final report

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Understanding Future Feedback Mechanisms

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Abstract

Effective provision of data-driven feedback is a top priority for enabling improved decision support on-farm and through the value chain. Data-driven feedback captures information from different sources (genetics, productivity, quality etc.) and visualises it in formats that are easily accessible and relevant to users. The Livestock Data Link (LDL) system was intended to provide feedback along the value chain. However, the system has experienced many and varied challenges. Integrity Systems Company (ISC) is seeking to understand the business case for further investment. Hence, following consultation with industry, this project adopted a design-led method and proposed completely new business models and underpinning customer value propositions to make a radical shift. Results from focus groups and surveys showed that industry strongly support data-driven feedback for decision making. A business model that creates *Network Effects* via a new mutually beneficial platform technology, and Application Programme Interface (APIs) for solution providers to connect with localised networks is strongly recommended as a first step. This should be followed by the progressive testing of *Proactive Analytics* that will likely make a bigger commercial impact. The Network Effects and Proactive Analytics models require further validation with industry prior to implementation.

Executive summary

Several years ago, Livestock Data Link (LDL) was developed as a pilot web application for sharing information and insights up and down the value chain, creating a feedback loop between processors and producers. The pilot required wide-reaching adoption allowing all stakeholders to benefit, however uptake has been slower than expected. Integrity Systems Company (ISC) is now seeking to understand the business case for further investment.

The LDL problem space is multi-faceted and involves numerous challenges: 1) data ownership; 2) outdated and inadequate technology; 3) inequitable funding and investment; 4) poor user experience; 5) lack of integration with other databases; and 6) lack of value for all supply chain participants. Perhaps the biggest question mark is over whether LDL in its current form is making any difference to on farm decision-making.

Despite the challenges, the key question that focused the project was;

How can data-driven feedback create the most value for the Australian red meat industry?

To answer the question Greenleaf Enterprises (Project Consultant) looked to understand industry needs, pains and gains for value chain feedback and to posit business model options that provide the greatest value in the future.

The project used design-led innovation because it is an appropriate method to address complex problems and create solutions that work in a commercial context. Data was collected from several data sources (documents, focus groups, surveys), with consultation including over 150 participants. Thematic analysis of qualitative data was used to identify key findings that informed the business model development process where innovation tools were employed to help with ideation. Quantitative analysis was also undertaken on survey results. These results were uploaded into a business model matrix to objectively evaluate and compare business model options.

Three business model options were developed:

- Status Quo Plus – incremental innovation of the current LDL system.
- Network Effects – radical innovation requiring a new platform to integrate networks of user types to create trust and mutually beneficial value.
- Proactive Analytics – radical innovation to capture industry-wide digital signals via a platform to deliver personalised, timely, value driven decision support.

Results showed that the Network Effects model is likely to create the most impact for industry, scoring highest across strategic fit, desirability, feasibility and opportunity. Confidence in the design of the Network Effects business model also rated higher than other options. This is a big difference from the current LDL system which has lacked a well-designed business model to accompany the base technology.

It should be noted that the Proactive Analytics option also scored highly compared to the current version and the Status Quo Plus. For this reason, the strengths of the Proactive Analytics option need to be considered as elements that could over time be integrated with the Network Effects model. The two models are not mutually exclusive, but rather could be progressively rolled out over time.

The potential value generated from better decision making is an important consideration for implementation of the Network Effects and Proactive Analytics business models. MLA's review of the value of objective measurement (OM) information for improved decision making (MLA V.MQT.0071 report) integrates well to extrapolate values for each business model.

It was identified that around $329 million per annum of potential gross benefit exists from the provision of data (not all of it currently available), associated pricing signals and resultant on-farm management changes by 2023. A net benefit of $40 million per annum is likely to be realised by 2023 (beef and sheep including mutton) while around $186 million net benefit per annum could be realised by 2040, providing a total net benefit of $1.066 billion between 2020 and 2040.

The portion of this value that can be delivered by each business model exceeds the current version of LDL and in 2023 is conservatively:

- Status Quo plus – 1.4 times greater or $8 million p.a.
- Network Effects – 3 times greater or $18 million p.a.
- Proactive Analytics – 4 times greater or $25 million p.a.

ISC is critical to the successful provision of the proposed business models. Firstly, because there needs to be a non-commercial trusted custodian who can disseminate data-driven feedback for industry-wide good. Industry trust in ISC will be strengthened through the development of a robust permissions framework and technology platform for multiple purposes. The permissions framework and the practical functionality must be built in a way that allows all stakeholders to control their own data. From a technical perspective, this can be achieved quite easily. Finally, there would likely be market failure without ISC involvement because it is the only one able to integrate multiple industry datasets and produce national benchmarking and aggregated insights that can be shared across industry.

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Abbreviations

API - a set of functions and procedures allowing the creation of applications that access the features or data of an operating system, application or other service.
DLI - Design led innovation
ISC - Integrity Systems Company
LDL - Livestock Data Link
MLA - Meat & Livestock Australia
MSA - Meat Standards Australia
MoSCoW – Must, Could, Should, Would
NE - Network effects
PA - Proactive analytics

1 Background

As noted in the Terms of Reference, Livestock Data Link (LDL) was developed as a pilot web application for sharing information and insights up and down the value chain, creating a feedback loop between processors and producers. The concept was to enable producers to make data-driven decisions that a) decreased non-compliance to specifications and; b) reduced the number of carcases affected by disease and defect. In doing so, producers would improve the quality of their livestock and decrease processor costs caused by downgrades and condemnations in carcase meat and offal. Value would be added based on premiums in return for higher quality products. This opportunity presented an estimate of some $127 - $162m p.a. To realise this, the pilot required wide-reaching adoption allowing all stakeholders to benefit.

The adoption of LDL has been slower than expected. With on-going technological advancements, it is timely to review the purpose and position of the program and gain an understanding of what future design is required to meet the needs of the supply chain, not just in terms of technology, but also business models that leverage data integration from multiple sources for increased adoption for decision making.

In its first iteration, LDL was an innovative concept that proved to be a valuable platform for change in feedback approaches. Now, it is one of many feedback mechanisms that exist in industry designed to enable producers to make better on-farm decisions and improve performance. Ensuring industry has access to objective, real-time and enhanced feedback is still a priority for ISC. It is recognised this will capitalise on the potential value in meeting consumer expectations with less supply chain wastage, provide a pathway for incremental change and increase industry agility. For these reasons, ISC is seeking to understand the business case for further investment. The first stage is to determine the industry and stakeholder requirements for the future delivery of feedback to producers.

2 Project objectives

The objectives of the project were to provide ISC with:

- A comprehensive understanding of stakeholder and industry requirements for supply chain feedback. This includes but is not limited to potential formats, frequencies and channels that will drive better on-farm decision making and provide value to supply chain participants.

- A complete analysis of the key opportunities and challenges for Livestock Data Link in delivering on the needs of stakeholders and industry. On this basis, provide recommendations for tactical and strategic changes to the product and business models to ensure it will provide the greatest value to industry in the future.

3 Methodology

3.1 Research design

3.1.1 Overview

The method for this project involved:

- Design-led innovation including five project phases;
- Five different data sources to understand future feedback mechanisms;
- Over 150 participants contributing to the development of business model options; and
- Qualitative and quantitative analysis.

3.1.2 Design-led innovation

This project selected design-led innovation (DLI) as an appropriate method to address the project objectives. DLI can deal with complex commercial problems because it is *"a process of creating a sustainable competitive advantage, by radically changing the customer value proposition"* (Bucolo & Matthews 2011). In this way, this project seeks to develop completely new business models and underpinning customer value propositions that make a significant shift. ISC is open to the development of radical innovation, particularly in how data-driven feedback via an industry-wide platform is provided. Two business model options for future feedback presented in this project are radical innovation (Network Effects and Proactive Analytics) and one is incremental (Status Quo Plus). The Status Quo Plus involves some product feature changes to create efficiencies and improve adoption. Both radical innovation business models involve a new technology platform to create a data-driven market where customers can grow through the provision of new feedback products and services.

3.2 Double-diamond

In order to develop new business models and value propositions for the Australian red meat industry, the project also used the double-diamond method in Fig. 1**Error! Reference source not found.** (Design Council 2015). The double-diamond helps to consolidate many disparate but valid perspectives across industry. A two-stage process of converging and diverging (to turn over all options and possibilities for innovative approaches), then focusing (to define the specific way value will be created) addresses all business model elements. These two elements are essential to developing potential opportunities and solutions.

The first diamond defines "Where to play", identifying the opportunity spaces that could create the greatest value. Then in the second stage, the testing of prototypes that help define "How to win" in the best playing field. This considers business model design, interaction between technologies and data sources, users' behaviour towards data and data provision methods, multiple service providers

and commercial delivery to create the most value from the red-meat value chain, industry capability and systems readiness.

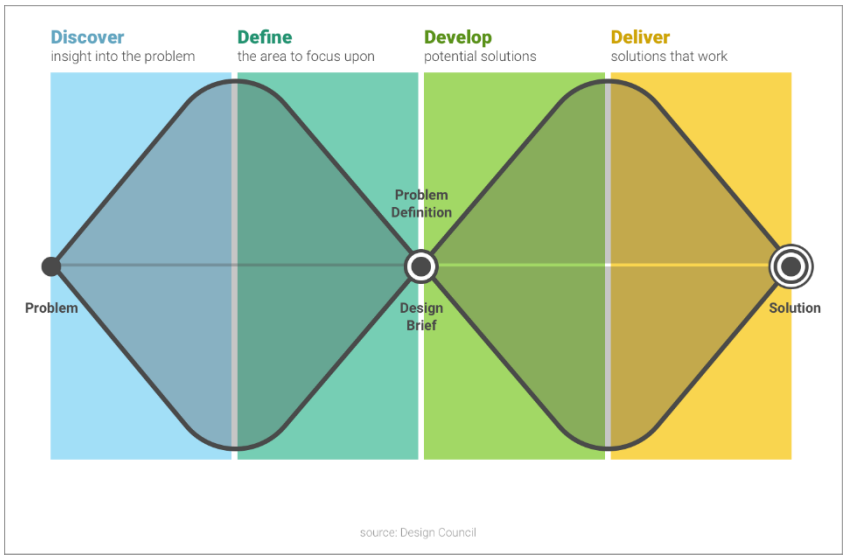


Fig. 1 Double-diamond method

3.3 Project phases

The Project Consultant followed five project phases (Fig. 2). A summary statement on each phase is included in this section, with deeper explanation of the phases presented in section 3.6 under the project analytic strategy.

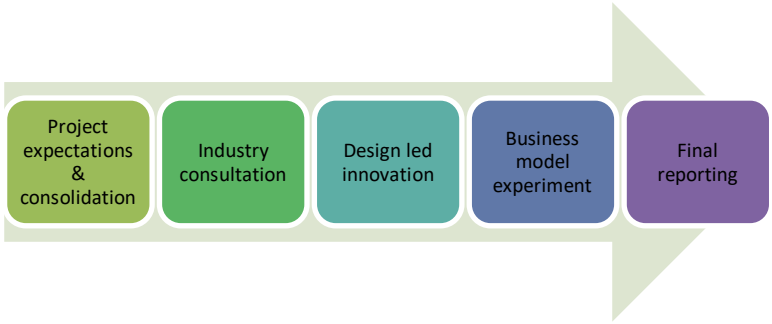


Fig. 2 Project phases

Phase 1 – Project expectations and consolidation

Upon execution of the contract, the project team met with members of the ISC project team. This initial meeting clarified project expectations and helped to identify relevant background information.

Phase 2 – Industry consultation

This phase involved the running of focus groups with industry, conversations with producers at the MSA EEQ forums, and surveying relevant industry groups. Consultation included producers and processors, current LDL users as well as non-LDL users.

Phase 3 – Design led innovation

The learnings from Phase 1 and 2 provided the basis to develop a design brief for potential solutions and new value propositions. In Phase 3 several Project Consultant conducted ideation sessions to synthesise the data collected and to conceptualise new options for feedback. These options were presented to ISC and industry representatives for feedback.

Phase 4 – Business model portfolio experiment

In this phase the business model options were presented to several industry groups and rated for their design and potential impact. This same process was also completed by the project team and ISC.

Phase 5 – Reporting

A draft final report was prepared, allowing enough time for the ISC team and relevant MLA persons to review the document. Several meetings were held with ISC, MLA and Greenleaf to provide feedback on the report and to clarify areas prior to the submission of a final report.

3.4 Data Sources

Five distinct data sources were used throughout the project to inform the development of business model options. These included:

- Documentation;
- Focus group;
- Semi-structured conversations;
- Business model matrix; and
- Survey.

3.4.1.1 Documentation

The project included several key documents that were valuable sources of information and assisted the project team to understand the existing knowledge base on feedback mechanisms in the red meat industry. It was important to do a high-level review of documents that were relevant to developing new value propositions. These included the following:

- V.LDL.1702 Review of Livestock Data Link (2017);
- Strategic Plan: Integrity Systems 2025 and beyond (November 2018);
- LDL Usage data (including google analytics data, 2019); and
- LDL Backlog Requests.

3.4.1.2 Focus groups

Focus groups were conducted to collect the perspectives of industry participants on the current state of LDL and future options. The first focus group (producers) was held on the 24th July 2019 and the second (processors) on 7th August 2019. Both focus groups were conducted over a six-hour period and included presentations from ISC on the current state of LDL and on other on-going digital value chain projects. This included a presentation on key research and development projects underway for LDL including solutions or alternatives to pricing grid complexity, Lean Meat Yield percentage (LMY%) prediction algorithms and on developing aggregated data insights. Each presentation allowed time for questions and discussion. Participants completed an anonymous survey (using interactive polling on

mobile devices) with 17 questions for producers and 18 questions for processors to capture their perspectives on LDL (see Appendix 9.1). This was followed by an activity on future scenarios for LDL. Participants rated the future scenarios on a 1-10 scale. All data from the focus groups was collated into a single document for analysis.

A third focus group was conducted with the *A Sheep Steering Committee* producer group (12 members) in Esperance, Western Australia. The group represents approximately 100 members from the region. This focus group was not part of the planned data sources but eventuated during the project as an opportunity to validate potential value propositions. This was particularly insightful at the time because the focus group was meeting to discuss animal health feedback using digital technology to support their local biosecurity plan. Data was collected informally during the focus group using a spreadsheet with questions on a data projector, however due to the qualitative nature of the discussions, it has not been included in the results section of the report.

3.4.1.3 Conversations

Several conversations were also undertaken during the MSA EEQ Forums throughout all Australian states excluding WA during September 2019. The approach involved forum participants (producers) speaking with ISC and Greenleaf Enterprises (Project Consultant) representatives during breaks in the forum. Data was recorded after conversations using the Fastfield app (www.fastfieldforms.com). These conversations provided the project team with an opportunity to speak with producers, however the event timeframe didn't allow for a structured LDL focus. The conversations are not included in the results section of the report due to their informal nature but helped to inform thinking.

3.4.1.4 Business model matrix

Greenleaf developed a business model matrix in Microsoft Excel during the project to evaluate future business model options. The options compared in the matrix are:

- Current version
- Status Quo Plus
- Network Effects
- Proactive Analytics

It was important that a consistent method was used to compare and justify the business model options. The matrix provided an objective way to determine the:

- *potential impact* of each business model; and the
- *design confidence* level (based on the evidence) in the overall robustness of each business model.

Combined scores of these two factors provided the best business model option. The design of the matrix was consistent with the overall project design-led innovation methodology. Hence, the constructs included are well established in the innovation literature, in business generally and in other MLA projects (IDEO 2019, Strategyzer 2019). The seven constructs in the matrix are presented in Fig. 3.

Fig. 3 Business model matrix constructs

3.4.1.4.1 Business model constructs

Strategic Fit

The strategic fit construct consists of: 1) vision, culture and image; 2) innovation guidance; and 3) leadership support. It is important to understand the degree of alignment with ISC's overarching strategy and the business model options and specifically whether the value propositions align.

Desirability

The desirability construct consists of: 1) customer segments; 2) value proposition; 3) channels; and 4) customer relationships. In this construct we compared how clearly the business models meet the needs of the intended customers.

Feasibility

The feasibility construct consists of: 1) key resources; 2) key activities; and 3) key partners. This construct helped to compare the evidence associated with implementing each business model option.

Viability

The viability construct consists of: 1) revenues; and 2) costs. This construct helped to determine how each business model generates revenues and for determining the costs of creating and delivering the value propositions.

Adaptability

The adaptability construct consists of: 1) industry forces; 2) market forces; 3) key trends; and macro-economic forces. This construct helped to understand and compare the level of understanding on the environment for each business model.

Culture

The culture construct consists of: 1) enablers; 2) blockers; and 3) behaviours. This construct was essential for understanding the cultural factors that influence the successful implementation of each business model.

Opportunity

The opportunity construct consists of: 1) value chain opportunity; 2) financial risk appetite; and 3) opportunity rating. This construct helped to compare the opportunity size and risk level for each business model option.

3.4.1.4.2 Business model statements and rating scales

Statements under each construct were sourced from Strategyzer's Innovation Scorecard, which is a tool for evaluating innovation projects and business models. Statements were slightly adapted to make them appropriate for the project (Strategyzer 2019).

Different types of scales were used depending on the construct. For example, for the strategic alignment construct it was important to know how well each business model aligned with the IS2025 Strategic Plan, so the following scale was used:

1 = No alignment; 2 = Little alignment; 3 = Potential for alignment; 4 = Good alignment; 5 = Strong alignment.

For the desirability construct it was important to know how clear the evidence was that each business model was able to meet the needs of industry stakeholders. Therefore, the following scale was used:

1 = Unclear; 2 = Somewhat clear; 3 = Some evidence; 4 = Good evidence; 5 = Evidence from several sources.

3.4.1.5 Surveys

3.4.1.5.1 Business model options survey

A business model options survey was designed and administered to the LDL advisory committee for the purpose of identifying trends on business model options (see Appendix 9.2). The sample size was too small to generalise the findings to the whole red meat industry population. Sampling was not random but selected from previous ISC contact lists. The survey was based on the constructs in the business model matrix which enabled comparison between the two data sources. Statements under each construct were slightly adjusted for industry.

3.4.1.5.2 Research survey

A research survey was also developed and completed by the ALMTech group, LDL advisory committee, and producers engaged through licenced processor's suppliers, ISC's Facebook and the MLA Markets and Insights e-newsletter. The survey covered questions on price grids, aggregated data insights, sharing information and specific producer questions (see Appendix 9.3).

3.5 Participants

Specific groups were strategically chosen as those who would contribute to the objectives of the project (see Table 1 and Table 2).

Table 1 Project participants

Data source	Participants	Number of participants
Focus group	LDL Processor Advisory Group	11
	LDL Producer Advisory Group	11
	A Sheep Steering Committee	11
Semi-structured conversations	MSA EEQ Forums in QLD, NSW, SA, VIC, TAS	20
Survey	Combined LDL Advisory Group	20
Research survey[1]	ALMTech group	15
	Facebook link to engaged producers	75
	MLA Markets & Insights e-newsletter advisory committee	

Table 2 Focus group participants

Producer Focus Group	**Processor Focus Group**
Organisation	**Organisation**
UNE	JBS Southern
Sheep Producers Australia	ACC
Producer	NH Foods (Wingham)
Producer and consultant	NH Foods (Wingham)
NABRC and Paraway Pastoral	Gundagai Meat Processors
Producer	NH Foods (Wingham)
Producer	Coles
Producer	UNE
ALMTech	ALMTech
MSA	MSA
MSA	MSA

[1] Total of 19 survey responses from ALMTech group and 75 from the Facebook link, however 4 and 10 of these responses respectively were disregarded due to incomplete or invalid responses.

