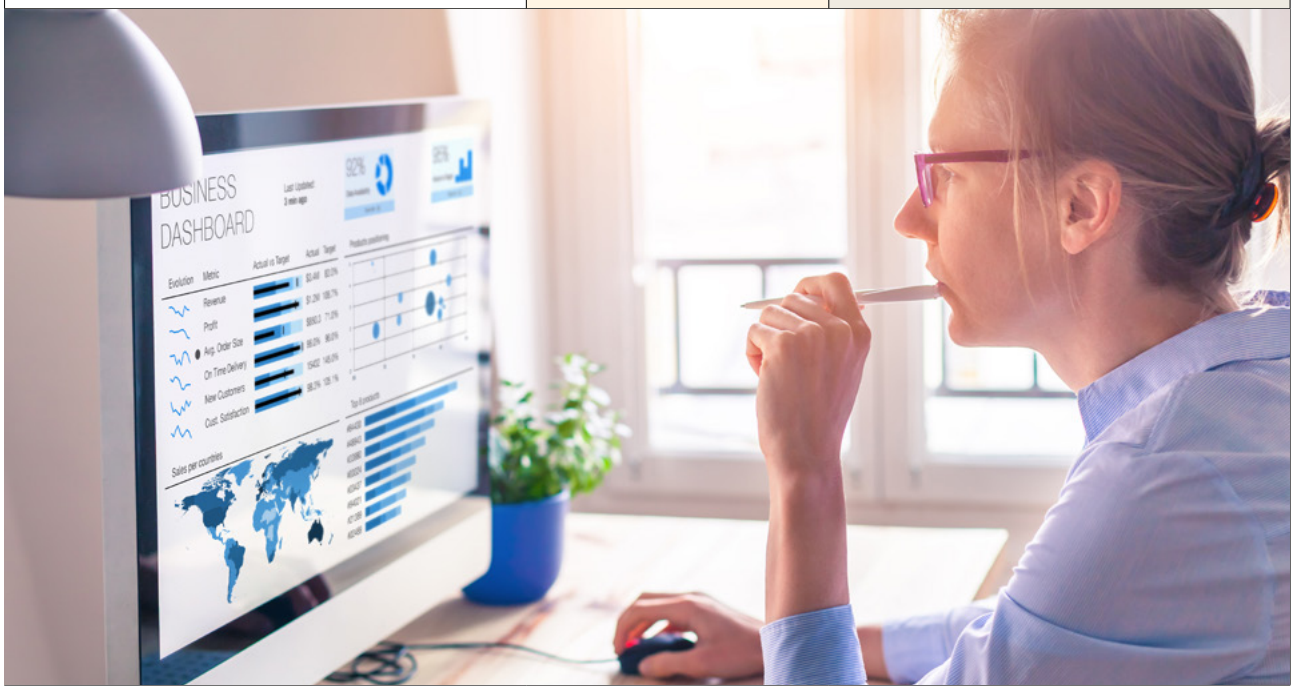
Integrate different data sources into information products for others to use, works across many functions of their organisation.

Key driver:

I am focused on creating the data products and insights that others need to understand risk and make decisions.

Questions that Rose wants to answer:

- How can I help make it easier for a new customer to choose our products and services?
- How should we price this new product for this market?
- What are our customers doing with their money?
- Are there any new trends in customer risks, behaviours or decisions?
- What interest rate should this customer be charged?
- How can I help to automate our understanding and reporting of our climate risks and footprint?
- What will make our products attractive to customers?
- Why do customers leave, or stay?
- How many more customers would likely pay for this product if I invested in this new dataset?



THE RISK ANALYST OR ACTUARY

EO Maturity Level: 1-5

0 1 2 3 4 5

Meet Steve

Steve uses data to produce risk information that decision makers use to maintain the right balance between risk and profitability. This could be for calculating return on investment (ROI), estimating the likelihood of loan defaults, or calculating the right premiums to charge insurance customers. He will develop statistical and process driven risk models using any available data, often using data products developed in collaboration with data analysts. He will use EO if it helps describe risk or drive models, but is unlikely to be a spatial or EO expert.

