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Development of supply chain objective measurement (OM) strategy & value proposition to stakeholders

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Abstract

The red meat industry does not currently have all the measurement technologies and systems available and adopted that might assist to optimise red meat value within the supply chain. However, advances in objective measurement on the live animal, carcase or cuts have the potential to assist the red meat industry by improving efficiency and underpinning a new value-based transaction model.

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 also recognition across the industry of the need for change.

This report estimates that over $420 million of potential gross benefit per annum exists from the further adoption of objective measurements and associated pricing signals by 2030. Less than $75 million of this is likely to be realised by 2020 while around $250 million could be realised by 2030. The difference between potential benefit and likely benefit is the gap between opportunity and adoption.

These benefits were estimated to be split equally between producer and off-farm sectors of the supply chain over time in most of the scenarios modelled.

Executive Summary

The Australian red meat industry does not currently have all the measurement systems available and/or adopted that might further improve red meat value within the supply chain. However, advances in objective measurement (OM) have the potential to assist the red meat industry by improving efficiency and underpinning a new value-based transaction model.

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. Figure 1 provides a summary of the potential value opportunity for the red-meat industry by 2020 and 2030 from modelling a small number of benefit scenarios as summarised in Table 1.

This report identifies that around $420 million per annum of potential gross benefit exists from the adoption of further objective measurements, associated pricing signals and resultant on-farm management changes by 2030. Less than $75 million of this is likely to be realised by 2020 while around $250 million is potentially realisable by 2030. The difference between potential benefit and likely benefit is the gap between opportunity and adoption. These benefits were estimated to be split equally between producer and off-farm sectors of the supply chain in most of the scenarios modelled.

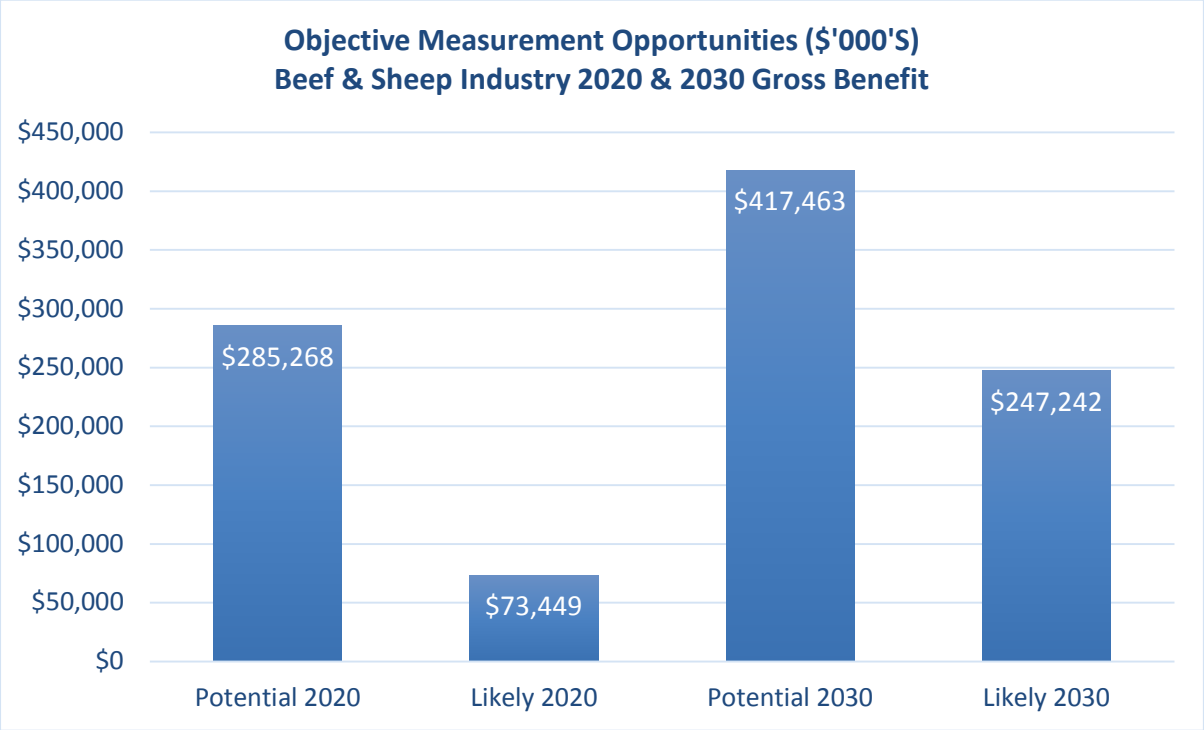


Figure 1: Objective measurement potential value opportunity for the red-meat industry by 2020 and 2030[1].

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 effected 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?

Table 1: 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.