3.6 Analytic strategy

3.6.1.1 Qualitative – thematic analysis

A significant amount of qualitative data (documents, focus groups, conversations) was produced during the project and converted into documents that could be analysed. A step-by-step process was followed and consisted of; a) preparing and organising data; b) exploring and coding the data; and c) using codes to develop themes. The codes were developed prior to analysing the data and were developed from the design-led innovation method. The entire qualitative dataset for the project was analysed using the codes in Table 3.

Table 3 Project codes

Desirability	Feasibility	Viability
How satisfied is the end user?	How easy is your innovation to implement?	What is the commercial model required for successful adoption of the innovation?

3.6.1.2 MoSCoW prioritisation

Key findings from the qualitative dataset were prioritised by the Project Consultants using the MoSCoW method (Cleg & Barker 1994). The MoSCoW method has four criteria for prioritisation:

- Must have - critical to the current delivery timebox for business model success. If any of these are not included the future LDL will be considered a failure.
- Should have - important, but not necessary for delivery in the current time box.
- Could have - desirable but not necessary and could improve user experience. These will be included if time and resources permit.
- Would have - agreed by stakeholders as least critical and lowest pay-back items, or not appropriate at the time.

3.6.1.3 Design criteria

Having analysed the qualitative findings and prioritised them using the MoSCoW method, design criteria using the business model canvas was developed to inform the future feedback business models. The design criteria are the key input to future business model options. This involved mapping the prioritised findings against the nine elements of the business model canvas (Strategyszer, 2019). The nine elements of the business model canvas are:

1. Value propositions;
2. Customer relationships;
3. Customer segments;
4. Channels;
5. Key partners;
6. Key activities;
7. Key resources;
8. Cost structure; and,
9. Revenue streams.

3.6.1.4 Business model and value proposition development

Following the development of design criteria and mapping to the nine elements of the business model canvas, an ideation process was undertaken. This began with refining the key value propositions and searching for similarities and differences within the design criteria. Project team members held multiple individual and combined brainstorming sessions, which involved rounds of analysis and synthesis of ideas (See Fig. 4 for ideation). These sessions were formalised into final business model canvases and written up as three business model options.

Fig. 4 Ideation for business model and value proposition options

3.6.1.5 Quantitative analysis

3.6.1.5.1 Producer responses to research survey

Quantitative data was collected from the research survey (See Appendix 9.3 for survey questions). 22 out of 25 questions in the survey had a quantitative response. Due to the survey being completed by some participants that were non-producers, some of the respondent's answers had to be ignored for the purpose of the analysis. Non-producers were considered those that either specifically noted this in any of the answers where free text could be written or those that did not complete anything past the first two questions.

Some questions in the survey were in relation to other LDL R&D projects, therefore not all results were summarised as part of the analysis. The results with specific insights relating to future feedback mechanisms for industry were summarised as a percentage representation of producer responses. There were three different types of representation of results from producers:

1. Representation as a % of all producers who responded to the survey;
2. Representation as a % of all producers who responded to the survey and answered yes to selling their livestock directly to a processor; and,
3. Representation as a % of all producers who responded to the survey and answered yes to having previously used LDL.

Where a different representation of producers was used, a footnote was documented in the table summary.

The findings were grouped as per the themes which had been identified in the early phase of the project. In addition to this, supporting graphs and charts were generated to highlight key insights and to discuss additional qualitative findings based on the survey. The survey allowed respondents to provide some open-ended responses to six questions in total, therefore some qualitative research has also been analysed from the survey.

3.6.1.5.2 Business model ratings

Quantitative data collected for the business model matrix and the completion of the business model survey were analysed together. The business model matrix was first completed independently by four people from ISC and Greenleaf Enterprises (Project Consultant). An inter-rater reliability calculation and standard deviation was completed to calculate the percentage of agreement and spread of scores between the four people. The project members progressively rated the seven constructs and their sub-items for each of the four business models. There were 23 items related to the *impact* of business models and 23 items for the *design confidence* level of the business models. Across the four business models, 184 items were rated on a 1-5 scale. Scores were totalled and averaged for each construct and then totalled for all seven constructs to provide and overall business model score. Total scores for each business model were linked through to a summary sheet in the matrix. A radar graph was used to display the overall construct results and a stacked bar graph for the overall business model results.

Following the completion of the business model options surveys by the LDL advisory committee, the data was integrated with the business model matrix for analysis. Combined analysis was possible because the results were based on the same constructs and statements/questions as those rated by the project team.

4 Results

The results are presented as they relate to each of the data sources:

- Documentation;
- Focus groups;
- [SWOT]
- Research survey; and,
- Business model matrix.

4.1 Documentation findings

To determine some of the underlying drivers and issues for future feedback mechanisms, several documents were consolidated to inform the industry consultation phase of the project. These included the 2017 Review of Livestock Data Link (V.LDL.1702), the IS2025 Strategic Plan (Integrity System 2025 and Beyond), the backlog requests for the current LDL (provided by ISC) and the usage data for the current LDL (google analytics provided by ISC).

The key value propositions of the current version of LDL for producers were identified as:

- Compliance to target market pricing grids;
- Grid comparison;
- Basic business reporting for feedback on farm; and,
- Disease and defect feedback on farm.

The overall results from documentation are summarised in Table 4.

Table 4 Summary of findings from document review

Key findings for stakeholder requirements		Future Feedback Impact	Document Source
All Users			
Feasibility	Multiple methods of interfacing with LDL are required for wider user engagement and adoption *(Customisable dashboards, enhanced analytics, integration of third-party apps, push notifications, automated links etc).*	Opportunity	V.LDL.1702
Producers			
Desirability	Current LDL value proposition fits with processor need over producers and does not guarantee high producer adoption.	Opportunity	V.LDL.1702
	1-2 times of use per year for producers is not a strong enough value proposition to routinely use LDL.	Opportunity	V.LDL.1702
	Producer engagement has been insufficient to generate a desire to connect.	Opportunity	V.LDL.1702
	Producers highlighted desire to be able to 'compare' different price grids between processors.	Opportunity	V.LDL.1702
	There is a decline in new user accounts this year for LDL.	Weakness	Section **Error! Reference source not found.**
	Adoption rates are estimated at 4.25%	Opportunity	Section **Error!**

			Reference source not found.
Feasibility	Not all producers have capability to enter price grids themselves.	Threat	V.LDL.1702
Viability	Producers ultimately need a pricing functionality to determine 'lost dollar value' of non-compliance or animal health issues.	Opportunity	V.LDL.1702
Processors			
Desirability	Some processors are already developing data analysis and feedback systems through commercial solutions providers.	Opportunity & Threat	V.LDL.1702
	Some companies choose not to share data (other than legislative requirements).	Threat	V.LDL.1702
	If Processors feel that LDL comparison tool influenced producers to supply elsewhere or that grids were inaccurate, there would be a negative fallout (requires strong communication strategy from MLA).	Threat	V.LDL.1702
	Supplier ranking is a highly visited page for processors.	Strength	Usage Data
Feasibility	N/A		
Viability	N/A		
ISC / MLA			
Desirability	ISC holds a key role within industry as trusted integrity data custodians.	Strength	V.LDL.1702
	ISC wants to ensure feedback is simple to use & interact with.	Strength	ISC Strategic Plan
	ISC recognise data sharing is fundamental to create value for industry and are planning to create platforms to connect value chain participants and their data.	Strength	ISC Strategic Plan
	Some companies choose not to share data.	Threat	V.LDL.1702
Feasibility	Complete rebuild of LDL is required.	Weakness	V.LDL.1702
	Robust API network would increase viability of LDL.	Opportunity	V.LDL.1702
	Data model is not feasible in present form.	Threat	V.LDL.1702
	A new data ownership model is required.	Opportunity	V.LDL.1702
	Variability in user needs and analytic capability – means different functional requirements.	Threat	V.LDL.1702
	Complexity of price grids between different animals and producers makes the system complex to build / align.	Opportunity	V.LDL.1702
	Several other data sources are required to deliver value for profitable decision-making.	Opportunity	V.LDL.1702
	Real-time monitoring & tracking of livestock is a priority for ISC.	Opportunity	ISC Strategic Plan
Viability	Industry is unlikely to get an ROI if LDL only delivers enhanced versions of current application layer.	Weakness	V.LDL.1702
	The work required to create a functional data permissions framework would be longer than a year and require significant funding.	Weakness	V.LDL.1702
Solutions Providers			
Desirability	Commercial companies are already developing data analysis and feedback systems for their own supply chains.	Opportunity & Threat	V.LDL.1702
Feasibility	ISC wants to enable innovation by allowing flexibility and adaptability in the integrity system.	Opportunity	ISC Strategic Plan
Viability	Speed and commercial drivers make innovation and adoption more likely if driven by commercial providers.	Opportunity	V.LDL.1702

4.2 Focus group findings

Qualitative findings presented in this section are based on producer and processor responses to structured questions during focus groups and an MSA EEQ producer forum. Additional quantitative results are also included from the confidential survey responses at the focus groups (See Appendix 9.1). Responses were coded according to the themes identified. Findings below showed where producers had similar responses and where they had different perspectives on how feedback mechanisms can work in the value chain. It is also important to note that there is overlap in some of the themes identified. The results have been summarised under the sub-themes for each key theme. Direct quotes and extracts are italicised in this section.

4.2.1 Integration theme

4.2.1.1 General data sharing

Participants were asked, *what is the purpose of LDL?* Eight out of ten producers understand the purpose of LDL to be related to integration and the sharing of data. Responses repeatedly mentioned the importance of *collaboration*, the *linking of the chain*, and the *sharing of data*. A representative extract from one producer,

> *"The purpose of LDL is to facilitate sharing of carcase data along the supply chain*."

Finding: LDL helps with interconnection along the value chain.

4.2.1.2 Centralised repository and data upload point

Processor perspectives tended to emphasise the value of having a centralised repository to help with *producer grid compliance*. Eighty-three percent of processors indicated that *entering grids is a friction point for producers*. Both producers and processors identified LDL as a *central repository*. Processors also emphasised the importance of a *single data entry upload* point using a *consistent data format*.

Finding: LDL provides a central repository for sharing grid compliance information.
Finding: There is a preference for a single data upload entry point in a consistent format.

4.2.1.3 Engagement techniques

In different ways, focus group participants were asked how to increase the use of LDL. Producers repeatedly spoke about '*integrating with existing workflows'* and integrating with on-farm systems. They also mentioned using '*notifications to say you have data uploaded'*. Processors said that participation will increase if LDL is '*easier to use for all ages.'* Processors also discussed '*using alerts/notifications to help increase use of LDL'*. They also recommended building an app and embedding LDL information into on-farm daily workflows.

Finding: Alerts and notifications are likely to increase engagement with LDL.

4.2.1.4 Solution providers

There was strong support from producers for LDL to provide open APIs to software companies using an adequate permissions framework that allows data owners to control data access. They see benefit in allowing the integration of LDL data with on-farm management systems for the purpose of *driving Lean Meat Yield (LMY), Eating Quality (EQ) improvement by certain pastures and soil types changing animal health*.

Open APIs were also viewed as a *modest way to drive adoption through increased efficiency and further development*. Processors tended to be more cautious about LDL integrating open APIs, suggesting the need for strong *governance and a case by case approval process*.

Producers (70%) and processors (64%) were also found to be concerned about receiving feedback from multiple channels. This is not a simple problem to solve because producers have different perspectives about which channel best suits their situation. This provides support for integrating solution providers through open APIs so that producers can make choices about which solution provider they believe best fits their context.

Finding: There is support for on-farm solution providers to integrate with LDL.
Finding: Need for governance and guiding principles.

4.2.2 Trust & permission theme

4.2.2.1 Willingness to share

However, when producers were asked '*who do you trust to give advice on how to improve livestock*', the top three responses were *consultants, producers* and *agents*. There was no mention of any data driven feedback in any response. And yet, LDL is promoted as a tool that helps producers to understand management practices to improve performance and non-compliant issues on-farm.

Based on these findings, it appears that LDL is not helping producers with the top three factors they consider when making on-farm decisions – *profitability, pasture and time*. However, 100% of producers and processors agreed that LDL needs to increase its communication and extension services.

Finding: LDL was not identified as a contributor for on-farm decision making.
Finding: Future versions of LDL need to find ways of integrating trusted actors in the value chain.

Even though this research shows that producers do not trust LDL feedback for on-farm advice, 100% of producers indicated that they are interested in giving processors (or the next value chain participant) information. All processors also see benefit in providing feedback to producers. Results indicated a willingness to share information if there are permission controls.

Finding: Both producers and processors see value in providing data to each other.
Finding: Permissions functionality is required in LDL.

4.2.2.2 Financial value transparency

Participants were asked whether LDL should include financial values instead of discounts. Producers were found to be 64% in favour and 36% unsure. Processor results were not conclusive, with 27% yes, 18% no and 55% unsure. Results indicate that processors may have concerns about how producers and others in the value chain compare financial impacts between competitors' pricing grids. The fact that only 18% of processors responded *no*, shows that there may be a change in thinking on displaying pricing impacts. Public availability of some processor grids and their display in various apps further validates this finding, for example, the application 'AgCentre' (https://www.agcentre.com.au/).

Finding: There is increasing support for integrating financial value transparency in LDL.

One processor was found not to have confidence in the data security of LDL. This was not a representative finding from across participants, however it is an important issue for the future of LDL which was highlighted in the previous review in 2017 (p.29 of V.LDL.1702 Final Report). For example:

> *A producer (first PIC) decides to have their stock custom-fed at a feedlot, or on agistment at another person's property (second PIC). This means that there is a PIC change, despite no change in ownership. The information provided through LDL is only visible to the vendor (second PIC), despite that they do not own livestock.*

Finding: The current LDL platform is not capable of identifying the progressive ownership of data along all supply chain pathways.

Results also confirmed that *all* processors were not concerned with producers knowing whether they participate or not in LDL. This would seem to indicate that processor involvement in LDL is not a factor that influences their ability to procure livestock. This may change if LDL was redeveloped as a mutually beneficial platform between producers and processors, where producers could compare data from multiple processors.

4.2.3 Regional insights theme

4.2.3.1 Benchmarking analytics

Several processors highlighted the value of aggregation and benchmarking they derive from LDL, stating that the purpose of LDL is to *aggregate data for industry research and to allow benchmarking and value add through aggregation to processors.* A representative quote from one processor:

"We need more consistent benchmarking and insights, so no matter what the system, the results are giving the same message."

Processors are clearly benefitting from regional insights and aggregation of producer data for benchmarking suppliers. These insights provide confidence about expected level/type/quality of supply and help to inform procurement strategies at a regional level. Discussions during the processor focus group also indicated that LDL may be helpful in the provision of animal health feedback at a regional level.

Finding: Regional benchmarking is a clear value proposition to processors.

One producer suggested using LDL to help establish *regional benchmark collaboration to on-farm performance*. Similar suggestions were made by producers when they were asked how to drive adoption including, *get other feedback from regional groups* and *needs to be localised to area of access for feedback*.

When processors were asked about how to encourage producers to check feedback after every consignment, they suggested that, *feedback be relative to others in the district* and to *form producer*

groups and support their use of LDL. This suggests that LDL may benefit from including social value proposition within the system to help producers connect around regional performance.

Finding: Producers value regional insights.

Producers also recommended that an *easy quick glance dashboard, app* be developed to encourage them to check feedback more regularly and that *processors should put unique information into LDL that they can't get anywhere else*. This suggests that the current information provided to producers is not creating enough value. Clearly processors value the current analytic capability of LDL for regional insights, however the same analytic value is not there for producers.

Finding: Producers need LDL to provide relevant analytic capability.

4.2.3.2 Contribution to decision-making

Results on the purpose of LDL revealed that processors have a better value proposition than producers. A single processor can benchmark the performance of all their suppliers over time and predict future value and volume. Whereas, a single producer is unable to compare the performance of multiple processors and or predict future value with any confidence. It shows that LDL is not a mutually beneficial platform. This inequity is further complicated by the fact that LDL platform is funded by producer levies

Finding – more equitable funding models can be explored

4.2.4 Focus group responses to future LDL scenarios

During the focus groups, participants were presented with five scenarios and asked for their preferences on each. Participants rated the scenarios on a 1-10 scale (scenarios are detailed in Table 5).

Table 5 Future scenarios proposed to focus groups

Scenario	Title	Key points
One	Sit tight	• Continue with current version • Wait for other ISC projects and initiatives to replace functionality
Two	Open API	• Redevelop database and application to facilitate open application programming interface (API) • Allow solution providers to innovate and provide 'above base' packages for producers • Investigate sustainable value proposition for solution provider segment
Three	Drive adoption	• Enable adoption internally and externally through increased communications and extension • Reach 10% adoption from PICs with accessible feedback

		• Continue similar funding model and reallocate larger proportions to extension
Four	Commercialise	• Define the intellectual property belonging to MLA / ISC and licence it to industry and solution providers • Re-purpose resources into other priorities
Five	Phase out	• Relinquish MLA / ISC's direct involvement in feedback • Re-purpose resources into other priorities

Analysis of the results showed option two and three were rated the highest (see Fig. 5). The result supports the assumption that the redevelopment of LDL needs to provide greater adoption potential and opportunities for innovation.

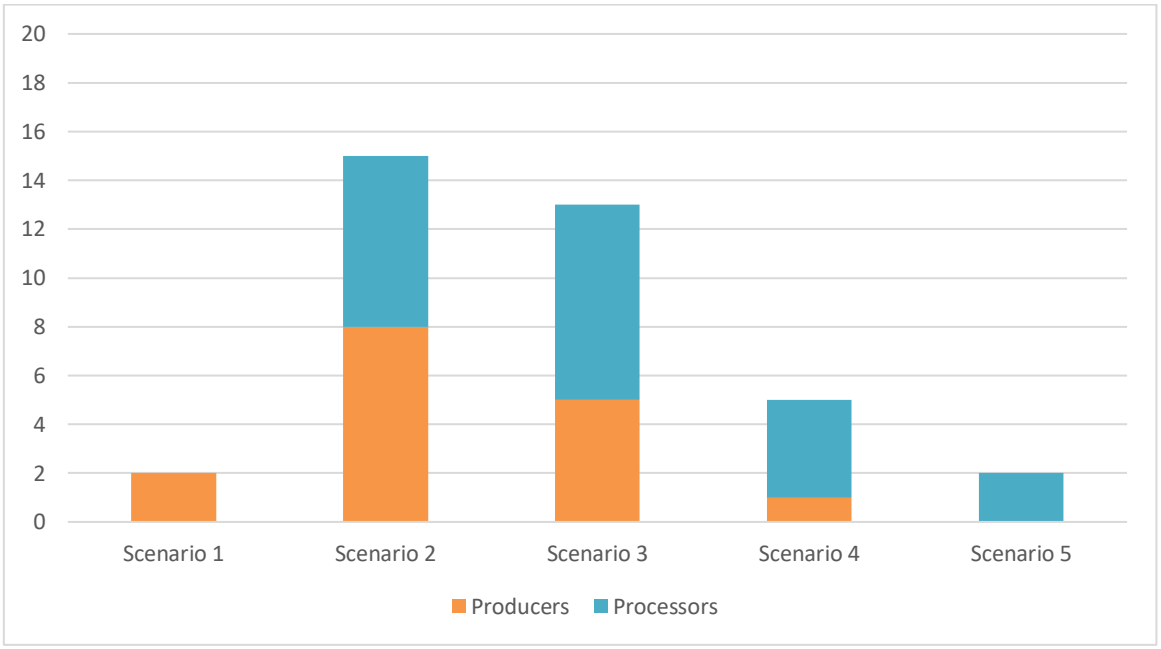


Fig. 5 Focus groups' ratings of proposed future scenarios

4.3 Prioritisation of qualitative results (documentation & focus groups)

The key findings presented above were prioritised using the MoSCoW method in Table 6 (Cleg & Barker 1994). The findings have been slightly reworded for clarity.