As a Risk Analyst or Actuary:

"I transform data into calculations of risk that others use to make business decisions. I want datasets that help me describe risk on their own or can be used as inputs into risk models. I source my own data and often work with data analysts to create the data I need. The source of data isn't important to me, but data quality certainly is."

Ecosystem category:

Personal Banking, Corporate Banking, Managed Funds and Superannuation, Capital Markets, Insurance and Re-Insurance

Role in the industry:

Evaluate risk and opportunity by estimating the financial impact of uncertainty.

Key driver:

I am focused on describing and understanding the nature and likelihood of risk to help others make the best business decisions. Reducing uncertainty in decisions is critical for me because uncertainty has financial impacts.

Questions that Steve wants to answer:

- How can I reduce uncertainty in our decisions?
- What risks is an asset exposed to (prior to insuring)?
- Can I help our customers mitigate risks, lowering the likelihood of an insurable event?
- Should we accept this new customer?
- How are natural disasters impacting our investment portfolio?
- How can I understand how external factors such as climate change impact our organisation at a portfolio level?
- What interest rate should this customer be charged?
- What should the price of this insurance policy be?
- Do we have enough resources available to cover major insurance events in a worst case scenario?
- What data may have reduced our liability or risk during a previous natural disaster?

INSURANCE CLAIMS OFFICER

EO Maturity Level: 0-2

Meet Amy

Amy evaluates and processes customer insurance claims. She will typically use data from an on-site visit to complete a damage assessment, prior to paying out the amount specified in the policy. She could use EO data such as drone footage or satellite imagery to help with rapid or widespread claims assessments if it was available, but she would be unlikely to do the analysis of this data herself.

As an Insurance Claims Officer:

"I am always balancing the needs of our customers, the obligations we have under our policies, and the money we pay out against claims. To do this I need to robustly examine the causes and circumstances surrounding any claim, while also remaining supportive of our customers in their time of need. Any data which can help me rapidly assess the validity of a claim makes my life easier."

Ecosystem category:

Insurance and Re-Insurance

Role in the industry:

Assess customer claims on insurance policies.

Key driver:

Ensure only valid claims are paid.

Questions that Amy wants to answer:

- Is this claim covered under the limitations and obligations of this policy?
- How likely is it that this person has been affected by a particular natural disaster event?
- Is there any risk that this claim could be fraudulent?
- What information can I gather to help be assess the validity of this claim?
- What was the event that has triggered this claim?
- What kinds of specialists will I need to assess this claim?
- Is there a way to avoid sending a person in to a risky situation?
- How can I forecast the geographical areas likely to be impacted by immediate natural disasters?
- What is the scale of impact on our customer likely to be from this event?
- How can I optimise disaster response using foreknowledge of the scale and likely geographical impact zone?

THE LENDING CONSULTANT

EO Maturity Level: 0-1

Meet Jake

He is an employee of a financial institution who works with loan applicants to find the best loan arrangements that suit both their needs. He has the extensive knowledge of the available loans and the necessary requirements to qualify for them. He relies on a lot of data, but doesn't prepare it himself. He is a people person and is good with numbers, but doesn't have any experience with EO.

As a Loan Approver:

"I need to find loan arrangements that cover a customer's risk profile from the organisation's perspective, but which also have competitive terms that are acceptable to them. Ideally, I'd like to approve a loan on the spot to improve the experience for my customer. I am heavily data-driven and work with data analysts who provide me with information about my customers, their circumstances, and any factors that could impact on repayment of a loan. At most I use EO as a communication tool, but the data analysts I work with may use it more quantitatively in determining risk."

Ecosystem category:

Personal Banking, Corporate Banking

Role in the industry:

Acts as a liaison between an institution and loan applicants.

Key driver:

To find a loan agreement that is in the best interests of both parties.

Questions that Jake wants to answer:

- How can I value my customer's assets with confidence?
- Is this loan likely to increase the value of my customers asset or business?
- How well is this customer currently managing and utilising their assets?
- What is the risk that this customer may default on their loan in the future?
- What are the loan types and interest rates that best match the profile of this customer?
- What other products might this customer be interested in?

