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Sustainpack

Innovation and sustainable Development in the Fibre Based Packaging Value Chain

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D 6.25 Desk Study on Reports made by Organisations or Institutions on Consumer Acceptance related to Communicative Packaging

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Desk Study on Reports made by Organisations or Institutions on Consumer Acceptance related to Communicative Packaging

Summary

To get an insight in the opportunities of introducing new technologies regarding communicative packaging in the retail stores, it is important to understand how the actors in the supply chain think and react, before introducing these new features. It is therefore interesting to find reports and surveys, which already exist and find their conclusions on these specific areas. This present Desk Study includes studies and surveys made by organisations and institutes.

To structure the searching and to give the best overview over consumer acceptance on communicative packaging, this Desk Study is made on the basis of "The Talking Box" with an additional category about general approach to new technology:

1. Hello – Appeal and information
2. It is me - Identification
3. I am original – Anti-counterfeiting and security
4. I feel good – Indicators and sensors
5. I do not harm - Sustainability
6. Consumer acceptance of technology in general in connection to the retail industry

For all categories it can generally be said that only little material exists. The exception is studies concerning RFID.

Appeal and information
Everybody agrees that it is of greatest importance to present any product in a packaging that appeals to the consumer. Because if the product/packaging is not seen, it is not sold! It is also well known that a huge percentage (some studies say up to 80 %) of all buying decisions is made in the store – a number, which has been increasing during the last decades. This only emphasizes the necessity for brand owners to catch the attention of the consumer and to ensure that the interest is kept, so the consumer ends up buying the specific product.

It is therefore surprising how little information which can be found concerning these issues.

A study based on nine discussion groups in Finland concerning what safe packaging means to consumers, how it can be accomplished and what the best way to provide information on it would be has been found. It was generally agreed that "the fundamental condition of a good package is its good functionality in daily use. In addition to good functionality, a good package must have many positive properties, such as an environmentally friendly mode of packaging, the recyclability or easy disposability of the package, clear packing marks, as well as durability. The examples of good packages that consumers offered revealed that they appreciate traditions and continuity, which also means comfort and easiness for the consumers".

Identification
Awareness of RFID has grown during the last years, but this technology has also brought worries about privacy along. The respondents' concerned from some surveys are centred on "privacy abuses, especially those involving misuse by the government and insurance companies and the distribution of RFID data over the Internet".

There are many myths about RFID, i.e. the belief that tags can be read from a long distance. This gives worries about being watched. It is important to confront and terminate the many myths concerning RFID. When it comes to the RFID technology, it is important to differ between using the technology for purely logistic purposes where no personal related data are generated and RFID, which hold potentials for monitoring and gathering i.e. consumers' behaviour patterns and buying patterns. The industry also has to deal with the fact that a lot of consumers are concerned that their shopping can be used to survey buying patterns and to gather personal related data.

The myths and concerns and the fact that consumers, who know of RFID are less concerned, emphasize the need for more information and education to the consumers.

Anti-counterfeiting and security
Fake products are an increasing problem. A Russian study made demonstrated that 93% of all in Moscow have purchased fake products in 2002. This happens although that 90% of all consumers are negative to fake products. The study is pointing out different stakeholders in the supply chain as responsible for fake products.

Indicators and sensors
End user acceptance (supply chain actors) on communicative packaging issues
It has only been possible to find very limited material concerning issues about end user acceptance, when the end user is an actor in the supply chain. A ***Retail Survey*** which was made as a part of the Sustain Pack project and the following ***Report on results*** with in-depth interviews were found and in the publication ***Novel food packaging techniques*** there are references to a Finnish study.

The found material concludes that the retailers in general have a "wait and see-attitude" towards technologies such as indicators and sensors in communicative packaging.

It is still the most "common known" technologies, which are rated as most important. Even though the technologies were explained more in details during the in-depth interviews, the over all rating did not change considerably. This can of course be due to the fact that it is difficult to see the possibilities from an explanation or that the knowledge still is too little to change the perception. RFID is highest rated in both surveys. In the in-depth interviews, the RFID technology is followed by TTIs and RFID extended. RFID can be used on all products, whereas TTIs and RFID extended primarily will be limited to the cooling chain.