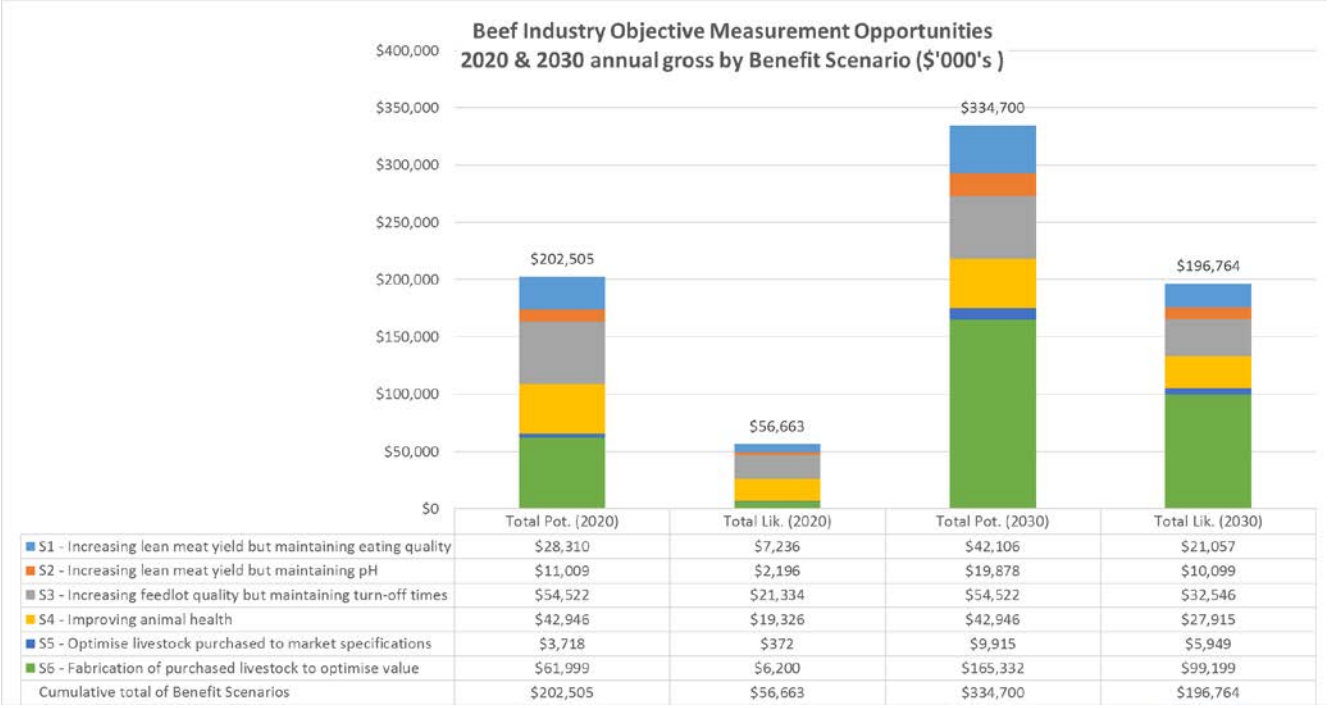
Each scenario is briefly summarised below:

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[2]. 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 quality 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[3,4,5]) is required for higher profitability.
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.
5. **Improved processing efficiencies -** Benefit of improved carcase sortation to customer specifications using accurate carcase objective measures to increase productivity within the processing plant.
6. **Fabrication of purchased livestock to optimise value -** Objective measures that enable more accurate processor sales pricing decisions and support boning make schedules to extract increased value from carcases.

Beef and lamb industry benefits for each scenario in Figure 2 and Figure 3 indicate:

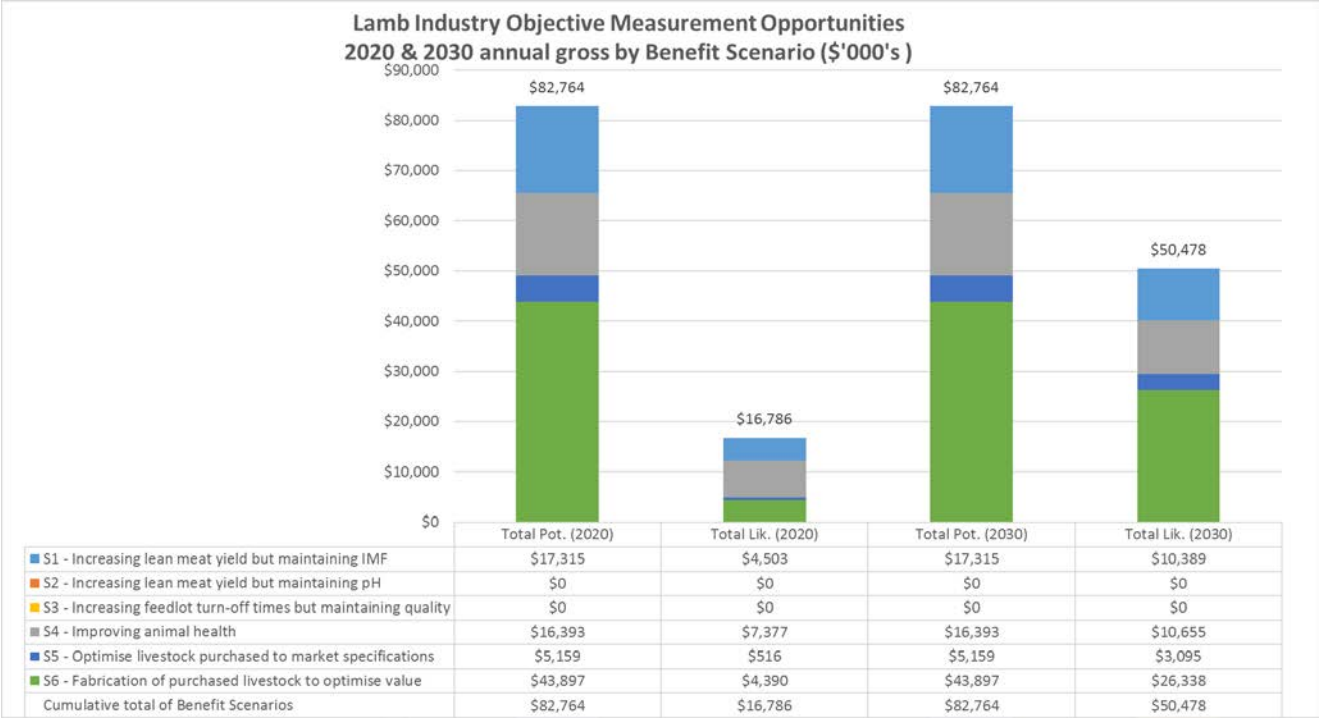
- Scenarios 1 through 4 deliver the greatest short-term value for beef.
- Scenarios 1 and 4 deliver the greatest short-term value for lamb (Scenarios 2 and 3 don't readily apply to lamb).
- Scenario 6 delivers far greater value over the longer-term (2030) than the shorter term (2020) for both beef and lamb, and assumes that processor profit is distributed up and down the chain over time.

[2] McGilchrist P (2012). Beef CRC Fact Sheet: Producers can eliminate 'Dark Cutting'. *CRC for beef genetic technologies*.
[3] Ewers (et. al.) (1999) Saleable beef yield and other carcass traits in progeny of Hereford cows mated to seven sire breeds
[4] 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.
[5] Arthur J, Herd R (2008). Residual feed intake in beef cattle. *Revista Brasileira de Zootecnia* (37). ISSN 1806-9290.



	Total Pot. (2020)	Total Lik. (2020)	Total Pot. (2030)	Total Lik. (2030)
S1 - Increasing lean meat yield but maintaining eating quality	$28,310	$7,236	$42,106	$21,057
S2 - Increasing lean meat yield but maintaining pH	$11,009	$2,196	$19,878	$10,099
S3 - Increasing feedlot quality but maintaining turn-off times	$54,522	$21,334	$54,522	$32,546
S4 - Improving animal health	$42,946	$19,326	$42,946	$27,915
S5 - Optimise livestock purchased to market specifications	$3,718	$372	$9,915	$5,949
S6 - Fabrication of purchased livestock to optimise value	$61,999	$6,200	$165,332	$99,199
Cumulative total of Benefit Scenarios	$202,505	$56,663	$334,700	$196,764

Figure 2: Potential beef industry value created from OM by benefit scenario relative to maximum opportunity



	Total Pot. (2020)	Total Lik. (2020)	Total Pot. (2030)	Total Lik. (2030)
S1 - Increasing lean meat yield but maintaining IMF	$17,315	$4,503	$17,315	$10,389
S2 - Increasing lean meat yield but maintaining pH	$0	$0	$0	$0
S3 - Increasing feedlot turn-off times but maintaining quality	$0	$0	$0	$0
S4 - Improving animal health	$16,393	$7,377	$16,393	$10,655
S5 - Optimise livestock purchased to market specifications	$5,159	$516	$5,159	$3,095
S6 - Fabrication of purchased livestock to optimise value	$43,897	$4,390	$43,897	$26,338
Cumulative total of Benefit Scenarios	$82,764	$16,786	$82,764	$50,478

Figure 3: Potential sheep industry value created from OM by benefit scenario relative to maximum opportunity

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.

