

Innovation in the fresh-cuts industry: drivers, trends and emerging technologies

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foodtech
Connect09



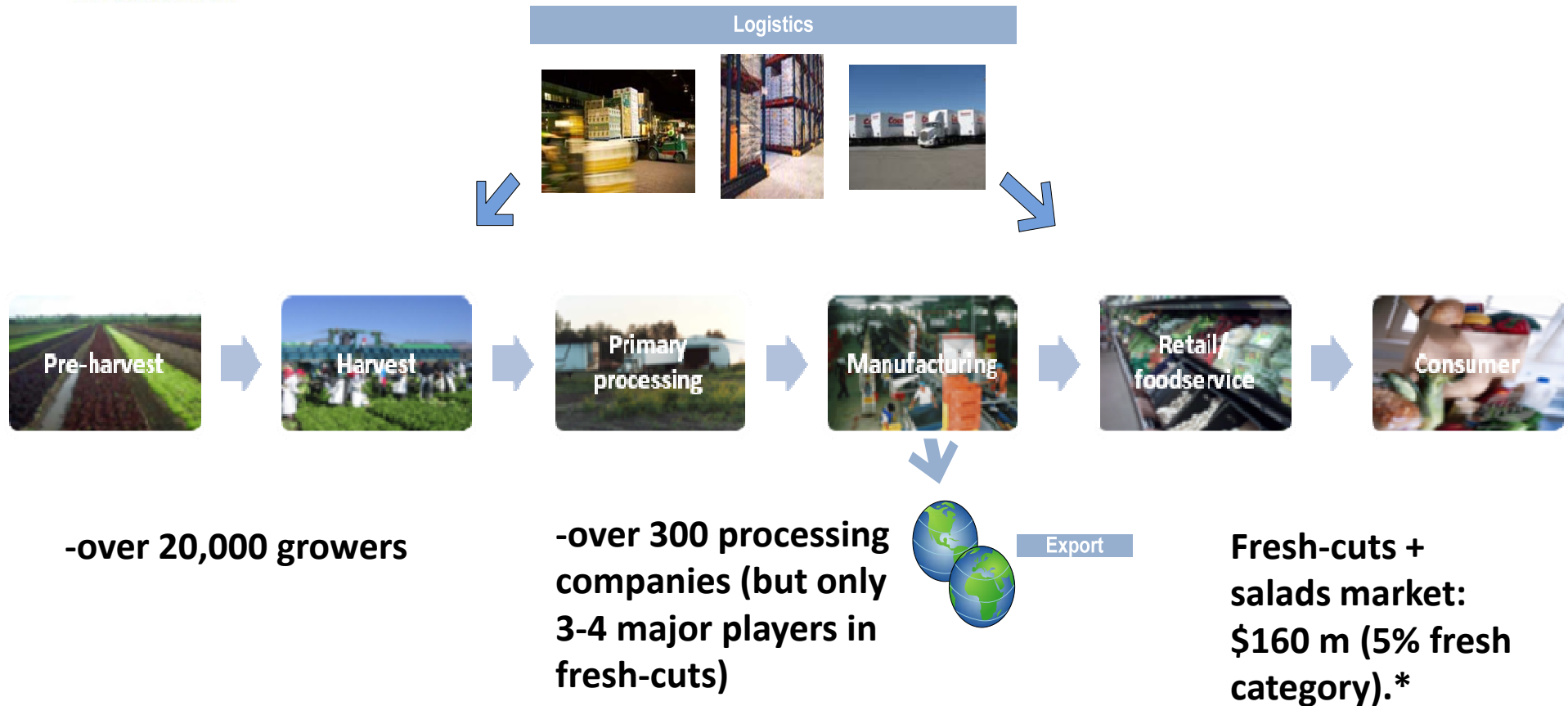
Outline of presentation

- **Drivers of Innovation in the Fresh-Cuts Industry**
 - Overview and drivers (10 min)
- **Supply Chain Innovation: Trends & Technologies**
 - Processing Innovation (10 min)
 - RFID for Traceability and Transparency (10 min)
 - Active and Intelligent Packaging (8 min)
- **The Future (3 min)**
- **Acknowledgements (1 min)**
- **Questions? (3 min)**

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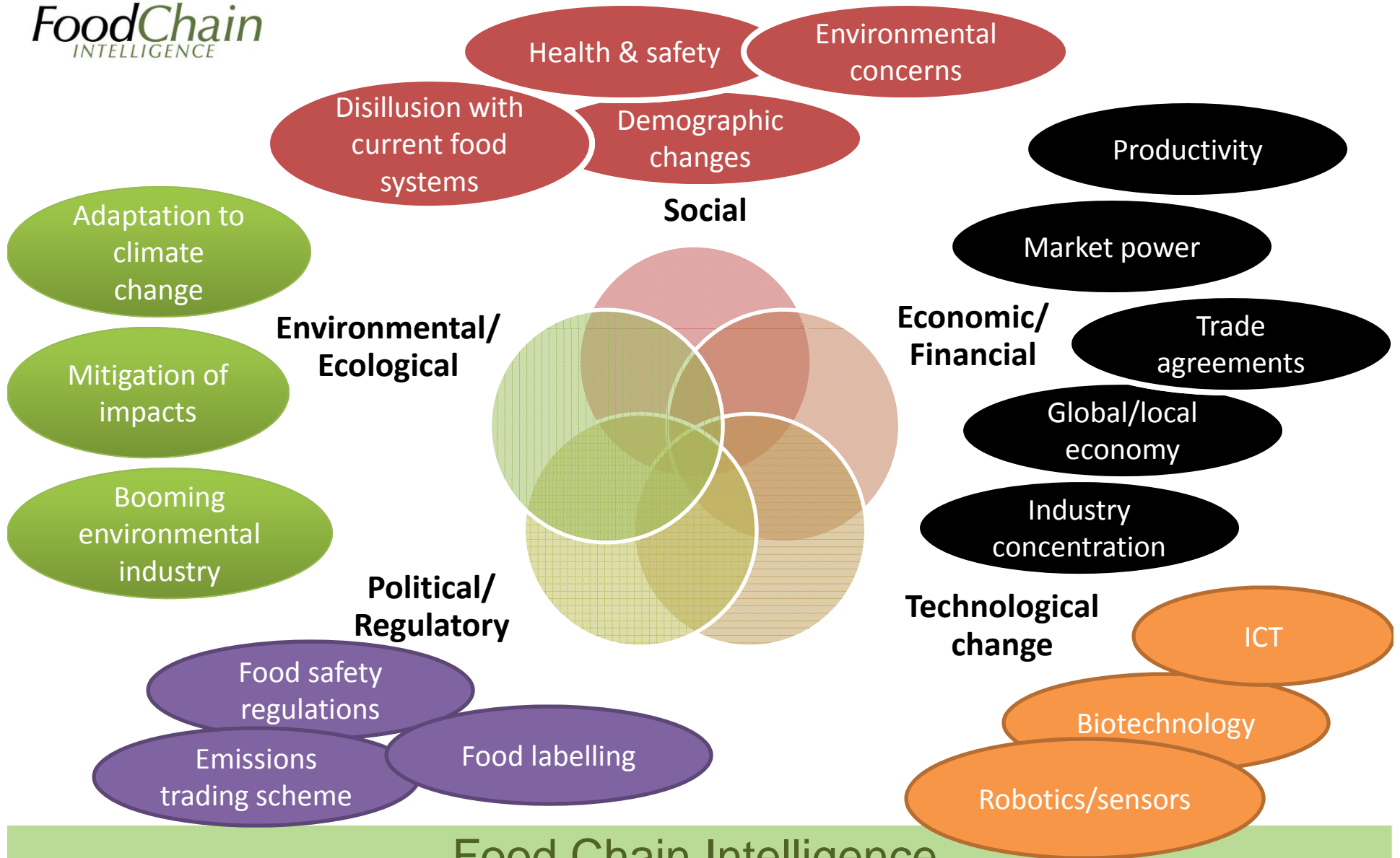
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The fresh-cuts industry



