The red meat sector must innovate, but the obstacles are vast.

ONE HUNDRED YEARS AGO firms in New Zealand’s red meat sector changed the way beef and sheep meat were consumed in the United Kingdom through the adoption of discontinuous product, process, and business-model innovation built on the commercialisation of refrigeration technology. By-products of the wool industry were transformed into chilled carcasses for a secure and growing market, slaughtering chains were introduced, and partnerships were developed between existing farming and shipping businesses. Large-scale distribution channels were created and new organisations, in the form of industrial-scale abattoirs and intermediary stock agents, were established to secure seasonal supplies of cattle and sheep. The resulting processed goods were then shipped to highly-regulated markets half way around the world.
In the face of fluctuating commodity prices and rising operating costs some dry-stock farmers have vertically integrated into boutique production, processing, and marketing businesses, converted to dairy farming, or left the industry. Each of these responses, while inherently logical for the individual farm owner, has contributed towards a reduced volume of beef and lamb available for processing. Given an existing 50 per cent processing overcapacity, the current business models for dry stock farmers, meat processors, and distributors appear to be unsustainable in the medium- to long-term.

Over the past two years I have worked with students to understand the challenges in the country’s red meat sector, drawing on innovation management theories to propose ways the sector might innovate to address these challenges. During this time, we have had the opportunity to speak with senior executives from firms with processing, and marketing and distribution capabilities, and research managers tasked with making R&D investments to support future growth.

Two broad questions have guided our investigations:

1. What patterns shape the types of innovation that occur in New Zealand’s red meat sector?
2. What management theories might inform the way innovation challenges can be addressed?

**WHY INNOVATION IN RED MEAT MATTERS**

According to the Meat Industry Association’s 2009 Meat in Focus report the New Zealand red meat sector generates about $8 billion in export earnings annually, with 92 per cent of lamb, 82 per cent of beef, and 95 per cent of venison exported. Together these product categories account for around 27 per cent of New Zealand’s primary exports. At the same time, the industry faces eroding profitability due to commodity price fluctuations, land use pressures, and increasing production costs.

Innovation matters because it can play an important role in addressing these challenges by exploiting opportunities created by changing customer needs in existing and emerging markets, and by adopting new production and organisational practices, and new business models. Yet the innovation needed in the sector differs somewhat both from what has occurred in the past and from current innovation in other industries.

A useful distinction in innovation types is that between incremental, synthetic, and discontinuous innovation, as outlined by organisational theorists Michael Tushman and David Nadler. Incremental innovation refers to small improvements to standard product lines or process improvements, such as added features, new versions or extensions, that lower production costs or increase quality. Incremental innovation exploits an organisation’s existing knowledge. Generally the red meat sector has been very good at incremental innovations – for example, by adjusting animal husbandry practices to local conditions and by grading carcass quality by eye. However, the limitation of focusing on incremental innovations is that over time the opportunities for small improvements become fewer and the organisation’s knowledge can be made redundant. The adoption of data-driven farm management practices using app-based large data sets, for example, provide more reliable data for decision-making than relying on the experience of individual farmers. While local knowledge about soil conditions and animal health (such as fertility, disease resistance, and growth rates) remains important, the financial value that can be created from data-driven techniques is significant.

Synthetic innovation uses existing ideas or technologies in creative ways to originate significantly new products or to increase the size, volume, or capacity of well-known production processes. For synthetic innovation, marketing and production skills are more important than technological ones. Historically, New Zealand meat processors have been very good at synthetic innovation, particularly that which produces volume and capacity outcomes. Such innovation includes the integration of new packaging...
technologies into existing slaughter chains to increase product shelf-life, and the upgrading of production processes to reduce carcass wastage. However, synthetic innovations are most effective when marketing and production skills are integrated in the innovation process. New Zealand’s red meat sector generally recognises that marketing skills are weak, particularly in terms of market intelligence, market validation, and market entry strategy.

**INDUSTRY MATURITY**

According to the industry life cycle theory, innovation in mature industries tends to be low compared with that in entry and growth industries, and is usually dominated by large firms.