The maturity sensor has climbed up the rating list in the in-depth interviews, which might be due to the fact that the sensor can be used in a positive way, that is not telling something is wrong, but indicating a maturity level. Leak is rated less important in the interviews than in the retail survey. The reason for that could be that the problem is not yet realized in the supply chain. Light and RH are lowest rated in both surveys.

The retailers do not accept that the consumers have access to read the output from the sensors. If the consumers are to see the indicators at all, it is very important that the consumers understand the functions of the indicators and sensors and also of highest importance that the technologies can be trusted. Otherwise it will only be a confusing element, which might give some bad will to both brand and retailer.

The consumer has to be educated to understand the functions of the specific indicator or sensor. The fact that different information can occur on the packaging (which can result in confusion) is a main issue that has to be taken care of, if a technology shall be implemented. The issue that an indicator can change colour after having left the store, is also a major topic. The retailers want to avoid disputes with claims, for instance because an indicator changes signal after having left the store.

In the Finnish study by Mikkola from 1995, 21 people involved in packaging issues were interviewed about among other things their knowledge of several absorbers and indicators. 57% recognised the moisture absorbers, 52% recognised the oxygen absorbers and 42% the TTI. “The interviewees had a positive attitude towards these examples of active and intelligent packaging, especially if applied to foods that are easily perishable, such as chilled food, vegetables, some bakery products, meat or fish products”.

<u>Consumer acceptance on communicative packaging issues</u>

Only two surveys about consumer acceptance on communicative packaging, including indicators and sensors were found.

VTT has published ***<u>Novel food packaging techniques</u>*** in 2003. An entire chapter has been dedicated to the subject: Testing consumer responses to new packaging concepts. Pira International has conducted the ***<u>European Consumer Acceptance Studies on Active & Intelligent Packaging</u>*** as a part of the EC sponsored project Actipak in 2001.

One of the sources in ***<u>Novel food packaging techniques</u>*** state that consumers in general tend to be suspicious towards any novelty in food products as any new element can be potentially harmful. To get pass this fact, advanced consumer education is required.

“The idea of active and intelligent packaging has received a generally positive response from consumers and their representatives. The reason may be that they seem to provide solutions for consumer concerns”.

One of the questions is, if consumers are willing to pay extra for the indicator. The respondents of a Finnish survey said that they were willing to pay 0.15 € more for the oxygen absorber and in a study, over 80% regarded TTIs necessary in certain food product groups, although they were told that TTIs would increase the price of the product by 8.5 cents".

In more of the studies it is mentioned as a drawback that "the suspicion that these indicators may give inaccurate information and thereby cause a safety hazard". Worries have also been mentioned about "possible tampering with TTIs in the shop."

Sustainability
A Danish study from 1995 has been found.

The results of the study indicate a) that many consumers are concerned about the environmental consequences of packaging (other environmental problems are perceived as more serious, however), b) that this concern is influenced by the personal values of consumers, and c) which can imply a preference for environmentally sustainable packaging, but d) that such a preference seldom has any effect on the buying of food products, because consumers are unable to distinguish between more and less environmentally benign packaging, because other preferences are more important to the consumer and owing to the fact that the buying of food products often is habitualized.

Consumer acceptance of technology in general in connection to the retail industry
Consumers tend to be more positive towards technologies, which they know and are familiar with and prefer that the technology can be easily used without any misinterpretations.

Consumers are not at all reluctant to technologies in the stores, when they can see (and understand) a technology, which can remove certain discomforts in the store, such as waiting in line. Technologies, which can give some added possibilities and maybe also be considered as a sort of event for the consumer in the store, are perceived positively.

Content

1. Background for the Desk Study

One subproject in the Sustain Pack project is to develop communicative packaging. This is a very critical area, wherefore it is important to investigate the positions and requirements of the end user (actors in the supply chain and the consumer) to facilitate decisions and developments of the communicative packaging technologies.

The objective of this report is to get an overview of which surveys or studies that have already been made on communicative packaging and to see if there is any common denominator in the results.

This is done by making a Desk Study to find existing reports on consumer acceptance concerning communicative packaging, either made by organisations or research institutes related to new technologies as well as specific behaviours or barriers.