* McKinna, 2007

Structural analysis: major drivers



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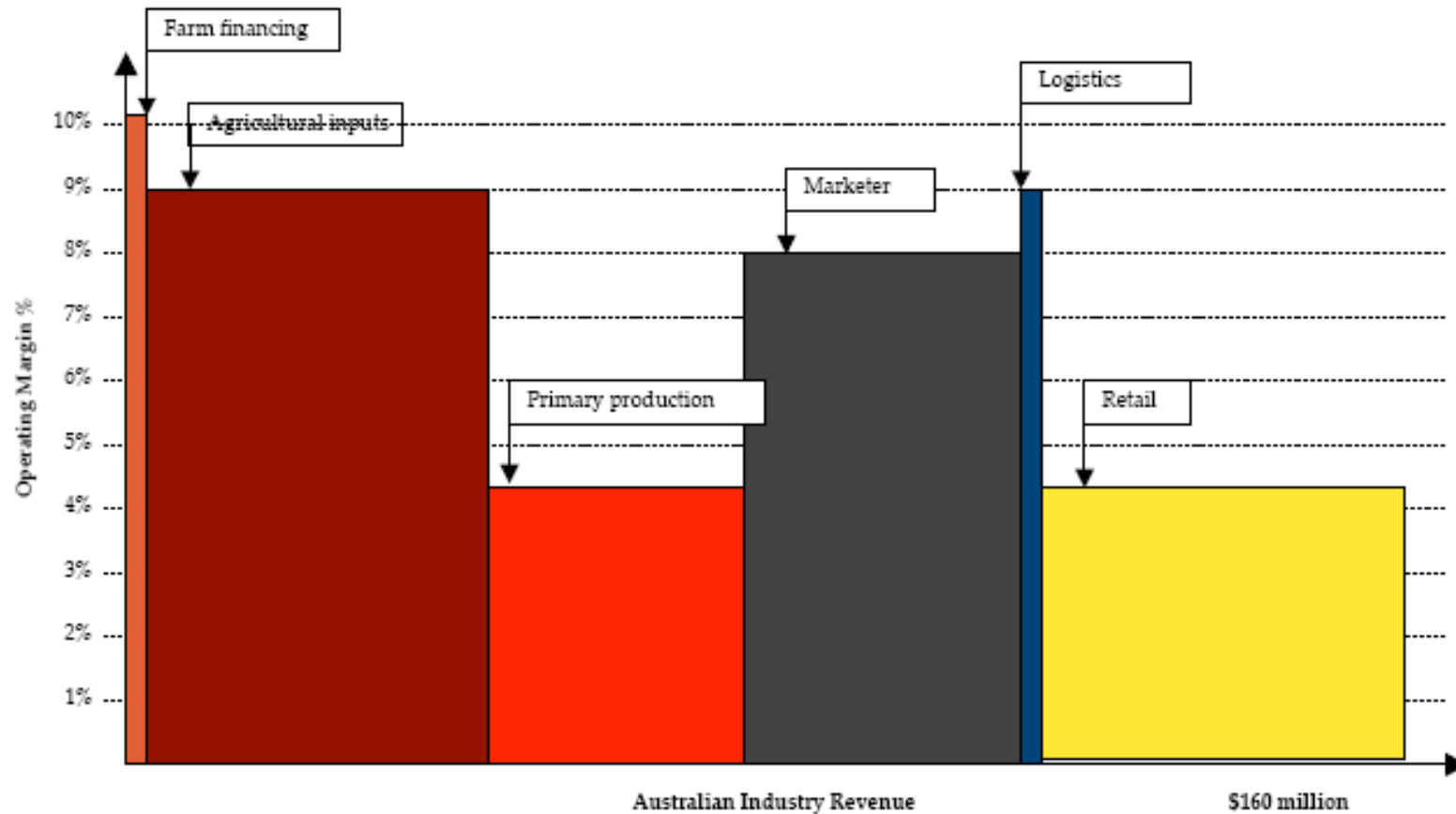
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Key Concerns of Retail and Manufacturer Decision-Makers, CIES (now CGF) Top-of-Mind Survey, 2009

	Issue	% choosing issue	Rank	
			2009	2008
1	The economy and consumer demand	56	1 	4
2	Food safety	34	2 	2 
3	Corporate responsibility	33	3 	1 
4	The competitive landscape	29	4	9
=5	Retailer-supplier relations	28	=5	5
=5	The retail/brand offer (e.g. private label versus manufacturer brands)	28	=5	8
7	Consumer health & nutrition	20	7	3 
8	Consumer marketing (e.g. loyalty programmes)	19	8	11
9	Technology and supply chain	18	9	7
10	Human resources	13	10	6

Source: CIES, 2009

The Fresh-cuts industry

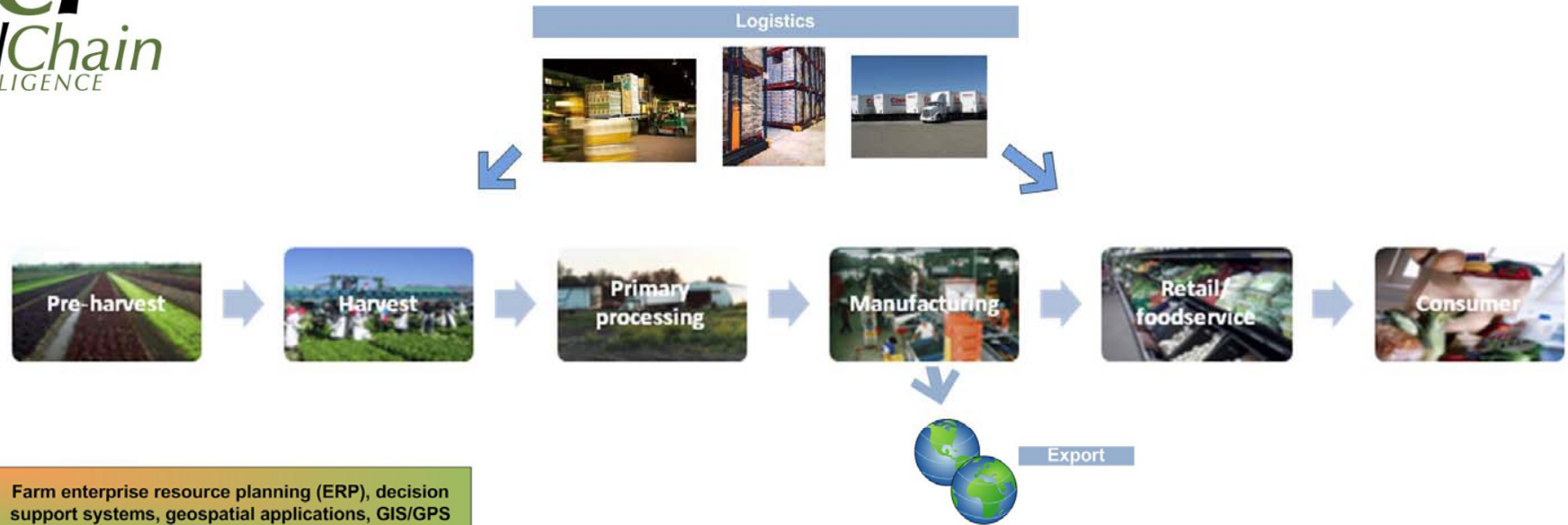


Fresh-cuts profit pool (McKinna, 2007)