THE CUSTOMER

EO Maturity Level: 0-5

0 1 2 3 4 5

Meet Brad and Janet

They are in the market for a new home. They want to be sure they don't pay too much for what they want. They aren't looking for EO specifically, but they like information about land, houses and insurance premiums to be presented clearly and maps and interactive apps can make it engaging and build confidence. They are not going to buy EO data but they will use apps and websites that employ EO to help them make their purchasing decisions, particularly if it makes their experience easy, provides confidence, and helps them understand more about their potential new local area.

As a Customer:

"I am looking for products and services that make my life better. I want to know that I'm getting the best deal and that what I'm paying for will do what I want it to without any hassles. I don't want to spend a lot of time doing things I don't enjoy, so I want clear information to base my decisions on when I need it."

Ecosystem category:

Personal Banking, Corporate Banking, Managed Funds and Superannuation, Capital Markets, Insurance and Re-Insurance

Role in the industry:

Consumer of products and services.

Key driver:

Get the best value products and services that meet their needs and to maximise the return on their investments.

Questions that Brad and Janet want to answer:

- How much can I borrow?
- What is near the property I plan to purchase that may affect value?
- What is the return on investment for my funds?
- How am I spending my money?
- Is this the best product for my needs?
- What risks might I be exposed to?
- Can you demonstrate the social and environmental performance of your institution?

TRADERS OR FUND MANAGERS

EO Maturity Level: 0-2

Meet Alice

She buys and sells securities to ensure the expectations of his investors are met. She does detailed research and analysis before making decisions and often works with a range of analysts to get the information he needs. She doesn't have much knowledge of EO, but the analysts she works with may use it in the compilation of the information they provide to her.

As a Trader or Fund Manager:

"I make data-driven decisions on buying and selling shares. I often need to understand dynamic economic and industry-specific factors that influence their performance. My decisions are data-driven, and I work with a range of analysts to get the information I need. I don't use EO myself, but if it can eb trusted and adds value to my analyses then it is a good data source for me."

Ecosystem category:

Capital Markets, Managed Funds and Superannuation

Role in the industry:

Implement investment strategies and manage trading activities to achieve goals over timeframes suited to investor needs.

Key driver:

Make a profit from buying and selling shares.

Questions that Alice wants to answer:

- What information will help me get an edge in the market?
- How confident am I about the decision to buy or sell?
- What risks is this stock open to?
- What information about the supply chain upstream and downstream of this company can help me predict future performance?
- Do I understand the climate impacts of my investment portfolio?
- How will my portfolio perform over the long term ?
- How has the value of this stock changed in relation to climate impacts and environmental change?
- How can I get visual estimates of global production of commodities?
- How can I track supply chain activity?
- How can I track production and consumption of commodities across their whole value chain?

THE CEO

EO Maturity Level: 0-2

Meet Sonia

Sonia leads an organisation that provides financial and insurance related products and services. She needs data to make decisions and communicate clearly to customers and employees. EO can be useful to her, but others will do the technical work to produce what she can use.

As a CEO:

"I make decisions about how my organisation runs and I drive its success. I need information about all aspects of my organisation that enables me to efficiently make correct decisions. I don't have time for the technical details of data, it just needs to tell me what I need to know or let me clearly articulate my points to others."

Ecosystem category:

Personal Banking, Corporate Banking, Managed Funds and Superannuation, Captial Markets, Insurance and Re-Insurance

Role in the industry:

Make decisions about an organisation's products, customers, employees, shareholders, and goals.

Key driver:

Make the organisation successful.

Questions that Sonia wants to answer:

- Are there opportunities to make my business more resilient through new product or market opportunities?
- Am I meeting the expectations of my board, stakeholders, staff and customers regarding ESG?
- How can I clearly demonstrate the ESG achievements of my organisation?
- What long term risks for our business do we need to mitigate?
- How could environmental change affect this business?
- What is the long term outlook for the economy under climate change scenarios?
- How can metrics describing natural capital be developed?

THE TECH START-UP

EO Maturity Level: 0-4

0 1 2 3 4 5

Meet Jerry

Jerry and his small team have deep technical knowledge combined with an astute understanding of where it can create value in the finance and insurance industry. They rapidly develop, prototype and release new products and services and seeks to capture new customers from existing providers by providing more customised technology-based offerings. Jerry's focus is narrow and leverages off his technical knowledge. His team will use EO if it is part of the product solution they offer as a company.