Table 6 MoSCoW prioritisation of thematical consultation findings.

Priority level	**Must-have**	**Should-have**	**Could-have**	**Would-have**
Integration Findings				
Interconnection along the value chain	✓			
Central repository		✓		
Single data upload point (for processors)		✓		
Consistent data format		✓		
Alerts and notifications		✓		
Open APIs for solution providers		✓		
Trust & Permission findings				
Governance & guiding principles	✓			
Allow trusted actors in the value chain to be users.			✓	
Include feedforward mechanisms		✓		
Financial values included for transparency		✓		
Ownership & permission model	✓			
Regional Insights findings				
Regional benchmarking for processors	✓			
Regional insights for processors	✓			
Relevant analytic dashboard / capability for producers	✓			

4.4 Research survey

75 producers completed the LDL research survey (see participants in method section).The survey findings have been summarised in Table 7 based on the key themes identified in prior consultation as well as a general section that highlights key information in relation to the survey, price grid confidence and LDL adoption.

Table 7 Research survey results

Survey Insights	Result
General	
Number of survey participants	75
Sell direct to processors	72%
Have used LDL previously[2]	39%
Have created a price grid in LDL[2]	43%
Consider it important to know price difference of consigning to a different grid[2]	98%
Consider it useful to know the price benefit of changing on-farm practice to improve grid compliance[2]	100%
Producers that would consider it useful to compare compliance between consignments	89%
Integration	
Use on-farm management systems or applications to record information about livestock	76%
Would like to receive carcase, disease and defect feedback/insights in their on-farm management system	73%
Consider it important to receive this data (within on-farm management system) to help with better decision making	76%
Trust & Permission	
Use an agent, advisor or consultant to help with on-farm decisions	47%
Use of trusted stakeholder/s for at least some of their decision making (on-farm practices and/or price grid marketing)	84%
Use of trusted stakeholder/s for help when targeting a price grid (market specification) [2]	94%
Willingness to anonymously share SOME or ALL de-identified information listed to help create regional insights and benchmarking[3]	85%
Willingness to anonymously share ALL de-identified information to help create regional insights and benchmarking?[3]	47%
NOT willing to anonymously share <u>any</u> de-identified information to help create regional insights and benchmarking?[3]	15%
Regional Insights	
Consider it useful to receive basic insights on compliance from producers who are directly consigning to a processor in their region	96%
Consider it useful to know the types of grids other producers are targeting in their region[2]	89%
Consider it **not at all useful** to know the types of grids other producers are targeting in their region[2]	11%
Consider it useful to compare carcase attributes and disease/defect inspections with other producers in their region	89%

[2] Result is only related to those producers that sell directly to a processor.

[3] Types of de-identified information were specifically listed in the survey for producers to select what they were and were not willing to share (See Table 8)

Table 8 Types of de-identified information to share to help create regional insights and benchmarking (survey options listed)

Production type (cattle, sheep, goats)
Number of livestock consigned
Breed type
Typical consignment periods
Carcase and disease and defect compliance

4.4.1 LDL adoption & producer decision making insights

The main reason for producers not to use LDL is because the 'haven't heard of it', followed closely because they don't sell directly to a processor (See Fig. 6). It's important to note for future feedback requirements that only 2% of producers answered that they 'don't use feedback' in their decision making. The results also showed that 24% of the producers that don't sell direct to processors have logged into LDL at least once. Of the producers who do consign directly to processors, only 29% have logged into LDL at least once. Producers also indicated that other than the price grid function, the most commonly accessed LDL function was the disease and defect reports.

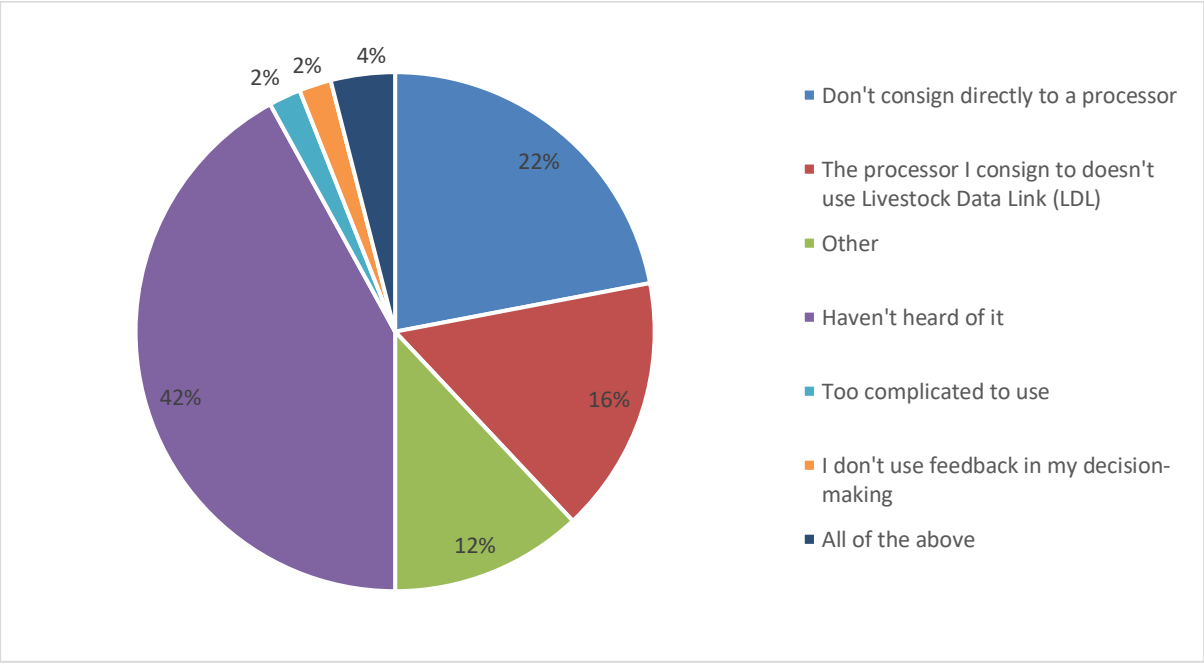


Fig. 6 Reasons for not using LDL

Results showed that only 41% of producers were very or extremely confident to target the best grid price (those that sell direct to processors, see Fig. 7). Of this, there was a difference between LDL users and non-LDL users, in that 50% of LDL users were very or extremely confident, whereas non-LDL users were only 37% very or extremely confident. The results overall suggest that LDL is generating a slight increase in producer confidence to target the best grid.

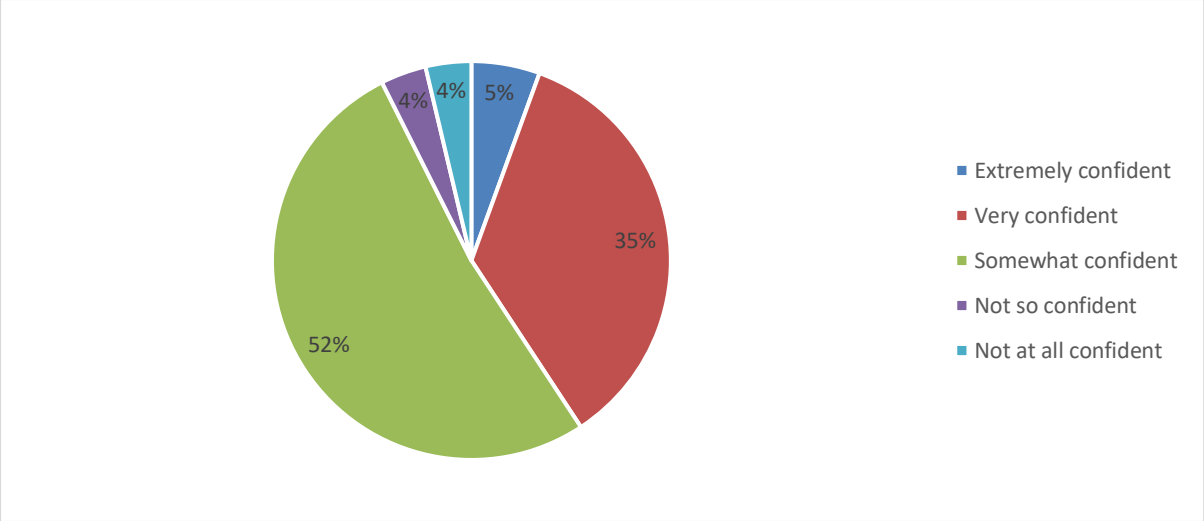


Fig. 7 Producer confidence in targeting the best price grid

Producers were asked to rank different types of information in order of their usefulness to improving compliance to price grids (see Fig. 8**Error! Reference source not found.**). The results were consistent with the findings from V.LDL.1701, with 'other information' being ranked most useful to improving grid compliance (compared to anything listed in the multiple-choice options to rank). Yet, it was not significantly higher ranked overall compared to the other choices. As seen in Fig. 8 there was a relatively well spread average ranking which suggests that different producers utilise information and feedback differently for decision making. This survey question did not ask producers to specify what the other information might be, however in a subsequent question that asked "who or what do you use to help make decisions?" producers were able to provide open-ended answers and some of the common themes in responses are shown in Fig. 9.

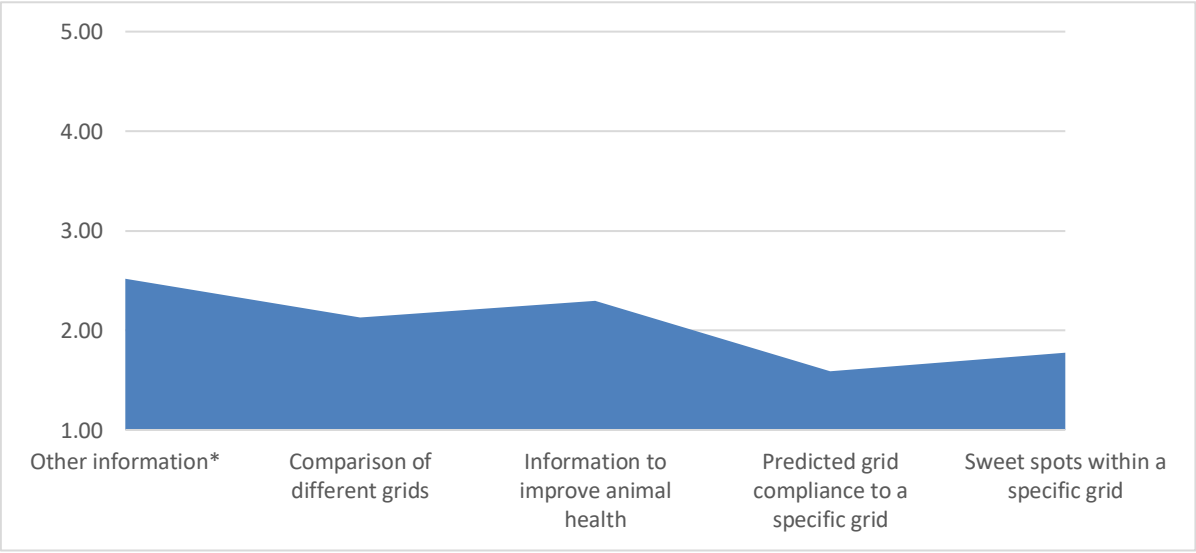


Fig. 8 Ranking of information usefulness to improve grid compliance

Fig. 9 Themes of what information producers use to help make decisions

Producers that sell direct to processors were asked to indicate who they were most likely to ask for help when targeting a price grid (market specifications). Multiple choices could be selected, or they could select other. The most common responses were that producers trust livestock buyers (processors) and livestock agents. All producers were asked whether they use an advisor or consultant to help with decisions to improve their livestock, for which 47% answered yes. For those that answered no, they were asked to advise who or what they use to help make decisions. This open-ended question resulted in the themes in Fig. 9 in addition to comments about talking with other producers and using experience to make decisions. Based on all 3 of these questions mentioned, the trusted stakeholders for decision making have been identified in Fig. 10.

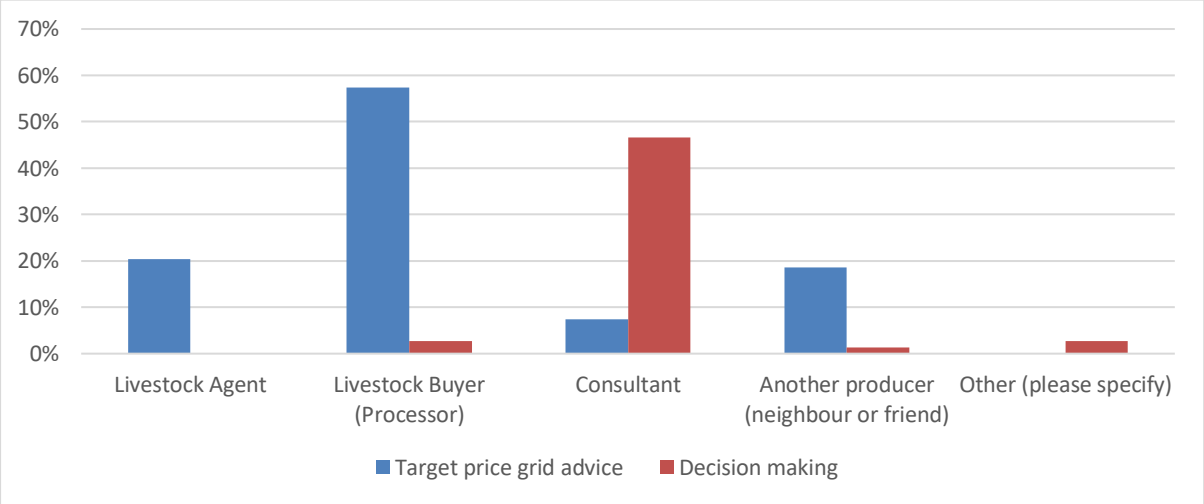


Fig. 10 Trusted stakeholder for decision-making

4.5 Business model option results

Three business model opportunities for the future of LDL are presented in this section. The names of the models presented are:

- Status Quo Plus
- Network Effects
- Proactive Analytics

4.5.1 Status Quo Plus

This option proposes to keep LDL as is but add functionality changes to the application layer of the system and increase the level of support and training for producers. A business model canvas was developed for this option and is included in Appendix 9.4. The option is discussed below.

4.5.1.1 Desirability of Status Quo Plus

4.5.1.1.1 Value proposition

LDL already provides some important value propositions for processors (Fig.). This finding was established in previous research as well as within the recent producer and processor focus groups. Processors also recognised that they currently gain more value from LDL in its current state than producers, due to the ability to benchmark producers. Consequently, the primary focus of this business model is to increase value for producers, by providing standardised dashboards with aggregated regional insights (see new value propositions in Fig.).

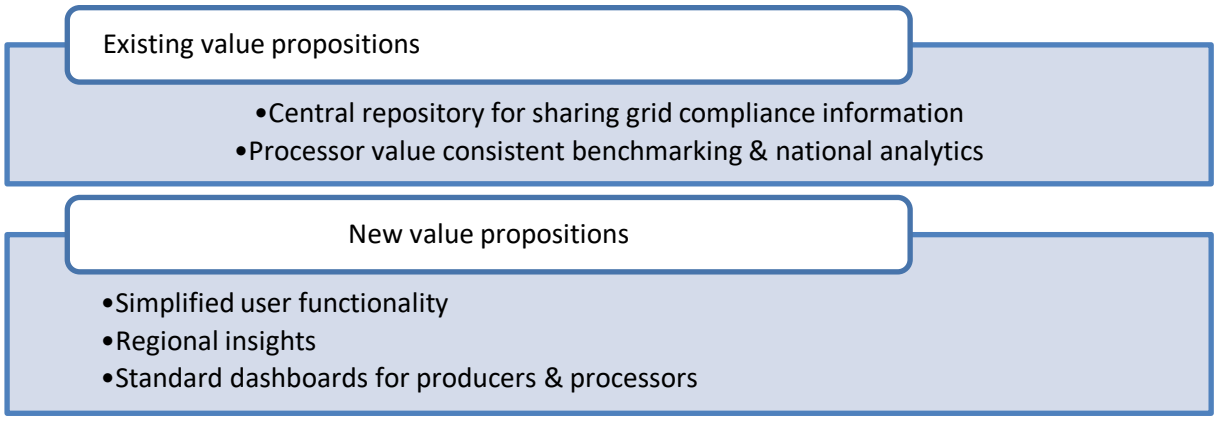


Fig. 11 Value propositions of the Status Quo Plus model

In this business model, the critical LDL customer segments consider ISC as a trusted data custodian (see Fig. 10). This relationship is essential for ISC to maintain so that data continues to be shared and to strengthen value chain partnerships. Establishing some basic alerts via push notifications is recommended as a new channel so that users can be made aware when new data is available. This could be in the form of SMS or email messages with a link to the LDL website login.

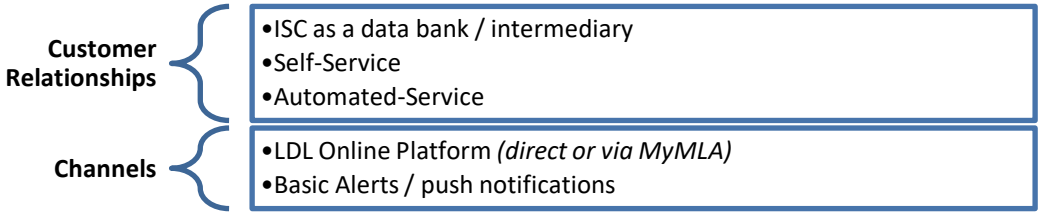


Fig. 10 Customer relationships & channels of the Status Quo Plus model

4.5.1.2 Feasibility of Status Quo Plus

LDL currently partners with the MSA, NLIS, AHA and NSHMP databases to combine data for compliance and animal disease and defect feedback. These partnerships must be maintained and the integration between these databases is critical for real-time feedback to producers. LDL's capability to combine

data from multiple sources to provide insights to industry is a critical value proposition that separates it from commercially available feedback tools. In this business model option, it is important that LDL maintains the key activities below:

- Govern LDL terms of use;
- Provide training & support to LDL users;
- Allow processors to benchmark suppliers; and,
- Continue to allow users to determine pricing impact of non-compliance.

In addition to LDL maintaining the above activities, it must develop the user interface further to be more intuitive and allow simplified aggregated insights and regional insights (see **Error! Reference source not found.**). Exactly what this might look like is not within the scope of this report. However, without any changes to the current dashboard or providing some regional insights for producers it is unlikely that adoption rates will increase. Any changes will require a collaborative communication plan to realise this increase.

