

final report

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Supporting industry compliance and productivity gains through integrated online systems

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Executive summary

The Australian red meat industry, through Meat and Livestock Australia (MLA), supports industry compliance and productivity through a range of industry value chain-based programmes. These are a mixture of online (National Livestock Identification System (NLIS), electronic National Vendor Declaration (eNVD), Livestock Data Link (LDL), Meat Standards Australia (MSA), National Feedlot Accreditation Scheme (NFAS) and partially online (Livestock Production Assurance (LPA) - assessment) programmes.

While farmer uptake of these systems is satisfactory, there are opportunities to increase compliance and increase adoption through streamlining management systems with integrity systems. These opportunities can be supported by increasing value gained and reducing the complexity in using these systems. Value can be increased by linking on-farm data to on farm productivity gains, processor feedback (LDL and my MSA) along with meeting compliance requirements (LPA) and an overall, reduction in workload that comes with the duplication of effort (e.g. double entry of data) to use systems.

To gain feedback on these systems and the industry status more widely, meetings were held with a range of industry participants along the value chain. This included farmers, bankers, investors, processors, stock agents, vets, rural support agencies and a range of MLA staff. The industry context and information requirements of these participants was discussed.

There are a range of views on the type of information collected, utilised and shared. With respect to farmers (and processors), at one extreme there is minimal information collected and only the bare minimum used to meet compliance needs. At the other end of the spectrum there are sophisticated users who are linked to the market through the processor utilising farm, processing and market related information to support compliance, productivity and provenance.

The meeting outcomes were supported by a value chain workshop with a feedlot. This group consisted of breeders, vets, nutritionists, meat companies, software providers and the feedlot management team. The workshop provided an improved view of the information required to support the spectrum described and information system suggestions to support industry uptake and use.

Outcomes from these workshops and meetings suggest that a multi-level framework or platform model be developed for Integrity System Company (ISC) core systems, which support digital compliance tools through to combining compliance with base productivity information and processing feedback data. This framework is broken down into five levels:

1. Paper/eForm – compliance + declaration
2. eData Form – compliance + audit
3. eData System – compliance + audit + share
4. eData System – compliance + audit + base productivity + share
5. eData System – compliance + audit + base productivity + processor + share

The core system (communications exchange platform) needs to be constructed in a manner that allows sharing as widely as permitted by the data owner to support 'once only' data entry and overall sector performance. The core system should link seamlessly to 'commercial' systems (product and transactional exchange platforms) facilitating two-way transfer of data.

There are many challenges in providing this core system including less than ideal internet access (especially in farm work areas), familiarity with mobile systems (e.g. using mobile phones for data

entry rather than a paper notebook) linking data seamlessly (e.g. reading EID tags), creating easy system linkages for data share and motivating chain participants to change historical behaviours (e.g. sharing data).

Table of contents

1	Background.....	6
2	Project objectives.....	6
2.1	Objective	6
2.2	Outputs	6
3	Methodology	7
3.1	Interviews	7
3.1.1	Participants Interviewed.....	6
3.2	Workshop.....	7
4	Results.....	8
4.1	Interviews - Key findings and themes.....	8
4.1.1	Findings	8
4.2	Value Chain Workshop	14
4.2.1	Value Chain Mapping and Problem/Opportunity Identification	14
4.2.2	Workshop Key Outcomes	16
4.2.3	Product Suggestions	17
5	Discussion.....	21
5.1	What would the industry benefit from?.....	21
5.2	Proposed Solution – ISC Core Platform	22
5.2.1	Level 1 – Form based compliance declaration	23
5.2.2	Level 2 eCompliance – Data linked form – Agri-Cred	24
5.2.3	Level 3 – Shared compliance data – Animal Passport	25
5.2.4	Level 4 – Sharing of base compliance and productivity information	26
5.2.5	Level 5 - Sharing of base compliance, productivity and processing information.....	27
5.3	Comparison of workshop needs vs proposed solution	29
6	Conclusions/recommendations	30
6.1	Recommendations	30
6.1.1	Overarching Principles	30
6.1.2	Industry platform	30
7	Appendix	33
7.1	Post it note Spreadsheet	33

7.2	Data sheet.....	33
7.3	Platform Systems	35
7.3.1	A taxonomy of Platform Systems	36

1 Background

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This project aimed to identify the key industry issues, especially from a producers' perspective that inhibit the uptake and compliance with value chain systems, including the industry integrity programs and identify the potential for digital solutions to resolve these.

The project involved the value chain including farmers, processors, regulatory and industry organisations. The final report will outline key challenges, proposed solutions and how these may be achieved.

2 Project objectives

2.1 Objective

Key information requirements (including process flow including measures, collection, storage, analysis, use sharing, decision points and associated cost) by value chain participant (retail, processor, farmer) will be identified through design thinking workshops. This will be from both a commercial and regulatory view point. (Farm IQ would work with MLA/ISC to identify relevant individuals and /or include participants from its own work).

2.2 Outputs

- Key findings and outcomes presented as:
 - Flow diagrams along value chain for animal, activity, product and information flow.
 - Associated use cases at critical control points along the chain
 - Decision to be made, key data required, source and form
- Key insights and recommendations
 - Key challenges and potential solutions to meet the sector's high-level collective information system requirements.

3 Methodology

3.1 Interviews

A range of internal and external interviews were held to gain an understanding of the issues and opportunities within the project scope. Rather than detail the information requirements at this time, the team picked up the key issues and opportunities from the interviews and developed a framework to outline the industry position. The detail of the information requirements was explored in the value chain workshop.

3.2 Workshop

Following the interviews, a whole of beef value chain workshop was held with the Sandalwood feedlot to collectively explore the challenges and opportunities at each step along the value chain as well as across the integrated system for integrity systems.

Stakeholders from all steps of the value chain attended from breeders to branded product marketers along with key service providers, vets, genetics, farm and industry consultants, industry organizations, academia, software providers, and consumers. This ensured that all of different and often divergent stakeholder perspectives were part of the process.

The workshop used a design thinking approach to analysing and evaluating the challenges across the whole value chain and for rapidly ideating opportunities and creating potential solution concepts.

The workshop was broken in to three major phases:

- Problem identification
- Problem redefinition
- Ideation and Concept Development

The group was split into two diverse groups of various stakeholders and worked through the first stage in these groups.

The first stage involved using a value chain problem/opportunity identification canvas of the whole value chain and all of the individual value chain steps from genetics to breeder to feedlot to processor to retailer to consumer. The participants were tasked with taking on an integrity of product perspective and completely fill in the canvas for each of the stages and key questions that needed to be answered under each state. Under each of these stages the following question headings were included:

- Functions
- Jobs to be done
- Problems/pains
- Opportunities/gains
- Info/data requirement
- What doesn't work

- Generic factors

Post-it notes were added under each of the stages aligned with the headings based on group discussions (see 4.2.1 for outcome).

On completion of the value chain problem/opportunity identification canvas wall, workshop participants were tasked with review, discuss and suggest changes to each others canvas. There was substantial debate and discussion about each of the results and often redefinition of the insights and issues.

Once complete, the participants were tasked to vote on the key outcomes, opportunities or issues that they felt need to be resolved with respect to integrity. The voting was carried out using yellow stickers. The issues that got the highest votes are included in 4.2.2.

Based upon these votes the workshop participants then went through a product/solution ideation process using trigger questions. This process created hundreds of ideas for solutions. Based upon this, the participants were asked to rapidly develop three to five concepts and share their concepts with the other workshop participants. The participants then worked to merge any concepts that were similar and then work as small teams to define revised, improved and integrated solutions pulling the best ideas and attributes from the first iterations into an improved and integrated solution. These product suggestions are outlined in section 4.2.3.