2. Introduction to the issue

To get an insight in the opportunities of introducing communicative packaging in the retail stores, it is important to understand how actors in the supply chain (from the up-stream supplier to the consumer) think and react, before introducing these new features.

A retail survey, which was done as a part of the Sustain Pack project, showed for instance that the retailers in general had a “wait-and-see” attitude towards communicative packaging based on different sensor technology and would not accept if the consumers should be able to see the output from the sensors.

It is also interesting to find out, how the consumers react, when they are offered new features or new technology on the packaging of a product. Can it be assumed that they have a positive attitude to features, which give them added value, or are they suspicious to the new features? And are they willing to pay extra for these features?

It is therefore interesting to find out, which reports and surveys already exist and what their conclusions are in these specific areas.

To structure the searching and to give the best overview over consumer acceptance on communicative packaging, the Desk Study will be made on the basis of “The Talking Box” with an additional category about general approach to new technology:

Source: “The Talking Box”, Presentation, Communicative Packaging, A&F, Ingrid Wienk

1. Hello – Appeal and information
2. It is me - Identification
3. I am original – Anti-counterfeiting and security
4. I feel good – Indicators and sensors
5. I do not harm - Sustainability
6. Consumer acceptance of technology in general in connection to the retail industry

Ad1)
Issues about how the specific packaging catches the eye of a potential consumer and/or gives information using new technologies (at consumer level).

Ad2)
Issues about how technology can offer identification of a product.

Ad3)
Issues about how to produce "fingerprints" to protect brand names or for security labels in order to avoid i.e. counterfeiting.

Ad4)
Supply chain issues, including indicator and sensor technology to monitor product quality or chain performance.

Ad5)
Issues about sustainability.

Ad6)
Material, which contain consumers' acceptance of technology in general in connection to the retail industry.

3. Methods

The Desk Study will be carried out by searching the Internet as well as using contacts within and outside the Sustain Pack group for information.

This present Desk Study will include reports and surveys from organisations and research institutes.

The results of the collected information will be divided into the following categories, mentioned in the Introduction:

1. Hello – Appeal and information
2. It is me - Identification
3. I am original – Anti-counterfeiting and security
4. I feel good – Indicator and sensor
5. I do not harm - Sustainability
6. Consumer acceptance of technology in general in connection to the retail industry

For each category, an estimation of the size of material, examples and a short situation overview are given.

The list below represents organisations, institutes and companies, which have been helpful with information and material:

Pira International, UK

VTT, Finland

National Consumer Research Centre, Finland

Copenhagen Business School, Denmark

Aarhus School of Business, Denmark

A&F, Netherlands

TRpacksolutions

4 Desk Study

The Desk Study will be based on results from Internet searches as well as information provided mainly from the participants in Sustain Pack, but also other relevant people with large knowledge of the retail industry.

4.1 Hello – Appeal and information to the consumers

In this category, there has been searched for material, which contains information about how the packaging is actively being used to catch the eye of potential customers and how information on packages is presented to the consumer.

4.1.1 Size of reports, surveys and studies

Everybody agrees that it is of greatest importance to present any product in a packaging that appeals to the consumer. Because if the product/packaging is not seen, it is not sold!

It is also well known that a huge percentage (some studies say up to 80 %) of all buying decisions is made in the store. In the mid 90s, an article was published in a Danish packaging magazine (INSTORE), concerning a study on consumers view on packaging. Unfortunately, this article is not available anywhere now. However, the researchers’ conclusions were similar to other studies and they showed that on products as candy, fancy food and cakes 95-99 % of the decisions were made in the shop. On the lower end, on dairy products and perishables “only” about 60 % of the buying decisions were made in the shop. A survey made in the UK in the 80s (referred to in the packaging magazine IN-PAK in 1989) the percentage of buying decisions in general in store was about 60 %, so the number has been increasing during the last decades.

This only emphasizes the necessity for the brand owners to catch the attention of the consumer and to ensure that the interest is kept, so the consumer will end up buying the specific product.

It is therefore surprising how little information, which can be found concerning these issues.

