



Final report

Design Sprint: Collaborative exploration of impact acceleration through commercialization: theme 1- Extending the shelf life of meat & theme 2 - differentiated collagen markets

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Abstract

MLA has engaged the services of SVG Ventures | THRIVE to assist in exploration and development of a corporate acceleration model. This work targets two main objectives: 1) to better leverage MLA's R&D investment and, 2) to drive positive impact for the Australian Red Meat industry.

This report details the first project with THRIVE that probed commercialization of MLA IP in three distinct directions: consumer packaging and storage, health and ingredients, and food retail. The first and most intensive initiative involved a series of collaborative, design-focused workshops with R&D and Innovation team members at Tupperware. The intent was to combine pools of expertise to identify innovative food storage concepts focused on extending the shelf-life of red meat. More broadly, this was an action-based demonstration of how MLA can extend its work in sustainability and meat science, which traditionally happens on farm, to consumers and commercial partners like Tupperware. The second and third initiatives targeting health and ingredients and retail markets was designed to explore a more expedited route to commercial opportunity identification through a series of 2-3 discussions revolving around the MLA IP portfolio and a corporate partner's commercial needs. The research team conducted discussions with CoreFX, a health-focused ingredients subsidiary of global food corporation, Ornuu. The team reached out to multiple large grocery chains with potential courses of dialogue but was unable to secure participation. The hypothesis, strengthened by the results of this project, is that untapped value exists in MLA expertise and can be commercialized in multiple ways, one of which is pursuing new venture development collaborations. David Kusuma, Former VP of R&D at Tupperware, summarized the benefits of working with MLA:

The collaboration created the perfect partnership to bridge technology from MLA and the meat industry, with advanced concepts on food conservation from Tupperware. It involved new problem-solving techniques to approach potential solutions from a different point of view. MLA shared their vast knowledge on meat science to help futuristic concepts from Tupperware come to life with realistic opportunities.

Executive summary

Background – Tupperware

Tupperware USA agreed to participate as the first corporate in this mini-accelerator format. THRIVE proceeded to design and facilitate a series of design thinking virtual workshops leveraging Miro, a virtual collaboration tool, to capture key insights and concepts. Over 12 workshops with asynchronous work in between, the research team identified key pain points and barriers for consumers that lead to meat wastage, shared insights in meat science and food and packaging science, synthesized key design themes, and brainstormed over 30 solution concepts. The top concepts were drafted into high-level MVP designs by Tupperware and THRIVE sourced start-ups bringing solutions to market that are making progress in line with the brainstormed concepts.

Through consumer needs led design methodologies, MLA, Tupperware, and THRIVE synthesized three key themes on which to base solutions:

- **Conservation to keep meat fresher, longer** – How might packaging, linkages to digital technology like smart fridges and kitchens, and meat science be combined to extend the shelf-life of meat and ultimately help consumers waste less meat?
- **Enhance meat quality through processing** – Can interventions such as sous vide, dry ageing, dicing, tenderising, marinating, etc that add value in meat factories instead be employed at home? How might a consumer storage product leverage these interventions to improve meat quality such that consumers have a better eating experience and waste less meat?
- **Simplistic monitoring of meat safety at home** – What emerging technologies and designs would help consumers understand if meat stored at home is safe to eat or not? Can these technologies be incorporated into commercially viable, intuitive solutions?

Objectives - Tupperware

1. Better understand ways to improve the consumer eating experience while extending the shelf life of meat products.
2. Apply MLA knowledge base, specifically industrial meat science and conservation, to consumer food storage science and design.
3. Explore applicability of Tupperware food conservation innovations in horticulture, grains, and dairy, in addition to its conservation work with NASA, to meat conservation.
4. Explore emerging concepts in food conversation, combined with functional expertise in #2 and #3 to develop a set of key functional requirements that guide new product development.
5. Develop tangible MVP design(s) with unique functionality that improve quality of life for Tupperware consumers.
6. Publish a report sharing process and findings (this report).

Methodology - Tupperware

The research team engaged virtually in 12 open innovation design-thinking workshops, combining unique MLA and Tupperware expertise to:

- Evaluate consumers' meat preparation, consumption, and storage journey after purchase
- Identify key barriers, pain points, and jobs-to-be-done in the extension of meat shelf-life, quality, and safety
- Ideate and prioritize potentially marketable solutions to those barriers and pain points
- Develop high-level prototypes around most promising concepts

The workshop series was conducted virtually via Zoom and Miro. The raw Miro board can be viewed [here](#), password: innovatemeat21.

Background – CoreFX and Retail

After concluding our work with Tupperware, the research team sought a more direct route to accelerate IP commercialization in health ingredients and retail markets. With a selection of high potential projects from the current IP portfolio and a hypothesis around how they could add value in the corporate space, the team theorized that a shorter series of discussions with an interested corporate partner would be sufficient to validate commercial potential (i.e. if it makes sense to proceed to a pilot project or not).

Objectives – CoreFX and Retail

1. Rapidly validate corporate interest in targeted MLA IP portfolio projects
 - a. Topics for health ingredients corporates: wellness collagen and protein powders derived from clean green Aussie beef / sheep origins
 - b. Topics for retail corporates: total animal wellbeing index and Aussie meat as part of wellness lifestyle positioning
2. Identify potential commercialization concepts for pilot
3. Explore alternative option to longer design sprint for accelerating commercialization of IP

Methodology – CoreFX and Retail

The research team reached out to prominent companies in the health ingredients and retail markets to identify a partner willing to engage in the discussion, at which point a flexible cadence of 2-3 discussions was executed between THRIVE, MLA, and the corporate partner with the following intent:

- Introduction and overview of pre-identified MLA IP assets
- Corporate partner shares needs in relevant area, clarifying questions
- Commercial concepts jointly identified, corporate partner validates concept potential
- Next steps documented

Consolidated Results & Key Findings

In the Tupperware sprint, the team ideated multiple promising concepts and believes that commercial potential exists among them. The team also identified emerging technologies on the market that are seeking to address similar challenges in different ways. In the accelerated ingredients discussions with CoreFX, promising commercial potential was identified in the form of consistently high quality, sustainable Australian collagen supply. Partner search efforts in the retail space did not result in interested participants. In the overall process, MLA gained valuable experience in corporate acceleration methods that can be applied to similar efforts in the future. Key findings include:

- There are multiple avenues for extending the shelf-life of meat in a post-retail context by leveraging emerging food and packaging technologies in tandem with good design.
- Many of these opportunities involve translating industrial meat processing and storage technologies into consumer-friendly products, a concept that could be applied to other problem areas in the future.
- Viable solutions for consumers do not have to be digital. In fact, combining meat conservation science with material and physical design may deliver a more accessible, simplified solution.
- Emerging companies in the food storage space are demonstrating commercial viability and consumer demand for solutions that extend food shelf-life and reduce waste, especially around pain points associated with meal planning, understanding food freshness, and alternative consumer storage designs like simplified vacuum containers.
- A value proposition likely exists for a consistently high quality, sustainable collagen supply if a trademark is in place, consumer efficacy can be proven, and economics are viable.
- Collaborative design thinking and corporate venture development exercises are viable approaches for MLA to extend value of existing IP.

Benefits to industry

Our work in this innovation sprint combined thinking from outside the red meat value chain with progress made in industrial red meat operations to fill a gap in the market for meat-optimized consumer storage solutions. This is a necessary, early step towards enhancing the sustainability of meat and improving consumers' experience with meat, which we believe will benefit the entire meat value chain. More broadly, this work suggests open innovation methodologies, like collaborative venture development, are viable tools for addressing large, cross-value chain challenges like sustainability, food waste, shifting consumer preferences, and likely many more.

- Extending industrial meat and packaging science to consumers presents opportunity to further strengthen Australian Red Meat sustainability credentials across entire value chain.
 - Providing key meat science and conservation concepts to corporate partner (Tupperware) increases potential to commercialize and distribute the concepts broadly.
 - Successful commercialization could significantly reduce post-retail meat wastage.
- Potential differentiated collagen supply derived from Australian meat by-products could add value to supply chain.
 - Reduce waste in red meat supply chain
 - Add economic value to all supply chain stakeholders
- New, corporate collaboration approach can more efficiently, effectively, and creatively position MLA IP to contribute to industry growth.
 - The first step is learning and experimentation with new methods for IP commercialization.
 - This will create a path to more effective, consistent IP commercialization and thus value creation for the industry.