As a Tech Start-Up:

"I use my deep technical expertise to create new products and services. I have an innovative, agile, mindset with new technology at its core. If I use EO I'm already an expert and am always interested in new EO datasets that will make my products and services better."

Ecosystem category:

Personal Banking, Corporate Banking, Managed Funds and Superannuation, Capital Markets, Insurance and Re-Insurance

Role in the industry:

Leverage new technology to develop better consumer products and services and more efficient ways for established institutions to work.

Key driver:

Drive success for his business by providing better products and services than established institutions.

Questions that Jerry wants to answer:

- How can I easily get data whenever I want it?
- How does the risk of natural disasters like bushfire and flood affect insurance premiums?
- How can property valuation be automated?
- How can I include agricultural productivity in rural property valuations?
- What insights should I deliver to increase profit from buying and selling shares?
- What mining activities can I track that help me predict future share price?
- How can I meaningfully present environmental factors that affect markets?

THE FINANCIAL REGULATOR

EO Maturity Level: 0-2

Meet Rick

His work is critical to ensuring that society maintains high confidence in the financial system. A huge array of metrics are used to monitor the workings of the system and ensure compliance with regulations. As the digital economy grows, and society responds to pressures like increasing climate risk, Rick is looking to new data sources like EO to get the information he needs but he is unlikely to have any expertise in the area.

As a Financial Regulator:

"I need data that tells me how well the financial system is working. I don't traditionally use EO as an information source but if it were to be presented to me in an easily accessible way that clearly relates to the metrics, I use then regular collection of high quality EO data could provide valuable insights."

Ecosystem category:

Personal Banking, Corporate Banking, Managed Funds and Superannuation, Captial Markets, Insurance and Re-Insurance

Role in the industry:

Maintain Australia's financial regulatory framework.

Key driver:

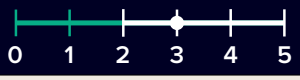
Ensure consumer and investor confidence in the financial system.

Questions that Rick wants to answer:

- How do I understand institutions' exposure to climate-related risks?
- How can I get visual verification of the accuracy of a company's financial reporting?
- What environmental and social factors are the most important within a framework for sustainable finance?
- How can I ensure activities comply with a framework for sustainable finance?
- How can I get an independent assessment of insurance risk to verify re-insurance requirements?
- How can I ensure confidence that companies have adequately allowed for the worst case natural disaster scenarios?
- What datasets will help me quantify how environmental changes might impact the stability of the financial systems?
- How will climate risk affect the price of money?
- What data do I need to calculate the carbon footprint of companies?
- How can I ensure that metrics for natural capital are meaningful?

THE DATA SME

EO Maturity Level: 2-5



Meet Jimmy

The Finance and Insurance industry relies on a lot of data and Jimmy's business provides the sector with data they can't source internally in formats that are easily usable. Jimmy's business uses EO if it needs to, and new businesses based on the provision of insights from EO to the industry are emerging.

As a Data SME:

"I work to provide clients with data they are unable to source themselves that helps them solve their problems. My clients might be anywhere in an organisation but are most commonly in roles where multiple datasets are aggregated and synthesised into information products to help others make decisions. I am comfortable working with EO data and see it as an increasingly valuable data source for the Finance and Insurance sector."

Ecosystem category:

Corporate Banking, Managed Funds and Superannuation, Capital Markets, Insurance and Re-Insurance

Role in the industry:

Provision of data and data products that can't be created or sourced internally.

Key driver:

I am focused on delivering the data and data products that my clients want.

Questions that Jimmy wants to answer:

- What is the likelihood of this natural disaster occurring?
- How can I get whatever data I need when I need it? (F)
- How is environmental change related to asset value?
- How can I work out the likelihood of customers being affected by natural disasters?
- How can I predict the likely value of insurance claims if a natural disaster occurs?
- How can I calculate carbon footprints and offsets?
- How can I monitor environmental impacts on assets?
- How can I model the impacts of climate change on the price of money?
- How can we develop a digital system for trading in natural capital?

