Packaging Technology & Research

Future of Packaging for Novelty Dairy Desserts

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ABOUT PTR

Dr. **Claire Sand** thinks “all food packaging all the time”

Claire’s mission is to enable a more sustainable food system with science and value chain innovations that more sustainably increases food shelf life and prevents food waste

- 35+ years of food packaging experience
- Ranks innovative packaging science and value chain solutions to extend shelf life
- Generates implementation roadmaps and aligns business cases

- IFT Fellow, Riester-Davis-Brody life-time achievement in food packaging award recipient
- Doctorate in Food Science and Nutrition at University of Minnesota
- MS and BS in Packaging at Michigan State University

Owner

PACKAGING Technology & Research

Adjunct Professor

MICHIGAN STATE UNIVERSITY

CAL POLY SAN LUIS OBISPO

Monthly Columnist

foodtechnology

PACKAGING DIGEST

Current Leadership & Editorial Boards

FOOD WASTE — *CoChair Consortium on Food Waste*

SUSTAINABLE PACKAGING COALITION® — *Advisor Food Waste Repackaged*

Journal of Food Science — *Associate Editor*

Food Packaging Division — *Executive Board*

Comprehensive REVIEWS in Food Science and Food Safety — *Editorial Board*

Packaging Technology and Science An International Journal — *Editorial Board*

NSF — *Reviewer National Science Foundation*

Recent Awards

Riester-Davis-Brody Food Packaging Lifetime Achievement Award

IFT feeding the minds that feed the world — *IFT Fellow*

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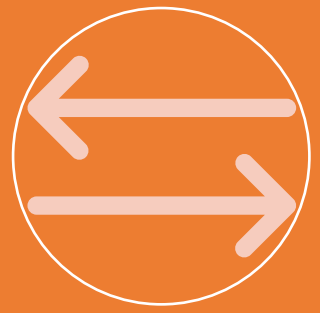
ABOUT PTR |
What we do

Provide tailored packaging **science & value chain** solutions to the **food & packaging industry**

