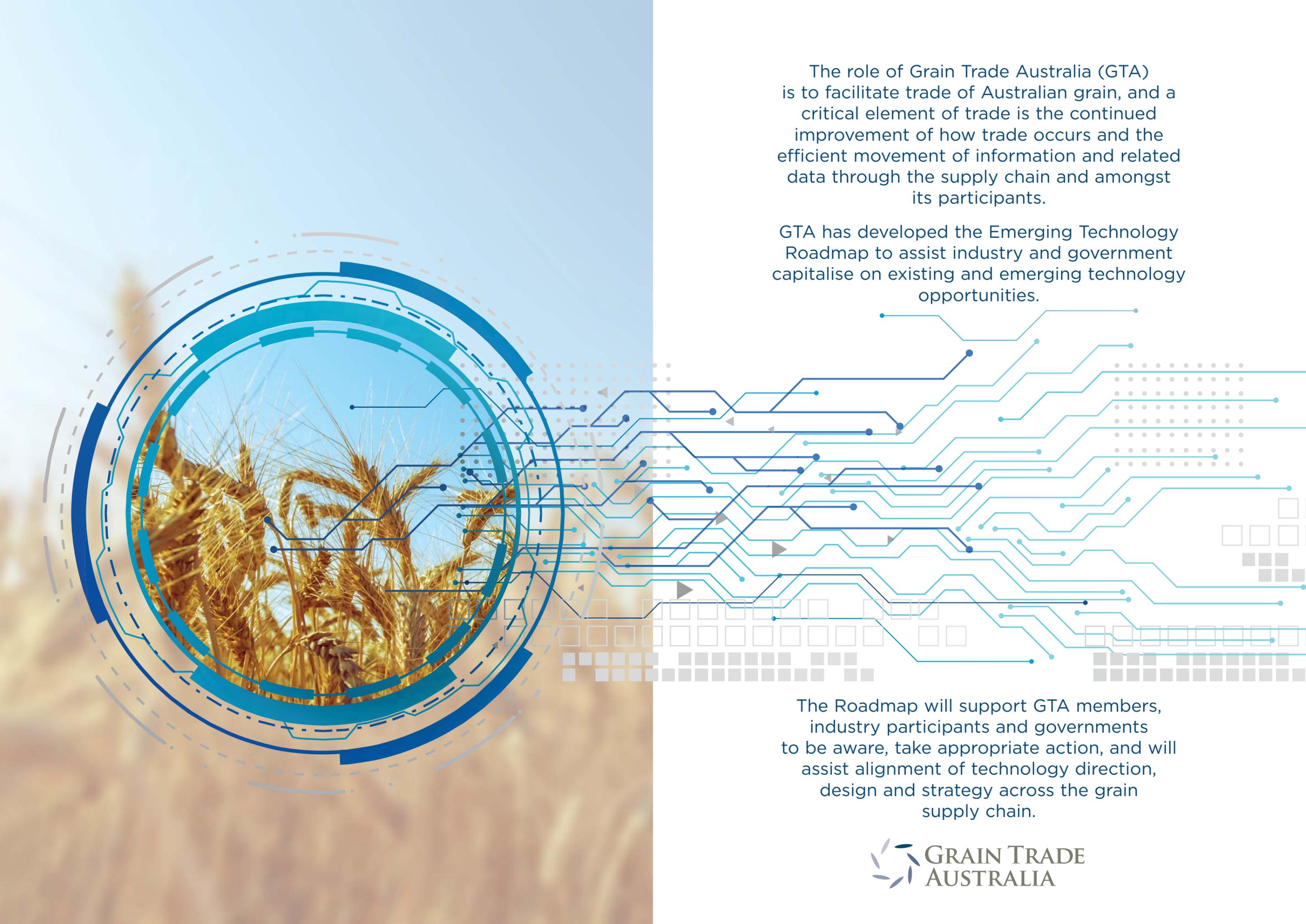




EMERGING TECHNOLOGY ROADMAP

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The role of Grain Trade Australia (GTA) is to facilitate trade of Australian grain, and a critical element of trade is the continued improvement of how trade occurs and the efficient movement of information and related data through the supply chain and amongst its participants.

GTA has developed the Emerging Technology Roadmap to assist industry and government capitalise on existing and emerging technology opportunities.

The Roadmap will support GTA members, industry participants and governments to be aware, take appropriate action, and will assist alignment of technology direction, design and strategy across the grain supply chain.

Emerging Technology Roadmap

1. Capability to grasp opportunities

The Australian grain supply chain is well placed to engage with and adopt the technology and supporting frameworks that will be transformative for industry.