PART 4: OPPORTUNITIES

In broad terms, EO can help organisations within the finance and insurance ecosystem to **achieve organisational success** by:

- Understanding risk
- achieving operational efficiency, and
- pursuing customer growth and retention through customer centric strategies.

More specific opportunities and key themes are outlines below.

EO CAN HELP ASSESS CLIMATE RISK

Reducing risk includes the current significant focus in this ecosystem on mitigating risk associated with climate-based events. This involves both risks to assets and customers' ability to service loans or premium rises due to bushfires, flooding, hail and localised sea-level change or foreshore erosion. This focus on climate risk within the industry is likely to intensify over the coming years, given the recent fires and floods within Australia, coupled with increasing societal expectations on banks to manage risks on behalf of their customers and communities. An increased focus on climate as a regulatory requirement will increase uptake of EO across the industry, due to it's ability to provide cost-effective means of reporting over large areas.

EO CAN REPORT ON ESG

Another priority area includes reporting and quantifying Environmental and Social Corporate Governance (ESG), particularly given the requirements of international markets to have regulatory reporting in place by 2022 for financial products offered in the European Union and the United Kingdom. Further, a recent call by the Australian Prudential Regulation Authority (APRA) for companies to consider climate change risk included a tender for a method assessing the impact on the nation's 500-biggest listed companies[18]. Even without regulatory measures, shareholders and financial institutions within Australia are increasingly seeking to ensure ESG responsibility as a pre-cursor to investing at the corporate level.

EO CAN ASSIST WITH REGULATORY REQUIREMENTS AND REPORTING

As the community expect more accountability, transparency and reporting from financial institutions, regulators will need to track approaches used to report on risks, impacts and outcomes by these institutions. Further, regulators may take the opportunity to lead the industry in setting standards and defining a common evidence base, such as EO data, for the consistent reporting of elements such as climate risk and carbon footprints.

EO CAN MAINTAIN RESILIENCE

Resilient communities and businesses reduce risks in both insurance and finance industrys by minimising the impacts of major events or increases in significant risks such as climate change. EO data can support this resilience by:

- Improving sustainable production levels. Ensuring agricultural and resources businesses maintain a stable production process which maximises the use and long-term value of the natural environment they utilise for their business.
- Helping businesses understand the climate footprint of their supply chain can help improve supply chain resilience, customer confidence and brand value.
- supporting the identification of diversified revenue opportunities for businesses, for example helping in site selection for new developments, identifying opportunities for green energy infrastructure, or providing evidence to support entering a carbon market.

EO CAN HELP FINANCE AND INSURANCE GROW BUSINESS

Combined with other data sources and machine learning models, EO can provide a ready stream of location-based data that can transform how the industry operates and responds to client needs. EO data can assist the industry in the digital transformation of current manual or semi-automated approaches, leading to shorter customer journeys,

18 *https://www.abc.net.au/news/2021-05-29/apra-preparing-for-climate-change-doomsday-scenario/100170940*

increased consumer confidence, and improved customer conversion. It can use this data to provide customers with a comparison of investment options, value loans, produce risk models for insurance premiums, and better assist customers with resilient response to natural events.

EO data can play a critical role in both developing new financial assets and increasing the customer base, both of which directly improve business growth.

- Identification of residential buildings with green energy assets, where mortgages can be bundled and sold as carbon/green bonds.
- Assisting customer businesses grow through the valuation of natural capital, and assessment of soil carbon opportunities.
- Simplify and speed up the customer journey, for example pre-filling building attribute data during online quotation process for new insurance policies.

EO CAN PROVIDE NATURAL DISASTER RESPONSE TIME AND EVENT RECOVERY EFFICIENCIES

Customers who lodge an insurance claim are often distressed, as the circumstances surrounding the need for a claim can often be events which affect the customers lives much more than their assets. Examples include theft, fire, and natural disaster events, all of which cause significant stress in the lives of the people caught up in each event.

Managing the process of an insurance claim can add significant additional stress to these people, and literature shows that the process surrounding claims assessment is one of the three largest drivers of a customer to leave an insurer[19].