Future research and recommendations

- Continue experimentation around leveraging MLA expertise for corporate acceleration and new venture development. MLA plans to explore this area further with THRIVE in additional corporate collaborations and design of a venture development model.
- Further develop proposed designs with physical prototypes and test consumer willingness to pay.
- For Concept 1, future research needs include identifying the appropriate humidity environment for meat products and a static design that consistently promotes this environment.
- For Concept 2, future research needs include testing feasibility of adding marinade to the bag prior to freezing while ensuring a quality eating experience and marinade penetration after thawing or cooking in the bag.
- Continue engagement with CoreFX to scope a sustainable collagen supply pilot from Australia through to US buyer, analyse next level constraints for commercial viability, and determine go / no-go on pilot investment.
- Define MLA role in commercialization beyond research to clarify roles and incentives for participating parties to proceed with commercialization concept

- Explore additional value chain challenges and opportunities that could be approached with similar design thinking methodologies (i.e. foods for an ageing population).

CoreFX - recommended next steps:

- Conduct necessary research to understand if investing in collagen supply pilot project is advisable. Recommended activities include:
 - Model value chain economics to understand additional value created relative to potential costs at scale
 - Map competitive landscape and potential manufacturers – if no viable manufacturers exist, explore opportunity for creation of new venture with investment partners
 - Clarify work to prove efficacy – cost and timeline
 - Design pilot project(s): process to maintain supply differentiation, manufacturing, supply and distribution, proof of efficacy, both raw ingredient and as applied in end product
 - Engage pilot partners for input
- Assuming viable results to pre-pilot research, conduct pilot project.

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1. Background - Tupperware

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- **Simplistic monitoring of meat safety at home** – What emerging technologies and designs would help consumers understand if meat stored at home is safe to eat or not? Can these technologies be incorporated into commercially viable, intuitive solutions?

2. Objectives - Tupperware

1. Better understand ways to improve the consumer eating experience while extending the shelf life of meat products. **Objective Met.**
2. Apply MLA knowledge base, specifically industrial meat science and conservation, to consumer food storage science and design. **Objective Met.**
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4. Explore emerging concepts in food conversation, combined with functional expertise in #2 and #3 to develop a set of key functional requirements that guide new product development. **Objective Met.**
5. Develop tangible MVP design(s) with unique functionality that improve quality of life for Tupperware consumers. **Objective Met.**
6. Publish a report sharing process and findings (this report). **Objective Met.**

3. Methodology - Tupperware

The research team engaged virtually in 12 open innovation design-thinking workshops, combining unique MLA and Tupperware expertise to:

- Evaluate consumers' meat preparation, consumption, and storage journey after purchase
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3.1 Our Design Thinking Journey

The team engaged in several innovation exercises covering consumer journey mapping, pain point and jobs-to-be-done identification and prioritization, consumer interviews, value proposition canvas development, open solution ideation, solution concept iteration and prioritization, high level commercial validation, and low-fidelity prototype designs. The key moments of our journey are shared here.

3.1.1 Kick-off and information sharing

In true open innovation fashion, the sprint kicked off with both teams sharing an overview of the relevant expertise each would bring to the table throughout this collaborative effort. [Highlights from Tupperware](#) included previous designs it brought to market around bread- and cheese-specific solutions, work with NASA around food preservation in space, and overarching design principles for reusable, sustainable consumer food storage.

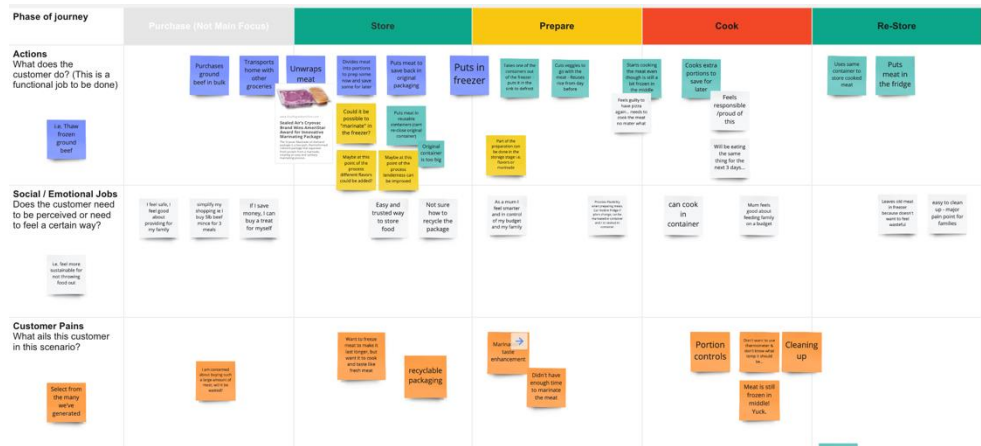


[Highlights from MLA](#) included extensive research in eating quality traceability with the Meat Standards Australia pathway, deep dive assessments on processing interventions like dry ageing, and investment in meat safety indicator technology research.

As seen in the final concepts, the team effectively leveraged each organizations' unique insights and transferred effective solutions from other areas to create new ideas.

3.1.2 Customer segment brainstorming and pain point identification

Using a combination of the Value Proposition Canvas, consumer journey mapping, and prioritization methodologies, the team was able to identify and target high priority pain points for consumers.



Starting with a brainstorm resulting in over 60 pain points, key themes were identified, and initial questions documented. The team realized our overarching objectives could be solved for at many points, or a combination of points, along the consumer journey.

This exercise is most effective when evaluating multiple consumer segments, so three differentiated segments were developed to create journey maps around: 1) Individuals seeking to improve meat quality or experience through some sort of conversion process, 2) Busy family with older kids that buys and cooks in bulk and prioritizes saving time and money, and 3) Busy family with younger kids looking for ease and flexibility that shops for meat multiple times per week, sometimes online, and is more likely to use connected kitchen tech.



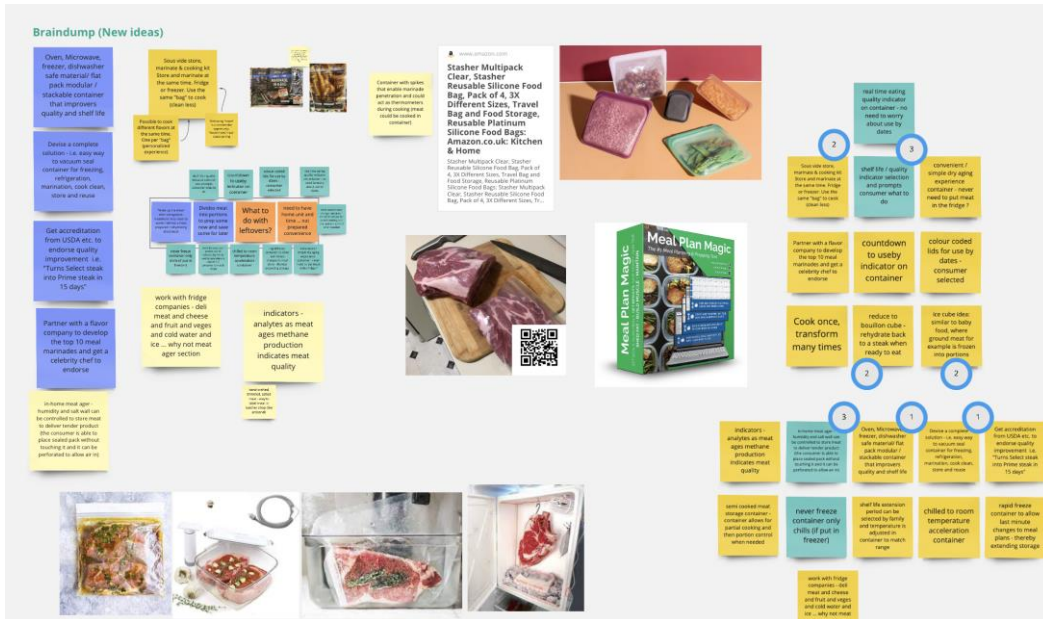
While many pain points and consumer “jobs-to-be-done” are important, focus was required for effective ideation. So, five pain points and five jobs to be done were prioritized from the rest at this stage. The pain points and JTBD in the image to the left were used as guideposts for ideation, not restrictive rules. The team ended up returning to these ideas after the first round of ideation to adjust and simplify based on our design trajectory, but the focus provided served an important function in our innovation process.