TAKE-AWAYS
Future of Packaging for Novelty Dairy Desserts

Role of packaging protecting novelty desserts

Packaging technologies for the future of novelty desserts

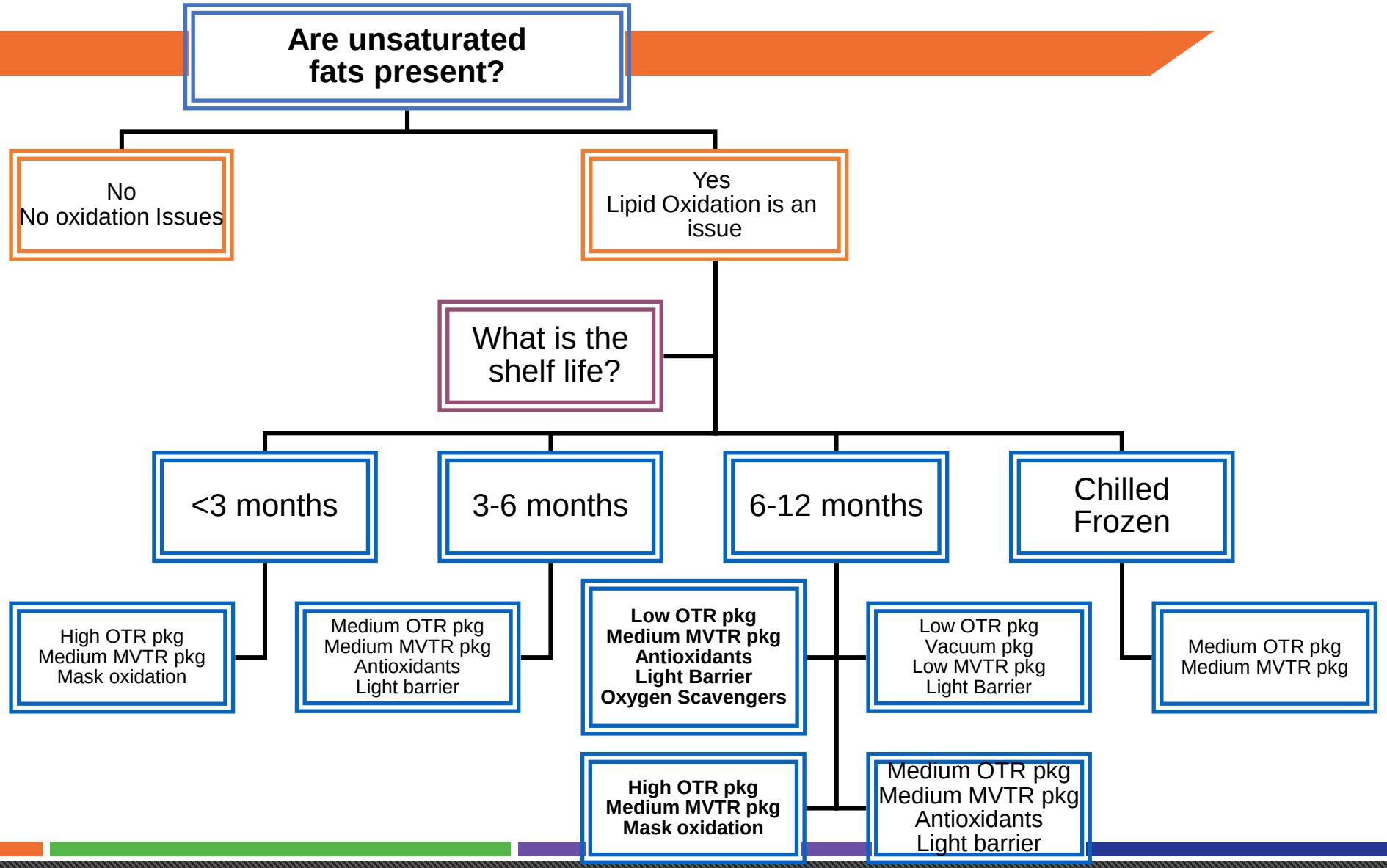


Fundamental shifts in novelty dessert packaging

Role of clusters novelty desserts

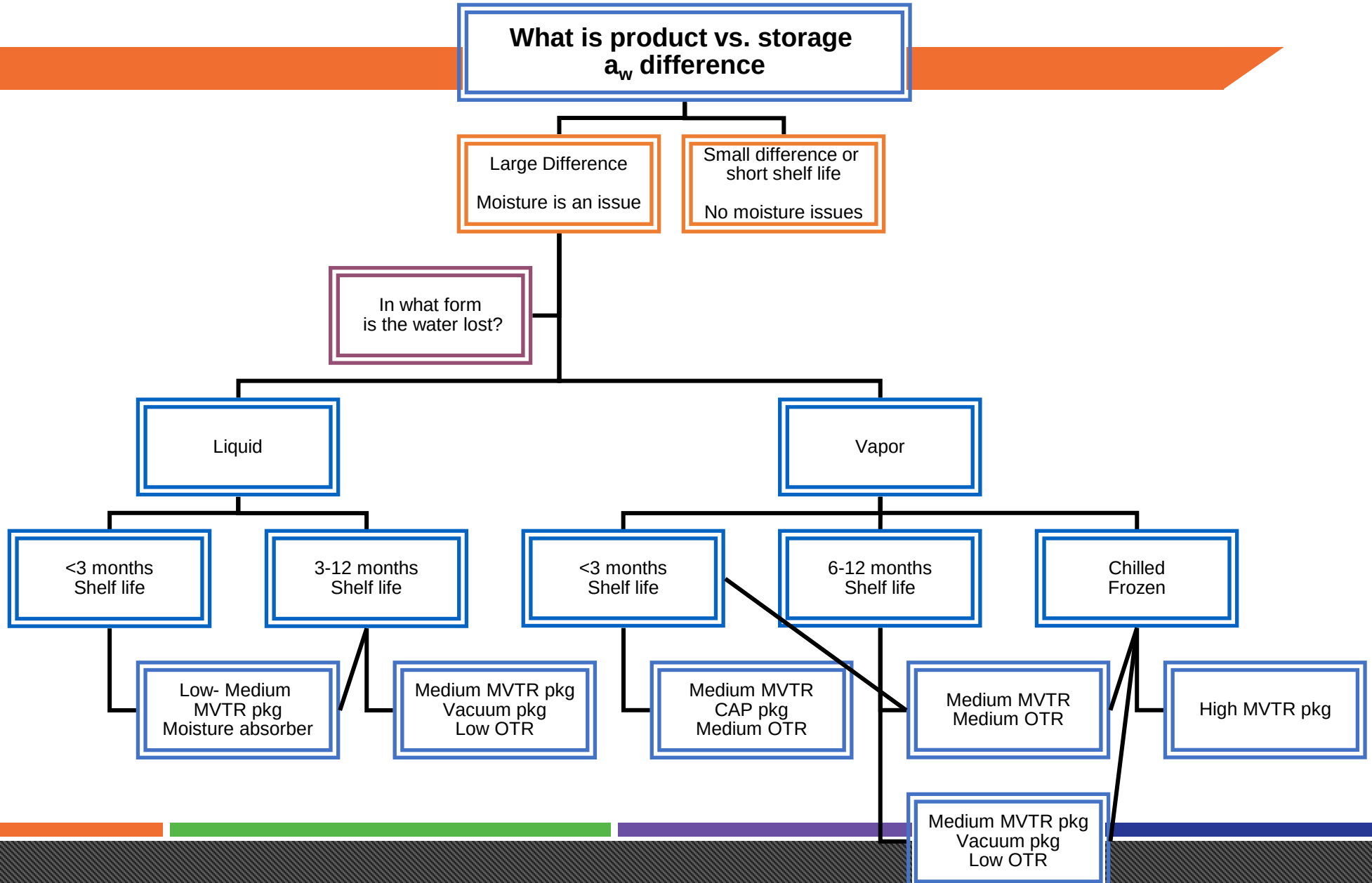
FUTURE OF PACKAGING FOR NOVELTY DAIRY DESSERTS

