

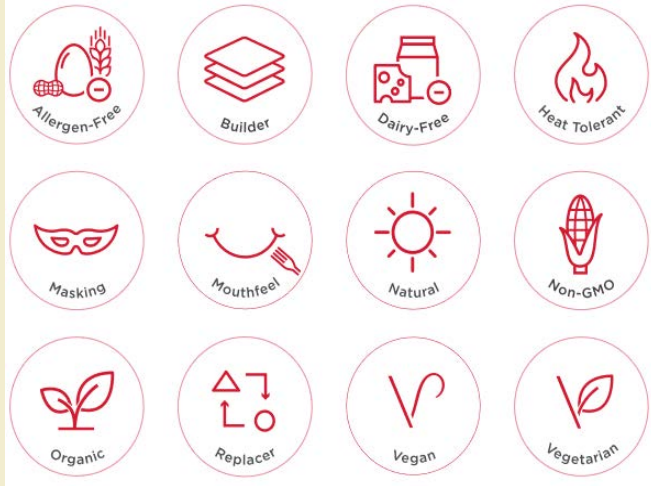


iNewtrition

FOOD SCIENCE EXPERTISE

**Case Study:
disruptive
innovation in
flavours for plant-
based products.**

Opportunities from *incremental*....



- Flexitarian diet with plant-based protein sources and natural dairy-free functional ingredients.
- Molecular gastronomy, culinary arts are early trendsetters for the food industry.
- Sensory experience for seniors market (texture/flavour): dysphagia, alteration flavour perception, loss of appetite (Alzheimer).
- Beverages redefined as sugar concerns drive opportunity with no limits on NPD.
- Natural ingredients & clean label for low-fat, low-sugar, low-salt and reduced calories products.
- “Inexperience” with consumers seeking more inspirational & immersive sensorial & personalised experiences with food beyond consumption.

.....to disruptive innovation with new technologies

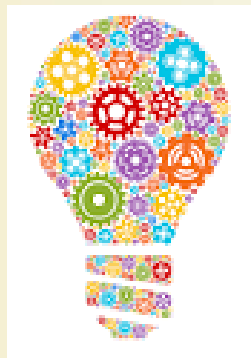


- Encapsulation & modulation / controlled release
- Dispensing / handling & ease of use in application (shelf life, solubility)
- Biotechnology combined with new raw materials to be used as precursors and/or catalysts for flavour formation
- In-house technology for flavoursome ingredients (lobbying opportunity w/ potential impact on regulatory & labelling)
- Multifunctional flavourings (including flavourings with modifying properties or FMP's)
- Flavour technology as sustainability solutions
- Natural sweetness modulating flavours (flavonoids, steviol glucosides or mogroside, natural sweet protein, lactones that enhance sweetness perception) combined with natural bitterness/astringency blockers and/or mouthfeel (creaminess) enhancers.

Aroma analytics & Molecular Science

- Analytical – aroma analysis.
- Flavour & matrix release interactions.
- Flavour & texture interactions.
- Chemical & enzymatic reactions leading to off-flavours and colour development during shelf life (lipid oxidation, lipolysis by lipases, Maillard reactions, etc.)
- Correlation between consumer preference driving (flavour, sweetness, texture) attributes & analytical data.

Data modelling & analytics to build predictive models (AI)



Innovation management:

- New Product Development
- Product reformulation
- Portfolio management
- Product adaptation

 FlavorWiki



Deep market insights:

- Competitive market mapping
- Emergent preference prediction



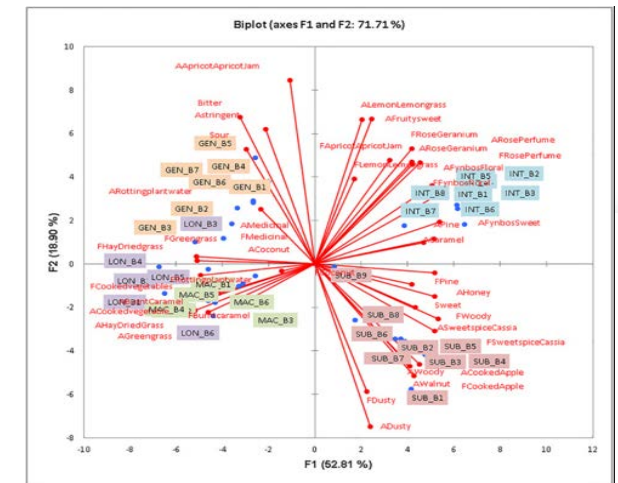
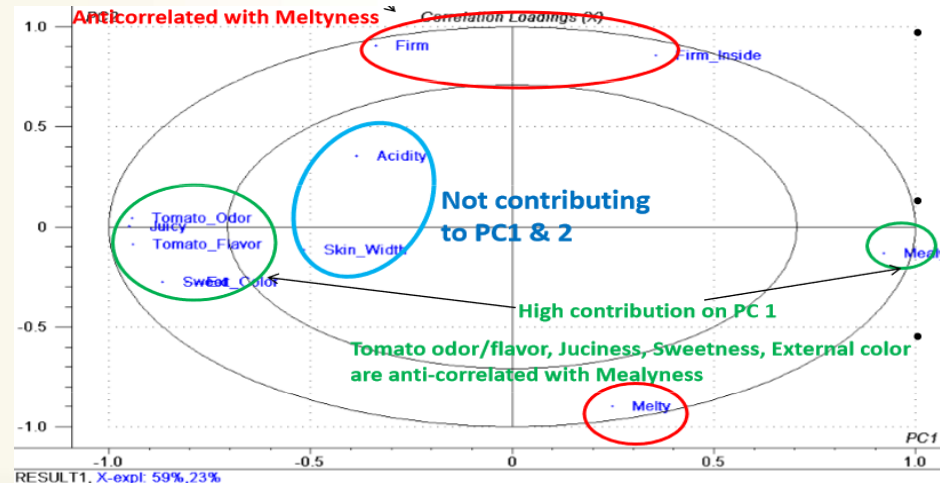
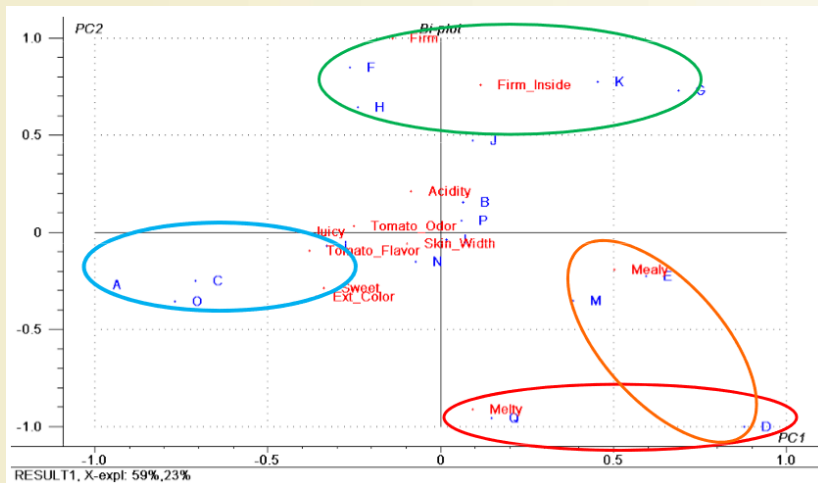
Cognitive marketing:

- Flavor profile preference priming
- Consumer value chain psychology prediction

 DouxMatok

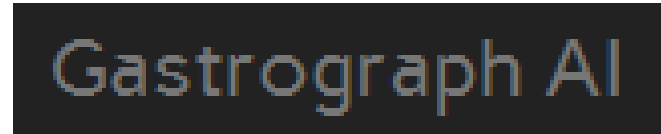
Support to B2B customers: understand consumers

- Data modelling & analytics
- Consumer science & research, trends & insights – fragmentation and customisation
- Global dairy / non-dairy: global & local sensory mapping per market using preference mapping methodology / principal component approach.