3.1.3 Idea expansion – testing solution boundaries and the cutting room floor

With focus now trained on consumers’ high priority needs, the team transitioned to our first ideation efforts. Our goal at this stage was idea quantity, not quality, and pushing the boundaries of what seemed feasible or reasonable. The team hypothesized that many processing interventions like sous vide and dry ageing are underutilized in a home context and could harbor untapped potential for quality improvement and shelf-life extension. Hypotheses were also held around alternatives to freezing, like salt boxes and refrigeration extension, being potentially viable solutions to shelf-life extension without impacting the consumers’ eating experience. Further, many ideas at this stage began to target consumer behaviour elements like forgetting meat in the freezer, portioning, and meal planning.

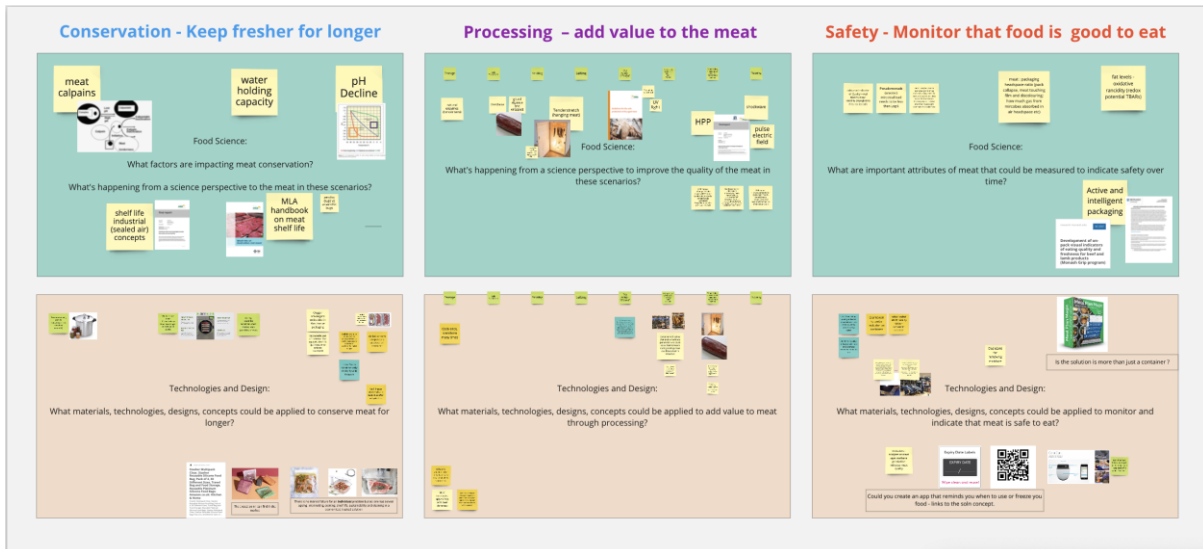
The resulting ideas varied in complexity from low-tech concepts like multi-coloured lids indicating shelf-life to technically complex solutions like dehydrating meat to a bouillon cube and

rehydrating it when ready to eat. Some ideas stretched the boundaries of feasibility, like an in-home dry ager leveraging historically relevant humidity and salt-wall technology. A segment of the ideation board is included below.



3.1.4 Refocusing on key design themes

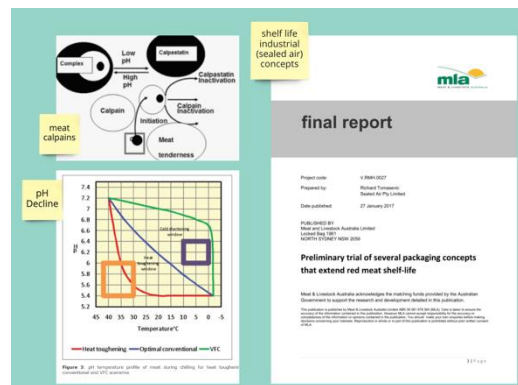
An initial round of prioritization was conducted in an attempt to identify promising solutions at this stage. The team quickly realized, however, that we were drifting from the project’s original scope and objectives. More specifically, the hypothesis that processing interventions like dry ageing could be made broadly commercially viable proved unlikely. In response, the three design themes highlighted in the executive summary, and reiterated below, were jointly developed for focus.



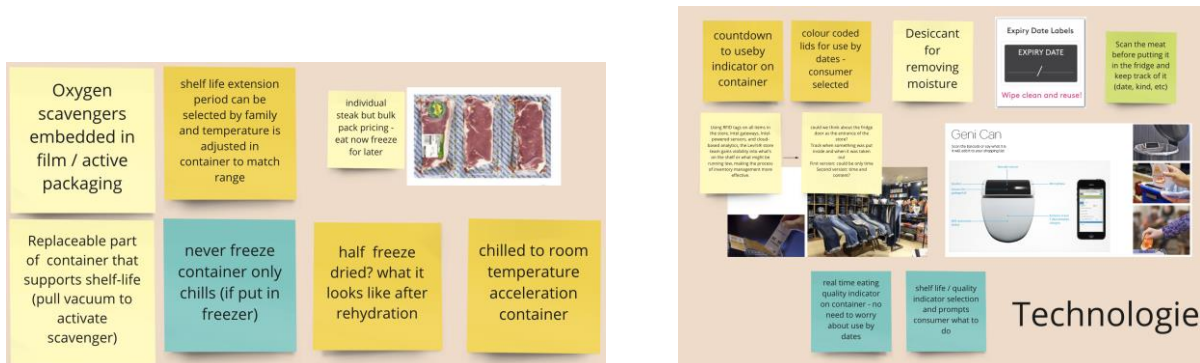
Resulting three design themes:

- **Conservation to keep meat fresher, longer** – How might packaging, linkages to digital technology like smart fridges and kitchens, and meat science be combined to extend the shelf-life of meat and ultimately help consumers waste less meat?
- **Enhance meat quality through processing** – Can interventions such as sous vide, dry ageing, dicing, tenderising, marinating, etc that add value in meat factories instead be employed at home? How might a consumer storage product leverage these interventions to improve meat quality such that consumers have a better eating experience and waste less meat?
- **Simplistic monitoring of meat safety at home** – What emerging technologies and designs would help consumers understand if meat stored at home is safe to eat or not? Can these technologies be incorporated into commercially viable, intuitive solutions?

The next activity was pivotal to consolidate the research team’s learnings to this point. Per the screenshot of the Miro board above, two sections were created for each design theme; one for meat and food science related to the theme and another directly below that for already generated and new ideas related to the theme. The team consolidated MLA and Tupperware resources reviewed previously and added new research, extracting relevant insights from each. For example, MLA provided education on meat calpains, pH decline and research around industrial sealed air packaging concepts that guided concept development for the ‘conservation’ theme. One resulting prototype directly leverages insights from the MLA report on industrial sealed air packaging, translating sealed air container solutions to a consumer product.



Both Tupperware and MLA teams then expanded on the ideas already generated with a second, more focused round of ideation. As put by Tupperware team member, Sara Delgado, “At the beginning we were thinking about solutions for niche customer segments, meat lovers. [In the second round of ideation] we started to think more about broader consumer segments, like moms, and day-to-day benefits.” More emphasis was placed on translating industrial-scale solutions to consumers. Michael Lee, from MLA, highlighted the team’s logic saying, “This was a new way to look at solutions in the meat value chain. Essentially, we are looking for ways to make consumers value adders, not just producers and packers.”