- EO can help reduce assessment and claim times, significantly improving the customer's claim experience and minimising their chance of leaving or becoming brand detractors.
- EO can assist in event response. There is a lot of value for insurance companies in improved prediction of events. This allows them to better organise their supply chains for rapid response under increasing natural disaster frequency.
- Post an event, EO can be combined with insurance claims to prioritise response activities, rapidly identify impacted areas, and target post-disaster government relief payments to ensure support gets to where it is needed more quickly.

EO CAN HELP DETECT FRAUD

Business and consumer activities which drive revenue can often be monitored using EO. Whether it is production at mine sites, loading and unloading cargo at ports, or counting the number of cars at key times in shopping centre carparks.

- EO data can be acquired which link activities to financial outcomes and over time enables detection of anomalies in reporting.

From the insurance perspective, natural disasters are accompanied by a spike in insurance claims from individuals and organisations impacted by a disaster event. Unfortunately, some claims lodged during these times may not be legitimately impacted by these events and determining valid claims from fraudulent claims can be time consuming.

The impacts of an error in classification can be significant and expensive. EO can reduce this uncertainty by:

- Accurately defining impacted areas rapidly during and after an event. For example, Radar data can be used to determine flood water extents, and is unaffected by cloud cover and time of day/night, which improves responsiveness and reliability of flood information.
- Rapidly classifying building damage using higher resolution EO to help insurance companies prioritise assisting those mostly heavily impacted first.

19 *Brockett, Patrick L., et al. "Survival analysis of a household portfolio of insurance policies: how much time do you have to stop total customer defection?" Journal of Risk and Insurance 75.3 (2008): 713-737.*

EO-DERIVED PRODUCTS CAN BE USED TO VALUE ASSETS REMOTELY

Valuing assets can be an expensive and time-consuming exercise, often relying on the expert judgement of specialist valuers. EO can be used in combination with big data analytics and artificial intelligence to automate the valuing of many complicated assets, for example property. EO can further enhance the valuation process by:

- Providing detailed information to value an asset remotely to remove or reduce site visit time for both banks and insurance companies.
- Identifying external drivers of valuation such as proximity to parks for a residential property.
- Examining business profitability and performance, particularly in the agriculture and mining industries.

INCREASING PROFITS

- By providing information on investments EO can help investors choose between different options. These insights may be in the form of a comparison to a benchmark or between two different options. This helps investors determine the opportunity cost of choosing one option over another.
- Through monitoring commodity production and demand EO can help businesses and individuals determine the most profitable time to buy or sell, as well as assisting in predicting future prices.

PART 5: CHALLENGES

Using EO to solve challenges within the finance and insurance industry requires both specialist knowledge of EO and domain knowledge for the types of problems (as presented above) that EO can help to solve.

INTEGRATING SUBJECT MATTER EXPERTISE AND SPECIALIST KNOWLEDGE OF EO DATA

Many of the problems encountered in the industry require integration of EO data or derived products with additional data, obtained from the customer themselves or collected by some other means, such as census. Few financial and insurance organisations retain the specialist staff required to interact with raw EO data or to produce derived EO products. Instead, they outsource this development to third parties that generate derived products and that can feed them insights readily able to be consumed by non-specialists within the finance or insurance organisation. However, this means that EO-based products and services are generally not built involving domain experts from the organisations with key knowledge of the critical problems to solve. However, this may be seen as both a challenge and an opportunity, as it allows for significant capital redirection to new companies, increasing employment and overall national GDP, but does also pose the problem of increased time for uptake of EO as it can not be directly integrated into current workflows. Strong commercial collaborations need to be established between domain experts and EO experts for the industry to get full value from EO.

DEVELOPMENT OF EO SOLUTIONS REQUIRES ORGANISATIONAL BUY-IN

To solve problems within the finance and insurance industry EO datasets often must be combined with other data an organisation may hold on its customers.

Organisations must spend considerable time on research and development to get to a proof-of-concept stage, with further costs for operationalisation, being significantly above the cost for status-quo operation. This requires significant funding and development time, but also requires trust from finance and insurance operations in order to expose customer data and operational workflows to new service providers. Financial and insurance companies often choose to outsource this development to third party start-ups, who are funded by venture capital to produce specialised products with one vertical domain, for example. agricultural production, flood risk, or climate reporting.