ROLE OF PACKAGING I
Oxidation Assessment

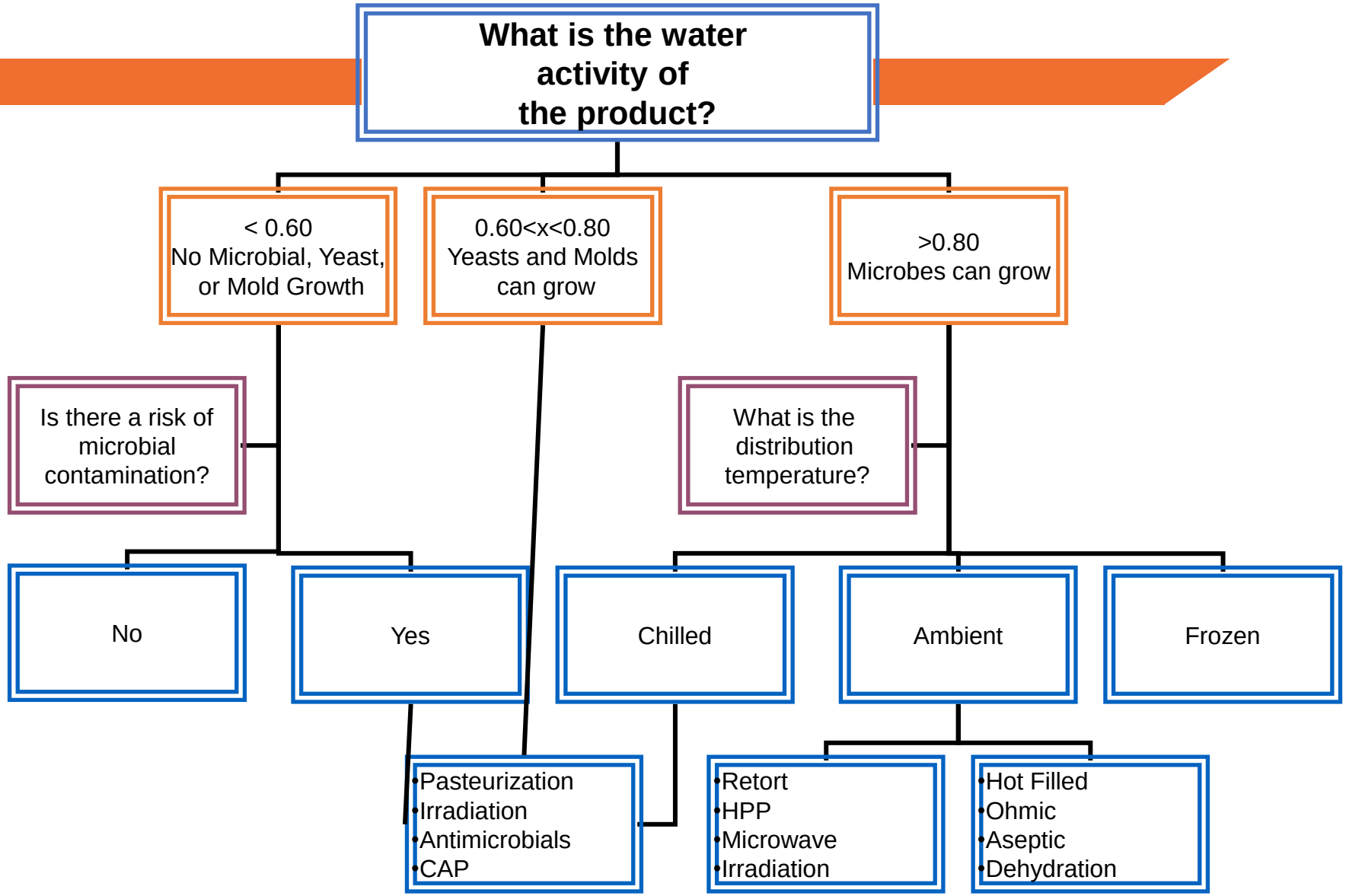


ROLE OF PACKAGING I

Moisture Gain/Loss Assessment



ROLE OF PACKAGING I
Microbial Assessment



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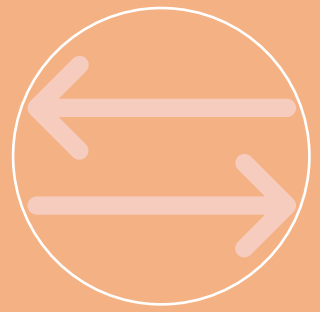

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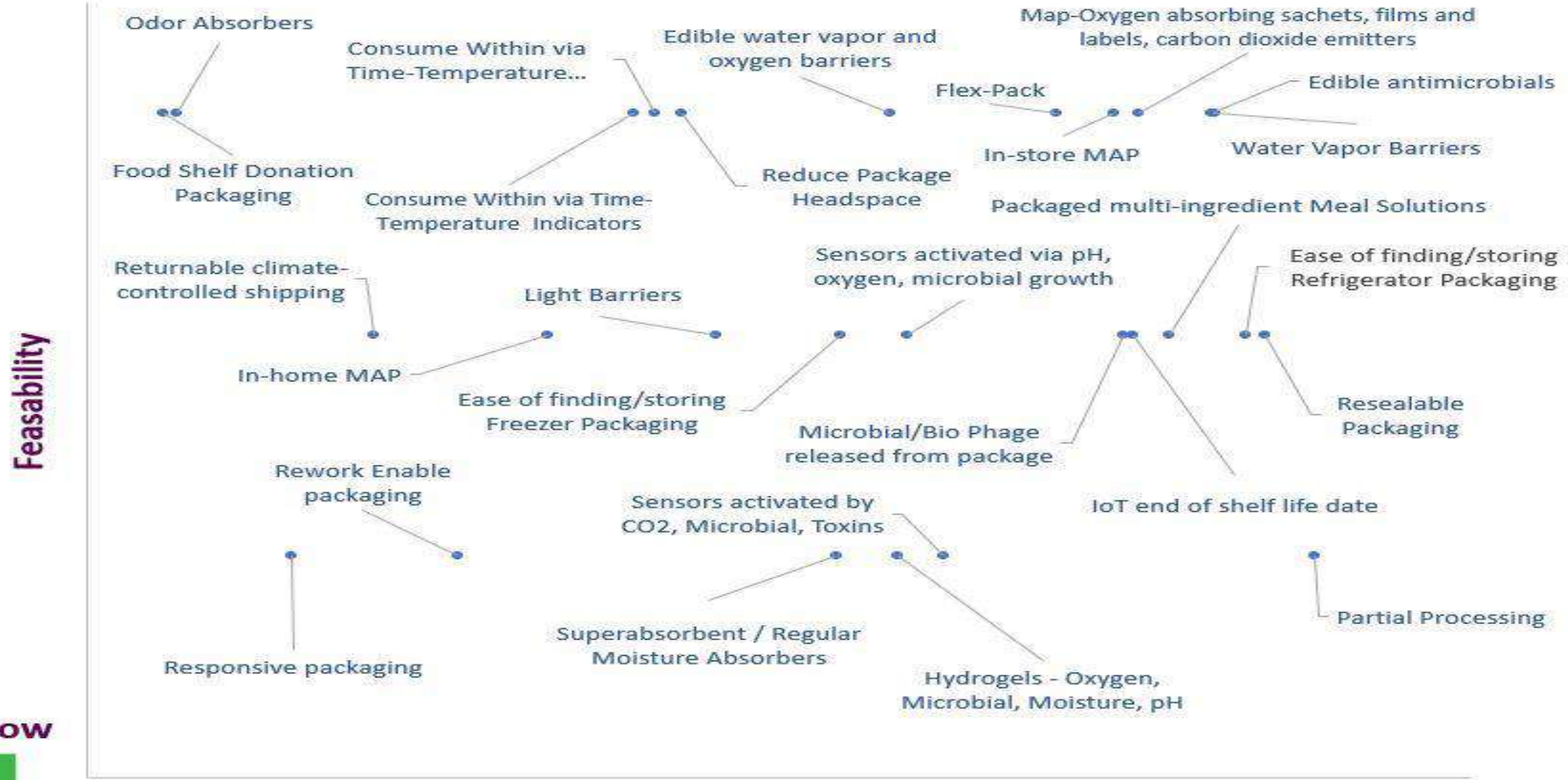
FUTURE OF PACKAGING FOR NOVELTY DAIRY DESSERTS