Danish Technological Institute (DTI) has developed a marketing research software tool aiming to research different packaging appeal to consumers on the shelves in supermarkets. The software both uses T-scope-tests and interviews. The software is called Pack-Appeal®. Pack-Appeal® is only used commercial and has up to now not been used for public research. For this reason DTI is not able to give direct references from actual market studies.

Experiences, however, demonstrate that consumer appeal is divided into two different situations which sometime working against each other.

The first problem the packed product has to overcome is the consumer attention in a supermarket environment with 1.000 – 30.000 different products in the same store. If the shopping time is 5-60 minutes the consumer only has 0,1 - 0,6 sec./product. So it is important for the packed products to look different compared to other products. The best way can be to use a strong and different colour than the product next.

But the consumer shall not only see the product between all other products. The consumer shall also feel the need for the specific product and put it into the shopping basket. And the effects used on the packaging can work just the opposite way. Practical tests demonstrate that the design for appeal always is a trade off between these two aspects of consumer attention.

The example showed below illustrates this situation, where the light blue coffee packaging creates a lot of attention. However the consumer do not tend to buy it, because it is not recognized as a coffee packaging

Example from a Pack-Appeal® test.

4.1.2 Examples

Katja Järvelä from the National Consumer Research Centre in Finland has conducted a consumer study in 2003, concerning: ***"As simple and as handy as possible" – Consumers´ views on grocery packaging.***

In the study, consumers are asked questions about various issues, such as: packaging development, package appearance, product safety and functionalities.

The report is written in Finish, but an abstract in English is available.

Abstract of the study

The study examined consumers' views of grocery packaging. The aim was to find out, what safe packaging means to consumers, how it can be accomplished and what the best way to provide information on it would be. The data for this qualitative study was gathered by means of focus group discussions amongst consumers. A total of 59 consumers from the Helsinki Metropolitan Area and the Oulu, Tampere and Turku regions took part in nine discussion groups. The consumers evaluated grocery packages in general and especially the packages of the convenience foods and dishwasher detergents selected for the discussions. The participants discussed about three types of broiler meal packages: packages of frozen meals, meal packages equipped with freshness and heat indicators as well as self-heating packages. The number of dishwasher detergent packages was also three: liquid capsules in a cardboard box, packed individually in biodegradable plastic, powder in a plastic bottle with a refillable multilayer plastic package, as well as detergent tablets in a coated micro flute package, packed individually in metallised plastic.

The general discussion emphasised that the fundamental condition of a good package is its good functionality in daily use. In addition to good functionality, a good package must have many positive properties, such as an environmentally friendly mode of packaging, the recyclability or easy disposability of the package, clear packing marks, as well as durability. The examples of good packages that consumers offered revealed that they appreciate traditions and continuity, which also means comfort and easiness for the consumers.

The evaluation of product examples showed that the acceptance of a new package type requires that consumers see the 'location' of the product in their everyday life and that some of the product's properties reflect familiarity and routine. In principle, the consumers considered the indicators positive and useful in regard to perishable goods. As a rule, the present date stamps were considered a sufficient guarantee of the product's freshness. The self-heating package proved to be problematic in many ways, especially because it is necessary and safe.

The safety of the product examples was analysed in slightly different ways. In regard to convenience foods, safety meant the freshness and healthiness of the product, and the evaluation was based on best before etc dates. The safety of dishwasher detergents was evaluated in four different ways: does the detergent touch one's skin, does the package attract children, does the detergent make dust and is the package sufficiently protective.

The consumers had a strong opinion of packaging development. The benefit to be gained from new packaging solutions and the price to be paid for them were often in conflict. Many of the reforms were considered apparently user friendly or only changes in the appearance of packages; such changes are easily interpreted as pure marketing tools. Instead, the consumers wish that packaging development will concentrate on the 'basics': simple and well-functioning packages. The demands on simplicity and functionality focused especially on how easily the packages could be opened and closed, and on the markings and materials of the packages, as well as their appearance, e.g., design and the use of colours.

4.1.3 Situation overview

It is only possible to find one survey, concerning basic issues like packaging appearance and information.

The survey, which was found, is based on nine discussion groups concerning what safe packaging means to consumers, how it can be accomplished and what the best way to provide information on it would be.