4 Results

4.1 Interviews - Key findings and themes

4.1.1 Findings

The following outlines key findings from the various perspectives in the value chain

Area	Key findings
People	<ul style="list-style-type: none"> • Producers generally older (at decision making level) • Kinaesthetic learners (hands on) • Looking towards retirement (not fully motivated) • Farming as they enjoy farming (not systems in an office etc) • Don't like being watched or monitored (share data?) • Will adopt if obvious, easy and makes money or is a significant compliance threat • Younger producers are more tech savvy and don't have experience to rely on intuition • Increasing corporatisation driving accountability within corporates and along value chain (data, scale and leverage) • Farming reoccurring as a management role for corporates • On average, low level of technical (digital) skill
Industry Economics	<ul style="list-style-type: none"> • Industry profitability variable as a result of the following: <ul style="list-style-type: none"> ○ Drought

	<ul style="list-style-type: none"> ○ Prices (input and output) ○ Long run average trends ○ Volatility ○ Succession ○ Adversarial market structure (competition across and along chains) ○ Economies of scale e.g. 'family' farm vs. corporates <ul style="list-style-type: none"> • 20% go ahead • 40% capable but not fully motivated • 40% potentially stuck in sub scale
Industry Structure	<ul style="list-style-type: none"> • Questions around how industry decisions are made (who says I have to do this?) • Questions around responsibilities of organisations (above and value add for levy) <ul style="list-style-type: none"> ○ Peak bodies ○ MLA • MLA connection with innovators? Are real leaders doing their own thing? • Range of fragmented industry organisations potentially competing for 'air'
Quality Assurance (QA) Systems	<ul style="list-style-type: none"> • Originally driven by thought leaders/trailblazers doing the right thing • Increasingly seen as regulatory, not value adding • Linkage to market not clear e.g. access to what market when for what gain • Feedlot system good example <ul style="list-style-type: none"> ○ Retailers sort of support, when they want to (go around if cheaper supply) ○ Minimal premium now (5% down to 0.1%) ○ What would create additional premiums? • What other QA related changes coming e.g. carbon • Duplication of data entry for other purposes • LPA seems to be generally supported, with some put off around the recent chargings • NVD books vs print vs eNVD. Feedback around incorrect information entered, and changes not well explained
Value Chain Information	<ul style="list-style-type: none"> • Low level of trust with data sharing/ownership • Information exists in pockets along the chain, but not consistently collected/managed • Information not always shared along the chain • Information should support profitable decision making and compliance • Some companies pushing brands and value chain back to farm with supporting info and systems • Others just require basics as per commodity • LDL did not get raised
Internet	<ul style="list-style-type: none"> • Coverage not great • Can get, but expensive and slow (satellite) • Mostly not where people work e.g. yards (enter offline or evening, no real time decision support) • Online NVD challenged by connectivity

	<ul style="list-style-type: none"> • Possibly used as an excuse to not use systems at times • Need online/offline functionality • Waiting for better technology (I will do something when it works)?
Hardware	<ul style="list-style-type: none"> • Mobile phones helping (but generally fiddly, not robust) • Can make scales/wands talk – still not simple enough • Tag reading also not as simple as could be (especially in volume) • Crush side operability very important (decision support, eNVD) • Mobile first functionality
Software	<ul style="list-style-type: none"> • Lots of systems • Many smaller • Many older (not easy or cheap to alter/upgrade) <ul style="list-style-type: none"> ○ Producer ○ Processor • Profitability/business model of software vendors? • Clunky interfaces • All parts of the chain need system access/functionality (e.g. transporter, yards) • MLA systems seem to be of last resort or basic – gives them a bad rap • Minimum industry level vs differentiation level of functionality • Commercial system providers don't always pick up the ball – market size/cost • Line between industry systems and commercial – who does what • Don't talk to each other or other parts of the chain easily (interoperability, data standards) • Tend towards data collection, information and not decision support (look at what other industries are doing e.g. grain) <ul style="list-style-type: none"> ○ Value proposition not clear • Data used to make better decisions
Legislation/regulation	<ul style="list-style-type: none"> • Minimum industry level (regulation and market access) verses market differentiation level (Companies commercial decision) • Paper base requirement eNVD • Variation in State and Federal regulations • Who leads change with these issues?
Process	<ul style="list-style-type: none"> • Tend to do a lot of comparisons between today and what digital would be but what is needed? Not necessarily a digital version of today • Easy to get caught up in the business and not understand the why • What's In It For Me?

4.1.2 Key themes and framework

The following outlines the overarching themes from the work and outlines an industry framework to describe them.

1. Producer profiles – representative examples

The producer profile examples below are at either end of the continuum. The motivation and needs at the extremes are significantly different. At the commodity end, minimal information is collected, primarily to meet compliance purposes. At the other end, information is collected/utilised to drive farm performance and create a point of difference with the customer/consumer. How these parties use systems are quite different and require different approaches.

Commodity

- e.g. 1200 head trading operation
- Buy in yards
- Sell by margin
- Minimise paperwork
- Base compliance only
- No formal animal performance measurement
- No info share excluding price
- Focused on financials - \$100 profit per head
- Only share base compliance data (eNVD/LPA) and financials
- Stored hard copy and spreadsheets
- Low cost, low value

Customer Experience – Creating a premium

- e.g. 5,000 lambs, 400 cattle Breeding/finishing
- Some purchased in
- Linked to Sydney butcher chain
- Gold supplier to Alibaba
- Eating quality
- Traceability
- Grass fed
- Provenance
- Animal performance measure
- Two way share data with processor, butcher, consultant, vet, fert co, stock agent, auctions plus.
- Small % using systems remainder stored hard copy or spreadsheets - actively seeking systems

2. Segmenting processors and producers by business focus and scale

Processors and producers were observed in the matrix (and along the continua) below:

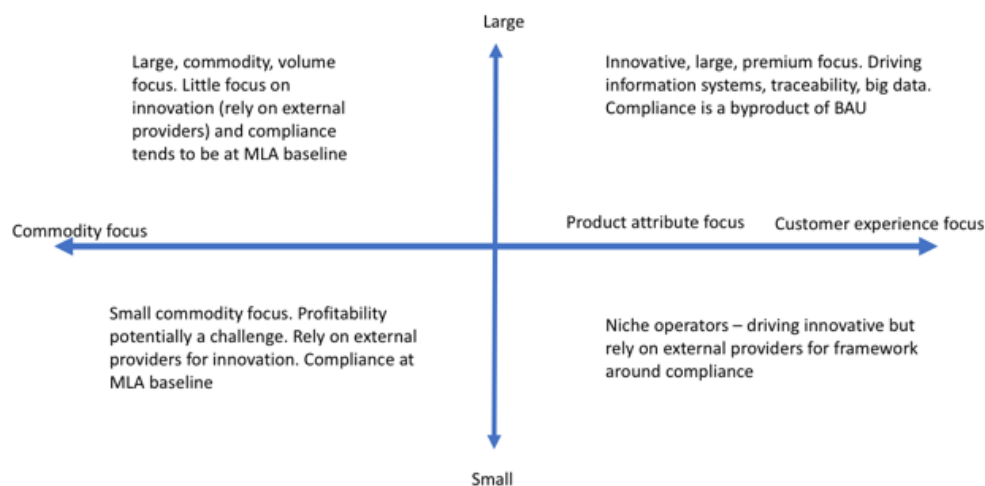


Figure 1– Processors and producer segmentation based on business focus and scale

In figure 1, organisations that rely largely on external providers for their innovation (including systems) sit to the left-hand side of the matrix. To the right, innovation is a core capability and those operations with scale are forging ahead. Small niche operators don't have the resources to invest in significant information infrastructure so continue to rely on systems, particularly to formalize integrity. As expected, producer focus (commodity versus customer experience) is strongly associated with the processor and the producer/processor relationship. It was

observed that in the top right box, processors play a pivotal role in gathering producers and building information management (and integrity) frameworks.

3. Information Requirements and Usage

The following diagram summarises industry information flows and usage.