GTA has developed the Emerging Technology Roadmap to assist industry and government capitalise on existing and emerging technology opportunities.

The Roadmap supports GTA members, industry participants and governments to be aware of existing and particularly emerging technologies across hardware, software, cloud data, and digital over the medium term. The Roadmap is designed to support alignment of individual business technology direction, design and strategy. It allows industry and government to align direction and to discover synergistic opportunities that may be technology-led or influenced.

Growth in the increasing complex supply chain will be enhanced if technology strategy and investment are aligned and effective.

2. How is the sector changing?

Research & Development

Rapid advances in the availability of data, increased computing power and plant gene engineering provides us with the opportunities to improve yields, reduce costs, create a more sustainable environment, and enhance quality and fitness for market.

Quality Assurance

Increasing use of digital imagery and the capture of in-stream grain quality analysis and data, aligned with in storage sensors will provide industry an integrated and transparent view of quality at a site level and at an aggregated industry level. This reduces risk and supports the satisfaction of market demand.

Storage

Sensors that measure quality in-store and can spot emerging diseases and pest infestation and can reduce risk and improve profitability. Data Standards and the Storage Assets Management Standard assist to integrate the transfer of data, between industry and government, remove data re-entry and reduce transaction timelines. Integrating storages into a systematic Standard will drive outcomes in quality assurance and quality assurance surety.

Marketing & Sales

Digital currencies, new payment processes, information interchange and blockchain capability with access to enhanced Quality Assurance and inventory data provides opportunities to lower supply chain cost, reduce counter-party risk and better forecast and capture market opportunities.

Logistics & Distribution

Connected data and smart systems that enable us to better understand and forecast changes to the supply chain will allow us to improve supply chain speed, reduce risk and optimise grain value.

3. What are the Opportunities?

Evolving Physical Supply Chain

The Australian supply chain is transforming from a structured and centralised model of major Bulk Handling Companies into a more dispersed multi-operator model where the farm and farm storages are directly linked to the domestic market and to the export interface including container packers and mobile bulk port loaders.

Visibility & Assurance

Real time machine-based grain assessment will become the new normal giving the supply chain manager and customer greater visibility through the supply pathway.

Unstable/Volatile Market Fundamentals

Increased competition from the supply side, global instability, increasing demand for food and the impact of climate change results in market volatility and supply chain shocks.

The Clever & Conscious Customer

Information moves faster than ever and dictates trends in food and health. Adverse stories relating to food chains can have dramatic reputational impacts. The grain industry must become more adept at meeting customer expectations and providing the surety the supply chain delivers a safe food and feed product whilst being environmentally aware and responsible.

E-Commerce & Data Driven Supply Chains

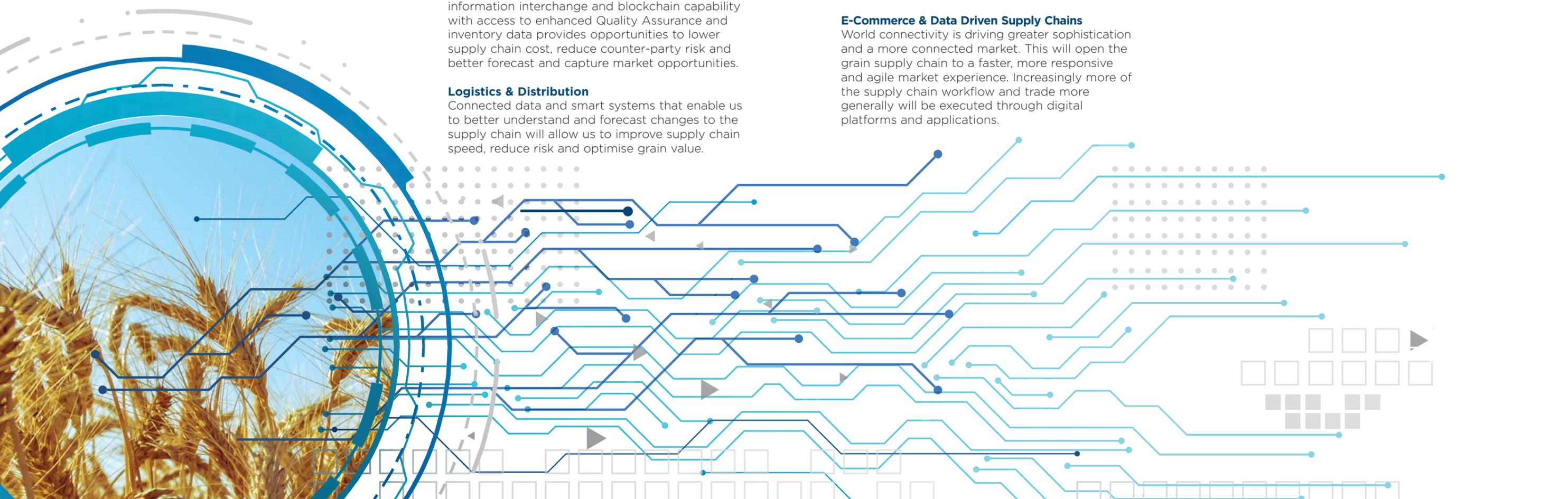
World connectivity is driving greater sophistication and a more connected market. This will open the grain supply chain to a faster, more responsive and agile market experience. Increasingly more of the supply chain workflow and trade more generally will be executed through digital platforms and applications.

