

BLOCKCHAIN FOR THE MEAT INDUSTRY: WHERE AND HOW?

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Project Description

There are instances where red meat products have been falsely marked as products of Australia in order to take advantage of the perception of premium quality. The AMPC project 2018-1047 was undertaken to help address this challenge of counterfeit products. The project investigated the use of blockchain technology to establish product traceability for the Australian red meat industry. Specifically, the project examined (1) what types of information, (2) at what places along the meat supply chain, and (3) how the information should be collected in order to facilitate the use of blockchain technology.

Project Content

The project utilised the Supply Chain Operations Reference (SCOR) framework as the basis for processing mapping, and this approach was strengthened by further process decomposition beyond the SCOR model. A web-based application was developed to facilitate the collection of detailed information, such as process time and resources required for collecting traceability information, for each process step. The data collected were then fed into an ROI calculator which, together with fixed investments, produced the results for ROI analyses.

Project Outcome

During this project, a base scenario (“as-is” scenario) was constructed to reflect the existing meat processing operations. Two “to-be” scenarios were then proposed based on the desired level of traceability: the first focussed on traceability at the batch level; and the second on one-to-one traceability (i.e., paddock to plate). The project outcomes included:

1. Process maps for both the “as-is” and the “to-be” scenarios.
2. Recommendations on where and how data could be collected to establish traceability for meat processors.
3. The proposed boning room redesign to enable one-to-one traceability, given the current boning room operations usually lead to mixing of primal cuts.

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4. The development of the web-based application to conduct process mapping and ROI analysis.
5. The ROI analysis results for meat processors on the scenario where one-to-one traceability is desired. As the one-to-one traceability needs a redesign to the boning room and thus operational changes to the current meat processing practices (and hence additional investment), two ROI analyses were conducted to assess the feasibility of this approach. The first ROI analysis focused on understanding the fixed cost implications of developing one-to-one traceability; and the second ROI analysis considered a number of benefits resulting from the use of one-to-one traceability.

Assuming an annual throughput of 150,000 animals and an average of 180 kilograms per carcass, the cost of establishing one-to-one traceability will be 1.19 cents per kilogram in Year 1, and 0.04 cent per kilogram from Year 2 and onwards. If there will be an assumed price increase of 5 cents per kilogram, and annual labour cost savings of \$60,000, the ROI analysis results indicated that there would be a positive cashflow of 0.7 cent per kilogram in Year 1, which rises to 1.85 cents per kilogram from Year 2.

Benefit for Industry

1. Market advantage in a future market
 - (i) Food provenance is becoming an increasingly important consideration for consumers, particularly within export markets where there have been cases of fraudulent products entering the retail stream. Blockchain can secure the supply chain in a digital manner and work with existing physical measures to further protect a brand's perception within the retail market.
 - (ii) Early adopters of the blockchain technology might gain advantages such as product competitiveness or customer loyalty, as a brand which gives consumers confidence in its authenticity and quality may secure or capture more market share in the future.
 - (iii) Consumers are likely to be interested in more than just the product provenance information. Meat product brands can seek to differentiate themselves by providing the 'story' behind their products in the form of such as the farming region and the approaches used by farmers to produce high quality meat.
2. Labour cost savings/automation
 - (i) Developments in automated red meat processing have the potential to integrate well with traceability systems.
 - (ii) Automation will also help address the issues of rising labour cost and labour supply in the long run.
3. Regulatory compliance and risk reduction
 - (i) Adoption of increased traceability systems may also help address the regulatory requirements. Companies operating a traceability system are likely to be ahead of the game and in a strong position to guide and inform policy development in a more advantageous way.
 - (ii) A blockchain enabled one-to-one traceability system would enable a meat cut's full history to be determined with certainty in a very short amount of time. This in turn would enable a quicker response to an emerging health-related situation, and more importantly limit the extent of damage arising from the incident to farmers, processors and retailers who are not affected or involved.

While there are risks associated with every investment, the results from this project suggest that blockchain technology enabled traceability is worth for future advantages it brings.

Contact Information

Australian Meat Processor Corporation
 Suite 2, Level 6, 99 Walker Street
 North Sydney NSW 2060
 Tel: 02 8908 5500
 Email: admin@ampc.com.au
 Website: www.ampc.com.au