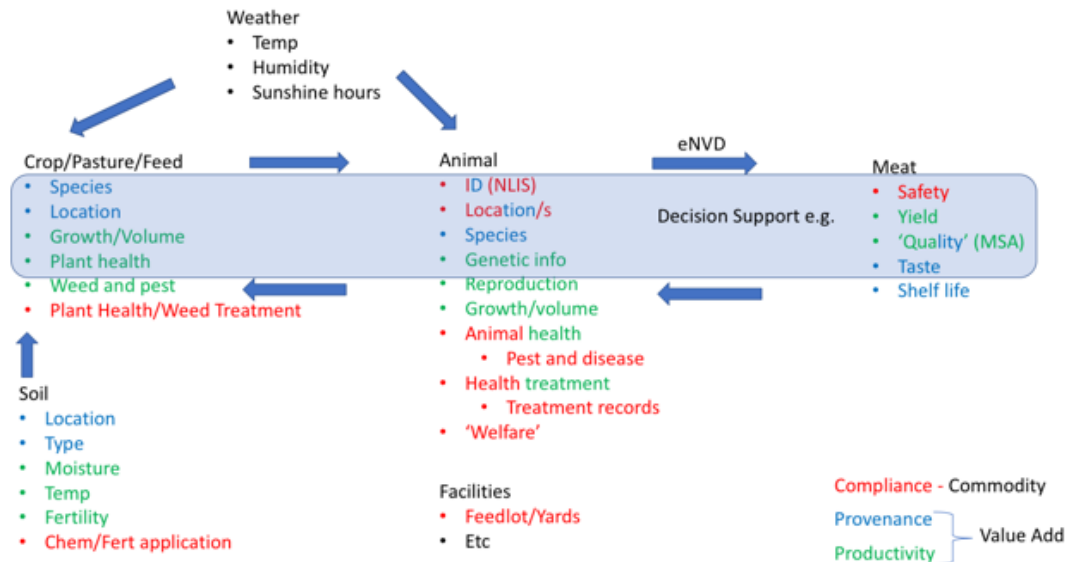


Figure 2 – Industry information flows and usage

Overall, there is a broad range of information potentially available along the value chain. Not all of it is necessarily measured, recorded (paper or system) or shared/shareable for variety of reasons including participant motivation, technical ability and general system functionality/availability. In our experience, motivation is a key driver. A motivated farmer will overcome the challenges inherent in information systems. The less motivated will not persevere.

Speaking to motivation, information recording/usage is generally correlated with where producers sit on the commodity / customer experience continuum described in figure 1 above. The closer they are to the right of the continuum, in general, the more information is collected. This is as a result of them being motivated to improve performance either on farm (productivity) or for the customer.

Regardless, there is a significant opportunity for information to be used for multiple purposes from basic integrity systems compliance through to sophisticated productivity analysis and decision making, thereby meeting or supporting industry information needs.

4. Industry Framework relating to business information and integrity

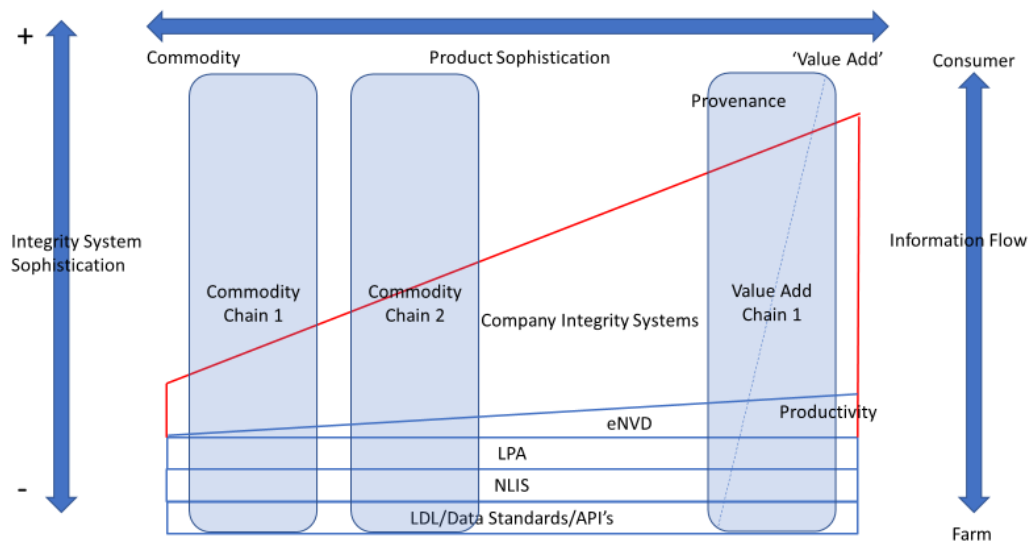


Figure 3 – Industry framework diagram referring to information and integrity

Figure 3 proposes a high-level framework for the industry where ISC provides baseline integrity systems to the entire red meat industry – supporting broader industry compliance in an efficient, cost effective manner. This is a communications exchange platform that facilitates the transfer of critical data from the “producers” of this data to the appropriate users of this data. See appendix 7.3 for an explanation of different platform approaches. This communications platform would be delivered through the integration and extension of current ISC systems. This communications exchange platform is the fundamental foundations on which the other exchange and product platforms are built. Above the baseline, private company development of information management and integrity systems varies by level of investment and sophistication increasing in association with value add / customer experience focus (red line in diagram above). The baseline integrity systems should allow and seamlessly support private companies to development and build private product and exchange platforms on top of the base system that minimise multiple data entry, transaction costs, compliance costs and maximise value creation across the whole value chain. While the project had a producer focus, a producer focus is strongly associated with a processor and market focus i.e. premium producers look to supply premium processors in return for a market premium for their product and these premium processors play a critical role in aggregating premium producers and building systems, capturing information, and providing integrity frameworks to create market premiums in the consumer market.

5. ISC compliance systems – user experience

Variable feedback has been received around ease of use and general functionality of ISC systems (LPA, eNVD, NLIS). Numerous suggestions were received around opportunities to streamline and link disparate systems to reduce double entry, time and effort.

Open market software providers have generally not picked up baseline compliance as a commercial opportunity to develop, given the likely limited return on that investment (high development costs, uncertain uptake, and concern over industry good solutions making commercial products redundant).

6. Level of Awareness and Education

The producers understanding of the importance and value of integrity systems was variable, which consequently had a significant impact on producer engagement/motivation and uptake/utilisation of compliance programmes. As expected, producers operating closer to or as part of an integrated chain at the premium/customer experience end of the continuum had a very good understanding and saw it as part of their combined value proposition. However, at the other end of the spectrum, commodity producers saw it as cost of doing business, or worse, something to be ignored.

4.2 Value Chain Workshop

A key part of the analysis was the running of a one day whole of value chain workshop to confirm and validate the observations and insights collected during the individual interviews and explore and propose potential public and private system wide solutions to solve the critical problems. The workshop was designed to bring together all of the key value chain actors from across the beef value chain and associated support actors. An integrated whole value chain approach was used to identify, debate, and validate the integrity issues at each level of the value chain. The priority issues were voted on and an iterative approach was used to ideate, conceptualise, and design potential solution concepts. The results of these workshops is shown below.

4.2.1 Value Chain Mapping and Problem/Opportunity Identification

The following photos show the post-it note wall. Please refer to the appendix for a summary spreadsheet of the wall.

Breeders and Growers



Background, Transport and Saleyard



Feedlot, Processor and Consumer

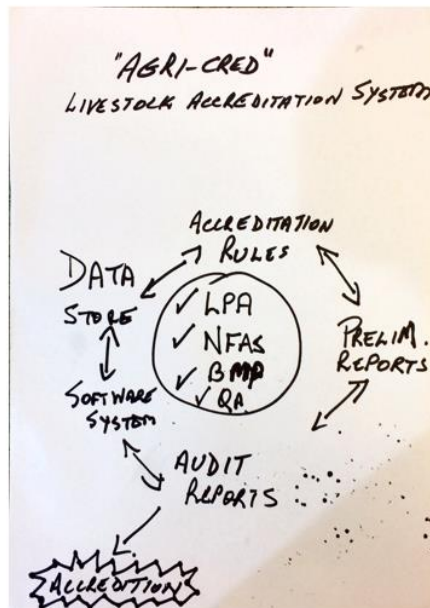
4.2.2 Workshop Key Outcomes

The list below captures those areas that were deemed most important.