Table 2: Key enablers to realize 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.*

Transitioning to greater industry value might look something like this:

Short-term (2-3 years)

The most likely impacts in moving to a system which is based on more objective measurement and value-based pricing include the following:

- There will be both winners and losers amongst producers as new payment methods reward better quality more accurately and identify where current systems overpay for waste / lower quality[6].
- There will be a lag in value increases because initially at least livestock supplied will be no different – and this won't change until feedback is provided and the next generation of improved animals reaches sale.
- Processor risks will remain the same during this period. The same average price will be paid for livestock and the same livestock will be supplied, although differences between supply chains may occur. For example, assuming partial adoption of VBT, supply chains paying a premium for better quality may attract higher quality from other supply chains that only pay average price across a range of quality levels..

Industry equilibrium - There is a lag between adoption of actions and change being realised. Simplistically, there will be no net difference in value at an industry level in the first 2-3 years.

Medium term (>3 years)

- The next generation of livestock (resulting from increased objective feedback) will progressively deliver improved quality and value. That assumes the price signal to improve is incentive enough to stimulate improved genetic selection and management practices.
- Producer will benefit because of feedback that is more accurate and with pricing premiums incentivising improved genetic selection and management decisions.
- Processors will benefit if they can receive more value from the increased quality than they pay for (this may be a risk as outlined below). There is also the opportunity to increase market share because of better meeting customer requirements.
- Sustaining price premiums for higher quality is another consideration. Processors also need systems and processes internally to help them realise the extra value they have paid for, and market activities that sustain value attribution.

> ***Objective measurement technologies*** *must be coupled with new* ***pricing signals*** *(Value Based Trading) that align decisions along the supply chain to consumer needs to* ***increase industry value****.*

[6] Rosenthal E, Savell J. Value-Based Marketing of Beef. *Meat Science*. Texas A&M University.

Key activity areas have been summarised in the following draft recommendations. Each area should be developed in parallel but in the following order. As each challenge is addressed the next one is more likely to be overcome.

Recommendation 1 – Form an Objective Measurement Adoption Group (OMAG) that focuses industry activities on outcomes that enable increased adoption of objective measurement and value-based transactions.

Recommendation 2 – Prioritise research and development of objective technologies and enabling capabilities for commercial use by certain time frames. The OMAG should consider how this activity progressively supports industry and the remaining recommendations.

Recommendation 3 – Support the industry to adopt objective technologies (becoming "objective measurement ready") via widespread availability of commercial systems.

Recommendation 4 – Increase supply chain participants (especially producer) understanding of the impact of objective measurement on their businesses by working collaboratively to educate and to support opportunities to increase value (becoming "objective measurement aware").

Recommendation 5 – Develop standards for objective measurement, data transfer and reporting that build confidence and integrate with industry support systems, on-farm and off-farm extension activities and reporting functions to facilitate "whole of industry" adoption of objective measurement and VBT systems (becoming "OM and value based trading ready").

Recommendation 6 – Support the widespread adoption of VBT to achieve a critical mass required to be sustainable (becoming "value based trading active").

Recommendation 7 – Continue to expand the base of commercial objective measures and integrate complementary programs to leverage ongoing industry improvement and competitive advantage from objective measures (leading "global competitive advantage").

Summary of recommendations

Were these 7 draft recommendations supporting adoption of objective measures and value based trading accepted, they would need to be progressively rolled out over time. An indicative timeframe for this is included in Figure 4.

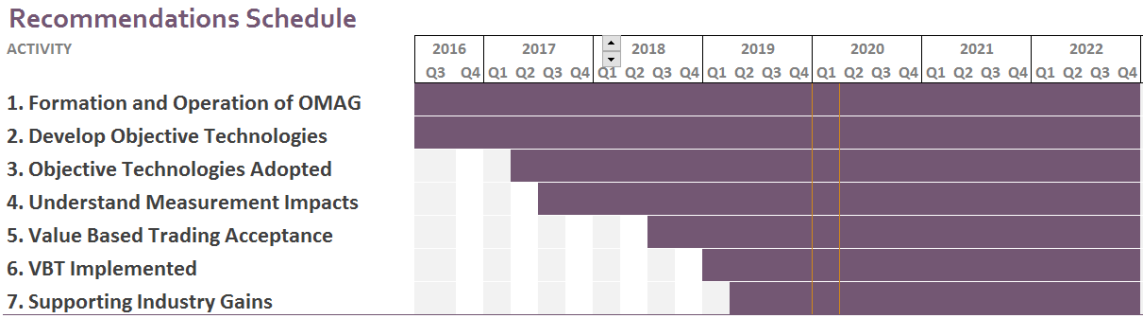


Figure 4: Objective Measurement Strategy Recommendations Schedule