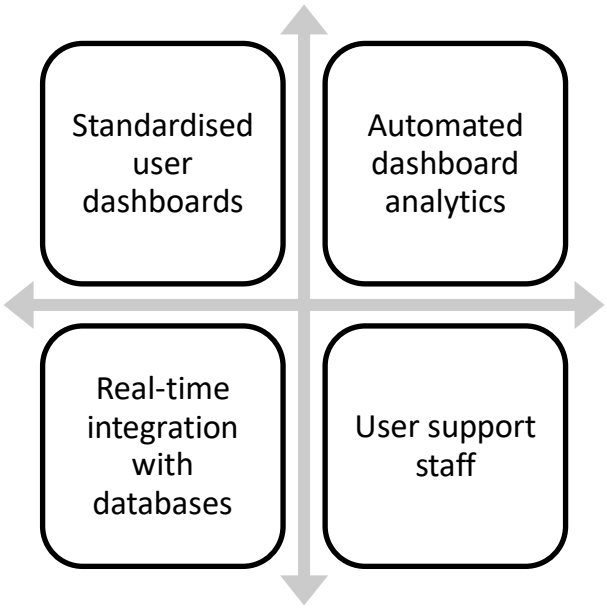


Fig. 11 Key resources of Status Quo Plus model

4.5.1.3 Viability of Status Quo Plus

Implementing the Status Quo Plus option is not expected to be a significant cost due to only a few additional functions. This may mean it does not deliver as high a value proposition as the other business models options. Costs to implement would be impacted by the interfaces required in the new dashboard as well as additional costs for communication and training for industry users to adopt the new interface. There may also be some additional cost to develop aggregated insights. Given that the current LDL support team has a build-up of back-log user requests, it is also critical that consideration is given to additional resources to provide user assistance into the future.

Revenue for this business model would remain the same.

4.5.2 Network Effects

Much of the success of newcomers to business in 21st century can be attributed to the positive network effects of their technology platform business models – think Twitter. As more people add (feedback, images, likes ~ data) to a platform, the more useful it becomes to members of the network (Parker et al., 2016). Typically, these new business models give rise to products and services that are more affordable, globally accessible and simpler to use. In its current format, LDL does not function as a network. Rather, it is reflective of a 20th century business model where large stakeholders (corporations) contribute all information that impacts smaller players (individuals or small groups). Findings from consultation indicated this kind of situation is present in the red meat industry. The proposed Network Effects option was developed based on consultation with industry stakeholders who described their pains and gains and daily workflow. These were summarised into three themes:

- Better integration of digital solutions;
- Increased trust and transparency; and
- Regional insights.

On this basis, it is proposed that LDL (or rebranded version) be established as an enabler for local networks of producers, livestock agents, vets, feed lotters, backgrounders and processors. Each stakeholder in the network will be able to control their own data and choose who they share it with. To enable the Network Effects option to be implemented, ISC will need to provide API integration for multiple solution providers in the commercial market to develop and provide technology platforms. It is envisaged that solution providers will be able to provide either new platforms or extensions to existing on-farm solutions. These types of solutions should stimulate innovation and promote feedback and feedforward (related to compliance and animal health) for users and create a positive overall network effect (Fig. 12). See Appendix 9.5 for the Network Effects business model canvas.

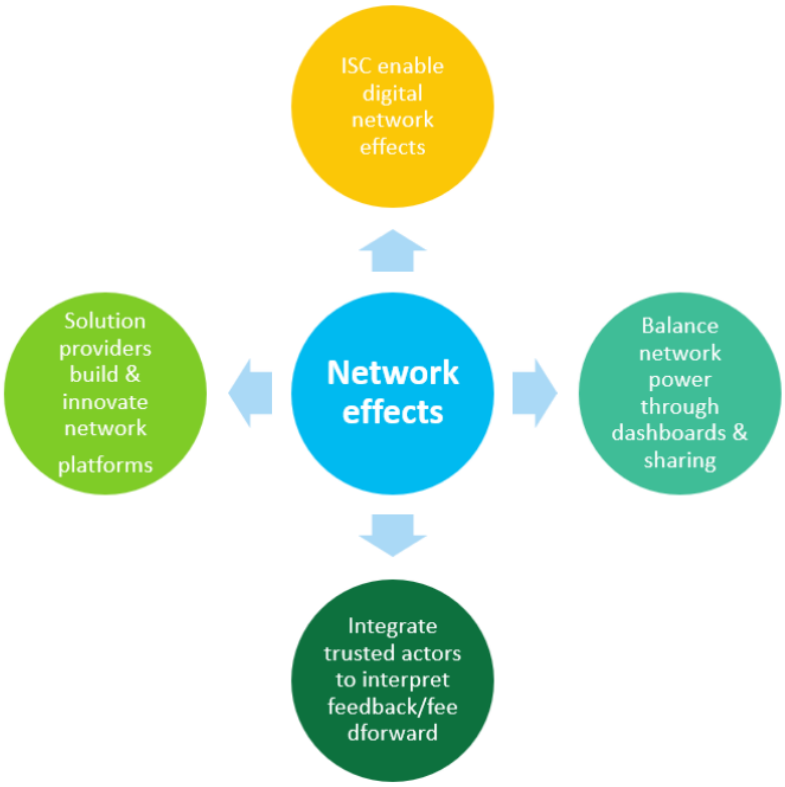


Fig. 12 Network Effects option

4.5.2.1 Desirability of Network Effects

Desirability of the Network Effects business model addresses how satisfied users are with the proposed option by identifying the customer segments, value proposition, channels and customer relationships.

Customer segments for the network opportunity have the jobs, pains and gains relevant to promoting/selling the value proposition. The critical customers are producers, producer networks and processors (see Table 9). Solution providers are enabled through integration with the ISC data platform. Whereas, the solution providers have their own technology platforms and dashboards to connect with the network customers.

Table 9 Customer segments of Network Effects model

Value proposition provider	**Primary customer segments**	**Secondary customer segments**
ISC/LDL	Processors Producers Producer networks Solution providers	To be determined
Platform solution providers	Processors Producer networks Producers	Saleyards Livestock agents Feedlots Grass Finishers Meat Traders Vets

The network effects are the main value proposition to address customer pains. This can be achieved by:

- Engaging networks of producers and industry stakeholders in feedback loops;
- Allowing more direct involvement of trusted industry stakeholders for solutions (e.g. vets);
- Aggregating insights to share across the network with relevant partners;
- Creating regional benchmarking within and between networks;
- Enabling regional networks to improve performance; and
- Encouraging feedback loops all year round.

For the Network Effects opportunity to have the best chance of success, there are three supporting elements proposed in Table 10.

Table 10 Support elements of the Network Effects opportunity

Data sharing & permissions	Integration & user functionality	Profitable decision making
• User/owner defined permission settings to control who can see information • Ability to request additional information from network actors to assist with decisions	• Consolidation of all data & analytics for users to a consistent format • Customised dashboards for producers, processors and secondary customers	• Allow users to track on-farm or in-plant costs against transaction outcomes to determine profitability (solution provider integration and IoT) • Enhance livestock management & decision support based on specific insights

The best channels to reach and acquire the customer segments include:

- ISC enabling API integration between the LDL database and network solution providers that is governed by data ownership and permissions models;
- Solution providers delivering feedback/feedforward via application dashboards and push notifications; and
- Producers and producer networks/trusted actors (including ISC) presenting regional feedback at workshops, webinars and other communication methods.

Developing the right type of relationships to retain customers is essential to the success of the Network Effects opportunity. In this way, it is proposed that ISC positions themselves as an enabler and not a commercial solution provider. Adopting this approach will make clear that ISC's purpose is to facilitate mutually beneficial network outcomes as a trusted custodian. Moreover, ISC will establish itself as an enabler for solution providers to create new feedback and decision support innovation. This relational approach allows solution providers to create more automated feedback for decision support for producers based on collection of on-farm and industry data. There are also opportunities for IoT and other technologies to be integrated with solution provider platforms to create additional value for networks.

4.5.2.2 Feasibility of Network Effects

Feasibility addresses how easy the Network Effects option is to implement by identifying the key resources, activities and partners. Over time there will be different types of resources needed to realise the network effects business model, however at this stage the key resources are:

- Base package platform and user interface (ISC) – it will be important that ISC provides the core modules of the LDL technology, especially for producers will do not currently use software providers for on-farm management.
- ISC resources related to analytics for regional and individual aggregated insights and real time API integration with the LDL database for solution providers; and
- solution provider resources including customised user dashboards for different types of users and user and application support.

The right capabilities need to be in place to handle the most critical activities to create the network business model value proposition. The key activities outlined are presented below in Table 11.

Table 11 Key activities of Network Effects opportunity

ISC / LDL	Solution Providers	Processors	Producers
• Develop permissions model • Provide governance & guiding principles • Provide solutions providers with timely regional insights • Enable API integration	• Allow sharing permissions of user data (adhering to permissions model) • Allow users to request data from network • Provide a customised format for feedback • Allow processors to receive feed-forward • Allow producers to compare processors & profitability between grids	• Single source upload for ISC databases • Manage permission model for their data (i.e. approve solution provider to view data.)	• Upload on-farm data for feed-forward • Determine profitability of decisions • Manage permission model for their data (i.e. approve solution provider to view data.)

The key partners who are likely to be willing to work with ISC to create and deliver the Network Effects value proposition are:

Solutions providers:

- Provide LDL user interface in commercial context
- Solutions providers are a catalyst for regional network interconnection, feedback & feed-forward

Producer networks:

- Help LDL to implement regional insights & increase adoption
- Help scale feed-forward & innovation with solutions providers

Trusted industry stakeholders:

- Vets
- Agents
- On-farm consultants
- Industry organisations

4.5.2.3 Viability of Network Effects

Consultation findings show there is support for continuing to use producer levies to fund feedback to industry and other funding mechanisms should be considered. It is proposed that the levies be used for the redevelopment of the LDL database and API integration with solution providers. Solution providers will be able to charge a percentage of their subscription fees to cover development costs. There may be a range of new costs associated for users with the Network Effects option including:

- API implementation;
- User support costs;
- Database/software development to aggregate insights;
- Communication and extension work; and
- Subscription for access to additional services.

4.5.3 Proactive Analytics

There is potential for an explosion of digital products and services across the red meat value chain that could help to create new value through the provision of personalised, timely and value-driven feedback. Digital signals abound through internet connectivity and digital sensors (e-tags, on-farms sensors, weather, DEXA etc.). Combined with analytical capabilities and industry databases there are opportunities for new types of feedback and feedforward for decision support. For these technologies to be widely adopted there needs to be significant relationship changes between organisations and customers, together with new approaches like the Proactive Analytics option proposed below (see Appendix 9.6 for business model canvas).

A proactive digital product or service is one where organisations don't wait for a customer request. Customers' needs are already understood through digital sensors so that services can be provided when the customer needs them most – this is a proactive relationship (Kowalkiewicz & Rosemann 2016). For example, a processor is notified via a mobile device of forecasted livestock supply volumes for the next three months, or a producer is alerted to the best market price available for their livestock and situation at a point in time.

Fig. 13 Proactive Analytics model

Detecting changes in stakeholder's (producer, processor etc.) circumstances and the accompanying analytic actions for decision support, together with identifying and interpreting patterns and trends in databases is the essential activity of the proactive business model (see Fig. 13). Proactive Analytic platforms that create the most industry-wide value will have the capability to forecast events, detect significant events and act with support after an event has taken place.

4.5.3.1 Desirability of Proactive Analytics

Desirability of the Proactive Analytics option addresses how satisfied users are by identifying the customer segments, value proposition, channels and customer relationships. All customers become critical in the Proactive Analytics option because they can use advanced analytics to forecast decision making and partner with suppliers and buyers. The mapping of each customer's needs and circumstances including their jobs, pains and gains is essential to high acceptance of the value proposition. Proactive decision support is the key element of the value proposition to address user pains. This can be achieved by developing a mutually beneficial platform for sharing and requesting information to make decisions proactively. Sharing of information across a trusted network (producers, agents, processors etc.) could be predetermined by each node/actor and thereby shared instantaneously. The timeliness of information shared is also essential to the value proposition.

The best channels to reach and acquire the customer segments are:

- ISC to promote (through communication & extension) the value of proactive digital value chains with analytic capability for forecasting decisions;
- Solution providers to create digital platforms with analytic capability for forecasting decisions; and
- ISC to create a new platform with analytic capability and APIs for solution providers, map relevant digital signals and link to database to support relevant decision-making analytics.

Relationships in the Proactive Analytics opportunity transition from transactional and analogue to optimisation of resources and activities through digital for the most value. ISC will remain as an enabler and not a commercial solution provider, however they will look to accelerate their platform analytical capability and continuously innovate their solution for wide-scale industry benefit and API integration for solution providers. Adopting this approach will reinforce ISC as a trusted custodian. ISC will also lead R&D associated with the proactive opportunity which will be essential to testing and prototyping practical solutions for industry. Solution providers will focus on building innovative platforms with competitive value propositions for decision support.

4.5.3.2 Feasibility of the Proactive Analytics

Feasibility addresses how easy the Proactive Analytics option is to implement by identifying the key resources, key activities and key partners. There will be many different types of resources needed to realise the proactive opportunity, however the key resources are:

- ISC platform resources and analytics and underpinning databases; and
- Solution providers with high levels of analytic capability.

The right capabilities need to be in place to handle the most critical activities to create the Proactive Analytics value proposition. The key activities outlined are presented in Table 12.

Table 12 Key activities of Proactive Analytics model

ISC	Solution Providers
• Provide new governance & guiding principles for proactive value chains • Develop ownership & permission model • Integrate databases for industry • Build new platform • Develop high powered analytics • Aggregate insights • Enable API integration	• Build proactive analytic capability relevant to the financial decision making • Analytics to compare / benchmark processors in regions • Analytics to compare / benchmark producers in regions • Ability to monitor supply levels & additional network volumes & predicted turn off times across a regional area • Build dashboards & analytics for compliance animal health plus other relevant value propositions (e.g. integrity along the chain) • Feedback & feedforward functionality • Functionality to share & request data

The key partners likely to work with ISC to create and deliver the Proactive Analytics opportunity are the solutions providers of the analytic platforms. A range of other partners will also be needed to help identify relevant digital signals and value opportunities.

4.5.3.3 Viability of Proactive Analytics

Revenue to fund the Proactive Analytics opportunity can be sourced from producer levies and MLA Donor Company. Consultation findings in this project show there is support for continuing to use producer levies to fund feedback to industry. It is proposed that the levies be used for the redevelopment of the LDL database, application and the API integration with solution providers, as well as ramping up the analytic capability of LDL. Solution providers may be able to charge a percentage of their subscription fees to cover development costs. There should also be consideration given to whether processors and other stakeholders in the supply chain should pay for feedback/ and advanced analytics from ISC given they will all benefit from the Proactive Analytics option.

4.6 Business model matrix results

4.6.1 Industry business model score results

Due to limited timeframes to complete the experimentation of business models with industry, only a small sample of results were collected on the business model survey by the LDL advisory committee. Fig. shows the level of completion of the questions by 20 industry participants. The results show a high level of understanding of the Current LDL (SQ Impact, SQ Confidence) version (greater than 80% completion of the survey questions related to the current version). Status Quo Plus (SQ +, SQ Confidence) and Network Effects (NE) models with completion rates between 49-60%. The Proactive Analytics (PA Impact, PA Confidence) model was understood least by industry with only a 40% completion rate on the survey questions. The LDL advisory committee participated in a one-hour webinar in which each business model was explained, allowing industry to ask questions, however it is evident in the results that due to the project time restrictions this was not suitable enough to generate a clear understanding of each option. Therefore, the industry scores have been combined with the Project Consultant and ISC to present a combined result for scoring the business models.

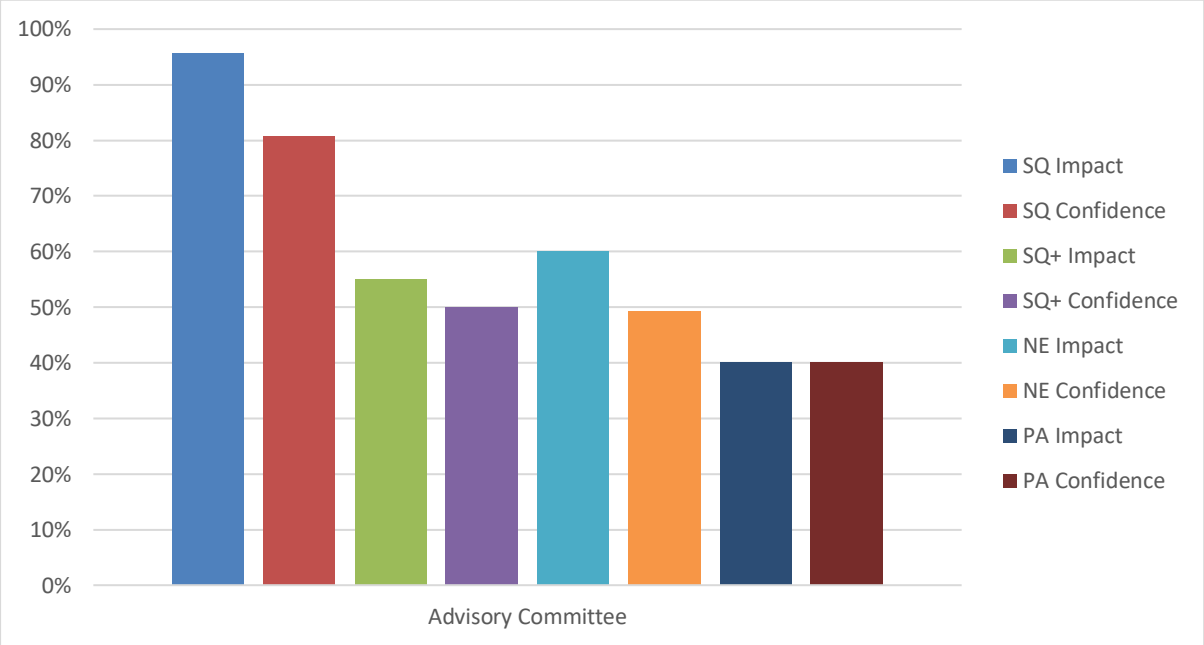


Fig. 5 Industry advisory committee completion rates of business model scoring survey

The overall combined results for business model impact showed that Network Effects still had the highest average impact rating, however, based on industry feedback it can be seen that this was very close with Proactive Analytics impact which lead the rating in four out of the seven constructs (see Fig.). Industry results showed that the Current LDL and Status Quo Plus were rated highest in terms of their viability impact.