4. If we stand still?

Standing still is not an option as information dictates trends in food and health. The grain industry and governments must become more adept at meeting customer expectations and providing the surety the supply chain delivers a safe food and feed product whilst being environmentally aware and responsible.

The challenges posed by the Australian supply chain is transformation into a more fragmented multi-operator model from the farm all the way to the end-use customer can be solved in part by technology awareness, implementation and network connectivity .

Australia must seize technology opportunities and enhance its global supply chain capability and value.



Emerging Technology Roadmap

Global connectivity, access to cloud technologies and the decreasing cost of digital solutions is driving greater sophistication and a more connected market. These provide the opportunity for a faster, more responsive and agile market experience.

Quality Assurance

- EXISTING**
- Chemical residue analysis
 - Grain protein, moisture measuring instruments
 - Common Industry Varietal Code Master List
- NEAR**
- Digital and hyper-spectral imaging utilised to assess grain for storage, sale and for biosecurity purposes
 - Real time and in-flow grain quality assessment
 - Sensors for pest and disease
 - Capture of aggregated in stream grain quality data
- FUTURE**
- National calibration and standards for grain assessment technology. Systemic capture of grain quality information at a regional and national level. Widespread grain assessment tech to improve supply chain efficiency.

Marketing & Sales

- EXISTING**
- Digital Commodity Vendor Declarations
- NEAR**
- Distributed ledger and blockchain to trace provenance and certify supply chain activities and events
 - Digital currencies
 - Digital asset IDs and digital twins
- FUTURE**
- Trade technology to improve credit and counter-party payments and timeliness

Storage

- EXISTING**
- Standardised site data codes
 - Standardised date, identifier, and transaction related codes
 - Standardised regional location codes
- NEAR**
- Improved connectivity and consistency between received agents
 - Block-chain based, sharing and integration of industry data
 - Data standards agreed by industry and government - matched the international protocols
 - Paperless supply chains and common standardised data
 - Storage Assets & Management Standard
 - Centralised data sources and support for grain assessment technology
- FUTURE**
- Technologies to optimise grade mixing in intermediate silos
 - On farm storages directly linked to broader supply chain network

Logistics & Distribution

- NEAR**
- Greater automation across industry to reduce costs and to provide quicker data and information flows
- FUTURE**
- Standardised consignment data
 - E-sharing of data and greater visibility of cargo aggregation
 - Greater level of aggregation industry information to assist decision making and drive actionable insights

Opportunities to be realised

Realisation of emerging technologies across the next decade will unlock opportunities for communities, business and individuals.

Alignment of Industry and Government Strategy & Frameworks

- The alignment of industry to government and international data standards and frameworks are essential to support growth and the seamless flow of data between trading partners, the Australian government and importing country governments.

Harmonised Trading Tools, Products and Services

- The speed and ease of trading and executing grain sales must be enhanced across both the domestic and export sectors. Low cost, timely and interoperable transactions must become the norm including the seamless transfer of historical feed and food safety data.

Quality Assurance Intelligence

- Australia has a well-earned reputation for a quality assured product that can further be enhanced through the reduction in subjective grain assessment tests and the capture and analysis of aggregated level QA information to assist research and extension programs and to monitor the ongoing surety of Australian grain.

A Better Trained and Informed Industry

- All supply chains require access to skills training - enhanced industry benefits will flow from technology supported training materials and platforms.

Product and Data Integrity

- The international and domestic markets are increasingly requiring authenticity and transparency and are calling for increasing traceability within supply chains. A coordinated industry and government approach using technology is required to ensure traceability provenance whilst protecting the commercial information of participants and across the value chain as a whole..





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