Hunter PR Reveals Results of USA Food Editors' Top 2008 Food Stories

- *Rise in food prices around the world*
- Melamine in Chinese milk scandal continues
- *Salmonella outbreak in raw tomatoes*
- *Supermarkets offer more locally-grown food*
- *New COOL (Country-of-Origin)labelling laws*
- Big food companies adopt nutrient standards
- *Jalapeño peppers test + for salmonella*
- Paul Newman dies
- NYC restaurant regulations on trans-fats
- Salt intake alarm – GRAS removal for salt?

Supply Chain Innovations



ET CATEGORIES INVESTIGATED IN THE SCL PLATFORM

Forecast and management of supply factors	Farm enterprise resource planning (ERP), decision support systems, geospatial applications, GIS/GPS
Forecast and management of demand factors	Efficient Consumer Response (ECR) Electronic commerce and data sharing Digital pricing
Management of stock and inventories	Traceability and Product Identification Standards Tracking of assets through RFID and wireless sensor networks
Robotics and automation	Mechanical harvesting Packaging/pallet-forming robots
Packaging & labelling	Grading/sorting Retail-ready packaging/ recyclable plastic crates Dynamic 'best by' dates
Cold chain logistics	Ethylene/humidity/temperature management Computerised Vehicle Routing and Scheduling (CVRS), telematics. Real-time product monitoring (RFID, mesh networks, biosensors)
Foodservice and point-of-retail	Vending machines for fresh vegetable products New product/service formats for foodservice
Emerging distribution models	Urban, local and regional supply-demand chains Sharing of distribution networks & infrastructure Supermarket-led initiatives focused to decrease environmental footprint Use of intermodal transport (for export and domestic)
Supply chain management	From supply chains to value chains