4.2.3 Product Suggestions

Based on the value chain problem/opportunity identification wall and resulting key outcomes, the participants undertook an iterative ideation and concept development, prototyping and design process. This process went through a number of iterations until a final group of concepts were framed up. The final consolidated concepts are shown below.

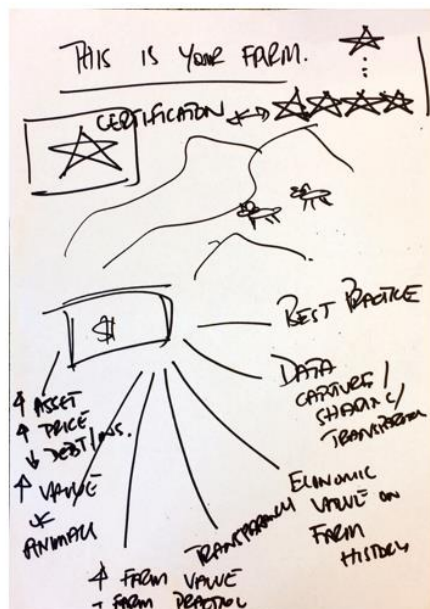
Accreditation



Build a national livestock accreditation system that leverages current systems

- The system would be built upon the current systems (LOA, NFAS, BMP, QA)
- All of the data would be captured and stored digitally
- A common and transparent set of accreditation rules and processes would be established against international best practice
- Farmers, agents, and buyers of livestock would be able to access the reports that indicated which livestock came from accredited and compliant farms and programs
- Audit reports would be based upon the data and visits – these would be graded A to E
- Farms that met the accreditation rules and processes would become accredited against the scheme

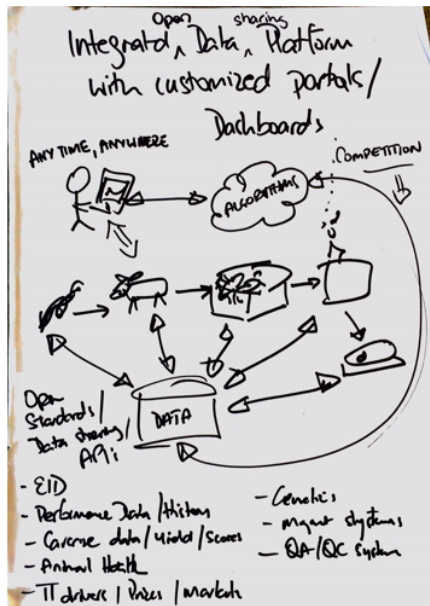
Certification



Livestock Farm Certification/Accreditation System

- All livestock farms and feedlots would be able to gain certification against a multiple star rating or accreditation system from nothing to five star
- The levels would be based upon a set of pre-determined standards
 - Adoption of Best Farm/Feedlot Practices on animal welfare, feeding, production and environmental management, etc
- Data would be capture at the farm level and shared and travel with the livestock and associated livestock exchange transactions
- The certification would provide economic value about the farm – higher star would signal higher quality farm and systems
- Codifying of the knowledge into farm systems would assist in knowledge transfer between parties
- The certification system would increase the value of the farming assets as well as the price or value of the livestock. This would increase farm profitability.

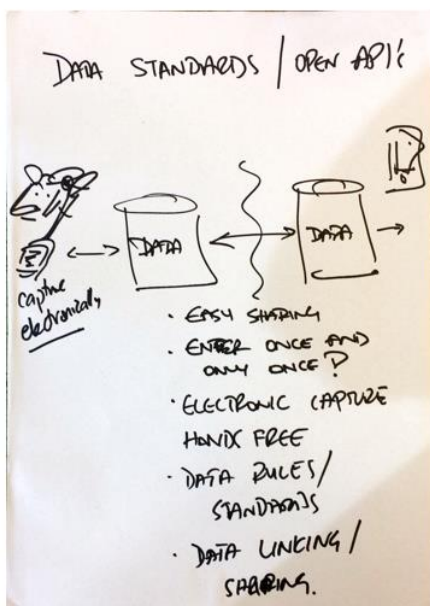
Data platform and Standards



Open Communications Exchange Platform

- Establish an industry owned open and distributed communications exchange platform that support the establishment of private product and transactional platforms and enable the frictionless sharing of data and creation of premium value livestock based upon the specific animal and farm data and credence attributes.
- Any stakeholder could gain access to the key livestock information by using an approved product or transactional platform.
- The data would include: EID numbers, performance and health data for each animal, yield data, farm and farm practice data, management and QA systems
- Data would be associated with each animal object and farm object
- A common set of rules of the game would be established
- Competition between private solution providers would ensure innovation and solution development. They would build their private product and transaction platforms on top of an open industry communications exchange platform

Open Data Standards and Platform



Establish an set of Open data standards, APIs and rules.

- Provide for easy sharing of data based on data standards, open API's and easy electronic capture once only
- Establish common rules, definitions and tagging structures to encourage the development of frictionless data access
- Ensure that data only needs to be entered once and then can be shared frictionlessly
- Enable electronic capture

Lifetime animal history



Establish an Animal Health Passport

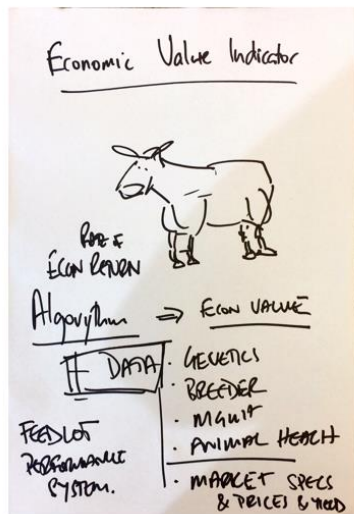
- Provide animal data 'passport' which allows the transfer and analysis of animal activities and performance data.
- The passport would store all of the critical animal health data
- All stakeholders associated with that animal would be able to gain access to the data at approved levels through approved systems
- Data would travel with the livestock just like human health records travel with the patient irrespective of the doctor or health clinic they are visiting
- Note: data 'owned' by animal



Life Time Animal History

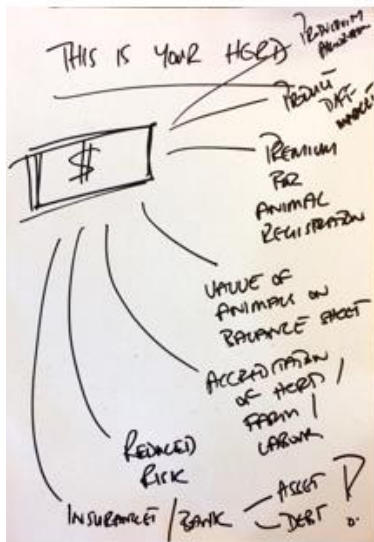
- Just like human health records, establish an lifetime animal health record.
- allows the transfer and analysis of animal activities and performance data
- Electronic history that is auditable and researchable
- Built on an industry owned open data and communications platform
- Every animal would be individually identifiable
- Effectively, any potential owner or current owner would be able to gain full access to the specific animals health and performance history on permission through an approved system

Economic Value Index/Indicator



Build an economic value index and indicator for livestock

- Tools that allow the calculation of economic value of the animal and herd along the value chain based upon a number of attributes
- Various firms are already developing private solutions, but opportunity to create a public version to increase market transparency



Establish a herd certification system

- The goal would be to create economic incentives to build a premium herd that is appropriately managed and signal this to the market, thereby providing market differentiation
- Specific markets would pay a premium for the purchase of certified animals from certified herd and farms
- The process would reduce market risk for the buyers and increase market certainty for the producers
- Certification specifics would be established by the market
- Probably based on a star system
- It is likely that the certification would signal better management and reduce farm risk, hence banks would charge less on loans

Certified Herd

'Beef App'



Build a modular Beef App

- The one stop shop for data entry and analysis both internal and external modularised to fit task at hand.
- This would ensure one time data entry
- Ensure frictionless data sharing
- Be built upon a common and open data communications exchange platform

5 Discussion

5.1 What would the industry benefit from?

As with almost all businesses, profitability is the primary driver for the sector. Within profitability, compliance and productivity are key drivers. Compliance is seen as a cost of doing business and productivity something to be optimised (within the bounds of personal motivation and skill). Providing information systems that allow easy compliance while supporting productivity combine both elements constructively. All the previous product concepts developed during the value chain workshop tackled these themes in different way.