3.1.5 Detailing concepts and high-level commercial feasibility

With another round of idea expansion complete, idea convergence and prioritization were next. The team individually consolidated ideas into more tangible solutions and developed two to three mini

business cases with descriptions of how the key design principles are addressed and preliminary hypotheses around degree of impact, market size, and feasibility.

Concept Vacuum bags with optional oxygen scavengers insert	concept description here Consumer will be able to add oxygen scavengers insert to a vacuum bag. How easy is to get 100% vacuum? Would the insert make sense in this case or would it be more beneficial in a hard container? • possible to include biodegradable sachet / insert
How does this concept improve meat conservation? To what degree (forever or for a few more hours)?	Method of Conservation (if any) Oxygen scavengers Degree of Conservation (if any) ?
How does it improve processing / add value to meat? To what degree?	Method of Value Add (if any) Degree of Value Add: 4-5 days for partial vacuum, a few weeks if you can pull a really good vacuum Added value would be in reducing the space needed to store the meat (no air is being stored) Potentially bags could be used to cook the meat. sous vide?
How does it improve meat safety indication? To what degree?	Method of Safety Indication (if any) Degree of Safety Indication (if any)
Market Size	Medium (more likely valuable to those who buy meat at butcher or buying in bulk)
Feasibility	• need to understand how much pressure / residual air is needed for conservation • design challenge - can you get the air out of a rigid container that can be washed, reused, etc.

While true understanding of impact, market size, and feasibility requires more detailed analysis, this exercise prompted important questions. Does this solution solve for the right problems? Will it be broadly impactful or only marketable to a specific consumer segment? Is it easily adoptable? Can it be executed and commercially scaled?

The team presented their mini business cases, asked clarifying questions, and suggested improvements to the concepts. In the example to the left, the combination of oxygen scavengers and vacuums as a method of extending shelf life was discussed at length. Even by pulling a partial vacuum, the group argued, an additional four to five days could be added to meat shelf life. Pulling close to a complete vacuum could add multiple weeks to shelf life, a potentially massive impact.

Discussion around market sizing led to important shifts in concept selection. It became clear that some solutions would be valuable only to certain use cases and consumer segments, like oxygen scavengers and vacuums supporting bulk meat purchasers. Other solutions would be more broadly applicable and use case agnostic, like freshness indicators integrated into storage containers. While limited market size did not rule out a solution, it was a factor in selection. Overarching Tupperware design principles strongly support simplistic, everyday design. From this exercise, two concepts were selected for prototyping.

4. Results – Tupperware

The research team developed two virtual prototypes described below and captured key learned as part of the process.

4.1.1 Resulting Prototype 1: ‘Meat Keeper’

The Meat Keeper is a consumer container concept intended to extend the shelf-life of meat with a simple design that passively controls humidity conditions to create an optimal environment for meat storage inside the container.

Concept 1

Meat keeper



The container lid also includes placement for a consumable insert that would combine the functionality of an oxygen scavenger and a freshness indicator. The humidity control and oxygen scavenger are solutions to the first design principle, 'conservation' (keeping meat fresher for longer). The freshness indicator targets the third design principle, 'safety' (monitoring that the food is still good to eat).

With the simplistic design, ideally interoperable with most Tupperware containers, the Meat Keeper is a widely adoptable solution to add days to the shelf-life of meat post-retail, while also solving a key pain point for consumers around knowing if meat is still safely edible or not. This concept employs core elements of Tupperware design in that it is simple to use and can be used many times, tied together with MLA's meat science expertise.

Key discoveries in the design thinking journey are evident in this prototype. MLA shared the work of a PhD student showing the feasibility of colour-based meat freshness indicators, which Tupperware incorporated into the design as part of the consumable oxygen scavenger. The consumable components would be new for Tupperware and are a potentially interesting new revenue stream as they would be purchased separately. Additionally, the humidity control design borrows directly from Tupperware's BreadSmart and CheeseSmart product lines, both of which use a static vented design to stabilize containers at specific humidity levels for those food groups.

4.1.2 Concept 2: 'Super Saver'

The second resulting prototype is called the "Super Saver." While more complex, this concept targets all three design principles: conservation, quality, and safety. This bag could be sold by or to butchers and grocers or sold directly to consumers. Its features include:

- Single-use freshness label (like concept 1)
- Vacuum plug to pull a partial vacuum from the bag once the meat is inside
- QR code to enable an associated smartphone application
- Inserts for adding marination before storing
- Material can be refrigerated or frozen

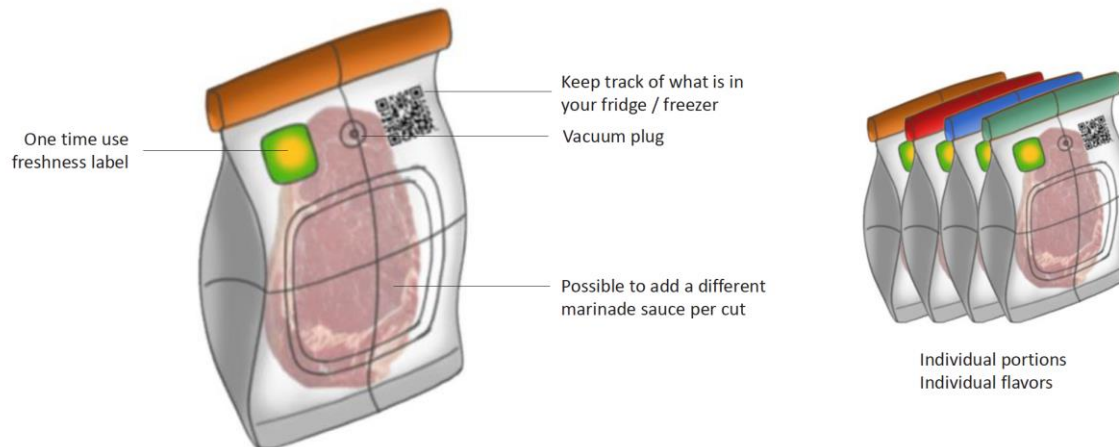
- Allows cooking directly in the bag (potentially sous vide)

Concept 2

Super saver



PRELIMINARY



Tupperware + MLA

TupperwareBrands 4

Recalling learnings around vacuum efficacy from industrial sealed packaging research, this design incorporates a vacuum plug as a simplistic method of pulling a partial vacuum to add a few days to shelf life. Discovered processing interventions are also present. The marinade insert would allow consumers to add their own marinades before freezing. And, though not mentioned on the diagram, it may be possible to prepare meat in the bag by sous vide cooking methods.

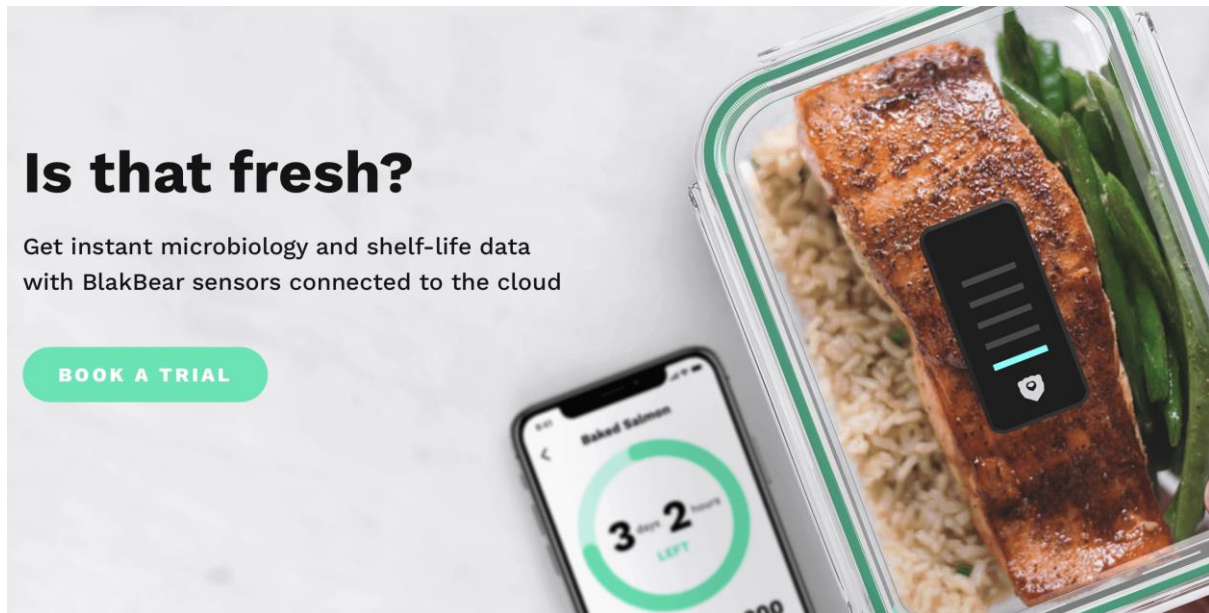
In addition to the biological barriers to improving the post-retail shelf life of meat, the research team discussed behavioural barriers extensively. Among the jobs-to-be-done identified early in the innovation sprint, portioning, cleaning, and remembering to use meat that has been left in the freezer before it spoils are addressed by this prototype via behavioural interventions. The freshness label on this prototype helps consumers understand how much time they have before the meat is no longer good to eat. The QR-code is the only digital element of the concepts discussed, which would pair with a smartphone application to track what is in a consumer's fridge or freezer, how long it has been there, and what will be expiring sooner.