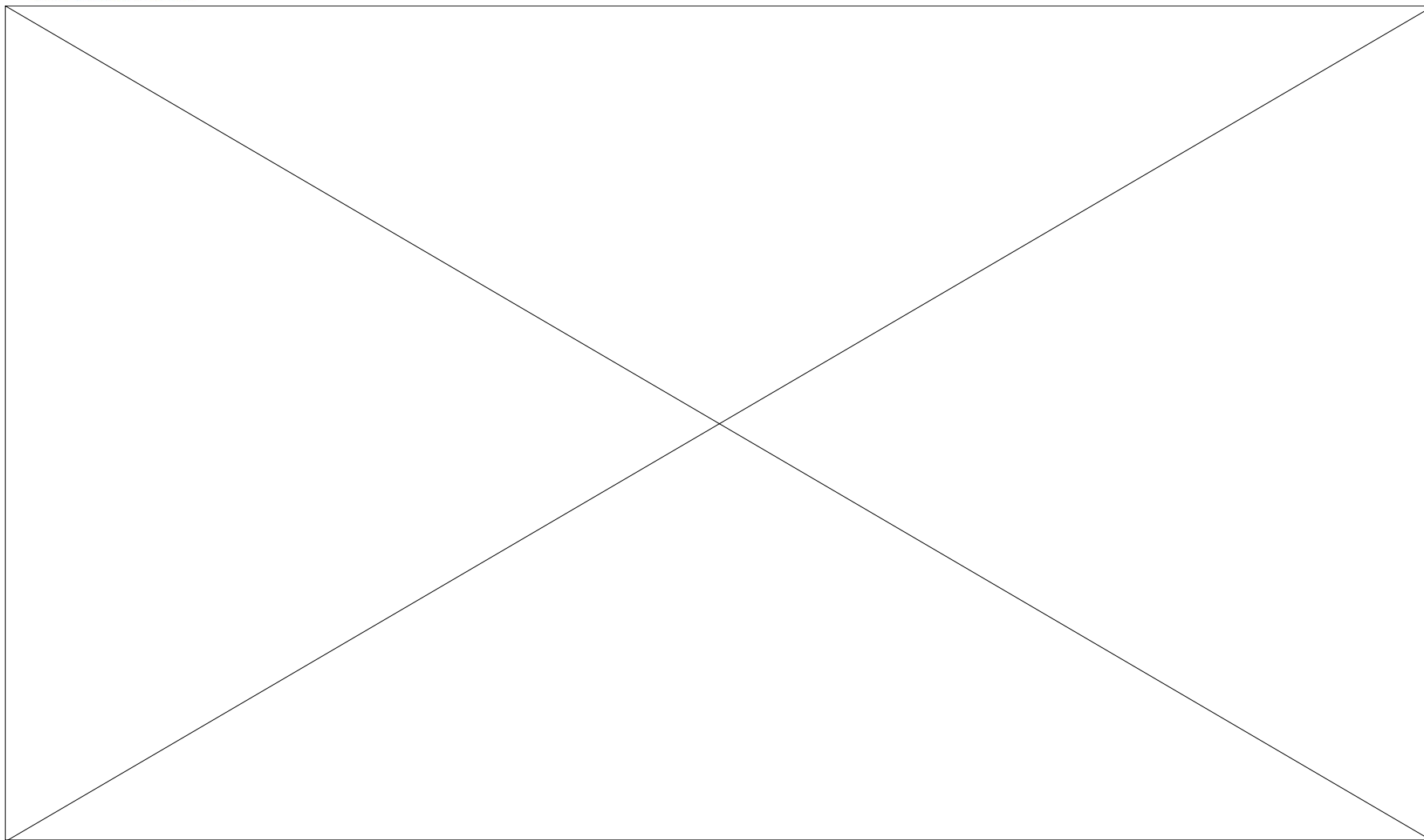
Processing Innovation

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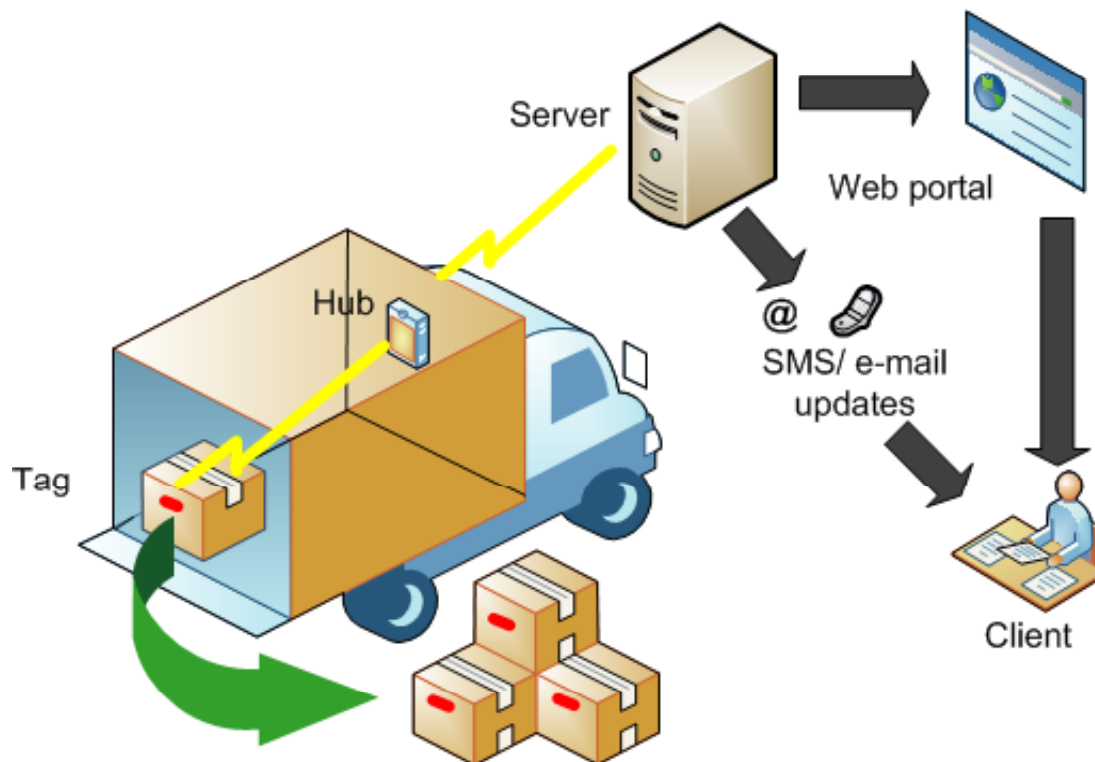
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Processing Innovation



RFID for Traceability & Monitoring



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RFID for Traceability & Monitoring

RFID tracking, traceability & monitoring

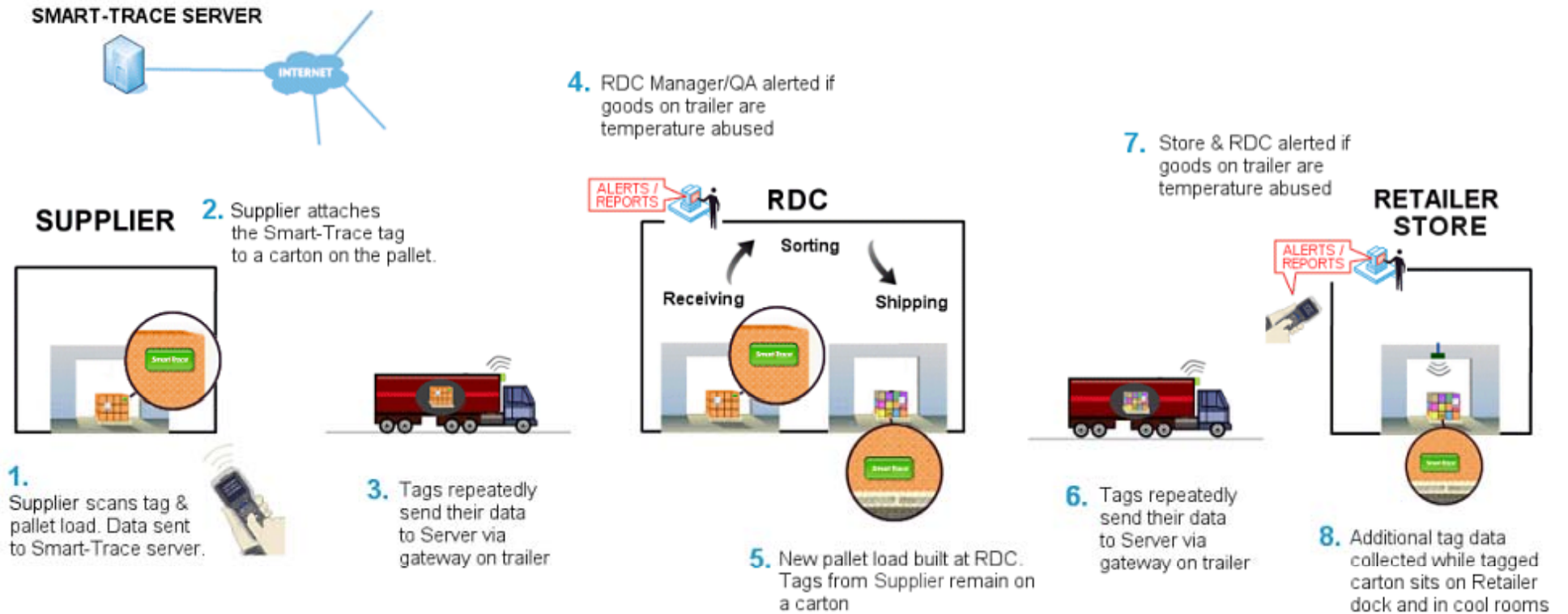
- Track the position of packages, pallets, shipping containers or trucks (stationary or in transit).
- Identify items through a unique EPC or other barcode alternatives.
- Store data (T, RH, [gas]) and transmit information as it happens



Corrective actions before products are damaged



Reach of RFID Traceability & Monitoring



Monitoring between Supplier, RDC, and Retailer Store

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Patents: US 6865516, AU 757438