It was generally agreed that “the fundamental condition of a good package is its good functionality in daily use. In addition to good functionality, a good package must have many positive properties, such as an environmentally friendly mode of packaging, the recyclability or easy disposability of the package, clear packing marks, as well as durability. The examples of good packages that consumers offered revealed that they appreciate traditions and continuity, which also means comfort and easiness for the consumers”.

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4.2 It is me - Identification

In this chapter, material concerning new technology which offers identification of a product is presented.

4.2.1 Size of reports, surveys and studies

The material concerning identification, which has been found, is all about the RFID technology and it has been possible to find quite a large amount of material about consumer acceptance and RFID and some examples are shown in the next chapter.

4.2.2 Examples

The web-site ***www.rfidjournal.com*** has an article about a survey from 2005 that finds that more U.S. consumers have heard about RFID, but worries about privacy remain.

In a RFID Consumer Buzz surveys carried out quarterly by BIGresearch, "41 percent of the 8,500 adults surveyed in March 2005 said they had heard of RFID. That figure is up from just 28 percent when the same survey was conducted in September 2004. But while awareness of RFID has grown, worries about the potential application of the technology have remained high, according to the report".

"Twenty-five percent of respondents said they were very concerned about the technology and another 42 percent said they were somewhat concerned. The respondents' concerned centred on privacy abuses, especially those involving misuse by the government and insurance companies and the distribution of RFID data over the Internet". "Those respondents that knew of RFID were less concerned about RFID applications than those that were unaware of the technology".

Source: Extract from http://www.rfidjournal.com/article/articleview/1491/1/1/

The web-site of ***CRM Today*** has an article about a survey made in 2005 by Capgemini.

"European consumers are beginning to recognise that Radio Frequency Identification (RFID) technology will bring real benefits to their everyday lives, reveals new research from Capgemini. The majority of respondents said they would buy RFID-enabled products if they meant potentially reducing car theft (70% of those surveyed), faster recovery of stolen items (68%) and improved security of prescription drugs (63%). Additional benefits of RFID identified as important to consumers include improved food safety and quality; faster, more reliable notification of recalls; and faster exit through store checkouts".

"However, the study also found that concerns over privacy issues threaten to overshadow the benefits of RFID. More than half (55%) of those surveyed are either concerned or very concerned that RFID tags will allow businesses to track consumers via product purchases, while 59% are worried that RFID tags will allow data to be used more freely by third parties". "Many of the concerns cited - for example, the belief that tags can be read from a distance (named by 52% of respondents) - are unwarranted and probably stem from European consumers' very low awareness of RFID".

The report concludes that it is very important to educate the consumers.

Source: Extract from http://www.crm2day.com/news/crm/113447.php

RFID and Perceived Control – The Consumer's View, Oliver Günther & Sarah Spiekermann, Humboldt-Universität zu Berlin, Institute of Information Systems, 2005

"The authors of this report have been working for the past years with the Future Store Initiative (explanation; of the German Metro Group) to extract consumers' major privacy fears relating to RFID and to develop and evaluate appropriate privacy enhancing technologies (PETs). Here, we analyze results of our empirical study of ordinary German retail consumers conducted in one user-based and one agent-based.

The consumers' reactions indicate considerable distrust of RFID-based environments. 73% of our sample preferred RFID tags deactivated permanently at check-out time, regardless of possible consumer benefits (such as claiming warranties without receipt) and of the PETs we offered them. For highly educated people, this percentage rose even to 78%. Retailers worldwide must address these concerns if RFID is to become a success".

The conclusion of the study is that "the fear of loosing privacy due to the introduction of RFID is widespread and deeply rooted in consumers' mind. Even though the potential advantages of RFID (such as enhanced after-sales services) are likely to be well understood by a solid majority of consumers, this fear seems to override most of the positive sentiments. Retailers must address this fear if they are to have any hope of making RFID an appreciated business tool giving consumers more convenience in the long term. An open dialogue about both advantages and potential danger of the technology is an important step in this direction.

Source: Digital Library of ACM: www.acm.org. Extract from study.

RFID – Opportunities and Threats, The Danish Board of Technology, 2005

"In the US and the UK, consumer organizations have been very critical of RFID, fearing abuse of privacy from the new technologies. The objective of the RFID-project is to assess advantages and disadvantages of the new technology".