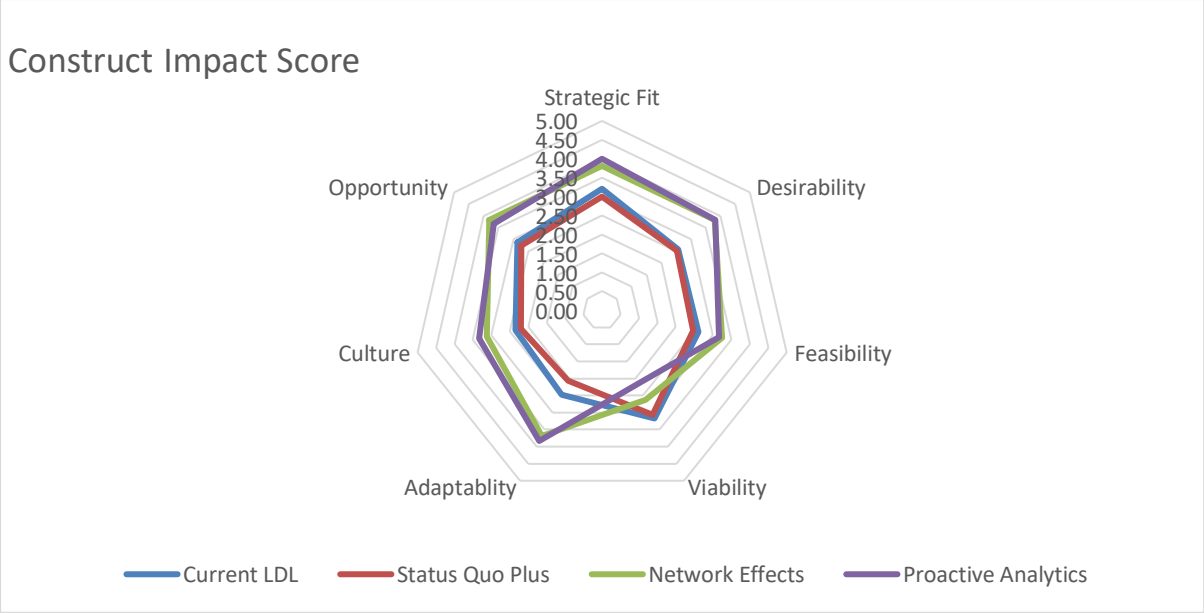


Fig. 6 Overall business model construct impact scores

Due to less questions being completed by industry in relation to confidence, the overall confidence rating is not as heavily weighted with industry feedback as the impact scores. However, the results still show that there is higher confidence in both the Network Effects and Proactive Analytics models to deliver on industry benefits overall (see Fig. 17).

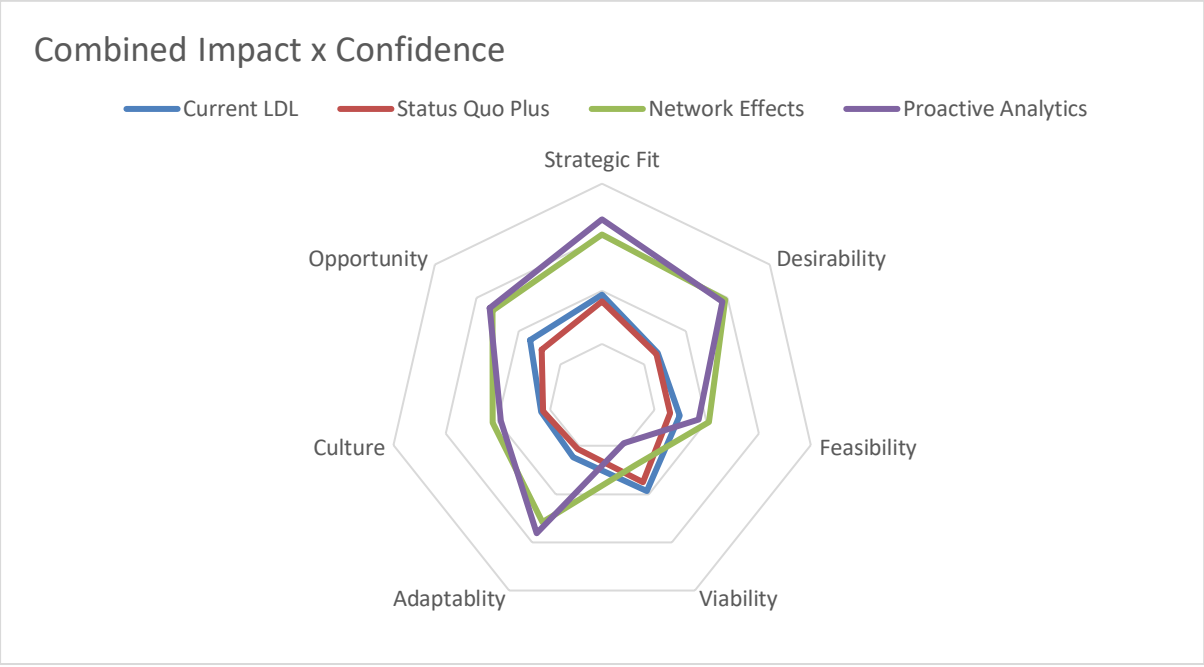


Fig. 17 Overall business model construct confidence scores

The overall business model rating is summarised in Fig. 18. It is evident in the results, that the Network Effects model is rated highest overall by industry in terms of impact and confidence, yet this is very closely followed by the Proactive Analytics model. Surprisingly, the Status Quo Plus model overall is rated lower than the Current LDL, which suggests industry don't have confidence, or believe in the impact, that simply updating the user interface of the Current LDL is a significant value proposition for

future feedback mechanisms. However, this statement is questionable because there was only a 53% completion rate by industry representatives on questions related to the Status Quo Plus model, compared to an 88% completion rate on the current version. This needs to be further validated with industry, although it would appear to be insignificant given the overall gap between the Current LDL, Status Quo Plus and the higher scoring Network Effects and Proactive Analytics models.

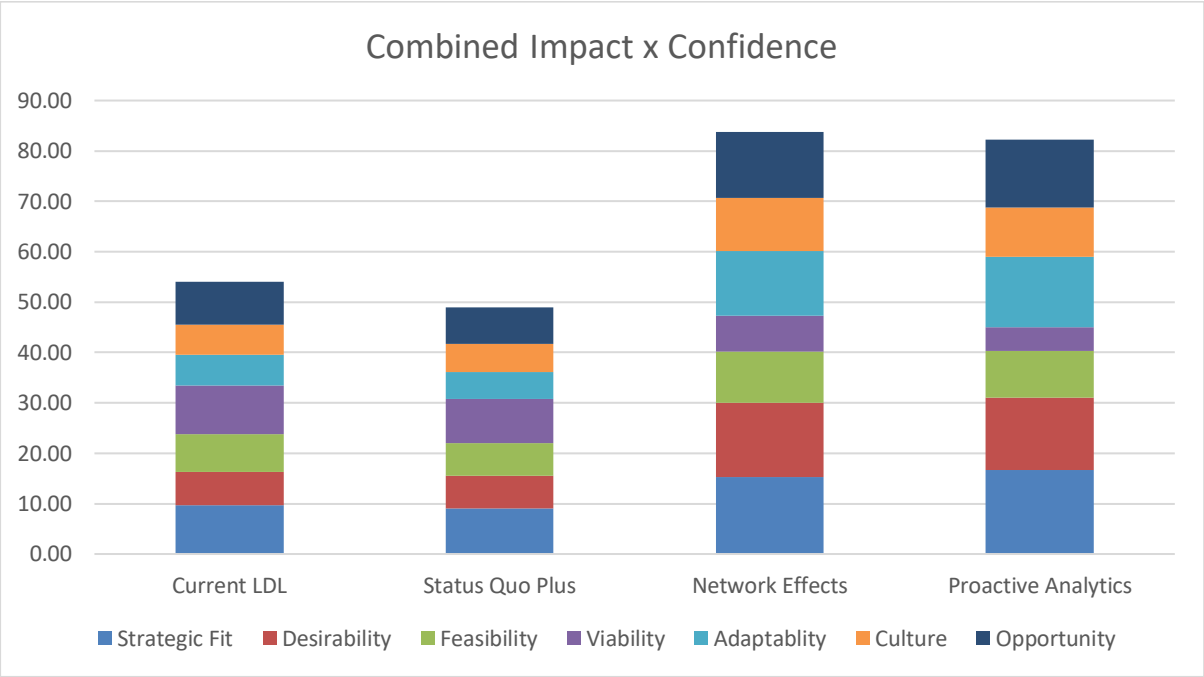


Fig. 18 Overall business model combined impact and confidence rating

5 Discussion

5.1 Other standard business model options

A range of different business models were considered to address the LDL problem space and to provide new ways of funding the provision of feedback.

Table 13 Business Model Options

Business model	Description
Bricks & clicks	Integrates offline (bricks) and online (clicks).
Cutting out the middleman	Removal of intermediaries in a supply chain.
Franchise	Alternative to building 'chain stores' to distribute goods and avoid investment and liability over a chain.
Freemium	Offer basic digital product, for free, while charging a premium for advanced features.
Pay what you can (PWYC)	Does not depend on set prices for its goods, but instead asks customers to pay what they feel the product is worth.
Subscription	Pay a recurring price at regular intervals.
Network effects	The value of the product increases according to the number of others using it.

The freemium model where users receive access to a basic version but pay for a premium version with advanced features may be of interest to ISC. Base model inclusions could include the core modules supplied by ISC, whereas the premium model could include other more personalised and localised elective modules. Elements of the Bricks and Clicks (offline/online) model could also drive adoption where ISC extension officers provide face to face services in regional areas and online services through digital networks. This may be an effective way of driving adoption for the Network Effects model.

Despite this project confirming continued support for the use of levies to fund feedback, this approach may not be sustainable over the long term. Other models in other industries have adopted the Pay What You Can approach. This model does not depend on set prices for the product, but instead asks users to pay what they feel the product is worth. With industry being supportive of open APIs and solution provider involvement there is likely going to be further subscription models where users will pay a recurring price at regular intervals.

A model that hasn't been considered previously is the franchise model. This would be a way for ISC to distribute their technology platform and services and avoid investment and liability over the full value chain. In the same way as a normal franchise, ISC as the franchisor could implement policies around quality, price, base level inclusions and offer training and support. A franchise model could provide ongoing revenue to ISC in exchange for data-driven insights. Solution providers would likely be the main franchisees. Some processors and other larger organisations such as livestock agencies may also be interested in becoming a franchisee.

Cooperative models may also be worth considering as a viable alternative to producer levies for funding future feedback mechanisms. Generally, cooperative models exist to serve the specific

objectives of members and can adapt with changing needs and help to promote the interests of less powerful members such as livestock producers. A Board of Directors would be responsible for operating policies, annual budget, overseeing operations and distributing any benefits. Perhaps multiple private member cooperatives could be established in regional areas and controlled by the users. A proportion of levy funds could be assigned to fund the corporative, plus members could elect to add additional revenues from other sources. For example, a cooperative may see value in purchasing data from ISC and a solution provider that is specific to their region.

5.2 Proposed business models

Across the full dataset for this project the project team was able to distil the results down to three critical areas: 1) integration through the value chain; 2) trust and permissions; and regional insights. The implication is that these three elements must be combined. It will not be good enough to make a few functional feature adjustments to the existing LDL. In fact, the final combined results showed that it would be better to do nothing new and stick with the current LDL version. The Network Effect business model proved to be the most supported by industry across all data sources. Arguably, this is because the model does the best job of combining the three critical areas.

This was closely followed by the Proactive Analytics model. In terms of strategic alignment, user desirability and feasibility for implementation, these two models were almost identical. Industry clearly see value in the ability of these models to make a genuine impact and they have some confidence that they could be implemented successfully. However, there are concerns about the financial viability of these models. Both models were similar in their ability to adapt in the overall business environment. This is very important given that any new business model adopted needs to give ISC and industry strong confidence in the robustness of the design. It should be noted that the project team think that the Network Effect model is a better initial cultural fit for the red meat industry. There a range of potential blockers and behaviours that may be a challenge in the implementation of the Proactive Analytics model. For example, if the analytics were such that they could benchmark processors and provide livestock producers with commercial decision support there may initially be some instability in the market. For this reason, it may be better to implement the Network Effects first and then look to develop and test analytics in market over the next five years and beyond.

5.3 Value creation for the proposed business models

ISC is focused on improving information transfer throughout the value chain that will improve decision making and value for the producer, for the sector and for the entire industry through increased productivity and alignment to markets. The potential value generated from better decision making is an important consideration for each of the business models presented. MLA's review of the value of objective measurement (OM) information for improved decision making (MLA V.MQT.0071 report) integrates well to support LDL's business model development strategy. That study has been used to extrapolate values for each business model discussed in this paper.

MLA in collaboration with industry has been developing objective measurement systems to aid in the assessment and description of livestock as they move through the value chain. Information can

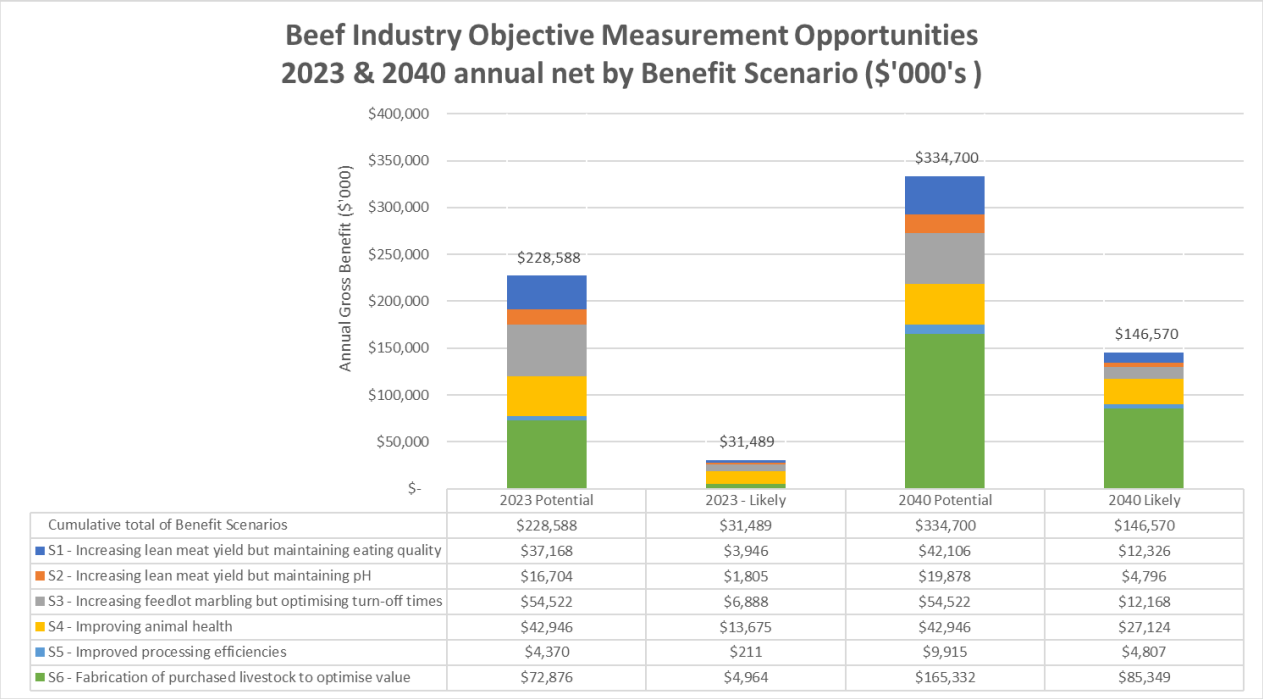
be used to improve decision making within a sector of the supply chain and aid in the alignment of livestock to the best downstream markets.

The Objective Measure business case analysis was technology agnostic. A detailed assessment of the decision points within and between sectors in the supply chain was undertaken including quantifying the value opportunities if accurate and timely data was made available. Much of the value results from increased accuracy of livestock measurements. It is important to note that a number of key enablers including information transfer and effective feedback and feedforward of data are required for these values to be realised. Half the key enablers in Table 16 in appendix 9.8 involve digital information systems.

At the point of writing this review only limited value of live animal pre-sale measurements have been included. The value of additional pre-sale measurements is being undertaken and will be integrated into the various OM value propositions outlined in this OM report later when completed. On that basis the realisable value discussed in this section is conservative.

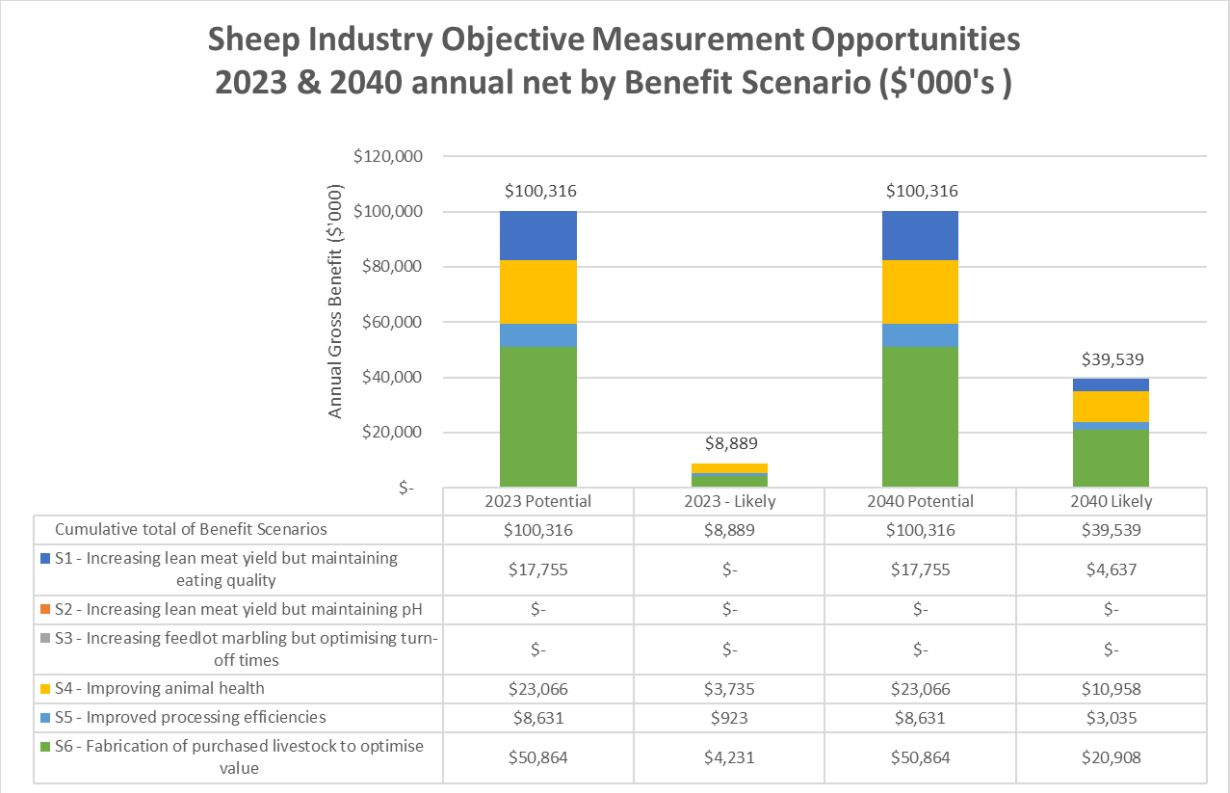
It was identified that around $329 million per annum of potential gross benefit exists from the provision of data (not all of it currently available), associated pricing signals and resultant on-farm management changes by 2023. This is based on the combined benefits for beef and sheep in Fig. 22 and Fig. 23Fig. 20. A net benefit of $40 million per annum is likely to be realised by 2023 (beef and sheep including mutton) while around $186 million net benefit per annum could be realised by 2040, providing a total net benefit of $1.066 billion between 2020 and 2040.