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RFID Monitoring Example

Truck shipment of chilled fresh-cut salads from Sydney NSW to Brisbane QLD

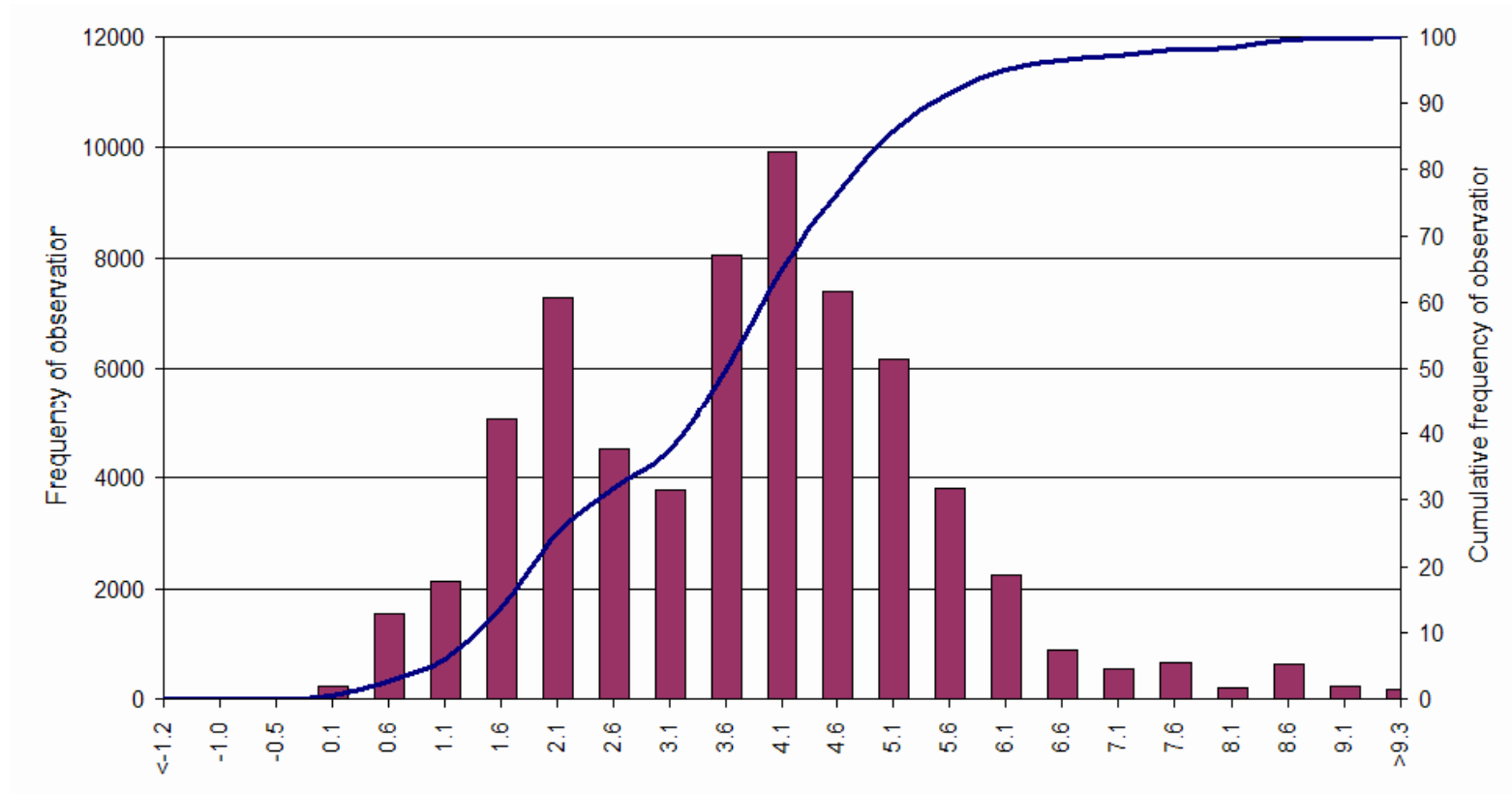


Figure 56 - Frequency of observations of in-pallet temperatures



RFID Monitoring Example

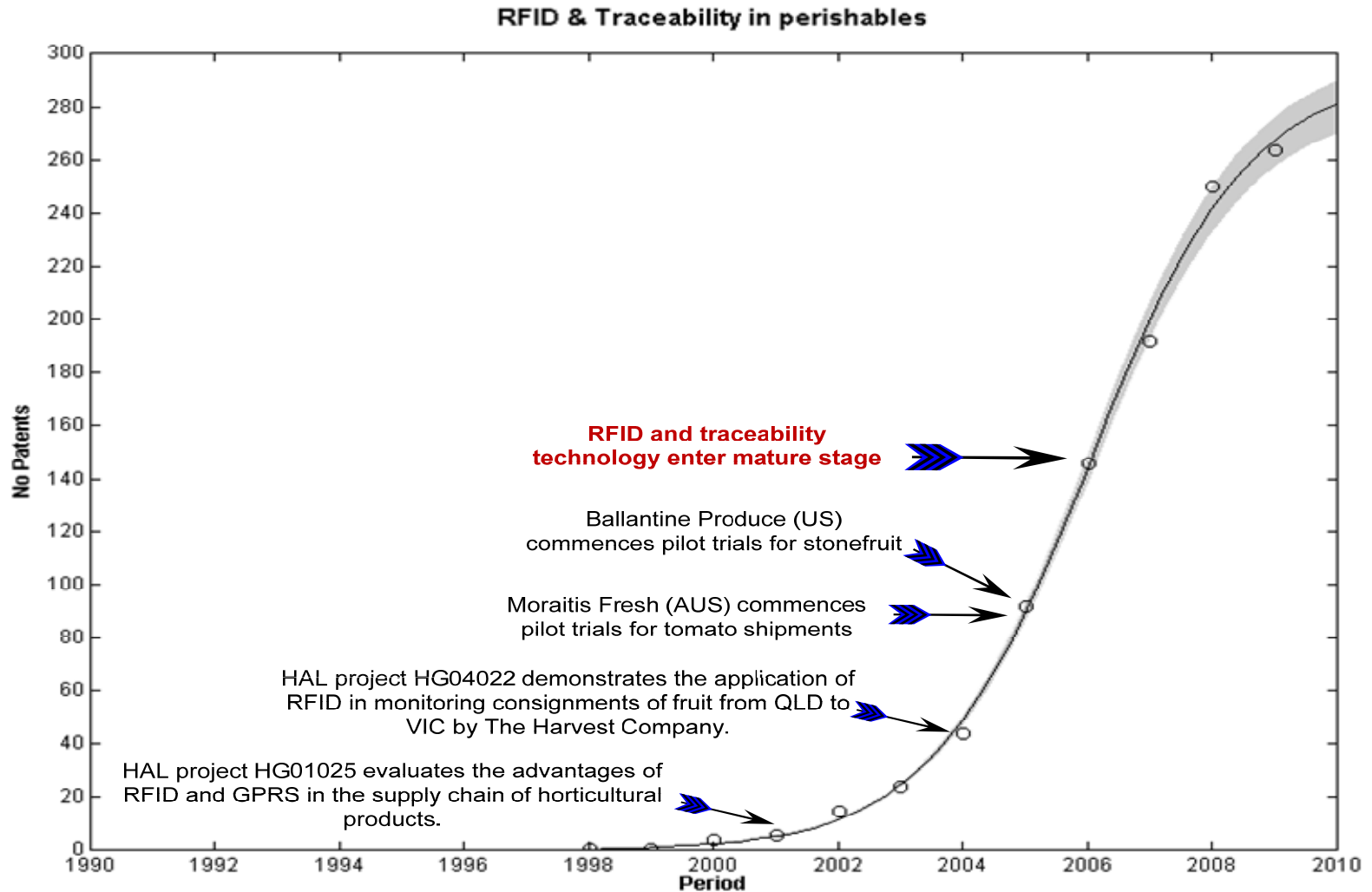
Truck shipment of chilled fresh-cut salads from Sydney NSW to Brisbane QLD