4.2 Additional concepts on the market

In addition to the concepts developed by the research team, THRIVE identified three start-ups with relevant solutions aligned to our design themes. The presence of these solutions on the market and traction some are gaining with customers serve as high-level validation of product-market fit, commercial viability of new food storage solutions, and technical feasibility of some key concepts the team discussed during the innovation sprint. The companies highlighted below are bringing to market solutions for food shelf life and safety indication (BlakBear and Ovie), simplified vacuum sealing to extend shelf life (Silo), and various notifications directing consumers to eat their almost-spoiled foods first (all three).

4.2.1 BlakBear

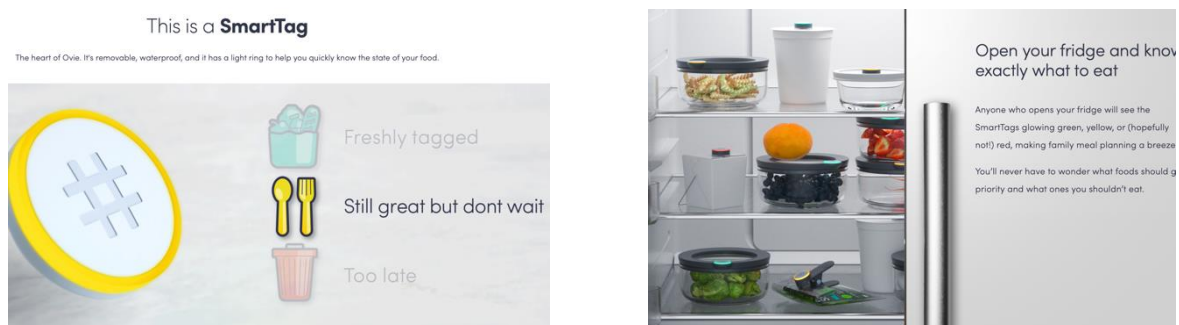
Developed as a technology transfer from Imperial College London, [BlakBear](#) is exploring multiple routes to commercialization for its advanced sensor technology and associated software packages. The solution takes shape as either a sticker or a hard sensor and assesses ammonia levels as food sits in a container or packaging. As described by Packaging World, “When food spoils, ammonia is released, and the gas is absorbed into the paper’s cellulose fibres and then dissociates into ions. The electrodes sense and measure the ionic conductivity present in the layer of water that is already naturally present in the paper’s fibres to determine the shelf life of the product.”*



In addition to its consumer-focused products, BlakBear is marketing its sensor solutions to food retail, logistics, and processing businesses, with added software and analytics packages. This go-to-market approach indicates the potential for consumer solutions developed in this space to be applied further upstream.

4.2.2 Ovie

Ovie develops “smart tags” in a variety of forms, Tupperware-esque containers, bag clips, and stick-on tags that deliver simple insight into when a food should be consumed. The tags integrate with Amazon’s Alexa and a database containing average shelf-life data for many foods. Consumers tell



Alexa what kind of food they are tagging, which links the Ovie tag to a food and shelf-life in the application. Users are then notified when food is about to expire, and the application recommends

recipes to make with foods that will go bad in the next few days. The simplicity of this model is encouraging, though consumers still have to make behavioural adjustments to make the most use of it and food shelf-life seems to be based on a static figure, which could be misleading.

4.2.3 Silo

Based in Brooklyn, Silo [raised over \\$1.4m](#) in pre-orders via the crowdfunding site, Kickstarter, for its simplified vacuum-sealing container system. The system consists of a platform to pull a vacuum,



specially designed containers fit for the platform, an application tracking the contents of each container, and voice integration with Amazon Alexa to easily confirm what is inside a container. The company claims fresh produce and leftovers stored in Silo containers last 2-5 times as long as conventional storage. The solution emphasizes simplicity, an important element for broad adoption, with one-touch sealing.

5. Background – CoreFX & Retail

After concluding our work with Tupperware, the research team sought a more direct route to accelerate IP commercialization in health ingredients and retail markets. With a selection of high potential projects from the current IP portfolio and a hypothesis around how they could add value in the corporate space, the team theorized that a shorter series of discussions with an interested corporate partner would be sufficient to validate commercial potential (i.e. if it makes sense to proceed to a pilot project or not).

6. Objectives – CoreFX & Retail

1. Rapidly validate corporate interest in targeted MLA IP portfolio projects
 - a. Topics for health ingredients corporates: wellness collagen and protein powders derived from clean green Aussie beef / sheep origins. **Objective met.**
 - b. Topics for retail corporates: total animal wellbeing index and Aussie meat as part of wellness lifestyle positioning. **Objective met, but further validation recommended.**
2. Identify potential commercialization concepts for pilot. **Objective Met.**
3. Explore alternative option to longer design sprint for accelerating commercialization of IP. **Objective Met.**

7. Methodology – CoreFX & Retail

The research team reached out to prominent companies in the health ingredients and retail markets to identify a partner willing to engage in the discussion, at which point a flexible cadence of 2-3 discussions was executed between THRIVE, MLA, and the corporate partner with the following intent:

- Introduction overview of pre-identified MLA IP assets
- Corporate partner shares needs in relevant area, clarifying questions
- Commercial concepts jointly identified, corporate partner validates concept potential
- Next steps documented

7.1 The CoreFX Discussion Process

THRIVE identified CoreFX as an ideal partner for this discussion given their positioning as a collagen and health ingredients supplier known to be open to new venture development opportunities. CoreFX is based in Chicago, Illinois, USA, and has worked with THRIVE on strategic initiatives in the past. CoreFX CEO, Denis Neville, agreed to participate in exploratory discussions with MLA and THRIVE.

MLA team members prepared pre-read documentation containing relevant highlights from the MLA IP portfolio, which was shared with Denis prior to the introductory meeting on September 27th, 2021.

Nutraceuticals

THE NEED:

The consumer health and wellness trend is growing exponentially, with a worldwide value of US \$320 billion per annum.

THE PRODUCT:

Nutraceuticals such as bovine collagen and red meat glandules/organs are in high and growing demand.

THE PROJECT:

MLA is co-investing ~\$3 million with commercial partners to develop and validate systems to collect and process a range of bovine and ovine nutraceuticals.

THE OUTCOME:

Forecasted to deliver in excess of \$20 m benefit per year to the beef industry.



A number of topics were discussed in the first meeting, highlighted below, resulting in multiple opportunities for continued discussion, with collagen as a leading option.