Packaging Solutions that Prevent Food Waste as a Function of Feasability and Impact



excerpt from Packaging Technology and Research project sponsored by ReFED 2019

PACKAGING SCIENCE I
Active Packaging

MAP

- ATMOSPHERE CONTROLS
- HIGH BARRIER PACKAGING
- OXYGEN SCAVENGERS
- OXYGEN ADDITIONS

MOISTURE & ODOR CONTAINMENT

- MOISTURE ABSORBERS OR EMITTERS
- PURGE ABSORBERS
- ODOR ABSORBERS OR EMITTERS
- HYDROGELS

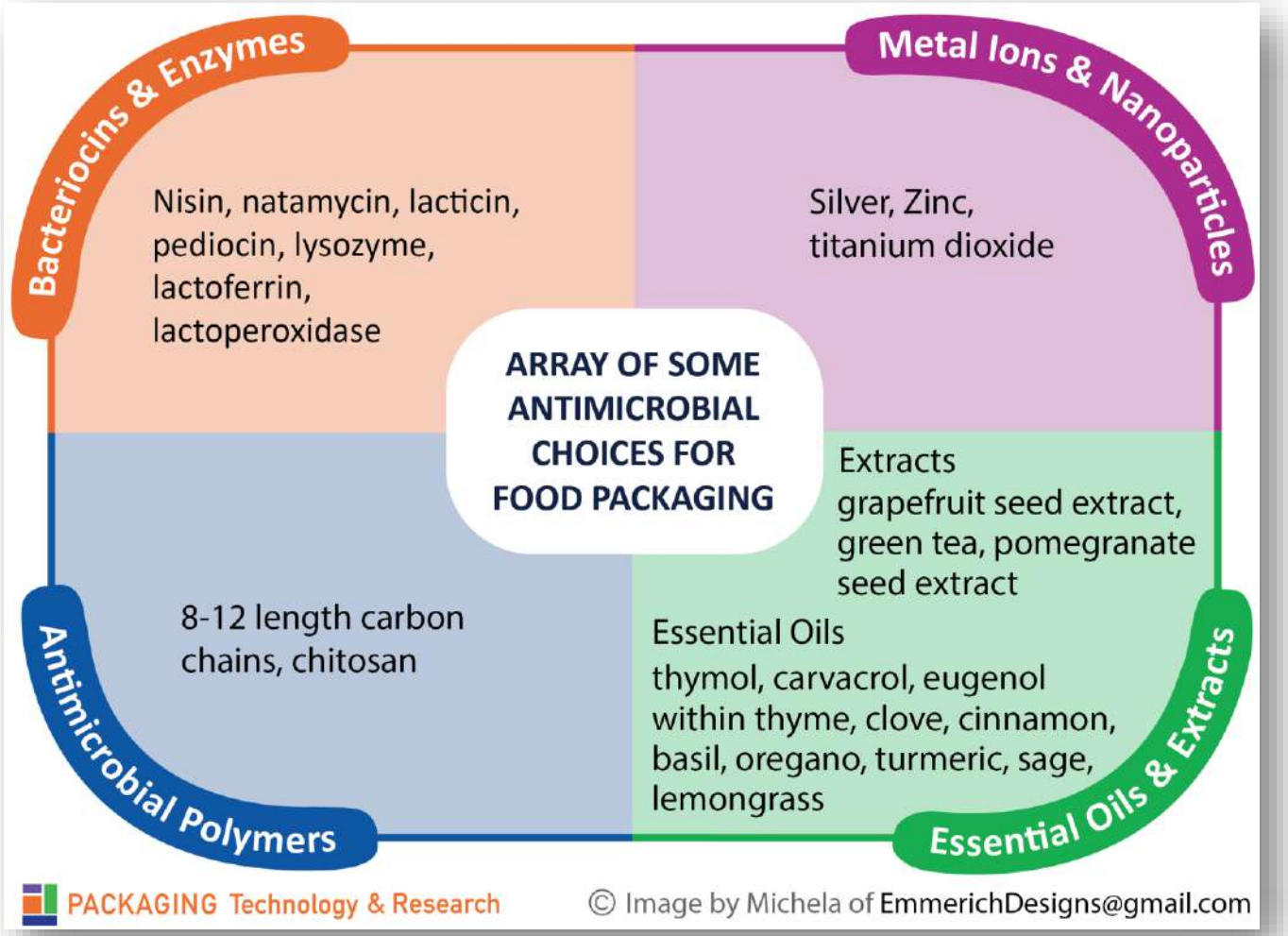
ANTI-MICROBIALS

- REACTIVE PACKAGING
- ANTIMICROBIALS
- EDIBLE ANTIMICROBIALS

FLOW MANAGEMENT

- CONTROLLED DIFFUSION
- MICROWAVE SUSCEPTORS

PACKAGING SCIENCE I
Antimicrobial Packaging



PACKAGING SCIENCE I
Antimicrobial Packaging

5 solutions were most viable
- Nisin
- Oregano
- Grapefruit seed extract
- Zinc Oxide
- Temperature Activated Venting

11 Solutions were partially viable
- Natamycin
- Lacticin
- Pediocin
- Acetic acid
- C8 – C12 fatty acids
- Garlic
- Green tea extract
- Silver
