

# Feasibility of active and intelligent packaging for local and organic food in Southern Finland

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## Aim of Study

- Target was to find out whether *a) special niche food market*, local and organic food, could present future market for active and intelligent technologies, and *b) if related ideologies* pose hindrances for adopting such technologies,
- Aim was to concentrate on **value chain stakeholders** and their readiness to exploit a given technology. Value chain stakeholders have a double role as professional decision makers and actors that bring products to the market, but also as consumers. These roles are assumed to be more or less mixed.

## Background

- Sales of **organic food** - increased due to health and nutritional aspects, taste, concern for environment, safety, or curiosity to fashionable trend.
- **Local food** - produced, processed & retailed within defined geographical area, but it is not a clear market sector. Motives to buy local include freshness and quality of food, support for local economy, and low environmental impact.



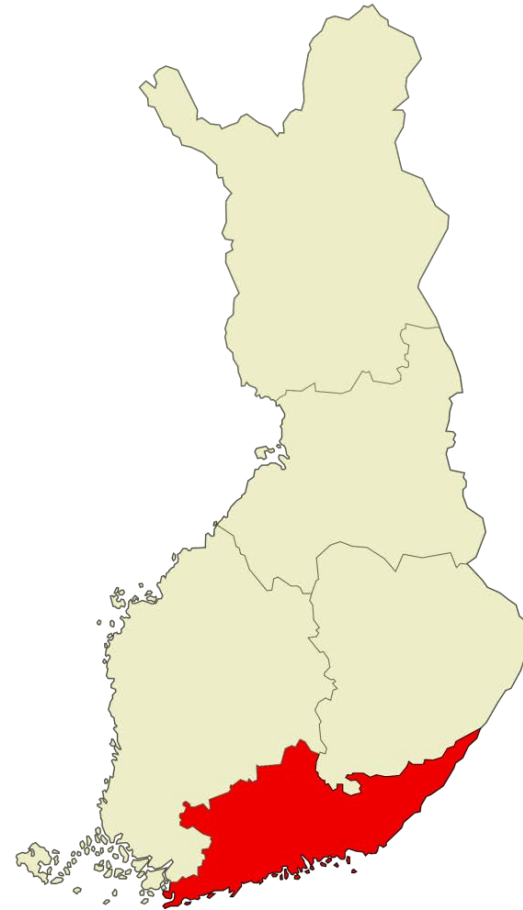
## Fewer than 10% of Inventions Actually Exploited

- **A&I packaging** positively received by consumers, because benefits aligned with their preferences and priorities,
- Retailers positive towards intelligent packaging, especially if these are designed to their own use,
- For brand owners and converters main restrictive factors adequate current solutions and additional costs.



## Method

- Opinions of 18 local & organic food chains collected during fall 2015,
- Micro- & small-scale producers and processors of **fish, meat, berries, and mushrooms**, wholesalers, retailers, and institutional kitchens.
- 3 out of 10 food producers and processors in organic foods, and rest in local food business.



## Questions for Semi Structural Interviews

- Have you heard of active and intelligent packaging?
  - If NOT introductory text was read mentioning following: oxygen scavengers, antimicrobial packaging materials, time-temperature, leakage, and freshness indicators
- What do you think of such features?
- In your opinion, would active and intelligent packaging be suitable for organic and local food?
- Do you see any need for active or intelligent features in your own product packaging? Why/why not?
- How much could these features add to the cost of packaging?

## Majority of Respondents with Positive Attitude

- 11 respondents knew about A&I packaging solutions, while 5 had no previous knowledge,
- 9 considered A&I solutions as positive developments, and that these solutions can only improve packaging,
- Antimicrobials for delicatesses and distribution of food, freshness and quality sensors, sensors for the integrity of package, and time-temperature loggers considered as beneficial (fresh products, meat and ready meals),
- Promises to deliver easily made empty if cost too high,
- Use of such solutions considered to increase in the future.

## Also Concerns and Negative Responses

- Three respondents held an one-sidedly negative attitude, and five stakeholders were ambivalent,
- Most common objection was that people should use their senses to detect spoiled food,
- These technologies were also seen as mere tricks without a proper need and value driving them,
- Doubts about reliability, or suspects that these could anyhow become compulsory against the wishes of the stakeholders,
- In 5-10 years these technologies were seen to be in use, but their time is not yet.



## Majority Could See Potential of A&I Packaging

- 12 of 14 respondents said that these technologies would be suitable both for local/organic and conventional foods,
- Organic food seen to benefit from these solutions due to the challenges in maintaining its quality and on average higher engagement of organic shoppers,
- Only two preferred not to have these technologies in local and organic food packages,
- Length/speed of food chains and centralized warehousing estimated to affect the feasibility of these solutions,
- Nine of 14 respondents would use A&I solutions for some of their own food products, and 5 of 14 would not use them.

## Remaining Obstacles for Using A&I Solutions

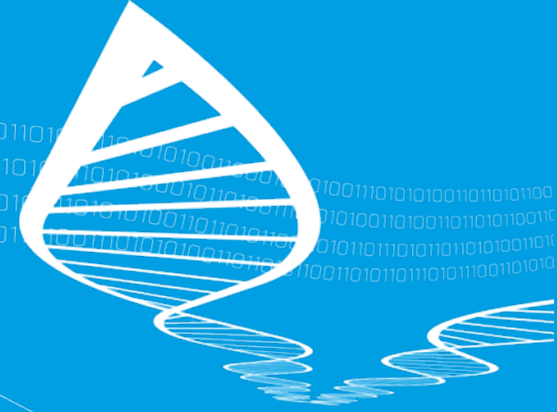
- Price increase – from 0% to five fold increase,
  - For retailers price of packaging low and new technologies can cost considerably; producers considered packaging big expense,
  - Break-through technologies allowed to considerably increase costs, but small producers not first ones to adopt them.
- Lack of proven value added,
- Technical complexity and lacking robustness,
  - Color indication or mobile phone favorable for consumers,
  - In industry and retailing loggers and reader devices.
- Amount of labor and maintenance needed,
- Liability issues and increased risk for cheating,
- Incompatibility with packaging machinery.

## Conclusions

- A clear majority of the respondents of this study thought that active and intelligent packaging techniques are equally suitable for local and organic food as for conventional food.
- The techniques that would prolong the shelf-life of delicate foods and organic products were seen as the most desirable in the future.
- However, less than half would use the technologies in their own products. The most commonly named reasons were price increase, lack of proven value added, and technical complexity of the solution.
- Local and organic ideologies not in conflict with A&I packaging.

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