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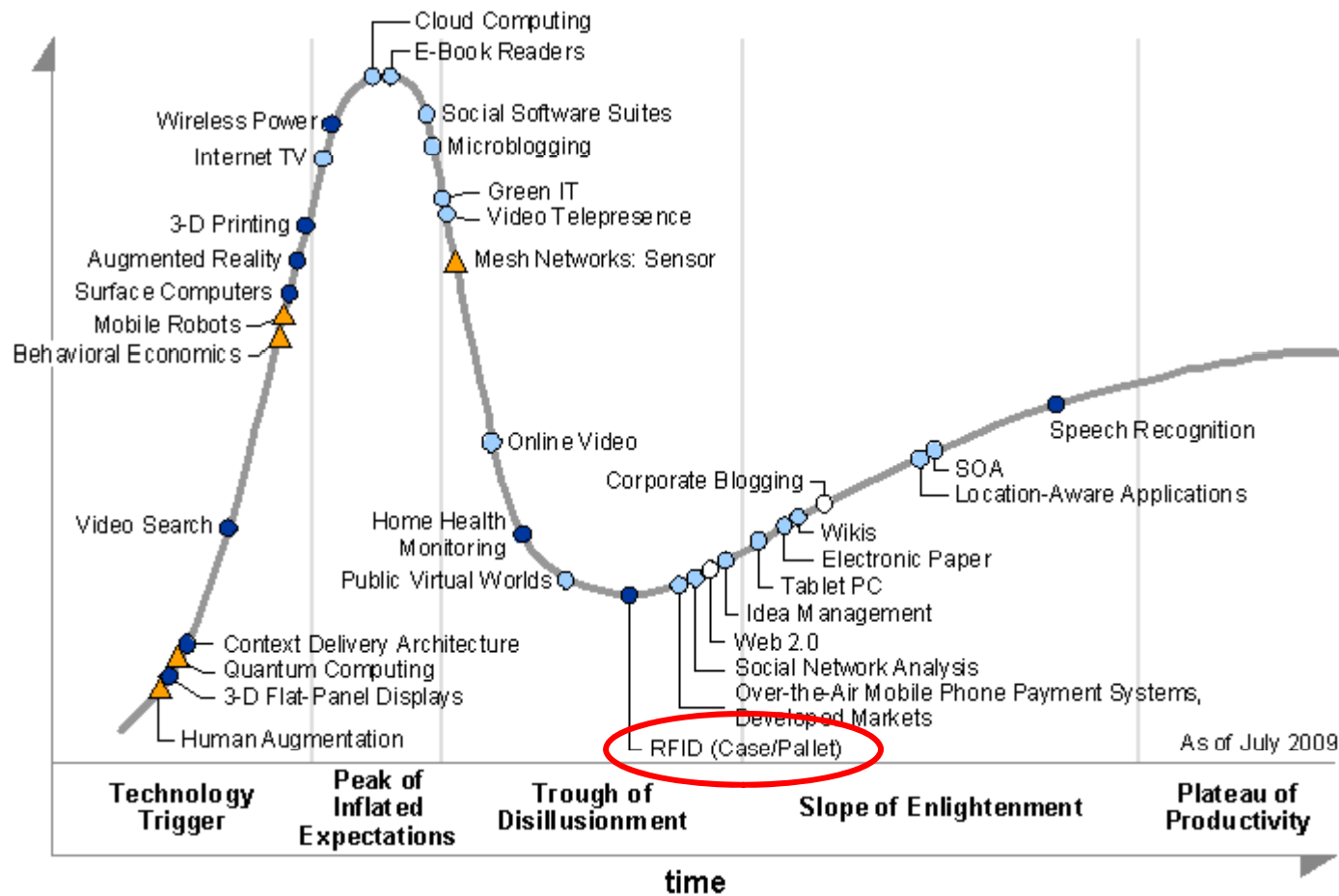
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RFID for Traceability & Monitoring



RFID for Traceability & Monitoring

Gartner's 2009 "Hype Cycle" -RFID for case/pallet tracking



Years to mainstream adoption:

- less than 2 years
- 2 to 5 years
- 5 to 10 years
- ▲ more than 10 years
- ⊗ obsolete before plateau

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RFID for Traceability & Monitoring

Company	Supply chain link	Application	Year	Implementation Costs	Benefits
Ballantine Produce (US)	Grower and distributor	Tracking fresh fruit shipments (nectarines, peaches, grapes) from packing house to retail DC	2005	US\$400,000	Competitive advantage (1st fruit supplier to comply with Wal-Mart's RFID initiative).
Moraitis Fresh and Testarossa Packers (VIC)	Grower, wholesaler and processor	Tracking tomato shipments	2004	AUD \$100,000 (1 year to recoup investment)	To gain supply chain visibility, optimize communications with retail partners and improve processes.
Samworth (UK)	Food marketer and distributor	Tracking of temperatures in refrigerated trucks transporting meats, salads, desserts and other perishables.	2005	Unknown	Maximise shelf-life and avoid shrinkage due to spoilage.
Dole FreshVegetables (USA)	Grower, marketer and distributor.	Tracking of pallets and cases of leafy greens.	2007	Pilot program: US\$2 m; Full scale operation: several millions.	Traceability.

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Active & Intelligent Packaging

Active Packaging. Performs functions beyond the protection and identification of its contents .

Extends the product shelf-life through components that release or absorb substances into or from the packaged food or its surrounding environment .

Intelligent packaging. Packaging technology that provides external data and/or relays information relative to the status of the contents (indicators).

Active & Intelligent Packaging

Active packaging



Sachets for absorption of H₂O, O₂ & C₂H₄

Active & Intelligent Packaging

Active packaging



Examples: Nisin-containing packaging, (antimicrobial), Active MAP, ethylene/oxygen/humidity scavengers incorporated to films

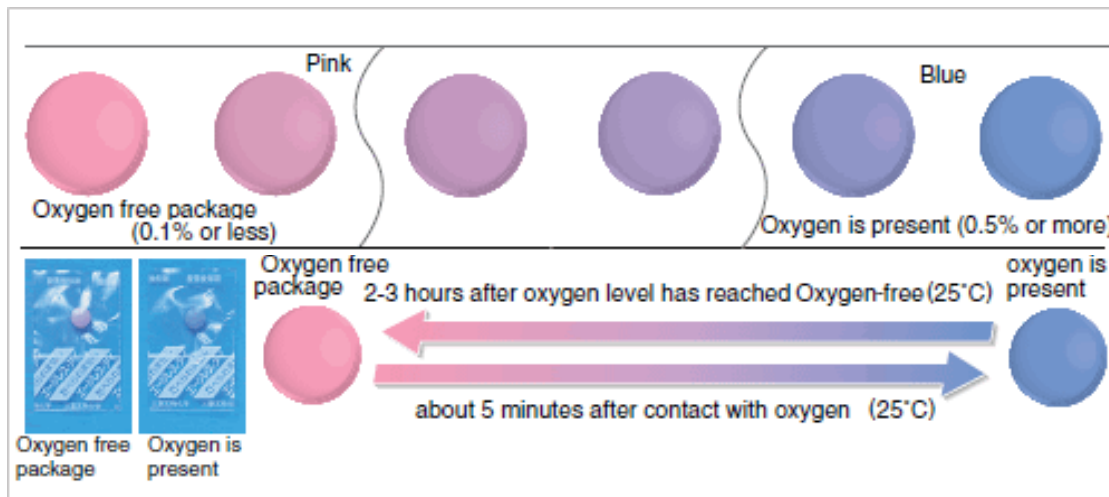
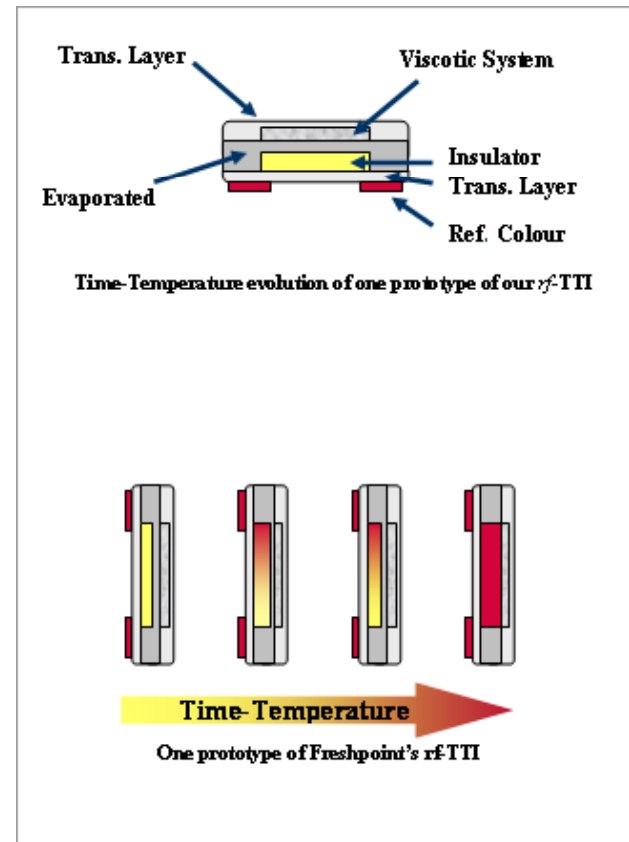
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Active & Intelligent Packaging