- Chlorine dioxide
- Ethanol
- Chitosan

20 Solutions were not viable
- Lysozyme
- Lactoferrin
- Lactoperoxidase
- Benzoic acids
- Parabens
- Sorbates
- Propionic acid
- Lactic acid
- Basil and Rosemary
- Cinnamon
- Grape seed extract
- Mustard (Allyl isothiocyanate)
- Titanium oxide
- Sulfur dioxide
- ε-polylysine
- pH responsive hydrogels and bioactive films
- pH & Temperature responsive packaging
- Enzyme-based
- Mechano-responsive hydrogels
- Electric field responsive hydrogels

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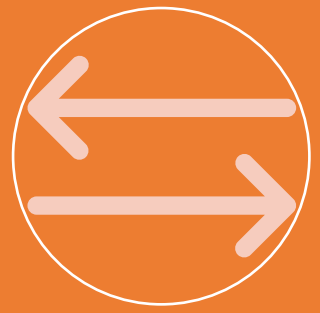

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FUTURE OF PACKAGING FOR NOVELTY DAIRY DESSERTS

Fundamental Shifts I
Short term Investment in Packaging

- Packaging better aligned with consumer needs - Reseal
- Price – Pack – Architecture
- Optimize packaging to eliminate components

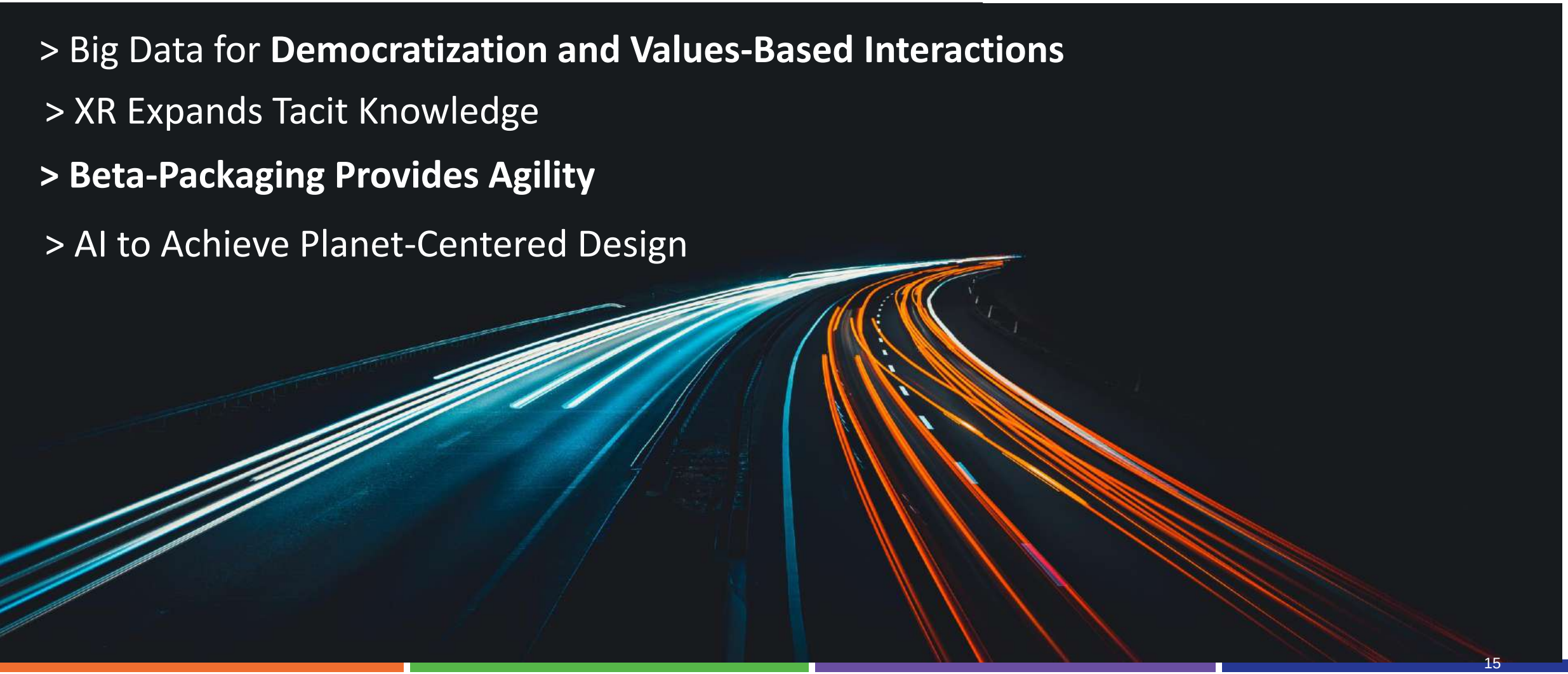
Fundamental Shifts I
Where Packaging is Heading