Following has been taken from the web-site and is translated into English.

Opportunities and Worries

In order to estimate opportunities and worries, which are the consequences of the spreading of RFID, it is necessary to distinguish between the pure logistic use, where no personal related data are generated and marking of items, which hold potentials for monitoring and gathering i.e. consumers' behaviour patterns and buying patterns by data mining. Making the flow of work more efficient, minimize shrinkage, traceability in the entire supply chain, increasing food safety, are some of the advantages, which the industry, wholesale trade and retail industry emphasize. The consumer is to gain advantages such as the refrigerator is able to read if the milk has passed the expiry date – and in the more intelligent version is able to suggest meals on the basis of the products in the refrigerator.

Consumer- and human right organisations have been criticising the RFID technology, because they fear that the increasing amount of electronic traces, which each consumer leave behind, can be misused and increase the monitoring through the registration of personal related data.

In the US, Germany and UK, where RFID has been implemented in the retail industry, more examples of opposition from consumer groups have been seen. The consumer groups have criticised the possibilities for surveying buying patterns and for making consumer profiles. Especially the group of CASPIAN (Consumers Against Supermarket Privacy Invasion and Numbering), which operates both in the UK and US, has strongly warned the consumers against RFID. They mention especially 3 areas:

1. RFID can be used to survey buying patterns and to gather personal related data
2. RFID can be read by a third party without the knowledge of the consumer
3. RFID increased the need for strong RFID readers, which in time will be unhealthy, because the electromagnetic waves thereby will increase

Source: Extract and translation from www.tekno.dk The Danish Board of Technology is supposed to promote the ongoing discussion about technology, to evaluate technology and to advise the Danish Parliament and other governmental bodies in matters pertaining to technology.

4.2.3 Situation overview

It is possible to find a lot of material about consumer acceptance in connection with the RFID technology. This is due to the fact that the awareness of RFID has grown during the last years, but also because this technology has brought worries about privacy along.

The respondents' concerns from some surveys are centred on “privacy abuses, especially those involving misuse by the government and insurance companies and the distribution of RFID data over the Internet”. “Many of the concerns cited - for example, the belief that tags can be read from a distance (named by 52% of respondents in a survey) - are unwarranted and probably stem from European consumers’ very low awareness of RFID”. This is one of many myths concerning RFID, which it is important to confront and terminate.

When it comes to the RFID technology, it is important to differ between using the technology for purely logistic purposes where no personal related data are generated and RFID, which hold potentials for monitoring and gathering i.e. consumers’ behaviour patterns and buying patterns. The industry also has to deal with the fact that a lot of consumers are concerned that their shopping can be used to survey buying patterns and to gather personal related data.

“Those respondents that knew of RFID were less concerned about RFID applications than those that were unaware of the technology”.

The myths and concerns and the fact that consumers, who know of RFID are less concerned, emphasize the need for more information and education to the consumers.

4.3 I am original – Anti-counterfeiting and security

In this category, issues about how to produce "fingerprints" to protect brand names or for security labels are searched for.

4.3.1 Size of reports, surveys and studies

Having searched the Internet thoroughly, it still has not been possible to find much material.

4.3.2 Examples

Several recent press releases demonstrate that fake products have become a large and in-legal industry.

A study made by The Coalition for Intelligent Property Rights (CIPR) and Consumer Advocates Release in Moscow have demonstrated that 93% of all in Moscow have purchased fake products in 2002. This happens although that 90% of all consumers are negative to fake products.

The study is pointing out different stakeholders in the supply chain as responsible for fake products.

Source: http://www.cipr.org/activities/release03_19_03.htm

4.3.3 Situation overview

Fake products are an increasing problem.

A Russian study made demonstrated that 93% of all in Moscow have purchased fake products in 2002. This happens although that 90% of all consumers are negative to fake products.

The study is pointing out different stakeholders in the supply chain as responsible for fake products.

4.4 I feel good – Indicators and sensors

In this category, there has been searched for material, which contains information about supply chain elements, such as indicators and sensors to monitor product quality or chain performance.