Stepping back and viewing the whole Australian red meat systems, one of the key insights from interviews and workshops was that the current MLA suite (although not necessarily well aligned and linked) does provide a very effective base level system integrity system for commodity producers when compared to other countries. The current systems make it easy for many producers to remain in the commodity value chain focusing on on-farm production and allowing them the market flexibility of chose to sell through spot markets as opposed to being forced join closed integrated marketing channels and having to make hard decisions on which channel to join. For many producers they liked the independence, flexibility and transparency that commodity spot markets offered. On the flipside the processors noted that it was difficult for them to differentiate themselves in the marketing channel with producers due to the strength of the commodity chain. They could only do this in highly niche product lines. The costs involved in marketing channel segmentation were too high relative to the effective floor price provided by the MLA suite. In effect as one group of producers commented “MLA is making it easy for us not to change.” That is MLA could be thought of as crowded out the private market opportunities for differentiation when compared to the integrated product channel innovation in other countries.

So what does this mean for MLA and Integrity Systems. There are two core components:

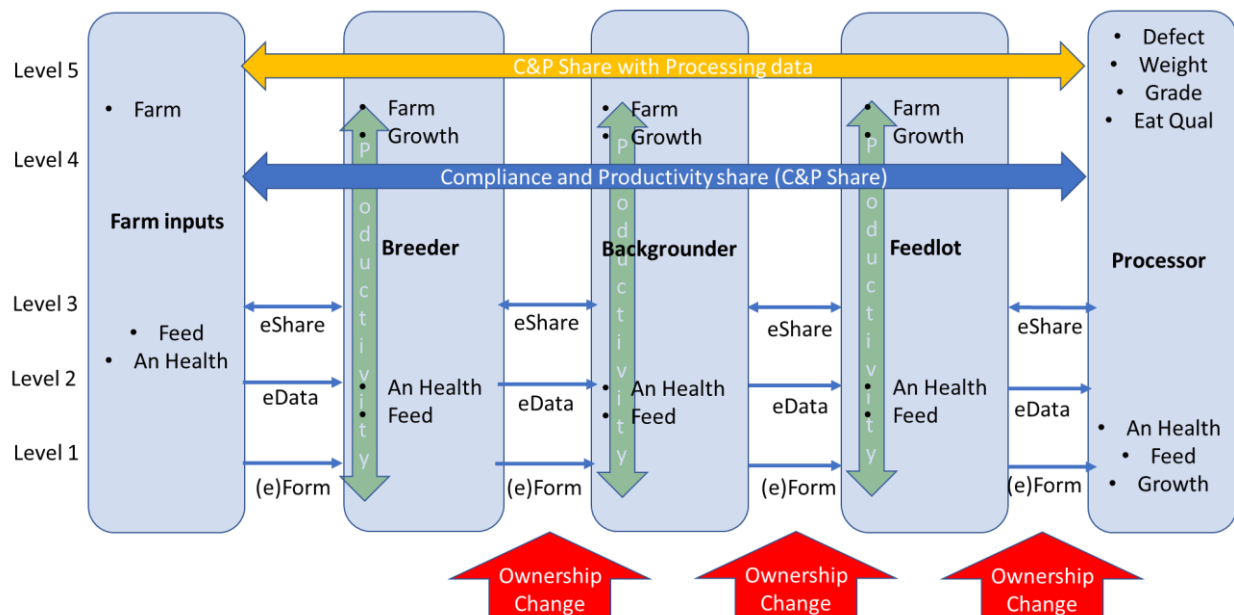
- First, the effectiveness and efficiency of the base-level (or foundational) communications exchange platform needs to be further developed (integrated and digitalized) to ensure that the red meat industry’s integrity systems are future proofed to meet the fundamental industry wide legal and integrity requirements for a high-end commodity business within a rapidly transforming digital global consumer marketplace and business environment. This would ensure that the Australian red meat industry had the most effective, robust and lowest cost integrity and compliance system.
- Second, the foundation platform needs to be designed to allow and incentivise for the rapid development of both transactional exchange platforms and product platforms to be easily, efficiently, and effectively built upon it. These higher-level platforms could be either privately or industry owned.

More broadly, the sector needs to develop in a way which supports individuals and firms in creating points of difference associated with their product offering in the final market place as well as at each stage of the value chain. This is both from the product platform perspective e.g. producer or processor differentiating with a ‘premium’ steak - and also those that provide services via exchange platforms – transactional and communications - to those within each step and along the whole value chain e.g. farm software suppliers with smart tools to drive productivity or stock trading exchanges for marketing animals or meat. MLA/ISC needs to support a ‘core platform’ without crowding out commercial parties. This has been outlined earlier in section 4.1.2.4

5.2 Proposed Solution – ISC Core Platform

The figure below outlines what the overall outcome may look like, broken into levels of data, digitisation and sharing along the value chain.

Value Chain Information Platform– Level 1-5



In summary, level 1 is an enhancement of the current paper or eForm based system which provides compliance declarations in a step wise manner along the supply chain digitally. Level 2 converts the electronic form to include the data required to support the declaration. This supports online audit. Level 3 builds on level 2 by allowing the sharing of the compliance data along the chain. Level 4 adds base productivity (e.g. species, date of birth, weights) to the compliance data, with all the data able to be shared. Level 5 in turn builds on 4 with the addition of processing information (e.g. carcase weight, grade, eating quality animal health info), all able to be shared.

The following table summarises the platform in further detail.

System Level	1	2	3	4	5
'Product'	Declaration	Agri-Cred	Animal Passport	Passport+	Processing passport
Description	Paper/ eForm – compliance + declaration	eData Form – compliance + audit	eData System – compliance + audit + share	eData System – compliance + audit + base productivity + share	eData System – compliance + audit + base productivity + processor + share
Channel Outcome	Compliance declaration for animal and farm	Compliance data for animal and farm with single step sharing	Compliance data for animal and farm with sharing	Compliance and base productivity data for animal and farm, sharing	Compliance and base productivity data for animal and farm and processing data, sharing
Data source	Farm records	Farm electronic data records	Farm electronic data records	Farm electronic data records	Farm and processor electronic data records.
Access	Farm, purchaser, regulatory	Farm, purchaser, regulatory, stepwise	Farm, value chain members, partners, regulatory	Farm, value chain members, partners, regulatory	Farm, value chain members, partners, regulatory
ISC Data	LPA, NLIS, CVD, NVD	LPA, NLIS, CVD, NVD	LPA, NLIS, CVD, NVD	LPA, NLIS, CVD, NVD, farm	LPA, NLIS, CVD, NVD, farm, LDL
ISC System?	No central database	Central Auditable database	Central Realtime, accessible history	Central Realtime, accessible history	Central Realtime, accessible history
Other system linkages (likely commercial)	Unlinked On farm recording systems	Linked On farm recording systems	Linked on farm recording and analysis systems	Linked on farm recording and analysis systems	Linked on farm and processing recording and analysis systems

The sections following provide more detail on each of the levels, starting with current issues and opportunities followed by more detail on the solution. The levels build on each other so solving the issues for example in level 1, will be required to support subsequent levels through to level 5.