> Big Data for **Democratization and Values-Based Interactions**

> XR Expands Tacit Knowledge

> Beta-Packaging Provides Agility

> AI to Achieve Planet-Centered Design



Fundamental Shifts I

Why we need agility in frozen novelty packaging

Externalities

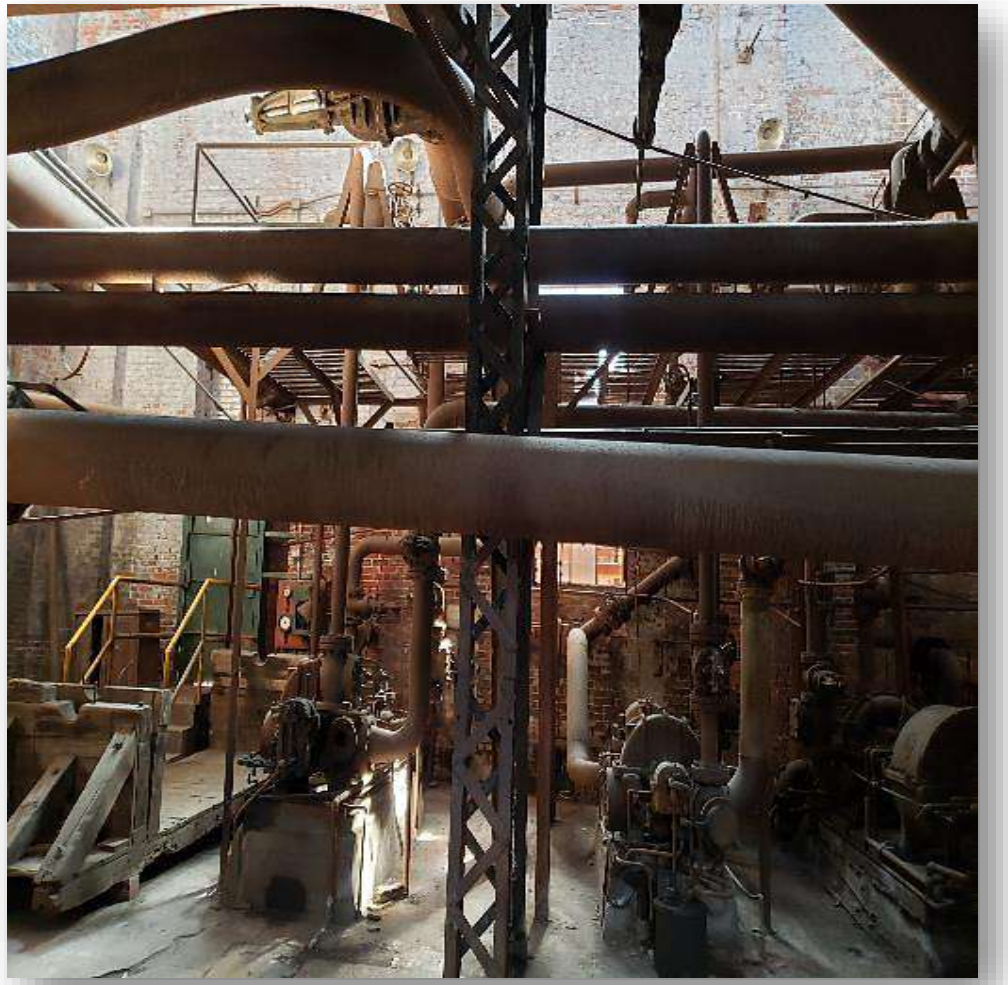
- Natural disasters (drought, fires, flood, typhoon, hurricane, tornado)
- Human struggles (virus, famine, political upheaval)
- Power reliability (outages, internet, production)
- Variable sustainability pressures (bans, taxes, policies)

Fundamental Shifts I

Why we need agility in frozen novelty packaging

Internalities

- Space external to retail
- Planogram issues
- Labor
- Restocking innovation needed
- OOS
- Cannot meet exact consumer need for size and product
- Intense shifts in value chain drivers



Fundamental Shifts I

Packaging Drivers in the Value Chain

	Causes/Categories	Category Z	Category Y	Category X	Catgeory W	Category V	Category U	Category T	Category S
Product Degradation Causes	Oxidation								
	Moisture Change								
	Microbial								
	Browning								
Pkg Prop.	Water resistance								
	MVTR								
	Antimicrobial								
Packaging and Handling	Reduce impact of contamin. ingredients								
	Reduce contamin. during product fill								
	Assess initial microbial load								
	Reduce initial microbial load								
	Reduce cross contamin.								
	Enable processing of some ingredients								
	Enable HACCP								
	Address chilled worker conditions								
Distribution & Retail	Time &Temp monitoring system								
	Oxygen level monitoring system								
	Control tempertaure								
	Measure microbial load at POS								
Consumer Use	Enable safe package reuse								
	Reduce consumer contamin. from repeat use								
	Expand time for safe product use								
	Enable oven/MW monitoring								
	Address eating hygiene through packaging								
	Enable freezer storage								