Lower innovation can be explained by the well-known principles of product life-cycles. As Tushman and Nadler revealed, once economies of scale and production cost reductions are achieved through product design and process improvements, and once markets become saturated, firms tend to focus on incremental improvements because the return on investment for larger spending becomes harder to justify. At the same time, firms are reluctant to make large investments into discontinuous innovation since these might make existing products or processes redundant. Thus, firms lock themselves into path dependence — they become focused on exploiting previous investments, and usually fail to see opportunities associated with new ones.

Incremental product and process innovation dominates the red meat sector’s current product portfolio. Since the 1980s, the automation of killing chains has reduced labour costs and injuries, reducing major variable costs, and increasing the accuracy of meat cuts. This, in turn, has enhanced the product consistency demanded by large overseas customers, such as British multinational retailer Tesco, and has reduced the quantity of unusable waste cuts. And the adoption of packaging technologies, such as the FoodCap system, has reduced temperature fluctuations, flavour tainting and meat discolouration, thus reducing wastage and increasing shelf life for overseas markets by up to 14 weeks — a necessary development given the shipping industry’s adoption of slower sailing times to contain fuel costs.

**PATTERNS OF INNOVATION**

While New Zealand’s red meat sector historically has used a range of innovation types, to understand better what innovation is needed in the future it is useful to consider the ongoing effects of two factors: industry maturity and low R&D investment.

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While incremental innovations are important for short-term performance, they do little to address processing overcapacities and the need to add value to what is a commodity product. According to the industry life-cycle theory, the red meat sector’s continued reliance of incremental innovation can only lead to its decline.

The second characteristic of innovation in mature industries is that it tends to be dominated by large firms, and this can be explained by both industry and product life-cycle models. Carnegie Mellon University researcher Steven Klepper has found that in mature industries there are fewer growth opportunities for all firms, which leads to shakeouts among underperforming incumbents. The power gained from agglomeration through mergers affords large firms the ability to dominate innovation through market share and control of resources. New Zealand’s red meat sector has a long history of mergers and acquisitions — a history that is described in detail in Mick Calder’s and Janet Tyson’s 1999 book *Meat Acts: the New Zealand meat industry, 1972-1997*.

Dominating market share and control of resources enables large firms to respond aggressively to competition through price wars. This is enables them to protect their investments in both incremental and discontinuous innovations.

**LOW R&D**

The second factor of low-to-medium technology industries is a tendency toward utilising low-technology innovation supported by low (or no) R&D investment.
Generally the level of business R&D investment in New Zealand is low, at around 0.64 per cent of GDP, and, according to recent analysis of OECD data by the New Zealand Productivity Commission, it rarely exceeds 0.5 per cent in sectors associated with low-to-medium technology industries. However, some parts of the red meat sector appear to fare worse. The 2012 High Value Manufacturing and Services report, which included red meat as a sub-section of high value manufacturing in food and beverage, found that only 12 per cent of firms in the Food and Beverage sector had active R&D.

Low (or no) private R&D investment is problematic because R&D is known to be an important investment for organisational learning. The theory of absorptive capacity, advanced by Wesley Cohen of Carnegie Mellon University and Daniel Levinthal of the University of Pennsylvania, explains organisational learning as an organisation’s ability to “recognise the value of new, external information, assimilate it, and apply it to commercial ends”. In studies of mainly high-technology sectors, R&D investment is positively associated with absorptive capacity; firms that invest in R&D develop organisational capabilities to look beyond existing markets to search out ideas, technologies, and new market opportunities, assess which of them support the organisation’s strategy, and integrate and re-organise the firm to produce synthetic and discontinuous innovation.

However, firms in the red meat sector tend to be debt laden and to face constant revenue variability. So, how can such firms invest to develop their absorptive capacity in order to understand new idea technologies, markets and business models, and shape value propositions that will drive future profitability when current low profitability blocks the necessary R&D investment?