5.2.1 Level 1 – Form based compliance declaration

Level 1 - Current issues/opportunities

- Information to support declaration not always formally collected – Audit credibility?
- Realtime information to support the declaration not always available to person declaring – do they know the history?
- Run out of paper pads – form in 'phone' no need for paper
- Paper pads can be stored at yards, used by anyone – do you want to leave a phone?
- Paper forms can be filled out and copy left for truck drivers – don't want to wait at yards
- Printing form, if no pad, hard especially in the yards
- eDEC/NVD covers wider declaration e.g. EU
- eDec/NVD hard to complete in office in advance as not always sure of animals to be transported
- eDec/NVD hard to complete in yards if no internet access
- eDec/NVD hard to leave copy for truck drivers (farmer not at yards, lack of electronic transfer)
- Neither version carries data
- Confusion around eDec and eNVD
- Declarations are not easily auditable (require LPA Audit) - cost

Level 1 - Purpose/Outcome

*Transfer compliance **declarations** down the supply chain with minimum effort*

Information System Elements	Description
Data required	<ul style="list-style-type: none"> • Minimal data (Owner, address, PIC, NLIS numbers etc) • Auto populate base data

	<ul style="list-style-type: none"> Majority information declarations (tick box) re HGP, feed etc
Data Source	<ul style="list-style-type: none"> Farm records (LPA/audited)
ISC System	<ul style="list-style-type: none"> Paper or ISC eDEC, eNVD (eForms)
System Requirements	<ul style="list-style-type: none"> Common information understanding/meaning/definition Accurate recording/declarations Transfer from device to device for eForm (truckie) (allow for no internet) Audit/compliance regime (existing)
Product	<ul style="list-style-type: none"> Access to printed books, ISC web form, phone app

5.2.2 Level 2 eCompliance – Data linked form – Agri-Cred

Level 2 - Current Issues/opportunities

- Access to animal-based compliance data e.g. treatment and feed records, not available beyond point of origination e.g. farm that treated an animal
 - Limits ability to reconcile/audit records back to source/s of supply
 - Limits ability to base any subsequent actions e.g. feedlot induction/treatments based on treatment/s at source of supply. Refining subsequent treatments means no double or missed treatments and handling animal appropriately.
- Currently requires on farm audit to verify data is recorded and linked to declarations made. Audit could be undertaken online back to original source.

Level 2 - Purpose/Outcome

*Transfer compliance declaration **and data** down the supply chain supporting **audit**.*

Information System Elements	Description
Data required	<ul style="list-style-type: none"> Animal compliance related data <ul style="list-style-type: none"> Owner, address, PIC, NLIS number, animal health treatments, feed inputs Data linked to animal EID or mob/animal class/farm if no EID
Data Source	<ul style="list-style-type: none"> Digital farm records 'Paper' farm records (declaration only)
ISC System	<ul style="list-style-type: none"> Leverage ISC eNVD, NLIS, LDL platforms for eData Forms
System Requirements	<ul style="list-style-type: none"> Digital data standards – Animal health (central database)/feed Easy on-farm digital collection Online/offline capability

Product	<ul style="list-style-type: none"> ISC web tool and App? Commercial products linked to ISC system via API's
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5.2.3 Level 3 – Shared compliance data – Animal Passport

Level 3 - Current Issues/opportunities

- Access to animal-based compliance data e.g. treatment records, is limited to single step and not available beyond those directly in the supply chain after purchase.
 - Limits ability to make purchase decisions based on previous animal compliance information (only know info after purchase)
- Other parties cannot access data which would support the operation of the farmers business or supply chain
 - These parties may include:
 - Other regulatory authorities?
 - Vets
 - Consultants
 - Banks
- Opportunity for chain participants to develop additional systems to analyse all the compliance data from their level back up and down the chain to identify chain participant performance. The further down the chain, the more benefit is available. Processors would be able to analyse all compliance data back to original source to support provenance claims e.g. 'never ever' and identify supply chains with superior performance.
- Given the data to this point is of a compliance nature, support for its provision could be underpinned by regulation. It was suggested that this information belong to the animal rather than the farmer and was required to be supplied. As a base, if the platform functionality supported this, those that chose to record/supply could gain a benefit over those that didn't.

Level 3 - Purpose/Outcome

Share compliance data along and around the supply chain

Information System Elements	Description
Data Required	<ul style="list-style-type: none"> Animal compliance related data <ul style="list-style-type: none"> Owner, address, PIC, NLIS number, animal health treatments, feed inputs Data linked to animal EID (or possibly mob/animal class/farm if no EID)
Data Source	<ul style="list-style-type: none"> Digital farm records

ISC System	<ul style="list-style-type: none"> Leverage ISC eNVD, NLIS, LDL platforms eData System share
System Requirements	<ul style="list-style-type: none"> Digital data standards – Animal health/feed Easy on-farm digital collection Online/offline capability Manage data share between value chain participants and partners
Product	<ul style="list-style-type: none"> ISC web tool and App? Commercial products linked to ISC system via API's

5.2.4 Level 4 – Sharing of base compliance and productivity information

Level 4 - Issues/opportunities

- Basic productivity outcomes are currently unlinked to data from along the value chain.
- Adding in a date of birth (D.O.B.) and weighing events (weight and weigh date) to an animal EID record would allow the animals compliance history to be linked to its weight gain.
- Building on level 3, opportunity for chain participants to develop additional systems to analyse compliance and base productivity data from their level up and down the chain to identify chain participant performance. The further down the chain, the more benefit is available.
- Using such systems farmers would be able to identify what source of animals performed best both on their property and at subsequent levels in the chain on a growth rate basis (and to some degree animal health). This would allow differential pricing (up or down) on similar future lines. In short, you would be able to identify animals that grew fast and required less treatments with those that did not.
- Processors would be able to analyse all compliance and base productivity data back to original source to identify supply chains with superior performance. Given the processor has their own data, they could add processing data to this analysis.

Level 4 - Purpose/Outcome

*Share compliance and **base productivity data** along and around the supply chain*

Information System Elements	Description
Data Required	<ul style="list-style-type: none"> Animal assurance and productivity related data <ul style="list-style-type: none"> Owner, address, PIC, NLIS number, animal health treatments, feed inputs NLIS data D.O.B., Weights (at a date) (may be voluntary to enter and share)

	<ul style="list-style-type: none"> Data linked to animal EID or mob/animal class/farm if no EID
Data Source	<ul style="list-style-type: none"> Digital farm records
ISC System	<ul style="list-style-type: none"> Leverage ISC eNVD, NLIS, LDL platforms
System Requirements	<ul style="list-style-type: none"> Digital data standards – Animal health/feed/on farm attributes Easy on-farm digital collection Online/offline capability Manage data share between value chain participants and partners
Product	<ul style="list-style-type: none"> ISC web tool and App? Commercial products linked to ISC system via API's

5.2.5 Level 5 - Sharing of base compliance, productivity and processing information

Level 5 - Issues/opportunities

- Basic processing outcomes are currently unlinked to data from along the value chain.
- Adding in the processing outcomes, weight, grade, animal health feedback, eating quality to an animal EID record would allow the animals compliance history to be linked to its weight gain and processing data.
- Building on level 4, opportunity for chain participants to develop additional systems to analyse compliance and base productivity and processing data from their level up and down the chain to identify chain participant performance.
- Using such systems farmers would be able to identify what source of animals performed best on a combined growth rate and processor information basis (and to some degree animal health). This would allow differential pricing (up or down) on similar future lines. In short, you would be able to identify animals that grew fast, required less treatments and 'graded' well and those that did not.
- Processors would still be able to analyse all compliance and base productivity data back to original source to identify supply chains with superior performance.