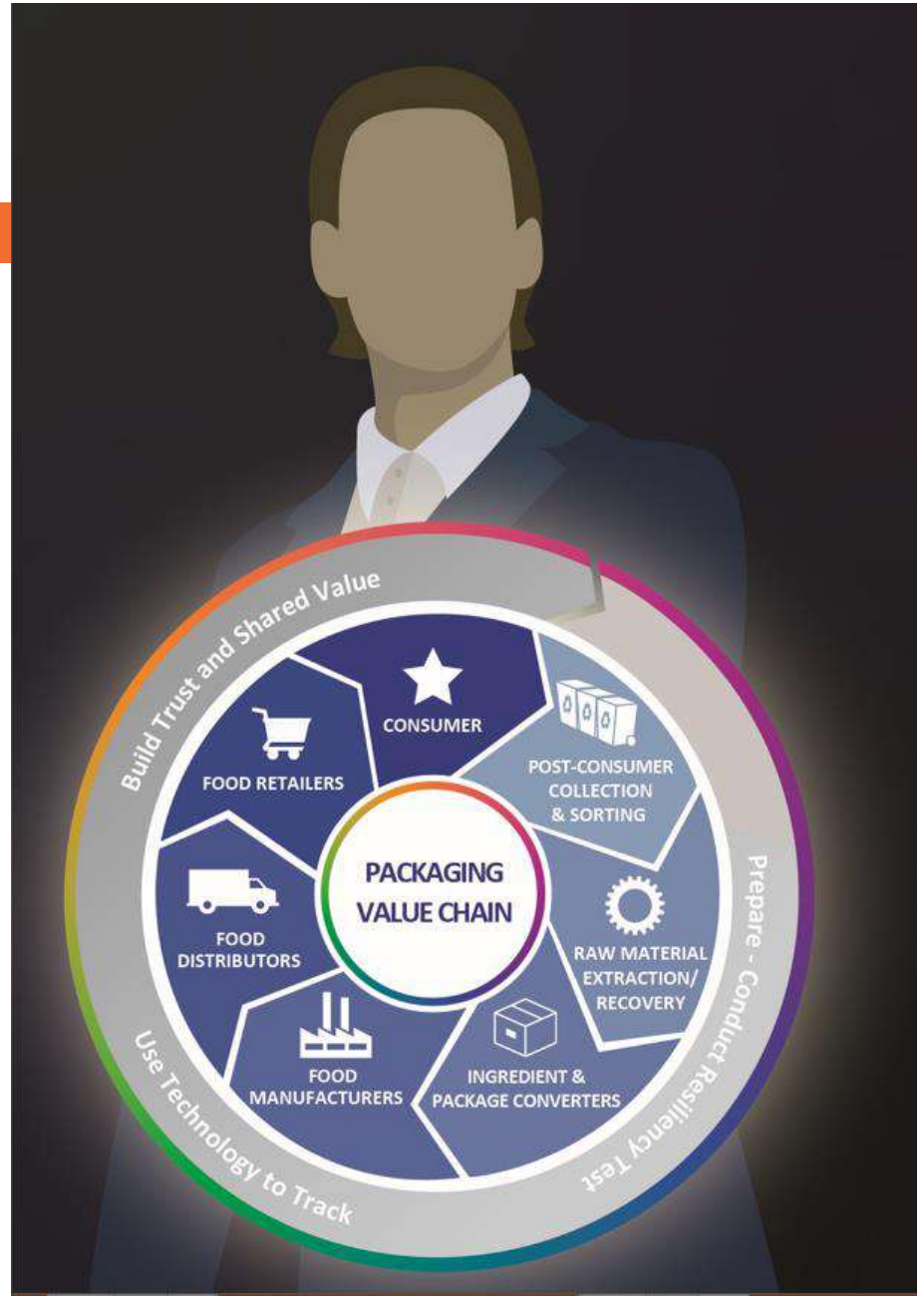
Fundamental Shifts I
Beta Packaging bring agility

Beta design:

- Beta-packaging focuses on **agility**
- Incorporates **5th** industrial revolution
- Generative **use-focused** design

- Allows retailers and consumers to adjust package

- Packaging that senses then acts
- Aligns with inherent variability of our food system



Fundamental Shifts I

Beta Packaging - everyone gets a golden ticket

Personalization

- Consumers in charge of formulations
- Packaging when consumers need it
- Less packaging for MSWs to handle

How and the Business Case

- Logistics stress transferred to retail and consumers
- Alter Primary packaging
  - <$$$
  - < barrier requirement
  - > recyclability
- Returnable tertiary packaging cost savings

Fundamental Shifts I

We are seeing the beginning of Beta packaging

Fundamental Shifts I

Beta Packaging Example – packaging that changes the product

Technology

- Release of ingredients by the package
- 2ndary addition of ingredients – similar to salads made BOH in store now

Consumer view

- Formulations defined by the package
- Consistent product
- Protected ingredients