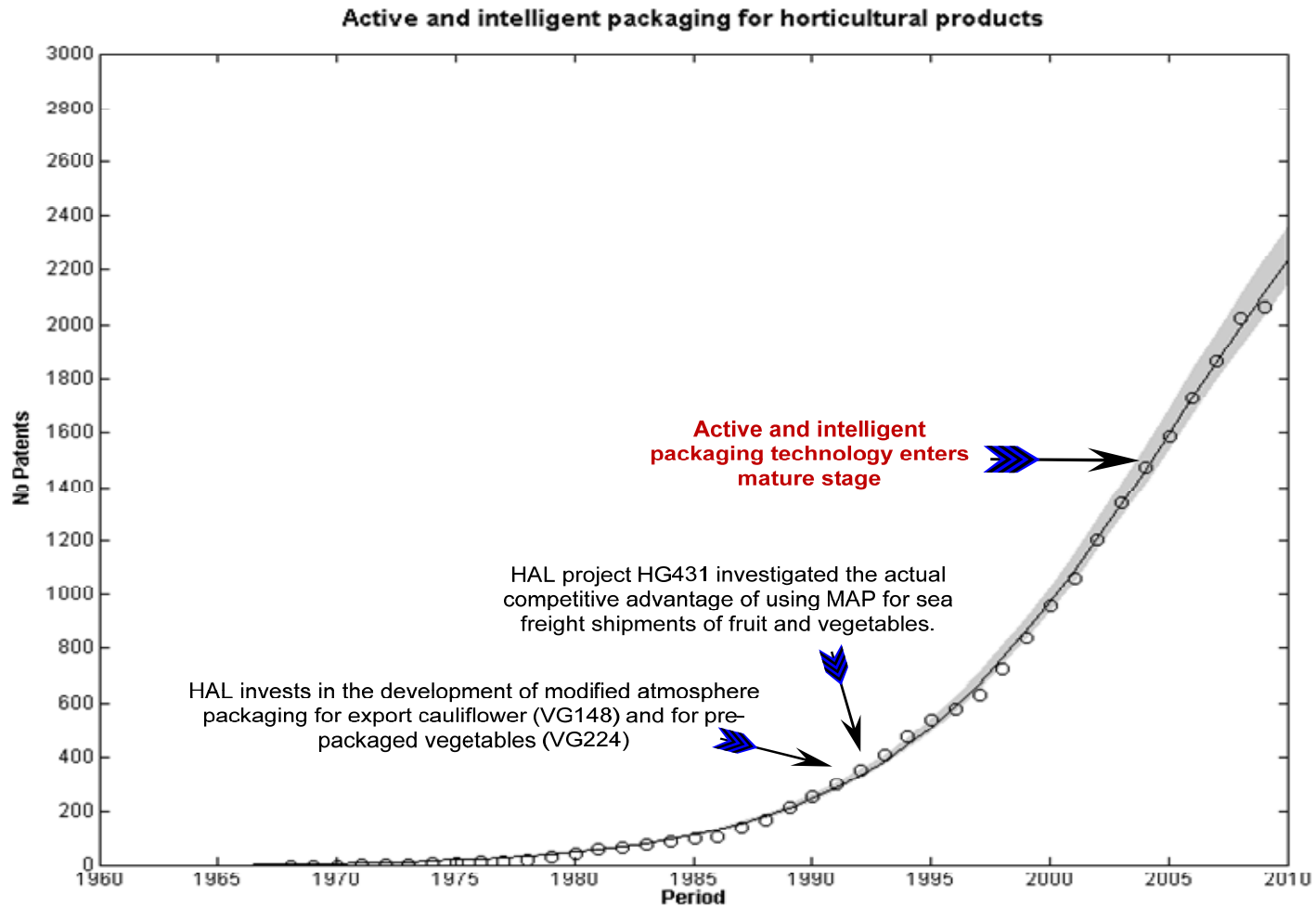
Intelligent packaging



Active & Intelligent Packaging

<i>Type of packaging</i>	<i>Packaging activity</i>	<i>Significance</i>	
Active	Antimicrobial surface Antimicrobial release Oxygen scavenging	Delay of microbial spoilage	
	Oxygen scavenging Odor absorption Antioxidant release	Slow rates of rancidity reactions	
	Oxygen scavenging	Decrease of nutrient loss and delay of colour changes	
	Absorption	Decrease of off odours/flavours	
	Desiccation Humidity buffering Absorption of condensate	Delay of microbial spoilage and retention of texture	
	Ethylene scavenging 1-MCP release Atmosphere modification	Delay of ripening	
	Intelligent	Time-temperature indicators	Signal temperature conditions and storage time
		Oxygen /carbon dioxide indicators	Signal packaging leaks and storage conditions in MAP
		Microbial growth indicators	Indicate microbial spoilage
Pathogen indicators		Indicate presence of specific pathogenic bacteria (e.g. E.Coli O157)	