Level 5 - Purpose/Outcome

*Share compliance, base productivity **and processing** data along and around the supply chain*

Information System Elements	Description
Data Required	<ul style="list-style-type: none"> Animal assurance and productivity related data <ul style="list-style-type: none"> Owner, address, PIC, NLIS number, animal health treatments, feed inputs NLIS data D.O.B., Weights (at a date) (may be voluntary to enter and share)

	<ul style="list-style-type: none">• Data linked to animal EID or mob/animal class/farm if no EID• Processing data – weight, grade, animal health, eating quality.
Data Source	<ul style="list-style-type: none">• Digital farm records, processor records
ISC System	<ul style="list-style-type: none">• Leverage ISC eNVD, NLIS, LDL, MyMSA platforms
System Requirements	<ul style="list-style-type: none">• Digital data standards – Animal health/feed/on farm attributes• Easy on-farm digital collection• Online/offline capability• Manage data share between value chain participants and partners
Product	<ul style="list-style-type: none">• ISC web tool and App?• Commercial products linked to ISC system via API's

5.3 Comparison of workshop needs vs proposed solution

The table below tests the proposed solution against the workshop requirements

	Requirement	Solution Outcome
1.	Easy collection of data in the field	<ul style="list-style-type: none"> While the proposal would not support collection of all data in the field, it would support collection of core compliance and productivity data. The core system would also connect with other systems collecting data in the field. Overall, the challenge remains farmer motivation to formally record information and internet connectivity when real-time data upload/access is required
2.	Easy update of NLIS system	<ul style="list-style-type: none"> NLIS linkage from phone/web app (as part of core compliance recording) would cover this combined with the point below.
3.	Data collection equipment failure e.g. tags, EID readers and weigh scales	<ul style="list-style-type: none"> This is not directly addressed in this proposal. However, a core system that supports the uptake of technology will also support the tech providers (tags, readers, scales etc) making investments in this space. The lack of market scale often limits the investment.
4.	Vet product management - products, inventory, animal treated, withholding times, animal history, audit	<ul style="list-style-type: none"> At level 2, the data on product used would be recorded. While possible in the absence of a central database of animal products (standard drop down list), it would be preferable if there was an industry register of animal products linked by QR code to the product. The register would carry all base data for the product e.g. withholding time, data safety sheets etc.
5.	Opportunity – animal product passport for each animal	<ul style="list-style-type: none"> This is envisaged at level 3. Compliance related animal activities e.g. animal health treatments would be recorded against the individual animal id and the data available to registered individual (person legally responsible for that animal).
6.	Linking supplier to animal performance	<ul style="list-style-type: none"> This is envisaged for level 4. The D.O.B., species and weights would be loaded against the animal EID. This information would be able to be accessed by the registered individual.
7.	Understanding drivers for performers and non-performers (animals and people)	<ul style="list-style-type: none"> The proposal would build a base for this type of analysis. Animal health, weight gain and processing information could be analysed if operating at level 5. There is a limitation as it is not suggested that financial information is collected as part of the core platform.
8.	Animal treatment history available at induction (feedlot)	<ul style="list-style-type: none"> Level 2 system would allow animal treatment history to be accessed.
9.	Animal history to supply audit trail for NVD (feedlot)	<ul style="list-style-type: none"> Level 2 system and above would allow compliance related animal history to be accessed to support NVD
10.	Lack of animal life history (processor)	<ul style="list-style-type: none"> Level 2 system and above would allow compliance related animal history to be accessed by the processor.

6 Conclusions/recommendations

6.1 Recommendations

6.1.1 Overarching Principles

The following general principles apply:

- Data entered/collected only once at originating activity
- Data supports compliance and/or decision making/productivity as required
- Data shared wherever needed/approved – approval system with open APIs
- Industry agreed, owned and updated data standards – Industry Data Standard/Dictionary
- Ability for private and industry good organizations to build product and transactional exchange platforms on the core system

6.1.2 Industry platform

- Agreement with industry on scope of ISC systems.
 - Suggest core system (level 1-5) vision for compliance, base productivity and standard processing data.
 - Information platform to which others in the industry can link or possibly build on.
 - Levels 1 – 3 provide the base communications exchange platform for the industry which supports the establishment of a private or industry good market of product and transactional exchange platforms.
- Assuming industry buy in, start with baseline ISC tools (level 1 and 2) to achieve a fit for purpose and easy to use platform built on current technology.
 - E.g. common portal.
 - 'App' that work anywhere in a practical form factor e.g. smart phone.
 - Connected to farm information systems (scales etc).
 - Ability to populate information across platform.
- Experiment with a level 3 system which can be enhanced with additional data (productivity and processing) in the future.
- Roll out level 4 and 5 based on industry support (farmer – productivity data, Processor, processing data). These could be built by private firms or by MLA/ISC as an industry good.
- Build different business models for each level of engagement based upon the costs involved and what is provided as an industry verse private good. There is probably a valid argument to price electronic data capture and sharing systems at a lower cost than paper, and thus use this as an incentive to get farmers and industry to switch.

6.1.3 Support industry led innovation

- Define and build a competitive ecosystem for red meat integrity systems
- Develop open and transparent “rules of the game” to support private development of an ecosystem with programmes/systems over and above core system supporting industry.
- Utilize (and refine?) co-investment structures to support and accelerate industry development of and investment in higher level information and integrity programs.

6.1.4 Awareness and Education

- Prioritize awareness and education campaign to raise producer understanding around full value, functionality and reason-for-being of integrity systems and value chain linkages.
- Create a shared industry vision of where the core platform will fit into the future and how it will 'work' within an ecosystem of commercial products in use within the sector
- Articulate and communicate the separation of between the base level integrity systems for legal and market compliance and alternative options for premium value creation with private or industry good marketing channels.

6.1.5 Next steps

Note: With respect to next steps, the report authors are not familiar with the steps Integrity Systems have/are taking outside of direct involvement in the development of this report.

Report development steps to date

1. Internal (MLA/ISC) Interviews
2. External Interviews along value chain
3. External design thinking cattle value chain workshop (Sandalwood)

The recommended next steps

1. External design thinking sheep value chain workshop
 - Identify sheep value chain requirements
 - Value chain mapping – problem/opportunity identification
 - Product suggestions
2. Industry systems provider workshop
 - Test findings from this report and subsequent sheep value chain workshop
3. Draft concept design for future ecosystem and communications platform overview (2-3-year vision?) with key stakeholders
 - Design workshop with key stakeholders from consultation process undertaken
 - Development of a white paper for wider industry consultation
4. Consult and validate concept design with industry
 - Stage 1
 - i. Sandalwood attendees
 - ii. Sheep value chain workshop attendees
 - iii. Industry systems provider workshop attendees
 - Stage 2
 - i. MLA/ISC industry consultative bodies
 - ii. Internal management/governance structure
 - Stage 3
 - i. Develop industry advisory group (value chain based) for ongoing input
5. Finalise future ecosystem and communications platform white paper and distribute
 - Gain feedback/signoff from advisory group
6. Develop and undertake specification development process for staged ecosystem and supporting communications platform (assuming agile build) including:

- Deliverables
 - Stakeholder engagement
 - Timelines
7. Undertake staged build process for ecosystem and supporting communications platform specification (assuming agile build):
 - Deliverables
 - Stakeholder/user engagement
 - Timelines
 8. Product staged roll out (with integrated user feedback system).
 9. Regular reporting on system performance and feedback to advisory group.

6.1.6 Key messages

- Creating and gaining systems adoption is not simple or fast. At the heart of this is the motivation of the industry participants. Profitability is important, but the majority of non-corporate farmers tend to balance lifestyle with profit maximisation. Compliance will motivate many but only if the reason e.g. visible market premiums, clear market access requirements, or significant risk of non-compliance penalties. In New Zealand, the threat from meat substitutes, environmental restrictions, and MBovis has motivated many to adhere to higher standards of care e.g. environmental planning and improve compliance e.g. animal traceability.
- System/s needs analysis and development should be an 'industry sport'. Creating buy in for what is being built is critical. Opinion leaders for the various levels of sophistication from the chain participants need to be identified and incorporated in the process. The levels can be used as simple personas.
- Systems need to be simple (even if providing complex outcomes), fit for purpose and bullet proof. The proposed solution is intended to allow the various participants to do what they want without thinking about additional complexity at 'higher' levels.

7 Appendix

7.1 Post it note Spreadsheet



Sandalwood
Workshop.xlsx

7.2 Data sheet

[illegible]

7.3 Platform Systems

The purpose of this appendix is to provide a brief summary of open platform systems.