UNDERSTANDING APPROPRIATE USE OF EO DATA CAN BE DIFFICULT FOR NON-SPECIALISTS

Understanding both the use of EO data and derived products as well as the benefits and potential pitfalls can be very challenging for new users. Currently, specialist knowledge is often required, as data quality indicators are not readily communicated in a method that is easy for the non-specialist to understand. Increasingly EO data and artificial intelligence models for data insight products that are of interest to the finance and insurance industry are being commoditised by organisations such as Amazon Web Services Marketplace or Refinativ, who provide them for purchase. However, these products also lack detail on assumptions, quality and suitability for different applications.

FINANCE AND INSURANCE INSTITUTIONS FACE STRINGENT SECURITY PROTOCOLS

Strict customer privacy policies and regulatory requirements mean that finance and insurance organisations must retain data within the organisation or on cloud-infrastructure hosted within Australia. This makes it almost impossible to use analysis platforms that require information to be moved to third party infrastructure, outside the organisational environment, or located on cloud platforms in international markets.

DATA REQUIRES A HIGH LEVEL OF MANAGEMENT

Generally, finance and insurance organisations do not want to do imagery analysis themselves and have several common data requirements for both EO and other types of data. It needs to be current,

accurate, linked to existing customer records, and regularly updated to match the needs of the business. Some activities such as setting insurance premiums happen on an annual basis, so require yearly updates to datasets. Others need to happen almost in real time when responding to events such as insurance claims for natural disasters. Data sets and the insights derived from them also need to be readily explainable to a non-specialist audience, as the decision makers within the finance and insurance industry will not be familiar with the assumptions for producing a dataset. They also need to be aware of the possible errors in the dataset and how this will affect their ability to decide within a bound of error.

SPATIAL RESOLUTION IS A CHALLENGE

National scale EO products are required for use in the finance and insurance industry, however most national EO products are produced on a spatial scale not suitable for the analysis of individual properties, particularly in urban areas where most of the Australian population is concentrated. In urban regions, high resolution satellite data or aerial imagery is required to map assets at the property scale. However, this data is costly to purchase and update at the frequency required for decision making. Existing coarser resolution EO products may only be suitable for regional analysis or broad trend determination.

GEOLOCATION OF ASSETS

Currently many financial and insurance organisations do not know the spatial or geolocation of their asset portfolio. Asset information is stored with the address only. To be able to use EO data in relation to assets, this address information must be geocoded. The process to do so is time consuming and costly, as it often requires consolidation of multiple databases across an organisation, and standardisation of addresses stored with different syntax. As it is sensitive personal information, geolocation of address databases is not readily able to be outsourced to third-party organisations with the expertise to do this operation.

PART 6: RECOMMENDATIONS

INVEST IN INTEGRATING AN AWARENESS OF EO CAPABILITIESWITH SUBJECT MATTER EXEPRTISE ON THE PROBLEMS TO BE SOLVED

Resources need to be invested to join potential users and providers of EO together. It is highly recommended that third-party spatial and technology companies looking to operate within the finance and insurance industry invest in understanding the specifics of the problems to be solved, and the implications of working with users with a generally low maturity level for EO.

Spatial organisations seeking to focus closely on the financial or insurance industry may also wish to retain at least one individual in the founding team with specialist knowledge of the problems faced in the industry, whose awareness of what is possible with EO can provide a key link between problems to be solved and EO-based solutions.

CLEAR COMMUNICATION OF BENEFITS AND PERFORMANCE OF EO SOLUTIONS

Products should enable comparison between alternatives or to a performance benchmark. If the application of EO data can meet a high-profile business case, then the cost factor may not be so important to the business. However, communication of the benefits of EO in meeting this business case need to be clear to the decision makers. Each company will have many competing business needs, with only the highest priorities being funded. This means that not all solutions with a positive return on investment will be funded, so the value proposition will need to be both clear and very compelling.

DATA SECURITY MUST BE A HIGH PRIORITY

Providers must work with companies to understand their security requirements as an essential part of system development. ISO 27001 provides for information security management, and accreditation in this standard should be considered as a minimum requirement for any organisation wishing to interact with finance and insurance organisations.