Example - Gastrograph AI

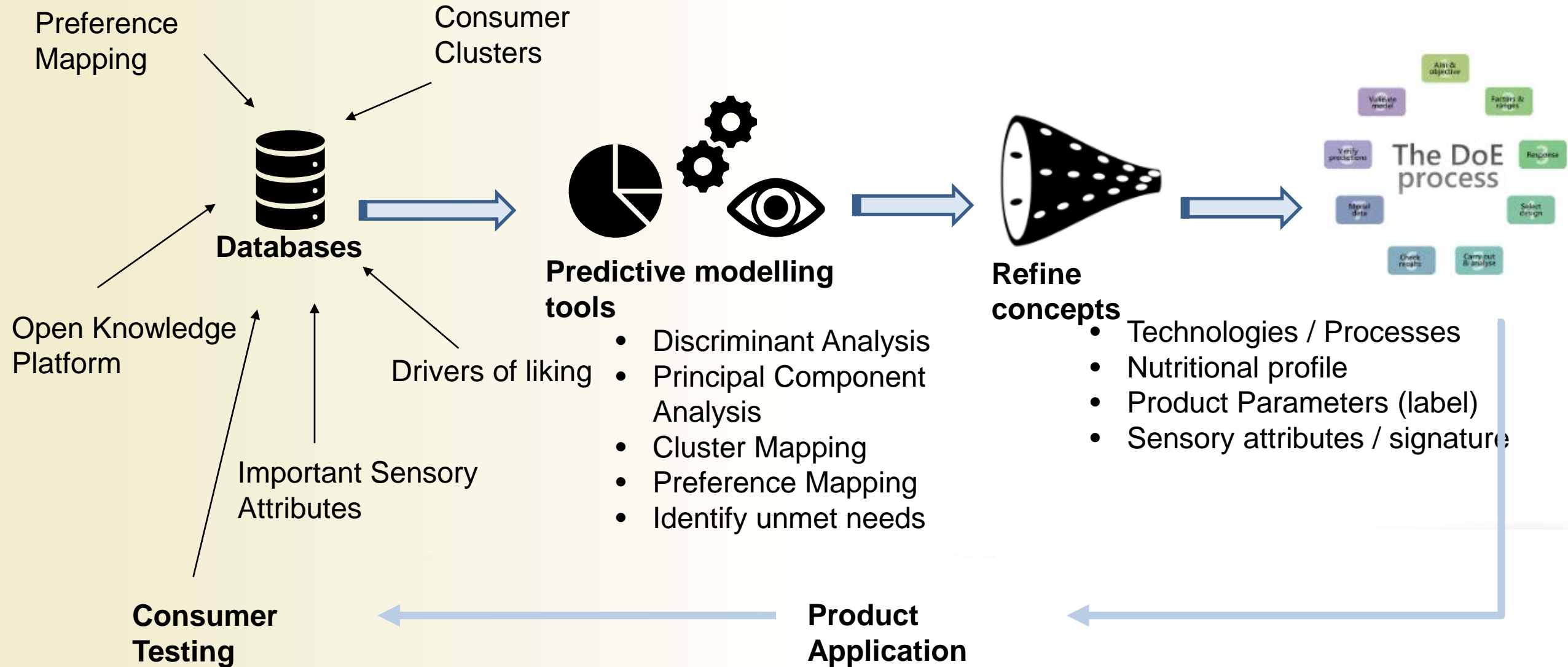
- 1- Translate perception across demographics
- 2- Hierarchical modelling
- 3- Predicting preferences today
 - Decomposition of flavour profiles*
 - Preference is contextual*
 - Applied semantic vectors from decomposed flavour profiles*
 - Modelling & predicting consumer preference*
- 4- Predict the evolution of preferences into the future



<https://mistafood.com/>, sensory science + data science on perception & preference:

<https://www.gastrograph.com/>

Faster Innovation - Empathic Design & Agile Market Orientation



Next steps

- Customer (B2B) and consumer (end user) centric Innovation workshop with key stakeholders and functions (internal) to prepare 5G pipeline
- Draft Organisation Master Plan (12M, 3 and 5 years) and refine KPI's
- 1-2-1 with key stakeholders to define/refine R&R, ways-of-working, expectations, timings
- Risk / Reward assessment for all projects => Grid => governance & prioritisation
- 6 and 12 months plan to visit key customers.
- 12 and 24 months plan for new customers and prospects
- Meet R&D teams, align and agree on stretched goals and promote culture of innovation within R&D teams. Regular meetings (virtual and F2F) to discuss progress and align on next steps.



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