September 27th, Meeting Notes - CoreFX

- Objectives of discussions: identify candidates for commercialization in MLA assets, validate opportunity, define appropriate next steps
- Overviews of CoreFX & MLA provided – some specific call-outs from MLA:
 - Strategic pillar in focus for these conversations is developing high-value products from beef by-products
 - 80% of end-product value comes from 20% of meat – significant research conducted in extracting addition value from low-value cuts (thyroid and gland meats, collagen from hide, beef liver tablets, etc.)
 - Purpose of these discussions is not to take equity but to accelerate impact of research for the AUS market
- CoreFX striving to be holistic nutrition company – supply relationships, especially now, are important – differentiation around sustainability is valuable
- Scalability and technical maturity important for CoreFX
- Discussed technical and commercial aspects of collagen, beef liver tablets, pet food, (please add if I missed a topic)
- CoreFX core area of interest is nutraceuticals – advanced, medical grade food solutions. Thinking ahead to personalized / precise nutrition and being the ingredients platform to power this

Next steps

- MLA can provide additional details – white papers, efficacy studies, evidence of scalability, etc. – on specific projects
- Prototype - ~20kg to prove efficacy – this is a valid objective to test commercial viability
- Would also like to forecast scaling steps beyond prototype – i.e. does market opportunity warrant MLA investment in scaling?

In the second meeting, held on November 8th, 2021, CoreFX, MLA and THRIVE discussed various aspects of a potential opportunity in collagen based on MLA IP in this area. Again, CoreFX validated commercial viability under certain conditions as described from an excerpt of the meeting below.

November 8th Meeting Notes - CoreFX

- Discussed supply volumes, shelf life, regulation, procurement strategy, trademarks, and product differentiation
- Denis validated importance of IP, trademark, and clinical studies on ingredient efficacy, in addition to testing on applied product
- Current collagen market endures varying quality, with some buyers investing significant amounts to standardize supply for their uses (Vital was mentioned)
 - Lack of transparency could become issue under increasing consumer and buyer scrutiny
 - Resulting opportunity may exist around a proven, high-quality / sustainable / responsible collagen supply
 - Aligns with “ancient nutrition” dialogue
- Traceability & grass-fed could be MLA differentiators
- Commercial arrangement could involve:
 - Trademark
 - Development of collagen product and proof of efficacy
 - End CPG/brand needs to do work around traceability and proof of quality

7.2 The Retail Partner Search Process

THRIVE conducted a thorough search for food retail partners, primarily grocery chains, willing to participate in the expedited exploratory meeting cadence, and could not find openness to the discussion. Contact was made at multiple grocery giants including Tesco (UK), Kroger (US – Midwest), Kroger’s VC & Innovation arm 84.51 (US – Midwest), Carrefour (France), Safeway (US – West), and Walmart (US). MLA provided similar overview materials featuring proposed discussion topics, most prominently an Animal Wellbeing Index that could enable grocery claims against validated animal wellbeing metrics and provide a competitive advantage for Australian meat.

MLA Animal Wellbeing Index

THE NEED:

Consumers are seeking assurance that livestock have been cared for throughout their lives.

THE PRODUCT:

A science based animal wellbeing index and supporting product claim.

THE PROJECT:

MLA is seeking to co-invest with commercial partners to develop and trail a science based animal wellbeing index at retail.

THE OUTCOME:

Complying supply chains will be able to make claims on branded, verified products.

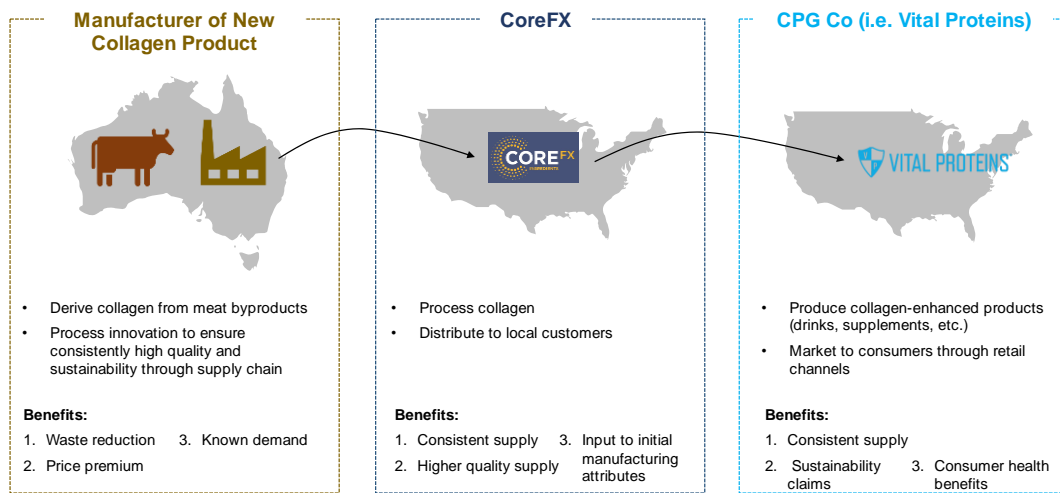


8. Results – CoreFX & Retail

8.1 CoreFX Results

The team, in collaboration with CoreFX, determined that there is a market opportunity for differentiated supply of collagen or other nutraceuticals based on validated sustainability, quality, and/or welfare metrics. The importance of IP, a trademarked product, clinical studies to support ingredient efficacy, and testing on the applied product to prove end user benefits were identified as key success drivers.

AUS Meat-Derived Collagen: Concept for a higher, more consistent quality, and more sustainable, collagen supply



8.2 Retail Results

Most target partners responded but indicated they were not interested in participating. This may be due to the regional nature of the grocery chains, especially in the US. Kroger questioned the proportion of their current meat supply that comes from Australia and if the business would be interested in engaging in a theoretical discussion that they knew would require a drastic shift to their meat supply. The team did receive a positive response from a livestock consultant who works extensively with Walmart on supply chain issues like the proposed discussion topic, but the team deemed this discussion too adjacent to the originally intended stakeholders.

9. Conclusion

9.1 Key findings

In the Tupperware sprint, the team ideated multiple promising concepts and believes that commercial potential exists among them. The team also identified emerging technologies on the market that are seeking to address similar challenges in different ways. In the accelerated ingredients discussions with CoreFX, promising commercial potential was identified in the form of consistently high quality, sustainable Australian collagen supply. Partner search efforts in the retail space did not result in interested participants. In the overall process, MLA gained valuable

experience in corporate acceleration methods that can be applied to similar efforts in the future. Key findings include:

1. There are multiple avenues for extending the shelf-life of meat in a post-retail context by leveraging emerging food and packaging technologies in tandem with good design.
2. Many of these opportunities involve translating industrial meat processing and storage technologies into consumer-friendly products, a concept that could be applied to other problem areas in the future.
3. Viable solutions for consumers do not have to be digital. In fact, combining meat conservation science with material and physical design may deliver a more accessible, simplified solution.
4. Emerging companies in the food storage space are demonstrating commercial viability and consumer demand for solutions that extend food shelf-life and reduce waste, especially around pain points associated with meal planning, understanding food freshness, and alternative consumer storage designs like simplified vacuum containers.
5. A value proposition likely exists for a consistently high quality, sustainable collagen supply if a trademark is in place, consumer efficacy can be proven, and economics are viable.
6. Collaborative design thinking and corporate venture development exercises are viable approaches for MLA to extend value of existing IP.

9.2 Benefits to Industry

Our work in these innovation sprints combined thinking from outside the red meat value chain with progress made in industrial red meat operations to identify gaps in the market for meat-optimized consumer storage solutions and a high-quality, sustainable collagen supply. The Tupperware sprint identified a necessary, early step towards enhancing the sustainability of meat and improving consumers' experience with meat, which we believe will benefit the entire meat value chain. Next steps in the CoreFX discussions could differentiate Australian meat-derived nutraceutical products in ingredients markets globally, reducing waste and increasing total value in the Australian meat supply chain. More broadly, this work suggests open innovation methodologies, like collaborative venture development, are viable tools for addressing large, cross-value chain challenges like sustainability, food waste, shifting consumer preferences, and likely many more.