4.4.1 Size of reports, surveys and studies

Surveys and studies, where the end user is the consumer

The amount of material about consumer acceptance on supply chain issues is very limited.

However, two studies with several references have been found;

Novel food packaging techniques, Chapter 26, Testing consumer responses to new packaging concepts
L. Lähteenmäki and A. Arvola, 2003, VTT Biotechnology, Finland

"European Consumer Acceptance Studies On Active & Intelligent Packaging", a part of EC sponsored project Actipak, 2001, Pira International, UK

Surveys and studies, where the end user is a an actor in the supply chain a brand owner or retailer

In spite of a thorough search on the Internet and kind help from contacts within and outside the Sustain Pack project, it has not been possible to find much material concerning issues about end user acceptance, when the end user is an actor in the supply chain.

In 2004 a ***Retail Survey*** was conducted as a part of the Sustain Pack Project. This Retail Survey was followed by a ***report on results from the Retail Survey*** in 2006

In the VTT publication ***Novel food packaging techniques*** in 2003 about: Testing consumer responses to new packaging concepts, there is mentioned a study made by Mikkola et al.

4.4.2 Examples

Surveys and studies, where the end user is the consumer

VTT has published ***Novel food packaging techniques*** in 2003. An entire chapter has been dedicated to the subject: Testing consumer responses to new packaging concepts.

The authors include and refer to material from about 1990 and up till 2003 within the subject of consumer response to new packaging concepts.

The following is some statements from the chapter of *Novel food packaging techniques* as well as a short summary.

"New packaging techniques promise consumers safe food products that keep their high quality throughout shelf-life". In order to do this, some technologies are applied to the products as a whole. The report refer to Rozin and Royzman, 2001, who state that consumers in general tend to be suspicious towards any novelty in food products as any new element can be potentially harmful. To get passed this fact, advanced consumer education is required.

In the introduction the report starts to conclude that only a few studies on consumer attitude towards active and intelligent packaging have been carried out. The studies, which have been made, mainly deal with attitudes towards oxygen absorbers and TTIs.

The report concludes that "the idea of active and intelligent packaging has received a generally positive response from consumers and their representatives. The reason may be that they seem to provide solutions for consumer concerns". In a Finnish survey (Korhonen et al, 1999) "about half of the Finnish respondents did not trust that all food products would still be edible on their expiry date". "Half of the consumers also reported that they would choose packages from the bottom of a chilled counter to ensure the freshness of the product".

Oxygen absorbers
In a test about consumer acceptance of oxygen absorbers done by Mikkola et al. 1997, half of the respondents received a package with a loose sachet enclosed and the other half received the package together with an information leaflet, which described the function of the absorber. "From those how received the additional leaflet 76% accepted the oxygen absorber vs. 67% in the no-information group. Information decreased the number of unsure people among the respondents but had no effect on the size of the negative group". "Respondents' attitudes towards oxygen absorbers were positive (3.8/max 5), respondents would rather favour than avoid them (3.6/max 5) and evaluated them more necessary than unnecessary (3.4/max 5)". The respondents were furthermore asked if they would be willing to pay extra for the oxygen absorber and they were willing to pay 0.15 € more.

TTIs

The publication refers to several studies made in Finland, UK and US. Here they conclude that the “concept of time-temperature indicators (TTIs) has been well received in consumer studies”. In a UK “The majority of the respondents (95%; n = 511) considered TTIs as being a good idea because they show whether the food is safe (28%), whether it is kept at the right temperature (21%) and whether food is fresh (16%). In an American study (n = 104) “90% considered TTI tags as a desirable addition and 97% believed that they could increase confidence in the freshness of the product”.

In more of the studies, it was mentioned as a drawback that “the suspicion that these indicators may give inaccurate information and thereby cause a safety hazard”.

In an US study, “the TTI tags are considered to be clever devices that could be used to differentiate products on the market, but they were not perceived to replace date markers. Furthermore the discussion brought to light a need for a consumer campaign before theses tags could be used as a marketing tool, since consumers need to be informed about their benefits”.

In a Finnish study (Korhonen 1999) “TTI were regarded as necessary to most products but the most necessary target were packaged fresh meat or fish, smoked fish, meat products, foods for children or ready prepared foods. Over 80% regarded TTIs necessary in these applications although they were told that TTIs would increase the price of the product by 8.5 cents”.