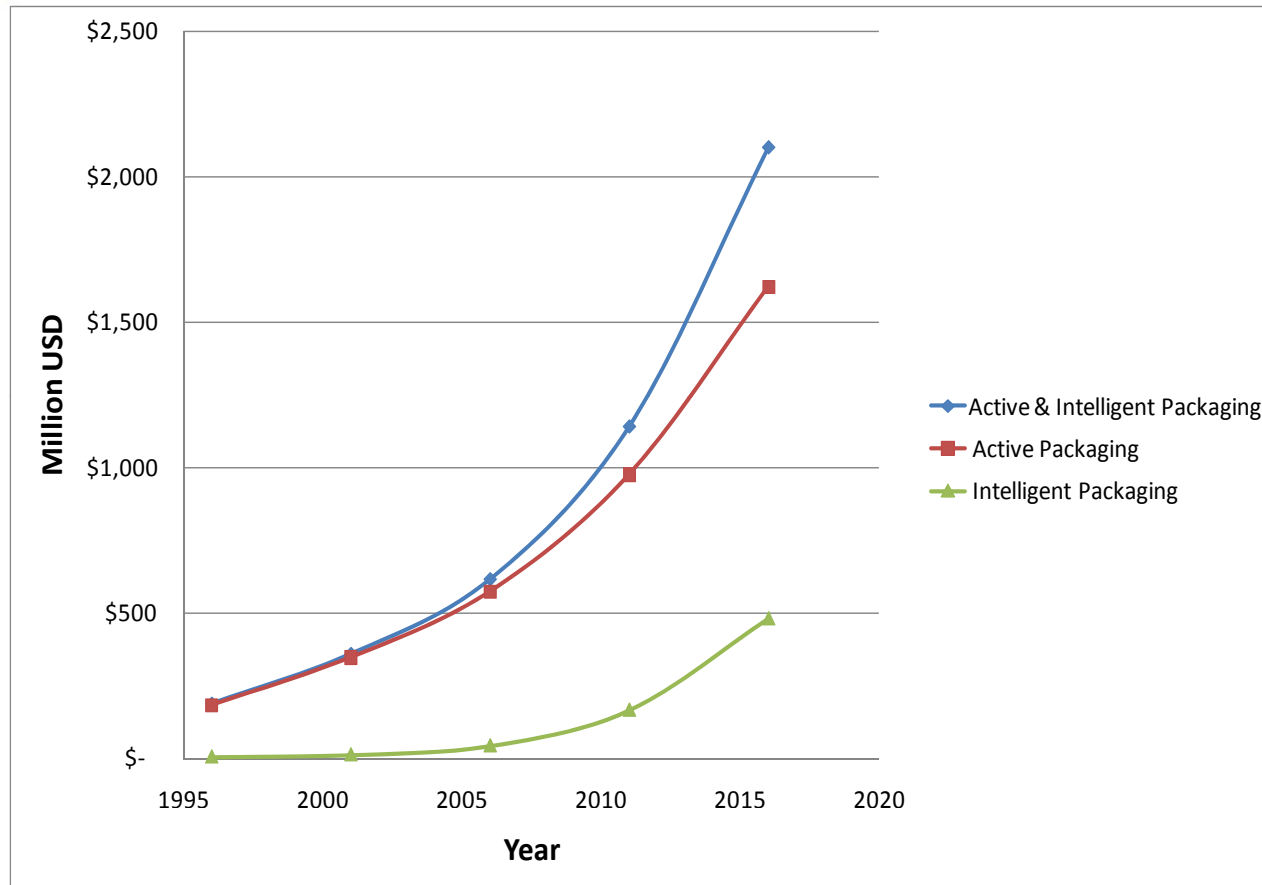
Active & Intelligent Packaging



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Active & Intelligent Packaging

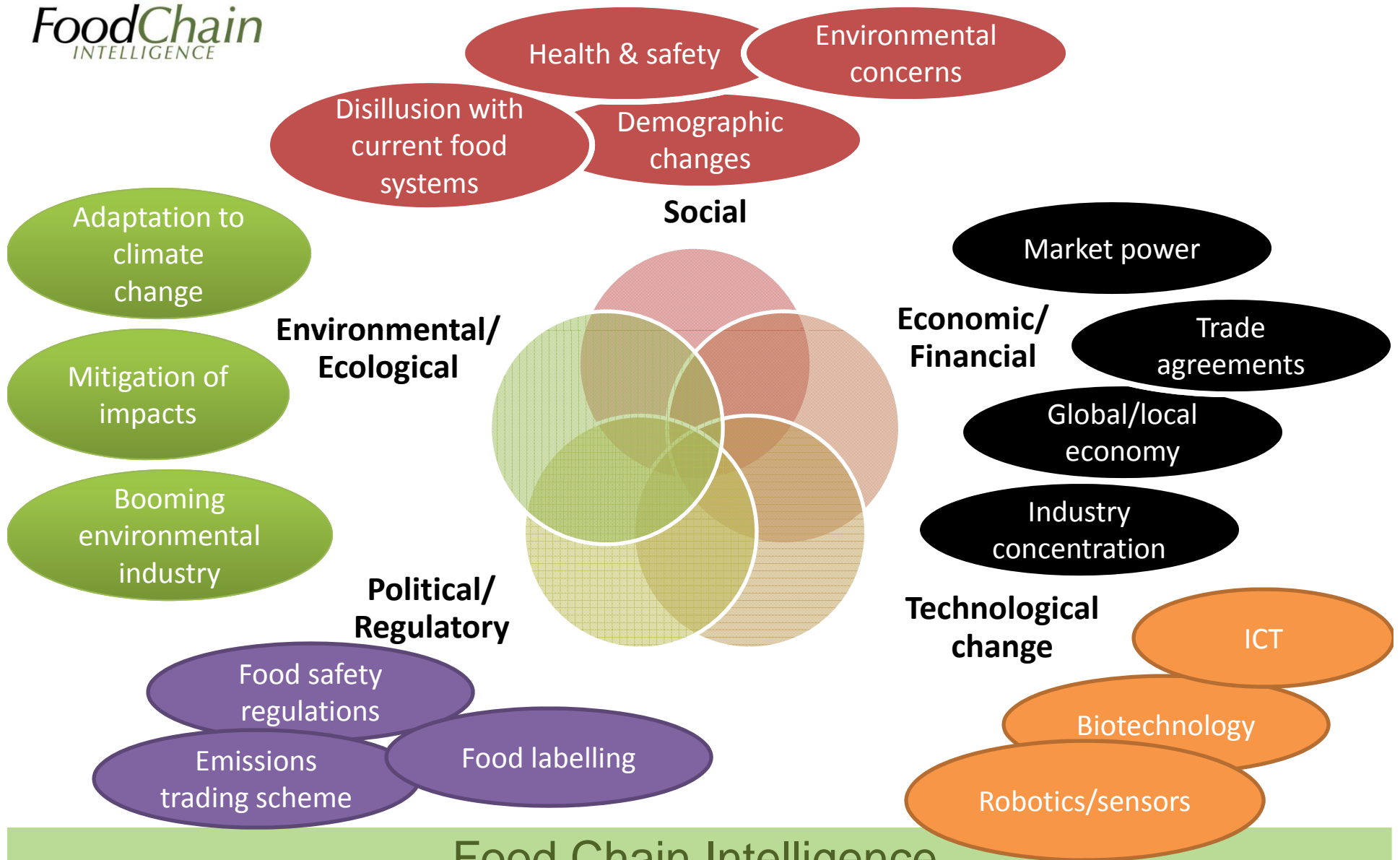


Historical data (1996, 2001 and 2006) and forecasts (2011 and 2016) for active and intelligent packaging demand in the US.

Active & Intelligent Packaging

Supply Chain Driver/challenge	Opportunity
Integrity	<ul style="list-style-type: none"> • Anti-tampering. • Monitoring.
Efficiency (CO ₂ -e and \$)	<ul style="list-style-type: none"> • Carbon-neutral packaging. • Biopackaging. • Packaging reduction (switch to polymeric materials or re-design of volumes).
Quality and safety	<ul style="list-style-type: none"> • Gas scavenging. • Antimicrobial compounds. • Oxygen/ CO₂/H₂O permeability (MAP).
Convenience	<ul style="list-style-type: none"> • 'Fit-for-purpose' packaging. • Easy opening packaging for elderly population (e.g. salads).
Health and wellness	<ul style="list-style-type: none"> • Delivery technologies of healthy ingredients (e.g. bioactives). • Ready-to-eat meals combining protein-based meal and vegetables.
Retail compatibility	<ul style="list-style-type: none"> • Tags/labels /codes compatible with e-commerce & digital pricing. • Retail-ready (RPC, cardboard).

The Future



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Acknowledgements

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Thank you!

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