ADDRESSING THE CHALLENGE OF MATURITY AND LOW R&D

Innovation management theories offer a number of insights and analytical tools that can help overcome the barriers to innovation in the red meat sector. The final section of this article outlines two responses that can offer ways forward for low-to-medium technology industries.

COLLABORATIVE INNOVATION

Collaborative innovation occurs when ideas, knowledge, expertise, and opportunities are shared across firms. It can provide a way for firms and industries to compete because capabilities for existing innovation, and the costs of developing new ones, are shared. In addition, collaborative innovative exposes firms to the ideas, processes and technologies used by local competitors, suppliers, and customers, and thus presents the opportunity to learn about alternate (and potentially competing) innovation, and to break path dependency.

Collaborative innovation is not a costless approach to innovation; it require investments in capabilities to...
coordinate and manage relationships, and firms must contribute their share to R&D investment in new capabilities. The Ministry of Primary Industries’ Primary Growth Partnership, which provides matched funding on industry-led initiatives, is one recent, and potentially constructive, intervention. Though innovation capabilities take time to develop, such collaboration provides a way to make high-risk investments that single entities would not undertake alone.

Since the discontinuous innovations that are likely to reinvigorate the red meat sector exist in distant emerging markets, including China, India, Southeast Asia, and Russia, and differ culturally from existing North American and Western European markets, and since they involve different product categories (for example ingredients as functional foods), and use new technologies, (such as extracting by-products for biomedical and healthcare applications, and nanotechnology for packaging), collaborative innovation offers a way of organising learning. Such an approach suggests there is also an increased role for universities and Crown Research Institutes.

ENTREPRENEURIAL COOPERATIVES

The second means of addressing industry maturity and low R&D investment - and one that is related to collaborative innovation – is to better understand how organisational structures support innovation.

A number of initiatives at the firm-level use organisational structures to address productivity issues in the red meat sector. Greenlea Premier Meats uses contracting arrangements with other processing firms, such as Wilson Hellaby, to manage production peaks and capacity issues. To re-balance returns to suppliers of high-end meat cuts, Greenlea has negotiated supplier contracts with iwi-owned farms for such cuts to be returned and marketed under tribal brands. Other processors, including Silver Fern Farms, Ovation, Progressive Meats, Lean Meats and Firstlight Foods, have introduced fixed-price contracts to improve income security for farmers and increase security of supply for processors.

While these organisational arrangements address immediate needs, it is not clear that they are able to support the discontinuous innovation required. Such investment in ideas, technologies and markets, requires collaboration among large and small farmers, processors, marketers, and distributors on a level that has not been seen in the sector before.

My colleague Frank Siedlok and I are currently investigating whether entrepreneurial cooperatives provide a useful structure for supporting collaborative innovation. Historically, collaboration in primary producer industries has been achieved through user-owned and user-controlled cooperatives such as the recent farmer cooperatives in the South Island. However, traditional cooperatives are usually commodity oriented and tend towards risk aversion, thus, are less likely to support collaborative innovation.

More recently, a new form of entrepreneurial cooperative structure has emerged; one that is customer-focused and innovation-oriented, and which includes engagement in R&D activities that would be beyond the scope of any single member organisation.

Recent farmer surveys have reported wide support in the red meat sector for adopting the Fonterra model. While the red meat and dairy sectors might share similar sales growth and low private R&D, differences in the nature of the commodity present different challenges. Unlike fresh milk, which can be broken down into constitute elements and stored for years as dried milk powder, fresh meat has a three-month shelf life, and current freezing practices significantly reduce the product value. Thus, consideration of the entrepreneurial cooperative structure should address whether it is capable of supporting the type of collaborative innovation needed to meet sector-specific challenges.

KEY TAKE-OUTS

• Lamb, beef, and venison make up 27 per cent of New Zealand’s primary exports.

• Industry maturity and low R&D investment are challenges to fostering appropriate innovation in the red meat sector.

• Collaborative innovation and entrepreneurial cooperatives offer two possible routes to industry profitability.