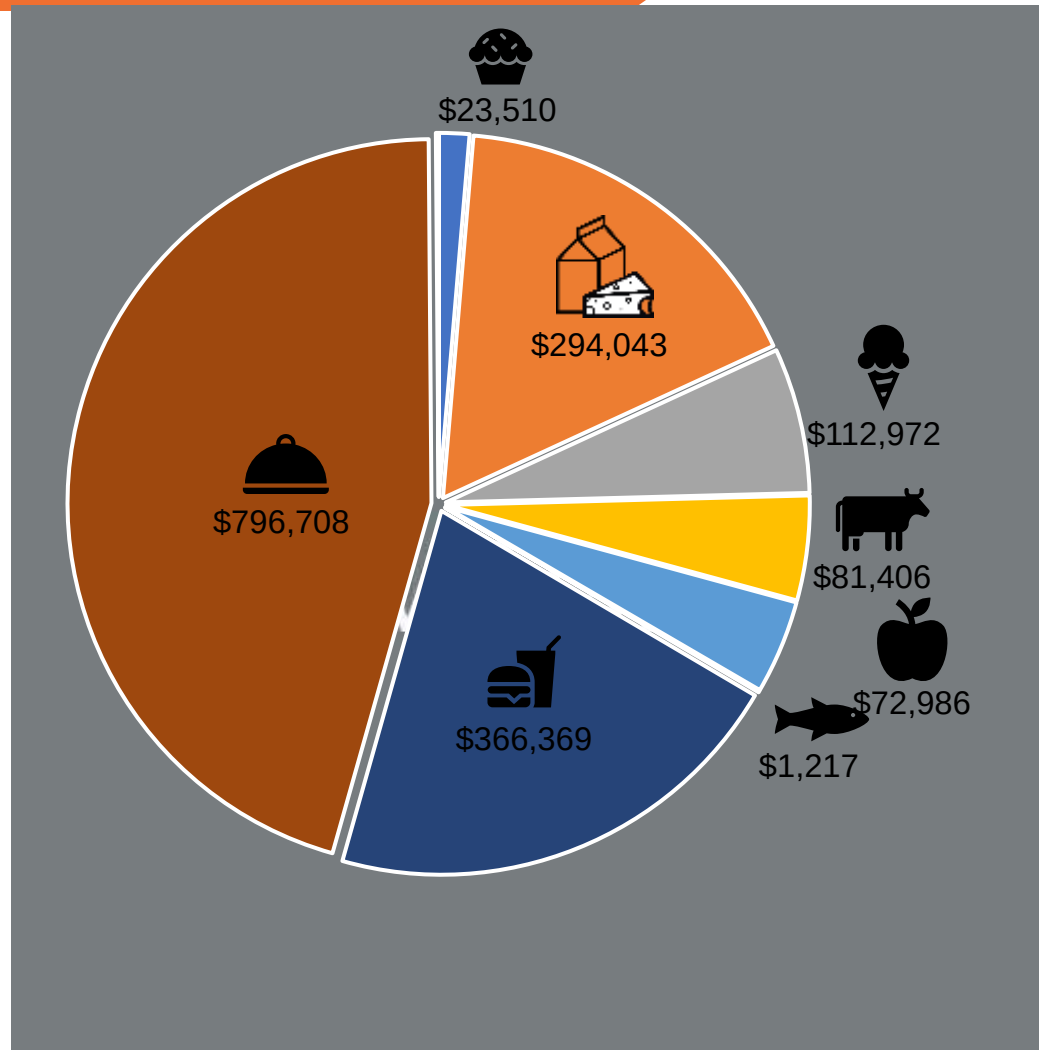
Business Case

- Aligns with production efficiencies
- Logistics stress transferred from production
- Adjust packaging vs product

Fundamental Shifts I
Beta plus Flip the Barrier

MasterPack Expansion
- Minimal primary packaging for consumer
- Reusable high-barrier MasterPacks opened to restock shelves

Impact
- Longer shelf life from manufacturer to retailer
- Consumer packaging focused on required shelf life
- Less primary packaging for consumer and MSW
- Potentially more recyclable primary packaging
- Less food waste



Fundamental Shifts I
Packaging Value Chain Innovation

- Factory in the Store
- Mobile factories replace ice cream trucks
- Direct to consumer delivery
- Self serve bins
- Align with grocerants

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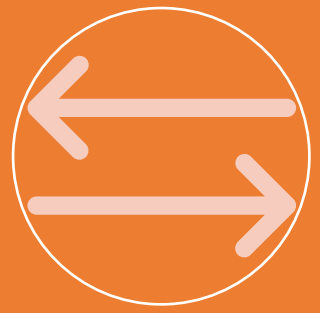

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Clusters I
Role of Dairy Center Clusters

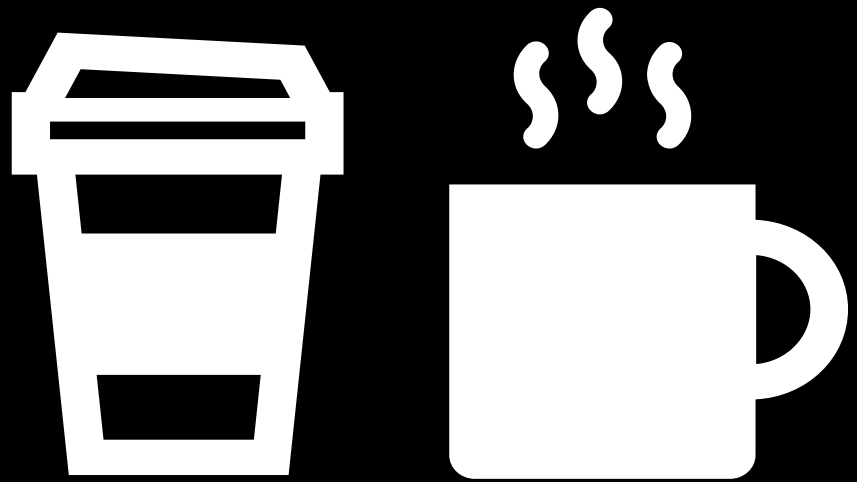
Address current industry challenges

- Increase food safety concerns with cold chain and entrepreneurs in the space
- Rapid package format conversions
- GHG and cold chain

Need windows to the future

- Enable rapid introductions with trust and shared value
- Novelty frozen dairy packaging in 2025 will not be what it is in 2035 or 2045
- No packaging on StarTrek
- Need to stay linked vs inward focused

Thank you & Next Steps



Set up a virtual coffee with Claire

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