- Extending industrial meat and packaging science to consumers presents opportunity to further strengthen Australian Red Meat sustainability credentials across entire value chain.
 - Providing key meat science and conservation concepts to corporate partner (Tupperware) increases potential to commercialize and distribute the concepts broadly.
 - Successful commercialization could significantly reduce post-retail meat wastage.
- Potential differentiated collagen supply derived from Australian meat by-products could add value to supply chain.
 - Reduce waste in red meat supply chain
 - Add economic value to all supply chain stakeholders
- New, corporate collaboration approach can more efficiently, effectively, and creatively position MLA IP to contribute to industry growth.
 - The first step is learning and experimentation with new methods for IP commercialization.
 - This will create a path to more effective, consistent IP commercialization and thus value creation for the industry.

10. Future research and recommendations

Tupperware - recommended next steps:

- Continue experimentation around leveraging MLA expertise for corporate acceleration and new venture development. MLA plans to explore this area further with THRIVE in additional corporate collaborations and design of a venture development model.
- Further develop proposed designs with physical prototypes and test consumer willingness to pay.
- For Concept 1, future research needs include identifying the appropriate humidity environment for meat products and a static design that consistently promotes this environment.
- For Concept 2, future research needs include testing feasibility of adding marinade to the bag prior to freezing while ensuring a quality eating experience and marinade penetration after thawing or cooking in the bag.
- Explore additional value chain challenges and opportunities that could be approached with similar design thinking methodologies (i.e. foods for an ageing population).

CoreFX - recommended next steps:

- Conduct necessary research to understand if investing in collagen supply pilot project is advisable. Recommended activities include:
 - Model value chain economics to understand additional value created relative to potential costs at scale
 - Map competitive landscape and potential manufacturers – if no viable manufacturers exist, explore opportunity for creation of new venture with investment partners
 - Clarify work to prove efficacy – cost and timeline
 - Design pilot project(s): process to maintain supply differentiation, manufacturing, supply and distribution, proof of efficacy, both raw ingredient and as applied in end product
 - Engage pilot partners for input
- Assuming viable results to pre-pilot research, conduct pilot project.

11. References

*<https://www.packworld.com/home/article/21140375/packaging-sensor-predicts-shelf-life-of-perishable-foods>

12. Appendix

12.1 Workshop Summaries

WORKSHOP #1: OBJECTIVES & PAIN POINT DISCOVERY



Aligning what each party, MLA and Tupperware, brings to the table and what we set out to accomplish.

The results of a team brainstorm around consumers' pain points in the meat buying, storing, preparing and re-using journey.

WORKSHOP #2: PAIN POINT SYNTHESIS



We refined and categorized pain points into key themes, generated open questions we wanted to explore further, and documented preliminary ideas for solutions.

WORKSHOP #3: CONSUMER SCENARIO DEVELOPMENT

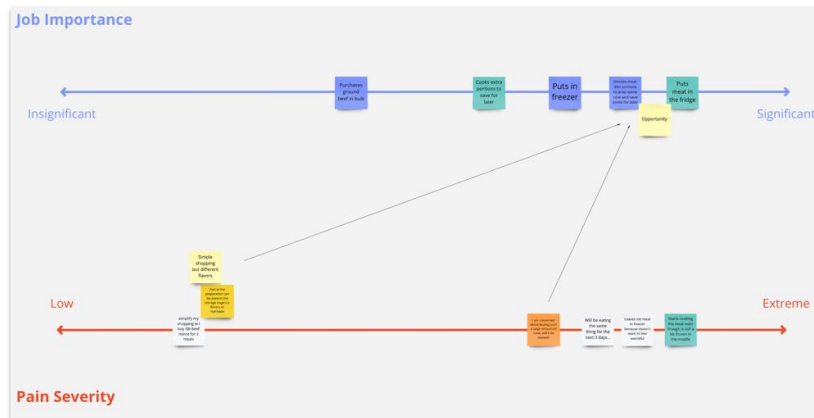
The results of both teams thinking through common and potential customer segments and meat preparation scenarios – i.e. cook some now save some for later, forget in freezer, dry aging, etc.

WORKSHOP #4: CONSUMER JOURNEY MAPPING

Phase of journey	Purchase (Not Main Focus)	Store	Prepare	Cook	Re-Store
Actions What does the customer do? (This is a functional job to be done)	<ul style="list-style-type: none"> Handbook attached to bag Thawing in microwave Preparation of meat 	<ul style="list-style-type: none"> Handbook attached to bag Preparation of meat Recycling of packaging 	<ul style="list-style-type: none"> Preparation of meat Recycling of packaging Preparation of meat 	<ul style="list-style-type: none"> Preparation of meat Recycling of packaging Preparation of meat 	<ul style="list-style-type: none"> Preparation of meat Recycling of packaging Preparation of meat
Social / Emotional Jobs Does the customer need to be perceived or need to feel a certain way?	<ul style="list-style-type: none"> Handbook attached to bag Preparation of meat Recycling of packaging 	<ul style="list-style-type: none"> Handbook attached to bag Preparation of meat Recycling of packaging 	<ul style="list-style-type: none"> Handbook attached to bag Preparation of meat Recycling of packaging 	<ul style="list-style-type: none"> Handbook attached to bag Preparation of meat Recycling of packaging 	<ul style="list-style-type: none"> Handbook attached to bag Preparation of meat Recycling of packaging
Customer Pains What ails this customer in this scenario?	<ul style="list-style-type: none"> Handbook attached to bag Preparation of meat Recycling of packaging 	<ul style="list-style-type: none"> Handbook attached to bag Preparation of meat Recycling of packaging 	<ul style="list-style-type: none"> Handbook attached to bag Preparation of meat Recycling of packaging 	<ul style="list-style-type: none"> Handbook attached to bag Preparation of meat Recycling of packaging 	<ul style="list-style-type: none"> Handbook attached to bag Preparation of meat Recycling of packaging
Priority How important is it that our solution solves the pain points in this journey phase?		<ul style="list-style-type: none"> Handbook attached to bag Preparation of meat Recycling of packaging 	<ul style="list-style-type: none"> Handbook attached to bag Preparation of meat Recycling of packaging 	<ul style="list-style-type: none"> Handbook attached to bag Preparation of meat Recycling of packaging 	<ul style="list-style-type: none"> Handbook attached to bag Preparation of meat Recycling of packaging

One of three consumer journeys mapped by the team. The journey maps are critical tools to step into the consumers' shoes to understand what tasks and pain points are most important to them.

WORKSHOP #5: PAIN POINT & JTBD* PRIORITIZATION



A key next step from consumer journey mapping is developing hypotheses around which "jobs to be done" (the tactical or emotional steps composing a journey) and pain points are most important for consideration in solutioning.

* Jobs to be done

WORKSHOP #6: INITIAL CONCEPT IDEATION

This collage, titled 'Previous session ideas', features several sticky notes and images related to 'Healthy Meals by Cut'. Key ideas include:

- In home meat tenderizer**: A sticky note suggesting a home-based solution for meat preparation.
- Soup wide and freeze directly**: A sticky note proposing a method for freezing soups.
- Could it be possible to "thaw" all the freezer?**: A sticky note questioning the thawing process.
- Individual packaging for freezing meat**: A sticky note suggesting individual portions for freezing.
- Healthy Meals by Cut**: A central theme with multiple sticky notes and images of meat cuts.

Ideas generated by the team throughout the process were consolidated in one place.

This 'Ideation Board' for 'Healthy Meals by Cut' includes several sticky notes and images. Key ideas include:

- Ware oh ware is my Tupperware?**: A sticky note suggesting the use of Tupperware for packaging.
- Is the solution more than just a product?**: A sticky note questioning the product's value.
- Just do this with a trusted brand and cheaper**: A sticky note suggesting a trusted brand and cost reduction.
- Healthy Meals by Cut**: A central theme with images of meat cuts and packaging.

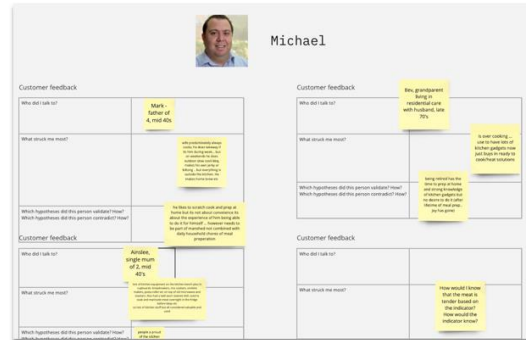
New ideas were developed asynchronously by the team and shared in the session.