Description of benefit scenarios - are summarised in the appendix 9.8.



	2023 Potential	2023 - Likely	2040 Potential	2040 Likely
Cumulative total of Benefit Scenarios	$228,588	$31,489	$334,700	$146,570
S1 - Increasing lean meat yield but maintaining eating quality	$37,168	$3,946	$42,106	$12,326
S2 - Increasing lean meat yield but maintaining pH	$16,704	$1,805	$19,878	$4,796
S3 - Increasing feedlot marbling but optimising turn-off times	$54,522	$6,888	$54,522	$12,168
S4 - Improving animal health	$42,946	$13,675	$42,946	$27,124
S5 - Improved processing efficiencies	$4,370	$211	$9,915	$4,807
S6 - Fabrication of purchased livestock to optimise value	$72,876	$4,964	$165,332	$85,349

Fig. 19 Likely beef industry value created from OM by benefit scenario relative to potential opportunity (2019 re-forecast)



	2023 Potential	2023 - Likely	2040 Potential	2040 Likely
Cumulative total of Benefit Scenarios	$100,316	$8,889	$100,316	$39,539
S1 - Increasing lean meat yield but maintaining eating quality	$17,755	$-	$17,755	$4,637
S2 - Increasing lean meat yield but maintaining pH	$-	$-	$-	$-
S3 - Increasing feedlot marbling but optimising turn-off times	$-	$-	$-	$-
S4 - Improving animal health	$23,066	$3,735	$23,066	$10,958
S5 - Improved processing efficiencies	$8,631	$923	$8,631	$3,035
S6 - Fabrication of purchased livestock to optimise value	$50,864	$4,231	$50,864	$20,908

Fig. 20 Likely sheep industry value created from OM by benefit scenario relative to potential opportunity (2019 re-forecast)

An estimate of the share of value from each benefit scenario that would be attributable to digital feedback systems has been calculated and summarised in Table 13.

- The Status Quo Plus model does deliver an increase in value over the current system on the basis that sharing of data and benchmarking becomes possible through enhancements to the user experience. However, the sharing of current LDL data (which is also available on kill sheets) is only making the existing data more accessible.
- Integrating other sources of data required to support profit improvement decisions doubles the value of decisions in the Network Effects model.
- There is a further enhancement to the accessibility of the Network Effects data in the Proactive Analytics model by about 20%. Further data analysis, early notifications and more timely interventions increase value.
- The animal health scenario is a good example. It is based on current animal health data collected at abattoirs and is all about information transfer.
    - Receiving animal health data about livestock already slaughtered doesn't inform if the next season will be the same. Maybe it is too late in the season to treat.
    - If I share my data (Status Quo Plus) it may benefit others in my area that have not sold yet.
    - But if the regions data is shared in real time, coupled with weather and treatment data, there is a big uplift in proactive interventions (Network Effect).
    - Overlaying this with animal health specific recommendations that continually learn about responses to intervention data, recommendations become more effective. The sharing of this information further engages users due to the financial benefits others in their region are gaining (Proactive Analytics).

Table 13 Value of digital information created by each LDL business model for 2023 OM adoption rate estimates

	Status Quo		Status Quo +		Network Effects		Proactive Analytics	
	Share*		Share*		Share*		Share*	
S1 - Increasing lean meat yield but maintaining eating quality	8%	$ 315,667	12%	$ 473,500	30%	$ 1,183,750	40%	$ 1,578,333
S2 - Increasing lean meat yield but maintaining pH	5%	$ 90,269	10%	$ 180,537	25%	$ 451,343	40%	$ 722,149
S3 - Increasing feedlot marbling but optimising turn-off times	2%	$ 137,751	8%	$ 551,003	40%	$ 2,755,015	50%	$ 3,443,769
S4 - Improving animal health	30%	$ 5,223,016	40%	$ 6,964,022	70%	$ 12,187,038	100%	$ 17,410,055
S5 - Improved processing efficiencies	0%	$ -	0%	$ -	0%	$ -	0%	$ -
S6 - Fabrication of purchased livestock to optimise value	0%	$ -	0%	$ -	15%	$ 1,379,254	20%	$ 1,839,005
Portion of OM Benefit attributable to this digital transfer model		**$ 5,766,702**		**$ 8,169,062**		**$ 17,956,400**		**$ 24,993,311**
Factor of value created relative to current LDL		**1.00**		**1.42**		**3.11**		**4.33**
		14%		**20%**		**44%**		**62%**

** Portion of Objective Measurement value attributable to digital information transfer*

Benefit scenario 1, 2 and 3 are similar in that they reflect the value of improved lean meat yield and quality grading which directly correlates to current LDL grid compliance data. Each scenario was developed to reflect the ways different production systems manage yield and quality. The maturity of existing data usage within these three populations has been considered when attributing a portion of value from the OM project to the LDL business model options. The following examples demonstrate the factors considered in allocating share of value resulting from data transfer in Table 13:

- Intensive feedlot systems require more data analysis and faster responsiveness to maintain profitability than extensive northern pastoral production. Existing LDL data will have a smaller contribution to their existing digital kill sheet data and business analysis than relative to an extensive pastoral business. But more advanced analytics in the networking and proactive business models will probably have a greater positive impact.
- More fragmented supply chains (cow-calf – backgrounder – finisher – abattoir) that focus on higher quality markets stand to gain more from connecting data between sectors of the supply chain for improved decision making.

The magnitude of difference in value increases over time (Table 14) between the current LDL system and the recommended business models due to an increase in the amount of data available for decision making. This table reflects the increased adoption of measurement systems across the value chain.

Table 14 Value of digital information created by each LDL business model for 2040 OM adoption rate estimates

Value of digtial information created by each LDL model for 2040 OM adoption rate estimates	Status Quo		Status Quo +		Network Effects		Proactive Analytics	
	Share*		Share*		Share*		Share*	
S1 - Increasing lean meat yield but maintaining eating quality	8%	$ 1,357,082	12%	$ 2,035,622	30%	$ 5,089,056	40%	$ 6,785,408
S2 - Increasing lean meat yield but maintaining pH	5%	$ 239,796	10%	$ 479,591	25%	$ 1,198,978	40%	$ 1,918,364
S3 - Increasing feedlot marbling but optimising turn-off times	2%	$ 243,361	8%	$ 973,443	40%	$ 4,867,213	50%	$ 6,084,016
S4 - Improving animal health	30%	$ 11,424,644	40%	$ 15,232,859	70%	$ 26,657,503	100%	$ 38,082,148
S5 - Improved processing efficiencies	0%	$ -	0%	$ -	0%	$ -	0%	$ -
S6 - Fabrication of purchased livestock to optimise value	0%	$ -	0%	$ -	15%	$ 15,938,569	20%	$ 21,251,426
Portion of OM Benefit attributable to this digital transfer model		**$ 13,264,882**		**$ 18,721,515**		**$ 53,751,319**		**$ 74,121,361**
Factor of value created relative to current LDL		**1.00**		**1.41**		**4.05**		**5.59**
		7%		**10%**		**29%**		**40%**

** Portion of Objective Measurement value attributable to digital information transfer*

5.4 Solution provider risks

The research survey in this project found that 76% of producers were supportive of solution providers being able to integrate disease and carcase feedback into their existing systems for decision support. The Network Effect and the Proactive Analytics models depend on the involvement of solution providers as key partners. However, for their successful inclusion, ISC must be able to show solution providers what's in it for them. This requires a clear value proposition to demonstrate benefits for solution providers. If solution providers are charged a fee to access the ISC technology platform, analytical tools and reporting features, then the value of the data must outweigh the potential risk of their involvement in the proposed business models. Over time there will be solution providers who thrive and others who will not succeed commercially. Both can have significant impact on the users that they serve. For this reason, the initial establishment phase between ISC and solution providers must be well considered to create sustainable feedback mechanisms.

5.5 ISC address market failure

The ISC is critical to the successful provision of the proposed business models. Firstly, because there needs to be a non-commercial trusted custodian who can disseminate data-driven feedback for industry-wide good. Secondly, there is a need for developing a robust technology platform for multiple purposes. Thirdly, there would likely be market failure without ISC involvement because ISC is the only one able to integrate multiple industry datasets and produce national benchmarking and aggregated insights.

6 Recommendations

6.1 Future R&D

This project did not allow time for a robust literature review on knowledge of data-driven feedback in other industries. There would be value in reviewing literature in other industries, particularly in non-red meat agriculture. Central to this review would be knowledge on agricultural digital platforms, API integration with solution providers and scaling feedback mechanism for commercial value.

As an output, a strengths and weaknesses framework could be developed and applied to the Australian red meat context.

6.2 Practical application of project insights

If the Network Effect business model is supported by ISC for implementation, it is recommended that the model is tested in beef and lamb value chains in Western and Eastern states over the next one to three years. Critical to the testing of the model is a full and complete financial assessment. Various elements of the Proactive Analytics business model should also be designed and tested, but only after the Network Effects model is in place to a satisfactory level.

Any testing of the proposed model should not be undertaken until the new ISC technology platform is completed, tested and integrated with relevant industry datasets. New interfaces must be developed at best practice standards for 2019.

6.3 Development and adoption activities

The current LDL version has not had an industry-wide adoption strategy, or a business model designed around the needs of users. The industry survey in this project found that 42% of producers had not even heard of LDL. Therefore, it is recommended that a comprehensive adoption strategy and implementation plan focussed on building digital networks is developed at the same time as the technology. The business model should be developed prior to the technology. It is important that the technology does not lead the development of the business model. The key risks are that the technology will not meet the needs of future LDL users. That is, the target market is too small (one customer segment) or the target customers don't see the value, or the technology will not reach, acquire, and retain targeted users.

It is recommended that LDL have a complete rebrand, including a name change and accompanying marketing strategy.

7 Key messages

The Australian red meat value chain is likely to realise benefits exceeding $25 million annually following the implementation of the new business models proposed in this project. That is a value between 3 and 5 times the current LDL systems potential.

ISC will be required to lead the way forward to enable data-driven feedback that creates new industry value.

New behaviours and practices along the value chain will be required to affect a mutually beneficial feedback culture.

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9 Appendix

9.1 Focus group survey questions

Survey Legend
Question asked at both focus groups
Question only asked at Producers focus group
Question only asked at Processor focus group

Question	Answer Type	Producer answers	Processor answers
Where is home for you? (roughly)	Nearest locality	Visual representation on a map of Australia	
What is the purpose of LDL?	Free text answer	10 responses	11 responses
Who is the customer of LDL?	Free text answers with word cloud visualisation[4]	Most common word themes: Processors, Producers	Most common word themes: Processors, Producers, Industry
How could we make it so that all processors are participating (in some way) in LDL?	Free text answer	N/A – not asked of producers	9 responses
How could we make it so that producers are checking feedback for every consignment via LDL?	Free text answer	9 responses	9 responses
Do you see the benefit in providing feedback to producers?	Yes/No/Unsure	N/A – not asked of producers	100% Yes
Who do producers (you) trust to give them advice on how to improve their livestock?	Free text answers with word cloud visualisation	Most common word themes: agents, consultants, producers.	N/A – not asked of processors
How could we make LDL self-service?	Free text answer	1 response: 'customised reporting'	10 responses
What information about producers or their livestock are you interested in?	Free text answers with word cloud visualisation	N/A – not asked of producers	Most common word themes: compliance, health
Should levy funds continue to be used to support LDL?	Yes/No/Unsure	90% Yes, 10% Unsure	100% Yes
How should we use (or expand) the Find My Data prototype?	Free text answer	4 responses	11 responses
How do you currently interact with your suppliers	Free text answer	N/A – not asked of producers	12 responses
What could we add to LDL that would make producers rely on the information it provides?	Free text answer	5 responses	N/A – not asked of processors
What could we add to LDL to attract more processors?	Free text answer	N/A – not asked of producers	11 responses
Are you concerned with producers knowing whether you are or are not participating in LDL?	Yes/No/Unsure	N/A – not asked of producers	100% No

[4] Word clouds display the most frequent words that appear from the audience's comments, thoughts, questions, and ideas (Poll Everywhere, 2019).

Do you think producers are concerned about receiving feedback from multiple channels in different formats?	Yes/No/Unsure	N/A – not asked of producers	64% Yes, 18% No, 18% Unsure
Are you concerned with receiving feedback on multiple channels? e.g. from processor, via email, using LDL etc.	Yes/No/Unsure	70% Yes, 30% No	N/A – not asked of processors
Is it important for LDL to include the actual value instead of discounts?	Yes/No/Unsure	64% Yes, 36% Unsure	27% Yes, 18% No, 55% Unsure
What would need to happen to decrease non-compliance by 20% in the next 12 months?	Free text answer	10 responses	10 responses
Do you think entering grids is a friction point for producers using LDL?	Yes/No/Unsure	N/A – not asked of producers	83% Yes, 8% No, 8% Unsure
Are you interested in giving processors (or the next value chain participant) information? i.e. feed forward	Yes/No/Unsure	100% Yes	N/A – not asked of processors
What key factors are you considering when you make on-farm decisions?	Free text answers with word cloud visualisation	Most common word themes: profitability, pasture, time	N/A – not asked of processors
Do we need to increase our communication and extension of LDL?	Yes/No/Unsure	100% Yes	100% Yes
What is the most important part of LDL?	Free text answer	8 responses	N/A – not asked of processors
What is the biggest constraint for LDL?	Free text answer	11 responses	N/A – not asked of processors

9.2 Business model rating survey

Impact was rated for each business model with five being very high potential value and one being no potential value.
Confidence was rated for each business model with five being very high confidence and one being no confidence.

Section/Question	Business Model construct to rank
For the current version of Livestock Data Link rate the following criteria based on the potential of the business model to create value for industry	The value propositions are aligned to the Integrity Systems 2025 strategy (strategic fit)
	The value propositions resonate with customers and we have the right channels are relationships in place (desirability)
	We have the right resources, capability, technology and key partners (feasibility)
	We understand the costs and revenues (viability)
	The business model addresses key industry and market forces and can adapt with key trends and macro-economics (adaptability)
	We have the right cultural enablers, blockers and behaviours and we are building industry capability (culture)
	The benefits outweigh the risks, financial and otherwise (opportunity)
For the current version of Livestock Data Link rate the following criteria based on the degree of confidence you have in the business model	The value propositions are aligned to the Integrity Systems 2025 strategy
	The value propositions resonate with customers and we have the right channels are relationships in place
	We have the right resources, capability, technology and key partners
	We understand the costs and revenues
	The business model addresses key industry and market forces and can adapt with key trends and macro-economics
	We have the right cultural enablers, blockers and behaviours and we are building industry capability
	The benefits outweigh the risks (financial and otherwise)
For the status quo plus option rate the following criteria based on the potential of the business model to create industry value	The value propositions are aligned to the Integrity Systems 2025 strategy
	The value propositions resonate with customers and we have the right channels are relationships in place
	We have the right resources, capability, technology and key partners
	We understand the costs and revenues
	The business model addresses key industry and market forces and can adapt with key trends and macro-economics
	We have the right cultural enablers, blockers and behaviours and we are building industry capability
	The benefits outweigh the risks (financial and otherwise)
For the status quo plus option rate the following criteria based on the degree of confidence you have in the business model	The value propositions are aligned to the Integrity Systems 2025 strategy
	The value propositions resonate with customers and we have the right channels are relationships in place
	We have the right resources, capability, technology and key partners
	We understand the costs and revenues
	The business model addresses key industry and market forces and can adapt with key trends and macro-economics
	We have the right cultural enablers, blockers and behaviours and we are building industry capability
	The benefits outweigh the risks (financial and otherwise)
	The value propositions are aligned to the Integrity Systems 2025 strategy

For the network affects option rate the following criteria based on the potential of the business model to create industry value	The value propositions resonate with customers and we have the right channels are relationships in place
	We have the right resources, capability, technology and key partners
	We understand the costs and revenues
	The business model addresses key industry and market forces and can adapt with key trends and macro-economics
	We have the right cultural enablers, blockers and behaviours and we are building industry capability
	The benefits outweigh the risks (financial and otherwise)
For the network affects option rate the following criteria based on the degree of confidence you have in the business model	The value propositions are aligned to the Integrity Systems 2025 strategy
	The value propositions resonate with customers and we have the right channels are relationships in place
	We have the right resources, capability, technology and key partners
	We understand the costs and revenues
	The business model addresses key industry and market forces and can adapt with key trends and macro-economics
	We have the right cultural enablers, blockers and behaviours and we are building industry capability
	The benefits outweigh the risks (financial and otherwise)
For the proactive analytics option rate the following criteria based on the potential of the business model to create industry value	The value propositions are aligned to the Integrity Systems 2025 strategy
	The value propositions resonate with customers and we have the right channels are relationships in place
	We have the right resources, capability, technology and key partners
	We understand the costs and revenues
	The business model addresses key industry and market forces and can adapt with key trends and macro-economics
	We have the right cultural enablers, blockers and behaviours and we are building industry capability
	The benefits outweigh the risks (financial and otherwise)
For the proactive analytics option rate the following criteria based on the degree of confidence you have in the business model	The value propositions are aligned to the Integrity Systems 2025 strategy
	The value propositions resonate with customers and we have the right channels are relationships in place
	We have the right resources, capability, technology and key partners
	We understand the costs and revenues
	The business model addresses key industry and market forces and can adapt with key trends and macro-economics
	We have the right cultural enablers, blockers and behaviours and we are building industry capability
	The benefits outweigh the risks (financial and otherwise)

9.3 Research survey

Welcome to the LDL research survey. LDL is an online program that enables the smooth, timely sharing of carcase and animal disease information between processors and their producers with the aim of optimising supply chain performance.