Over the past decade, “open product” platforms have helped speed up the spread and adoption of design and production of complex modular processes and systems over many autonomous organizations. Similarly, the web has led to the creation of “open exchange” platforms – websites designed specifically to facilitate transactions and other valued exchanges of goods, services and information.

All platform systems, both open and closed, are similar in several ways. Fundamental they are based on the modularization between the core platform and optional components. Design rules related to an architecture, interfaces, tests and rules of the game – ensure interoperability of the components.

Platform systems provide the follow five major benefits:

- Positive economic impact of options or choices for the users – users have choices that they didn’t have before as firms will build different offerings on the platform providing both variety of choices as well as price points.
- Positive network effects between options and users – platforms drive innovation and provide the opportunity for firms rapidly develop new options to meet any users’ unmet needs
- Positive impact of risk within options – Any risks within a single option or modules are rapidly identified and new options created by new modules or remixing the current modules.
- Positive impact of modularity – modularity allows individual components to be switched out, added, or removed seamlessly (plug and play). It also reduces the costs of modular and systems innovation.
- Complementarity between modularity and risk – there are incentives to innovate and change the high risk modular

A “platform system” is defined as

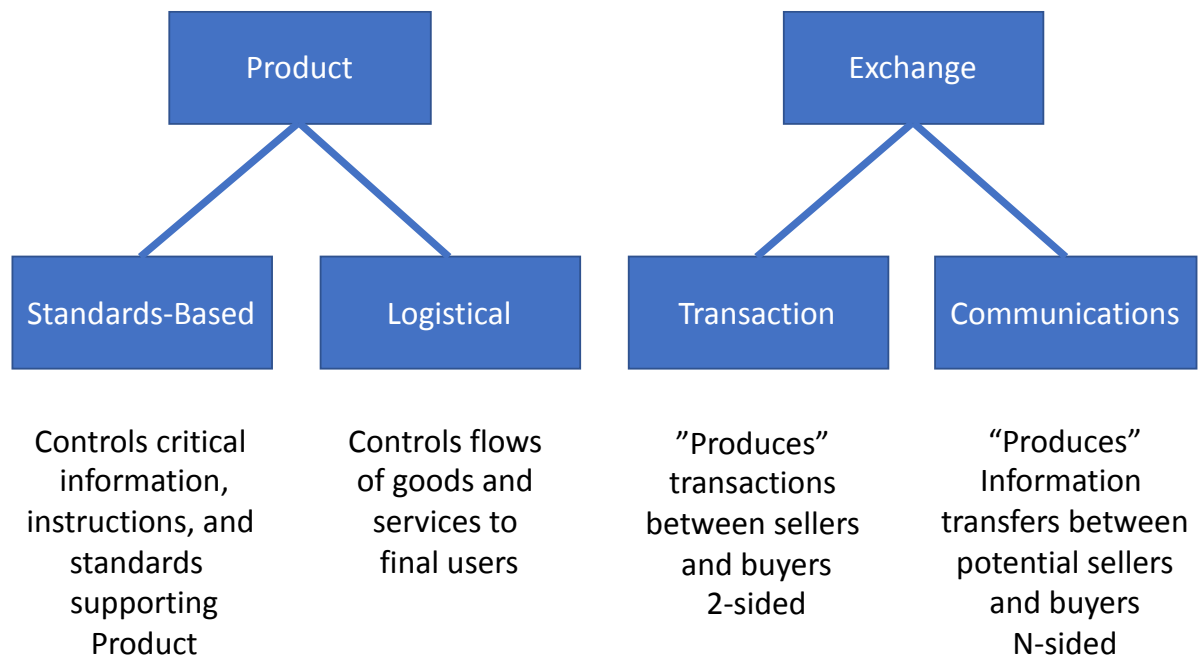
... a technical system comprising a core set of essential functional elements (the platform) plus a set of optional complements. The platform and each complement are separate modules bound together by commonly recognized design rules (rules of the game). The platform has no value except in conjunction with one or more complements.

A necessary condition for successful platforms is that the firm’s product has “limited value when used alone but gains in value when used along with complements” (Baldwin and Clark, 2000)

As noted above, there are two types of platforms: Product Platforms and Exchange Platforms (see 7.3.1). These can be further categorised:

Fundamental to all product platforms is the creation of options – the right but not obligation to modify the product or system in response to new technology, new prices, and new customer demands. When the platform is established it is not known with certainty what will happen in the future. The modularity of the platform provides a degree of flexibility and tolerance to this uncertainty.

7.3.1 A taxonomy of Platform Systems



Adapted from Baldwin 2018

Product platforms as either *standards-based product platforms* and *logistical product platforms*;

- *Standards-based product platforms* support the design and production of complex systems of goods and services. An agricultural example of this is how John Deere manages the manufactory of components and assembly of tractors.
- *Logistical product platforms* allow a systems integrator to coordinate and manage the movement of products and services through a complex network of steps. An agricultural example of this is Zespri and their integrated value chain from orchard to market.

Exchange platforms differ as they provide either physical or virtual spaces that enable and facilitate the creation of value and exchange between diverse agents. Exchange platforms have been around for centuries and go back to the original markets. Similar to product platforms, exchange platforms create value by the number of options that they support and their ability to differentiate between these different options. Usually at the time of establishment, it is not known what specific transfers will be desired by the users, but what is known is they need to be efficient, rapid and transparent exchange. Thus, exchange platforms provide the efficient connection and transfer of the critical information, goods and services between users over the platform.

Exchange platforms as *transactional exchange platforms* and *communications exchange platforms*.

- *Transaction exchange platforms* enable and facilitate transactions between users. They have two sides – the buy side and the sell side. Examples include Chicago Board of Trade, Amazon, and Alibaba.

- *Communication exchange platforms* enable and facilitate the exchange of information between users. This exchange may be done in a one to one relationship, one to many relationship, many to one relationship, or many to many relationship and the platform may one or many of these exchange options to the users.

An exchange platform is a business based on enabling the creation of value associated with enabling interaction and exchange between users (producers and customers). The platform provides an open, participative infrastructure for these interactions and sets governance conditions for them. The platform's overarching purpose is to consummate matches among users and facilitate the exchange of goods, services and or social currency, thereby enabling value creation for all participants. (Parker et al, 2016).

These exchange platforms can be either transaction or communications platforms. A transactions exchange platform is based upon the transfer of rights and of payment preceded by the transfer of information. Thus transaction platforms are by necessity also communications platforms. The opposite however is not necessary true. Communications platforms maybe transaction free or may have transactions at the periphery. An example would be when friends meet at a café. They do not necessarily need to transact with each other, although they may need to buy food or services to sit at the café. But they could also meet in a park or at home.

Key to understanding the differences is that transaction platforms are places of trade where agents (buyers and sellers) meet to exchange goods and services in return for payment of money or in kind goods and services. The key to their success is their ability to create depth of market – sufficient buyers and sellers to ensure that the market clears and the benefits of transacting are greater than the value of the alternatives. The sponsor of the platform must ensure that an exchange match is made with relative ease and the transaction costs involved – defining, measuring, negotiating, paying, and fraud - are minimised. To achieve this they often bundle or package in other external service offerings from outside providers, to increase the value proposition for users, e.g. credit card payments, transportation, grading systems, and product reviews. Revenue is general generated by a fee on the transaction either charged to the buyer or seller or both.

Communications platforms are a place for the exchange of information between users. They can be one to one or one to many. The sponsor of a communications platform must provide a suitable communications location (physical and virtual) and technology (physical, analog, or digital), attract suppliers of content (senders) and consumers of content (receivers), and establish a suitable business model to capture sufficient revenue to cover the costs of the platform and creation and delivery of content. There are a number of ways to do this. Charge the sellers (postage stamps with mail or adwords with google) or charge the purchases (subscriptions with magazines). They can also charge for the associated services like food and drinks at the café. Mixed models of charging posting fees for sellers and subscription fees for buyers is now becoming common.