* Jobs to be done

WORKSHOP #7: INITIAL CONCEPT SELECTION & CONSUMER FEEDBACK



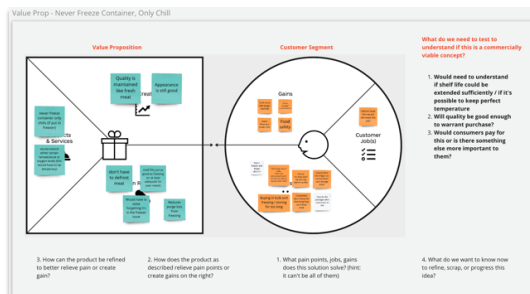
The team voted on initial concept directions to explore in conversations with consumers.



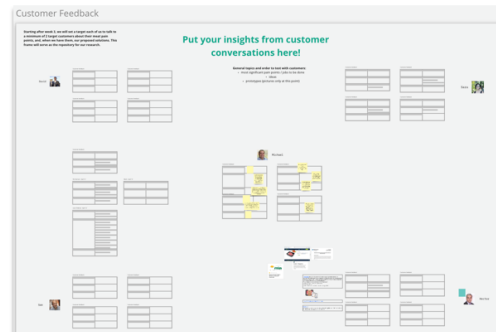
The team also engaged in consumer conversations to validate pain points and jobs to be done.

* Jobs to be done

WORKSHOP #8: CONCEPT VALUE PROPOSITIONS & CONSUMER FEEDBACK



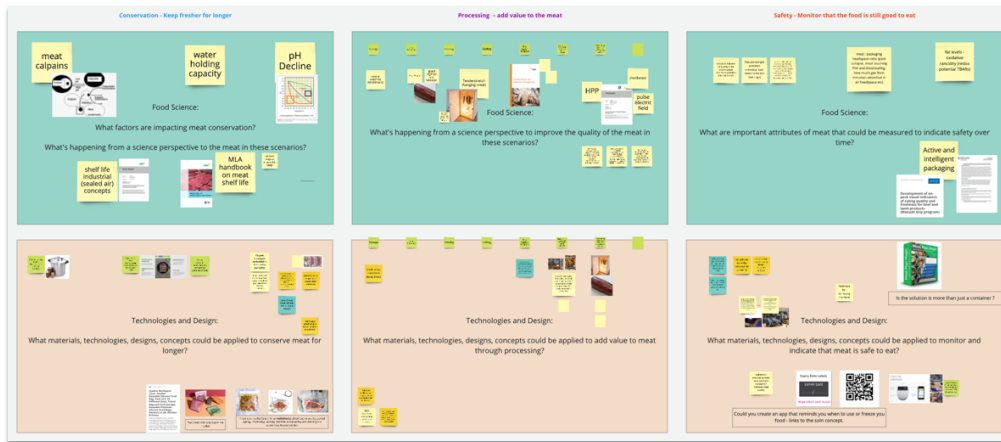
A resulting value proposition canvas for one solution concept, detailing how this concept would solve specific pain points and add value for consumers.



The team continued gathering consumer feedback on initial concepts.

* Jobs to be done


WORKSHOP #9: RETURN TO IDEATION



The resulting ideation board tying MLA's meat science expertise to Tupperware's consumer food storage and design expertise across three solution themes: conservation, processing, and safety.

* Jobs to be done

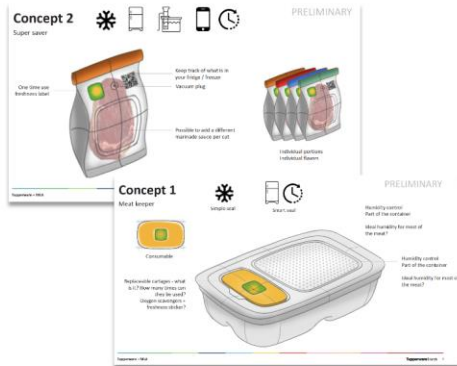
WORKSHOP #10: SOLUTION MINI-BUSINESS CASES

Concept Mini Business Case Template		Concept Mini Business Case Template	
<p>Concept</p> <p>Defrost and marinate at the same time</p> 	<p>concept description here</p> <p>Meat defrost "juice lifter" is released from the bottom and "replaced" by marinating sauce coming from the top. Could it be possible to marinate from inside out?</p> <ul style="list-style-type: none"> "spikes" will penetrate the meat and slowly release the sauce could add flavor pod added to container prior to or after freezing, which when the meat is defrosted, is released (gravity) to marinate meat could also explore powder additive currently used in factories that will turn into glaze or marinade when interacting with moisture 	<p>Concept</p> <p>Vacuum bags with optional oxygen scavengers insert</p>	<p>concept description here</p> <p>Consumer will be able to add oxygen scavengers insert to a vacuum bag. How easy is to get 100% vacuum? Would the insert make sense in this case or would it be more beneficial in a hard container?</p> <ul style="list-style-type: none"> possible to include biodegradable sachet / insert
<p>How does this concept improve meat conservation? To what degree (forever or for a few more hours)?</p>		<p>How does this concept improve meat conservation? To what degree (forever or for a few more hours)?</p>	<p>Method of Conservation (if any)</p> <p>Oxygen scavengers</p> <p>Degree of Conservation (if any)?</p>
<p>How does it improve processing / add value to meat? To what degree?</p>	<p>Method of Value Add (if any)</p> <p>Better flavor - Reduce cooking time by combining 2 processes</p> <p>Degree of Value Add (if any)</p>	<p>How does it improve processing / add value to meat? To what degree?</p>	<p>Method of Value Add (if any)</p> <p>Degree of Value Add: 4-5 days for partial vacuum, a few weeks if you can pull a really good vacuum</p> <p>Added value would be in reducing the space needed to store the meat (no air is being stored). Potentially bags could be used to cook the meat, sous vide?</p>
<p>How does it improve meat safety indication? To what degree?</p>		<p>How does it improve meat safety indication? To what degree?</p>	<p>Method of Safety Indication (if any)</p> <p>Degree of Safety Indication (if any)</p>
<p>Market Size</p>	<p>Large</p>	<p>Market Size</p>	<p>Medium (more likely valuable to those who buy meat at butcher or buying in bulk)</p>
<p>Feasibility</p>	<p>Good, geometry based solution</p> <p>Food Tech: starches can break down the blood that usually comes out of the meat when it's defrosted.</p> <ul style="list-style-type: none"> marinade replaces soaker pad 	<p>Feasibility</p>	<ul style="list-style-type: none"> need to understand how much pressure / residual air is needed for conservation design challenge - can you get the air out of a rigid container that can be washed, reused, etc.

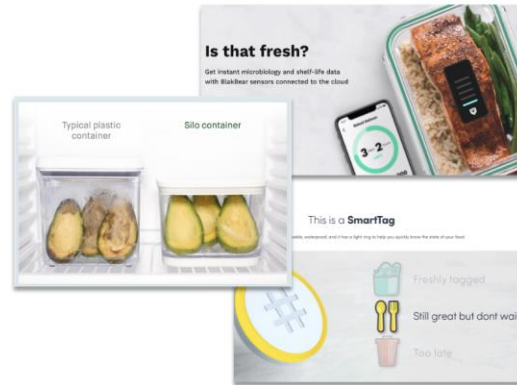
Two examples of mini-business cases the team developed after the higher-level ideation session. Here, we are narrowing in on concepts and their features, value propositions, market size and (estimated) feasibility. After this, we will sketch high level prototypes of the concepts and iterate on the concepts.

* Jobs to be done

WORKSHOP #11: SHARE HIGH LEVEL MVPs



Two high level solutions were developed by the Tupperware design team and socialized with the broader team.



Additional emerging solutions being brought to market by startups were sourced and shared by THRIVE.