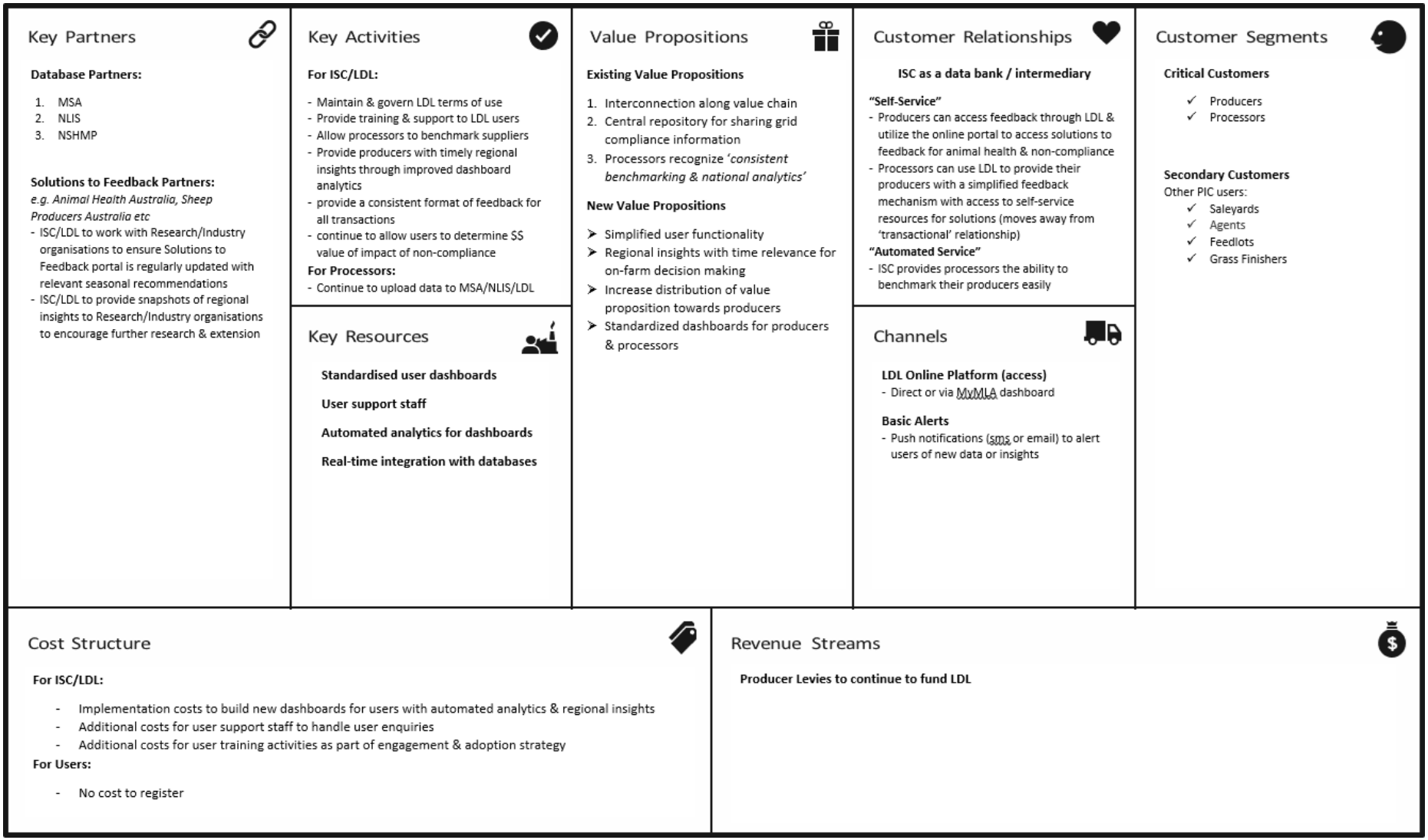
The questions in this survey are about the use of and structure of grids (market specifications), carcase compliance, health information, and benchmarking. It is critical we understand how these types of information can be improved in LDL to help you optimise your production and make informed on-farm decisions.

1. What is your main type of production?
    a. Cattle
    b. Sheep
    c. Goats
2. Do you sell your livestock directly to a processor (abattoir)?
    a. Yes
        i. Are you confident you're targeting the best grid (market specifications) for your livestock? (Yes/No)
        ii. Who are you most likely to ask for help when you're targeting a grid (market specifications)? (Multiple choice: Livestock agent, Processor's buyer or agent, Consultants, Other producers, Other – please specify)
        iii. What information would be most useful for you to have to improve grid compliance? (Ranking: comparison of different grids, predicted compliance to a grid, sweet-spots within the grid, animal health improvements on-farm, Other – please specify)
        iv. Would it be useful to know the types of grids other producers are targeting in your region? (Yes/No)
        v. How important is it for you to know the price difference (benefit or loss) of consigning to a different grid? (Ranking: Not important, Neutral, Important, Very important)
        vi. How important is it for you to know the price benefit of changing an on-farm practice to improve your grid compliance? (Ranking: Not important, Neutral, Important, Very important)
    b. No
        i. Would it be useful to see some basic regional insights from producers who are directly consigning to a processor to improve your production? (Yes/No)
3. Do you use an agent, advisor or consultant to help with decisions to improve your livestock?
    a. Yes
    b. No
        i. If no, who or what do you use to help make decisions?
4. Do you use any on-farm management systems or applications to record information about your livestock performance?
    a. Yes
        i. Would you like to receive your carcase and health feedback in your on-farm management system?
        ii. Would you use that data to make better decisions?
    b. No

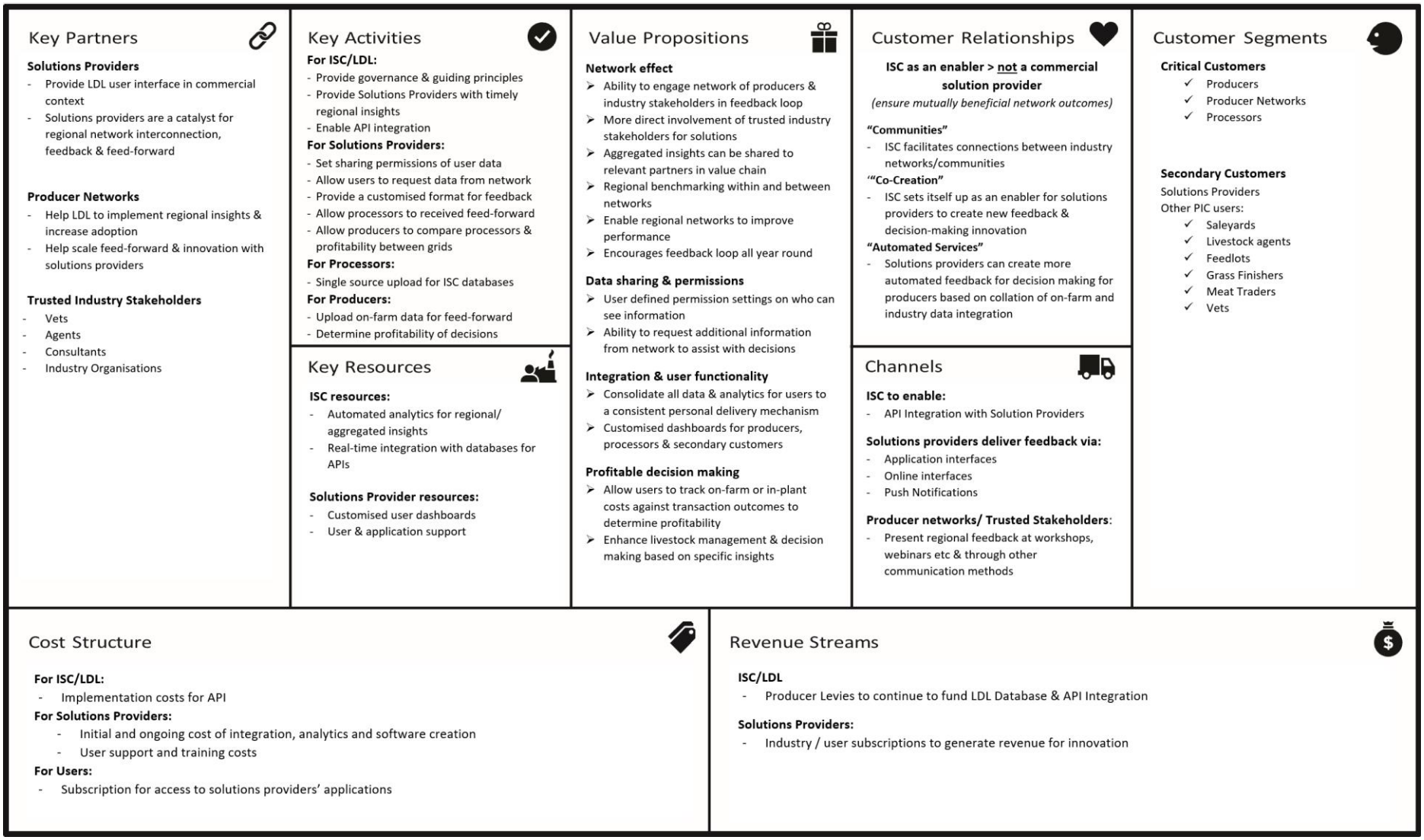
5. Have you used LDL (LDL)?
    a. Yes
        i. Have you created a grid in LDL? (Yes/No)
            1. If yes, is this function useful? (Yes/No)
            2. If no, why not? (Open)
            3. If no, what would motivate you to enter a grid? (Open)
            4. What other functions do you use in LDL? (Open)
    b. No
        i. Why not? (Multiple choice: Haven't heard of it, Too complicated to use, Don't consign directly to processer, Processor doesn't use it, Don't use feedback in decision-making, Other – please specify)
6. Would you be willing to anonymously (de-identified) share the following types of information to help regional benchmarking?
    a. Production type (cattle, sheep, goats) (Yes/No)
    b. Number of livestock (Yes/No)
    c. Breed type (Yes/No)
    d. Typical consignment periods (Yes/No)
    e. Carcase and health compliance (Yes/No)
7. How useful would it be to compare your compliance between consignments? (Ranking: Not useful, Somewhat useful, Useful, Very useful, Extremely useful)
8. How useful would it be to know your carcase attributes compared to other producers in your region? (Ranking: Not useful, Somewhat useful, Useful, Very useful, Extremely useful)
9. What filters would you expect to use if you were able to compare to other producers? (Multiple choice)
    a. Area (shire, region, state)
    b. Period (week, month, season, year)
    c. Breed
    d. Carcase attributes
    e. Animal health conditions (disease and defect recorded upon inspection)
    f. From the same processor

Thank you

9.4 Status Quo Plus business model canvas



9.5 Network Effects business model canvas



9.6 Proactive Analytics business model canvas

Key Partners

Solutions Providers
- Provide proactive analytic capability for all supply chain users
- Provide mutually beneficial platform with feedback & feedforward

Producer Networks
- Face to face & digital networks to maximise scale & regional value

Trusted Industry Stakeholders
- Vets
- Agents
- Consultants
- Industry Organisations

Key Activities

- Build proactive analytic capability relevant to the financial decision making
- Analytics to compare / benchmark processors in regions future value
- Analytics to compare / benchmark producers in regions potential future value
- Ability to monitor supply levels & additional network volumes & predicted turn off times across a regional area
- Build dashboards & analytics for compliance animal health plus other relevant value propositions (e.g. integrity along the chain)
- Feedback & feedforward functionality
- Share & request data functionality
- ISC to develop new governance principles for proactive value chains

Key Resources

- Access to full set of ISC databases
- ISC team to focus on building proactive capability throughout the industry
- Solution providers with high level analytic capability

Value Propositions

Proactive decision making
- Mutually beneficial platform for sharing/requesting information to make decisions proactively
- Timely feedback relevant to the customer
- Automated recommendations relevant to customer need and circumstance

Customer Relationships

Proactive long-term relationships
(allow forecast feedback loops to key partners)
- Allow value-chain partners to forecast upcoming supply & demand scenarios to make proactive decisions together
- Moves away from transactional based marketing decisions

Relationships already established through network creation via solutions providers:
- Communities
- Co-Creation
- Automated Services

Channels

Solutions providers to create:
- Digital platform with analytic capability for forecasting decisions

ISC communication & extension:
- Promote proactive value chains in regional areas through producer groups, networks and other industry relationships

Customer Segments

Critical Customers
- ✓ Producers
- ✓ Producer Networks
- ✓ Processors
- ✓ Saleyards
- ✓ Feedlots
- ✓ Meat Traders
- ✓ Agents
- ✓ Grass Finishers

(all customers become 'critical' as they can use advanced analytics to forecast decision-making and partner with suppliers/buyers)

Cost Structure

For ISC/LDL:
- Implementation costs for API

For Solutions Providers:
- Initial and ongoing cost of integration, analytics and software creation
- User support and training costs

For Users:
- Subscription for access to solutions providers' applications

Revenue Streams

ISC/LDL
- Producer Levies to continue to fund LDL Database & API Integration
- Potential for Solutions Providers to pay for API installation and/or access

Solutions Providers:
- Industry / user subscriptions to generate revenue for innovation

9.7 Business model matrix questions

Rating scales:

Alignment Rating	1= No alignment, 2 = Little alignment, 3 = Potential for alignment, 4 = Good alignment, 5 = Strong alignment
Relevance Rating	1= No relevance, 2 = Little relevance, 3 = Potential for relevance, 4 = Good relevance, 5 = Strong relevance
High/Low Rating	1 = Very low, 2 = Low, 3 = Moderate, 4 = High, 5 = Very high
Evidence Rating	1 = Unclear, 2 = Somewhat clear, 3 = Some evidence, 4 = Good evidence, 5 = There is evidence from several sources

Business Model Matrix:

Constructs & Sub-items	IMPACT	CONFIDENCE
	Consider all statements as to their potential to impact/create value for industry	**Consider all statements as to what degree they provide confidence in the business model**
Strategic Fit		
VISION/CULTURE/IMAGE Our value proposition & business model are aligned to ISC's vision, culture and image.	Alignment Rating	Evidence Rating
INNOVATION GUIDANCE Our value proposition & business model are aligned to ISC's innovation guidance.		
LEADERSHIP SUPPORT Our value proposition & business model has the support from ISC's key sponsors.		
Desirability		
CUSTOMER SEGMENT Our critical customer segments have the jobs, pains & gains relevant for selling the value proposition.	Relevance Rating	Evidence Rating
VALUE PROPOSITION Our value proposition resonates with the critical customer segments.		
CHANNELS We have found the best channels to reach & acquire our critical customer segments.		
CUSTOMER RELATIONSHIPS We have developed the right relationships to retain customers and repeatedly create value.	High/Low Rating	
Feasibility		
KEY RESOURCES We have the right technologies & resources to create our value propositions.	High/Low Rating	Evidence Rating
KEY ACTIVITIES We have the right capabilities to handle the most critical activities for creating our value proposition.		
KEY PARTNERS		

We have found the right key partners who are willing to work with us to create & deliver our value proposition.		
Viability		
REVENUES We know how much our customers are willing to pay & how they will pay.	Evidence Rating	Evidence Rating
COSTS We know our costs for creating & delivering the value proposition.		
Adaptability		
INDUSTRY FORCES The BM VP's withstand competitors & emerging players in our markets.	High/Low Rating	Evidence Rating
MARKET FORCES The BM VP's address critical issues & shifts in our target market & economic value.		
KEY TRENDS The BM can adapt/adopt key technology, regulatory, cultural & societal trends that affect our business model.		
MACRO-ECONOMIC FORCES Negative impact of macro-economic & infrastructure factors on business model viability.		
Culture		
ENABLERS Presence of cultural enablers to implement this business model across the red meat industry.	High/Low Rating	Evidence Rating
BLOCKERS Presence of cultural blockers that may hinder the successful implementation of this business model across the red meat industry.		
BEHAVIOURS The specific people behaviours necessary to implement this business model are present.		
CAPABILITY The BM will build industry capability for improved decision making.		
Opportunity		
VALUE CHAIN OPPORTUNITY There is a financial benefit for each stakeholder in the BM / value chain.	High/Low Rating	Evidence Rating
FINANCIAL RISK APPETITE The financial opportunity outweighs the potential risk of unsuccessful implementation.		
OPPORTUNITY RATING The business model will create opportunity for the red meat industry.		Evidence Rating

9.7.1 Project Consultant team business model score results

The Project Consultant team results show that Network Effects rated the highest impact overall, with a lead rating in 5 out of 7 constructs (see **Error! Reference source not found.**). Conversely, Proactive Analytics rated highest in terms of strategic fit, but lowest in terms of viability. The Current LDL and Current LDL Plus models were rated highest in terms of viability (due to low expected impact on costs for implementation) but they rated below Network Effects and Proactive Analytics on all other constructs.

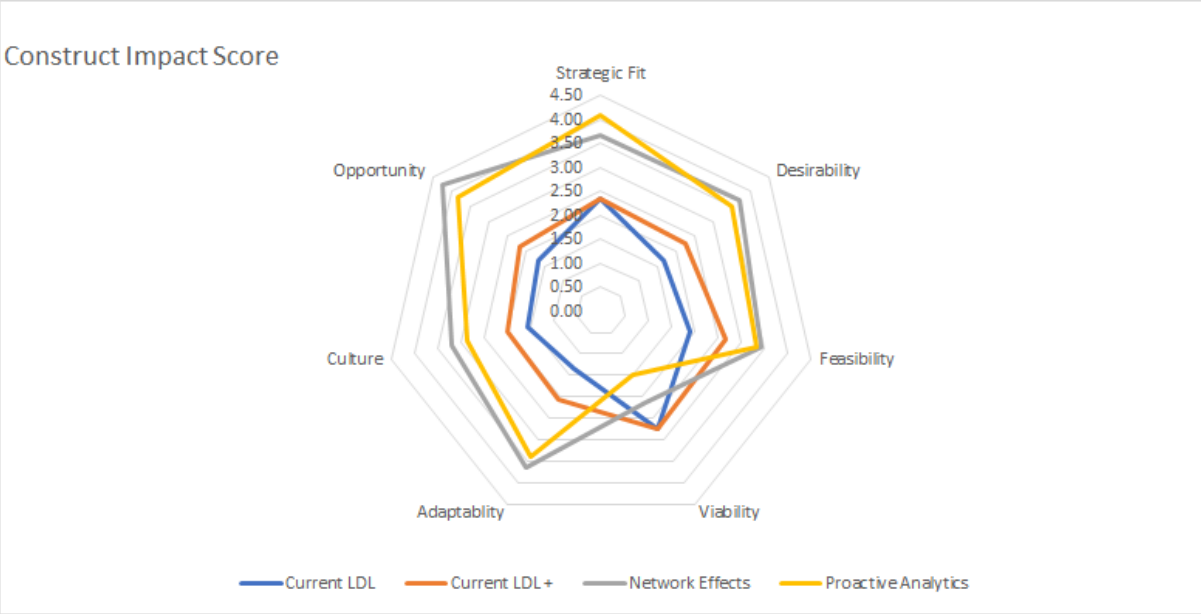


Fig. 1421 Business model construct impact scores (project team)

Due to high-level of domain knowledge, the project team was able to rate how likely success is based on the business model design and its supporting evidence (see **Error! Reference source not found.**). In comparison to the impact rating where Network Effects had a clear lead on each construct item, in terms of confidence even though it still had the highest overall confidence rating, it did not lead in each construct. For example, Proactive analytics had the highest confidence in terms of strategic fit, desirability and adaptability, however Current LDL Plus had the highest confidence rating for feasibility and viability. With regards to culture, Network Effects and Status Quo Plus had an equal confidence rating by the project team.

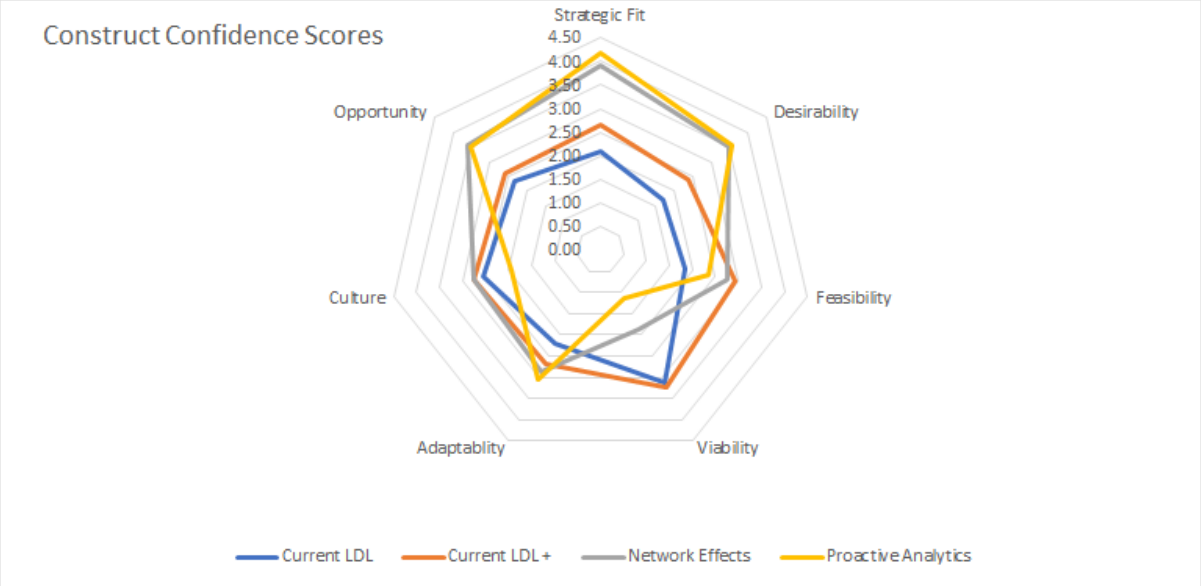


Fig. 22 Business model construct confidence scores (project team)

The overall impact rating was combined with the confidence rating for each construct to determine the overall evidence supporting each business model for creating industry value in future feedback mechanisms (See **Error! Reference source not found.**).