MAKE EO EASY TO INTEGRATE INTO EXISTING WORKFLOWS

The format the data is provided in should be able to be readily integrated into existing workflows and software as few companies will be wanting to add another piece of software to an already overburdened staff with numerous apps required for their everyday work. Most often the preferred form of data provision is through an application programming interface (API) that can provide on demand data requests, for integration into existing software platforms. Ideally, the EO data will help automate a current manual process, with the new EO solution needing only limited human assistance to produce insights.

PROVIDE EO DATA INSIGHTS READY FOR DECISION MAKING

Impact occurs when someone is able to act on information to make a decision. Value is created when this action takes place, and the decision maker need not know that EO was involved in their decision making process at all. Producing simple, clear and actionable information may mean complex analysis is presented as a single number, graph or recommendation. This simplicity in insight will only enhance the market for EO, where even the visual complexity of a map or image would reduce the usability. Some of these issues can be overcome by the producers of derived EO data products producing the end products required by the finance and insurance institutions, built with a clear understanding of how the intended users make their decisions.

PART 7: CONCLUSION

Australia is at a significant acceleration point in developing and provisioning fundamental, next-generation EO data, products, services, and insights. The Finance and Insurance industry is facing new challenges in societal expectations, climate risks, and a fast changing technology landscape. This change must be balanced against the impacts that a poor financial or insurance decision may have on customers lives, and so managing risk and uncertainty is always top of mind. EO can play a vital role in providing timely, accurate and insightful information to users across the finance and insurance ecosystem, creating value while increasing customer satisfaction, and supporting the creation of new products, services and financial instruments.

This report has outlined recommendations to help accelerate EO product workflows and processes across the finance and insurance industrys. Still, it will be technology organisations, research providers, government agencies, and notably the companies with the critical problems outlined in this report who need to develop compelling business cases to drive change.

If you or your organisation would like to help in driving investment in earth observation, you are encouraged to:

- Start talking about problems, not solutions.
- Get involved in the adoption of Earth observation products and services.
- Share this report within your organisation and discuss how you could adopt the recommendations.
- Consult supporting documentation for further information and visit the DEA Industry Strategy website: frontiersi.com.au/dea
- Tell us your thoughts: dea@ga.gov.au

FURTHER READING

Digital Earth Australia

DEA: www.ga.gov.au/dea

Financial Regulatory Bodies

APRA: www.apra.gov.au
ASIC: asic.gov.au
RBA: www.rba.gov.au
ACCC: www.accc.gov.au
AUSTRAC: www.austrac.gov.au

Australian Government

AUSTRADE: www.austrade.gov.au
Australian Bureau of Statistics: www.abs.gov.au
Australian Taxation Office: www.ato.gov.au
Australian Transaction Reports and Analysis Centre: www.austrac.gov.au
Commonwealth Treasury: www.treasury.gov.au
Fido: www.fido.asic.gov.au

Industry Professional Bodies

Alternative Investment Management Association: www.aima-australia.org
Association of Superannuation Funds of Australia: www.superannuation.asn.au
Australian Accounting Standards Board: www.aasb.com.au
Australian Institute of Superannuation Trustees: www.aist.asn.au
Australian Private Equity & Venture Capital Association: www.avcal.com.au
Australian Securities Exchange: www.asx.com.au
Financial Planning Association: www.fpa.asn.au
Financial Services Institute of Australasia: www.finsia.com
Fintech Australia: www.fintechaustralia.org.au
Funds Executives Association Ltd: www.feal.asn.au
Insurance Council of Australia: www.insurancecouncil.com.au
Insurtech Australia: www.insurtechaustralia.org
Investment and Financial Services Association: www.ifsa.com.au
Securities and Derivatives Association: www.sdia.org.au

International References of Interest

EU Sustainable Finance: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance_en
Catapult Satellite Applications – Sustainable Finance: https://sa.catapult.org.uk/sustainable-finance/
Task Force on Climate Related Disclosures: www.fsb-tcfd.org/publications

ACKNOWLEDGEMENTS

FrontierSI and DEA would like to thank those who participated for their constructive ideas and contributions.

FRONTIER SI