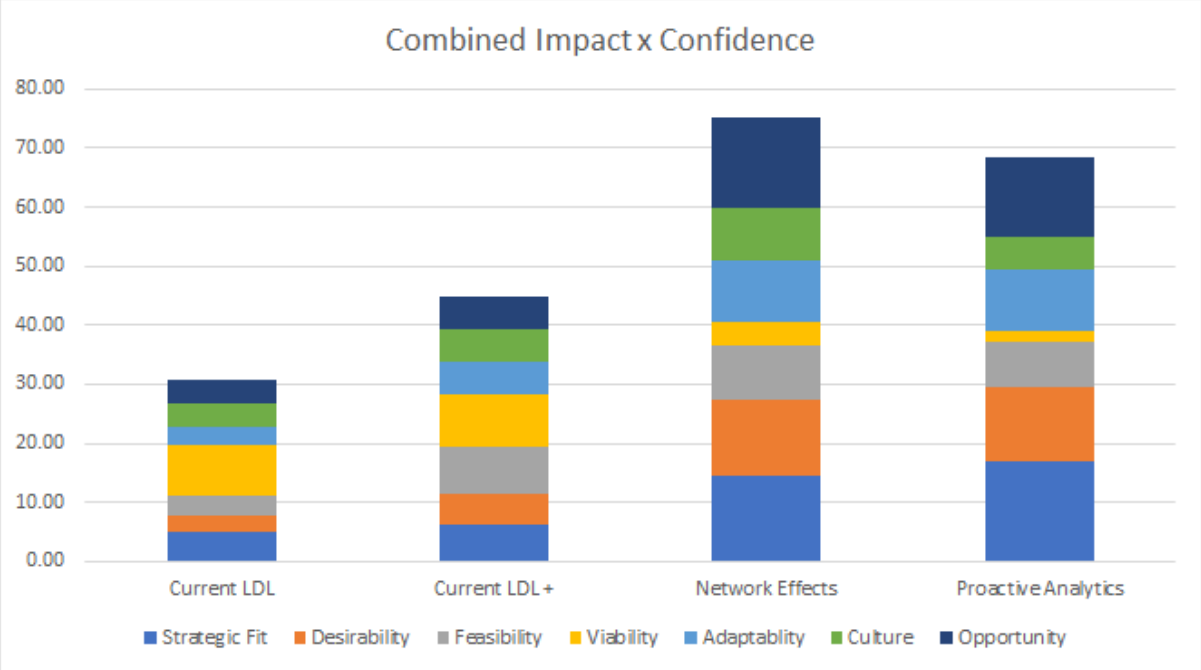


Fig. 23 Business model combined impact and confidence rating (project team)

9.8 Benefit scenario explanations (taken from V.MQT.0002)

The Australian red meat industry does not currently have all the measurement systems available and/or transfer of information that might further improve red meat value within the supply chain. However, advances in access to data have the potential to assist the red meat industry by improving efficiency and underpinning new value-based transaction models.

All sectors of industry recognise that value is being lost through inaccurate measurement or appraisal systems and that this could be improved by addressing the current objective measurement related limitations. There is willingness across the industry for change and the delivery of the benefit scenarios in this report provides an indication of the value potentially available from doing so.

Potential benefits have been calculated for the following:

- Potential benefit – considers where in the chain the measure is applied, likely measurement accuracy and magnitude of change that can be affected when measured at that point assuming 100% adoption of the measure.
- Likely adoption benefit – potential benefit adjusted downwards for expected adoption rate at each supply chain measurement point. Note that the adoption rates used for modelling benefits exclude fast tracking the rollout of DEXA x-ray systems for lean meat yield measurement, as currently being considered by the red meat industry. Should this adoption rollout be fast tracked, then the potential benefits for lean meat yield relevant scenarios will be somewhat larger and achieved earlier than 2030.

As noted above, to identify the opportunities that may be available from improved measurement systems across the red meat supply chain, several benefit scenarios were developed and modelled. Benefit scenarios estimate the combined value of a group of attributes or characteristics that may be impacted using objective measurement. These scenarios are summarised in Table 1, along with which species and production system they apply to. The benefit scenarios considered attributes such as:

- What measurement traits are important – and to whom are they important and who might benefit?
- Where can / should these traits be measured?
- What level of accuracy may be needed – and who will benefit from improvements in accuracy?
- Are there any important correlations between traits – either favourable or unfavourable?

Benefit scenario descriptions

1. **Increasing lean meat yield but maintaining or improving eating quality -** Together Lean Meat Yield (LMY) and Eating Quality (EQ) largely determine total carcase value. This scenario applies to 100% of **lamb** production and 60% of **beef** production where reliable environment and broad market access reward a mix of quality and yield.

2. **Increasing lean meat yield but maintaining pH** – 'Dark cutters' impose significant discounts on beef carcases[5]. Value is generated by increasing LMY and reducing dark cutters through genetic selection and management. This scenario applies primarily to 30% of beef production in more unreliable northern environments where conditions make it more difficult to get a return on investment in EQ in Scenario 1.

3. **Increasing feedlot marbling but optimising turn-off times -** This scenario applies to feedlot animals (10% of beef production) destined for high quality markets where marbling (MB) has a greater impact on finished product value than lean meat yield, but more efficient feed conversion (negatively correlated to MB[6,7,8]) is required for higher profitability. Value is generated predominately by improving marbling content through genetic selection and secondarily by a small improvement in feed efficiency, generated through seedstock and live animal objective genetic tests.

4. **Improving animal health -** This scenario considers the value opportunity for managing animal health issues that impact both the production and processing sectors across the beef and lamb industries by the provision of animal health feedback from processors to producers. Value is generated via improved feedback that enables improved on-farm management interventions to reduce parasites and resultant offal condemns at processing.

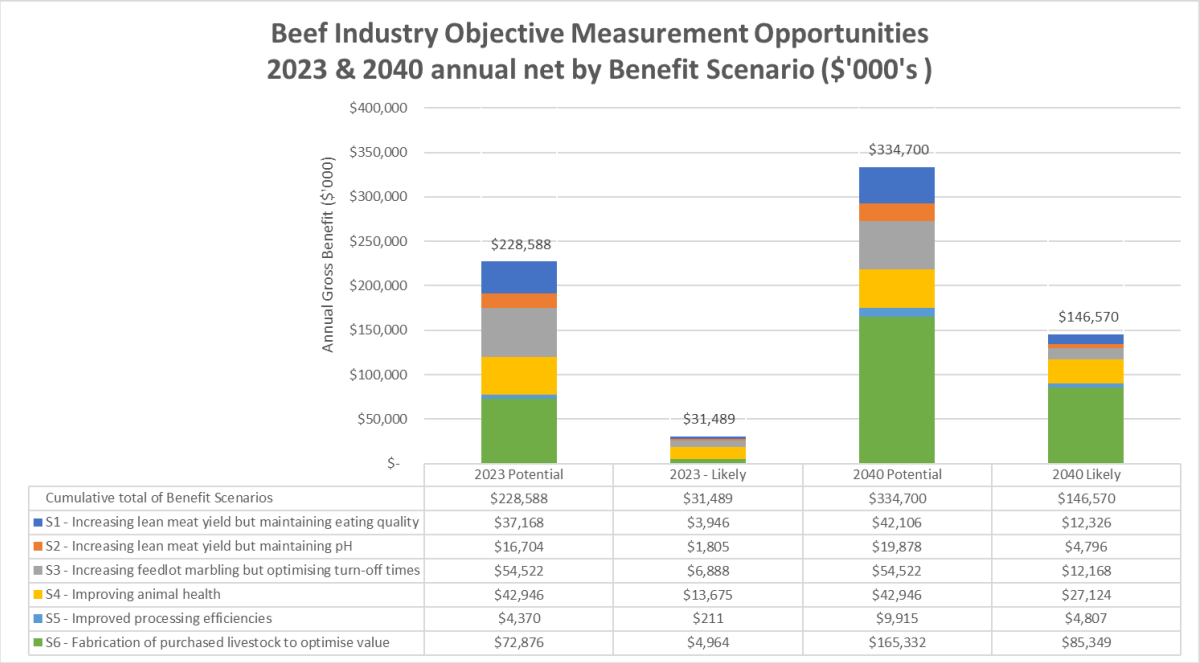
5. **Improved processing efficiencies -** Accurate carcase objective measures improve carcase sortation to customer specifications based on different trimming work required. Chain speeds can be adjusted to increase kilograms per man hour to increase productivity within the processing plant. This is not applicable to all processing plants.

6. **Fabrication of purchased livestock to optimise value -** Objective measures enable more accurate processor sales pricing decisions and support boning make schedules to extract increased value from carcases.

[5] McGilchrist P (2012). Beef CRC Fact Sheet: Producers can eliminate 'Dark Cutting'. *CRC for beef genetic technologies*.
[6] Ewers (et. al.) (1999) Saleable beef yield and other carcass traits in progeny of Hereford cows mated to seven sire breeds
[7] Cartens G, Genho P, Miller R, Moore S, Pollak J, Tedeschi L (2005). Determine the genetic and phenotypic variance of meat quality traits and their interrelationships with economically important traits in bos indicus type cattle. *National Cattlemens Beef Association*. The Beef Checkoff. Page 4.
[8] Arthur J, Herd R (2008). Residual feed intake in beef cattle. *Revista Brasileira de Zootecnia* (37). ISSN 1806-9290.

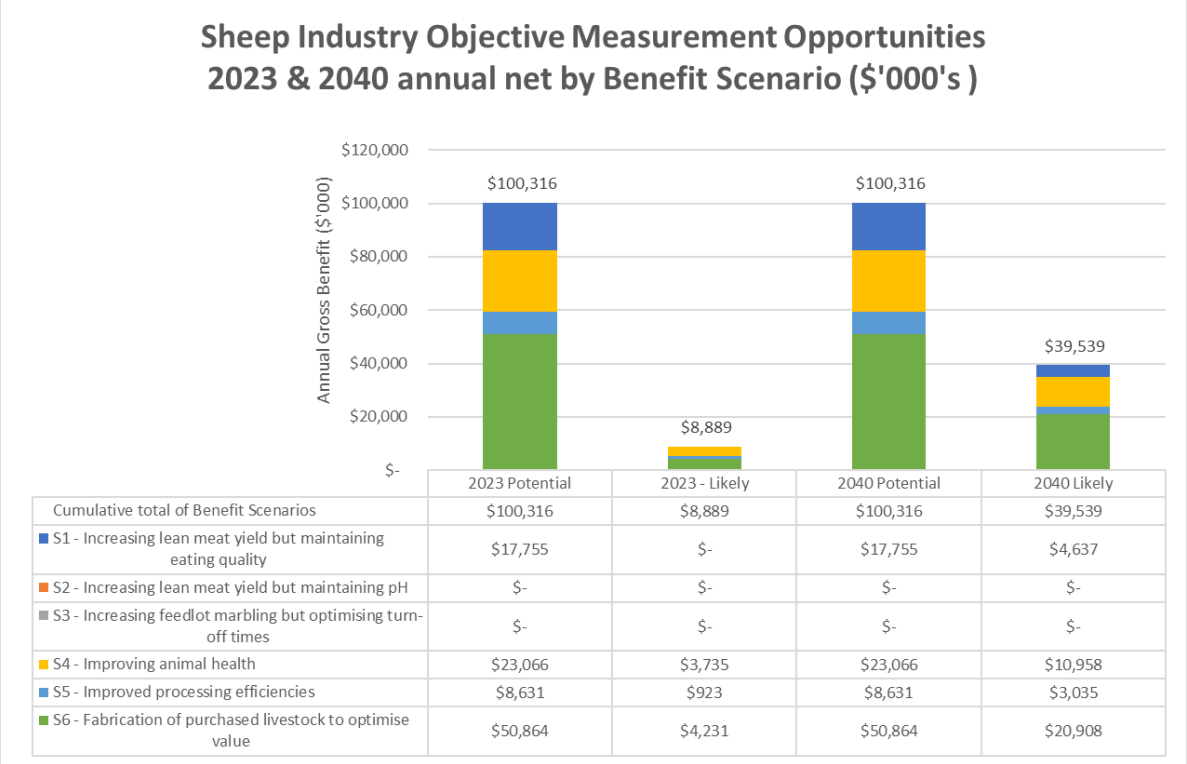
Beef and lamb industry benefits for each scenario in Figure 24 and Figure indicate:

- Scenarios 1 through 4 deliver the greatest short-term value for beef.
- Scenarios 1 and 4 deliver the greatest short-term value for lamb (Scenarios 2 and 3 don't readily apply to lamb).
- Scenario 6 delivers greater value over the longer-term (2040) than the shorter term (2023) for both beef and lamb and assumes processor profit is distributed along the chain over time.



	2023 Potential	2023 - Likely	2040 Potential	2040 Likely
Cumulative total of Benefit Scenarios	$228,588	$31,489	$334,700	$146,570
S1 - Increasing lean meat yield but maintaining eating quality	$37,168	$3,946	$42,106	$12,326
S2 - Increasing lean meat yield but maintaining pH	$16,704	$1,805	$19,878	$4,796
S3 - Increasing feedlot marbling but optimising turn-off times	$54,522	$6,888	$54,522	$12,168
S4 - Improving animal health	$42,946	$13,675	$42,946	$27,124
S5 - Improved processing efficiencies	$4,370	$211	$9,915	$4,807
S6 - Fabrication of purchased livestock to optimise value	$72,876	$4,964	$165,332	$85,349

Figure 24: Likely beef industry value created from OM by benefit scenario relative to potential opportunity (2019 re-forecast)



	2023 Potential	2023 - Likely	2040 Potential	2040 Likely
Cumulative total of Benefit Scenarios	$100,316	$8,889	$100,316	$39,539
S1 - Increasing lean meat yield but maintaining eating quality	$17,755	$-	$17,755	$4,637
S2 - Increasing lean meat yield but maintaining pH	$-	$-	$-	$-
S3 - Increasing feedlot marbling but optimising turn-off times	$-	$-	$-	$-
S4 - Improving animal health	$23,066	$3,735	$23,066	$10,958
S5 - Improved processing efficiencies	$8,631	$923	$8,631	$3,035
S6 - Fabrication of purchased livestock to optimise value	$50,864	$4,231	$50,864	$20,908

Figure 25 Likely sheep industry value created from OM by benefit scenario relative to potential opportunity (2019 re-forecast)

Table 15: Industry sector potential value realisation from each scenario

OM Benefit Scenario's	BEEF				SHEEP		
	Extensive Northern	Reliable Environment	Feedlot	Processing	Lamb	Hogget	Processing
S1 - Increasing lean meat yield but maintaining eating quality		✓	✓	✓	✓	✓	✓
S2 - Increasing lean meat yield but maintaining pH	✓			✓		✓	
S3 - Increasing feedlot quality but maintaining turn-off times			✓	✓			
S4 - Improving animal health	✓	✓	✓	✓	✓	✓	✓
S5 - Optimise livestock purchased to market specifications				✓			✓
S6 - Fabrication of purchased livestock to optimise value				✓			✓
✓ *where the most value will be realised*							

For scenarios 1 through to 4, benefits are estimated to be equally split between producer and off-farm sectors of the supply chain. For scenarios 5 and 6, initial benefits would accrue to the processing sectors, although in the long-term it is anticipated that redistribution would accrue to other supply chain sectors.

If the above opportunities are to be realised by industry, transformational changes are required. These include the use of new measurement technologies, changes to existing pricing systems, producer extension and capability building as well as successful implementation of new business processes and systems in areas such as information exchange, decision support tools, market reporting, communication and traceability. The priority and timing of key enablers have been summarised in Table 2.

For the purposes of this LDL report, note the sections of the table below highlighted in green relate directly to information exchange and data driven feedback and feedforward systems along the supply chain

Table 16: Key enablers to realise industry value

Key Enablers	Description	Priority[+]
Technologies / objective trait measurement	1. Commercial installation of objective measurement systems at processing a. Lamb intramuscular fat (IMF) b. Beef LMY c. Beef pH – current measures do not align to consumer value d. Beef eating quality – replace existing MSA assessments with objective measures to predict EQ	 1 1 2 3
	2. Objective measures in live animals: a. Genomic testing to aid management decisions (e.g. lamb yield and IMF, beef marbling pre-feedlot etc.) b. Scanning for prediction of yield and quality* **Critical but likely more difficult and not at the expense of processor measures that will have faster and wider industry adoption.*	 2 3
	3. Management decisions enhanced by individual sheep ID – will speed selection pressure but not as critical as objective measures due to flock-based management.	3
Calibration of measurements/trust	4. Coordinated third party maintenance of standards and accuracies across (potentially) multiple measurement technologies and installations. 5. Industry visibility of measurement standards and accuracy demonstrated to instil confidence and trust in new measurement and trading systems.	2 2
Data transfer standards	6. Agreed standards and mechanisms for data transfer from measurement technologies to support interoperability between supply chains. 7. Animal health data capture and transfer protocols established	3 3
Value based trading (VBT)	8. Support industry uptake of VBT that is aligned with consumer value traits (including eating quality, yield, and pH) and animal health.	1
Feedback systems / Price transparency	9. Development of company and industry feedback systems that link objective measures to value for improved price transparency. 10. Capture and feedback of subjective/objective animal health data captured within a processing plant. 11. Support integration of objective measures into multiple decision support systems along the supply chain. *(for example, breeding values, on-farm and processor decision support tools, online auction systems, pricing grids, market reporting, underpinning of consumer value propositions)*	1 1 3
Market reporting	12. New market reporting approaches that align objective measures to consumer value and support industry to adopt VBT. 13. Increase industry awareness and understanding of the role of objective measures in new market reporting approaches.	1 2
Internal processor traceability and decision support systems	14. Support development of sortation and fabrication systems at processing that realise increased value of higher worth livestock to maximise value from VBT.	1
Producer/seedstock extension programs	15. Convey a deeper understanding of objective measures, their relationship with consumer value and how on-farm activities and management decisions impact them to enable continuous improvement. 16. Develop industry-based training programs to maximise industry understanding and use of feedback systems.	1 2

[+]***1*** *- Critical to realising direct industry value or indirectly (trust, information transfer etc.). Limits benefit of other correlated factors that would otherwise deliver value.*

2 *- Improves on existing effective measures, delivering greater value increases (increased accuracy or rate of information transfer)*

3 *- Provides efficiency or cost-effective alternatives to existing measures with less industry benefit but potential adoption increase.*