Some worries were mentioned about “possible tampering with TTIs in the shop” in a Finnish study. “One worry was that the shopkeeper could possible change the indicator and thus misleads consumers”.

In an UK study, some respondents who perceived TTIs as unnecessary even reported that “they would deliberately sabotage them if they appeared on the market”. “The technical reliability of the indicators was also questioned; other markings should be so clear so consumers would not have to trust solely the indicator”.

“In general people seemed to trust TTI indicators”. ”When respondents had to make assessment on the quality of food product they seemed to place more trust on the TTI than on the date mark”. “Although respondents seemed to trust the indicator more, having both date marks and indicators were perceived to be the best solutions in those studies”.

The last part of the chapter discusses the future prospects of active and intelligent packaging from a consumer standpoint.

“The technological possibilities are way ahead of commercial applications, which may be due to suspicion about consumer attitudes towards these new devices. Consumers tend to be sensitive about novelty in the food domain, as food ingested and incorporated in the body could be an unknown substance and a potential source of risk".

"The challenge for new packaging solutions is how they and their benefits are made familiar to the consumers".

"As was expressed by consumers in the few studies carried out on active and intelligent packaging, these new techniques may be more beneficial for the food industry and the retailers than consumers, but consumers still have to pay the price".

"In the future, it is likely that intelligent and smart tags can contain abundant information about the product characteristics, the amount of information now being limited by the available space on the package".

Pira International conducted in 2001 ***European Consumer Acceptance Studies on Active & Intelligent Packaging*** as a part of the EC sponsored project Actipak.

The objective was to investigate consumer reactions to current active and intelligent packaging devices and to get an idea of reactions to future use of such devices. Several focus groups were held in different European countries in order to detect any regional differences.

The participants in the focus groups were asked questions about packaging in general, packaging which extend shelf life (modified atmosphere packaging, removal of oxygen and micro perforations). As the last part the focus group was asked questions about active devices to extend shelf life or indicators to show correct storage conditions. The devices were: oxygen absorbers, moisture absorbers, ethylene absorbers, time/temperature indicators, carbon dioxide indicators and oxygen indicators.

Some of the findings are:

- Consumers in all countries trusted the supply chain and packaging to be safe
- UK and German consumers felt the retailers and upstream suppliers had more to gain from these systems than the consumer
- UK, Italian and German consumers felt that there was little benefit or no requirements to extend shelf life
- Spanish consumers accepted packaging as "necessary evil" and were very concerned about MAP
- Consumers from all countries felt that there was more value to or expressed a preference for indicators over sachets

- TTIs: Spanish consumers were particularly keen on indicators; as proof that the supply chain has done its best to deliver products in good conditions and shows up retailers if they have not taken care

- TTIs: There was widespread dislike of the tablet indicator by all consumer groups

- TTIs: The need for standardisations was expressed in more countries

- Active devices: A particular dislike for sachets was expressed in Germany and Finland

- Active devices: There was some concern over the contents of the sachets and the way in which consumers might misuse them

- Active devices: UK, German and Dutch consumers indicated that they had no concern over non visible absorbers/emitters

- Active devices: Spanish consumers prefer visibility of devices and saw that as presenting a positive advantage and also expressed a preference over preservatives in food

- Information: Consumers in all countries wanted information and explanation of devices. Minimum amount on pack with detailed supporting information via leaflet, poster or advertising

- Pricing: UK, Italian and Finnish consumers would not knowingly pay more. German, Dutch and Spanish consumers would pay more particularly on premium lines

- Environment: No concern was expressed regarding environmental impact of the devices by UK, German and Dutch consumers. Italian consumers expressed minor concerns

Surveys and studies, where the end user is a an actor in the supply chain a brand owner or retailer

Retail Survey – a part of the Sustain Pack project
Report on results from the Retail Survey

One of the reasons why it was decided to perform the Retail Survey in Sustain Pack was the fact that knowledge of end user acceptance (supply chain actor) is lacking and the fact that it is important to investigate the positions and requirements in the retailer area before decisions and developments of communicative packaging technologies are taken. The results gave reason to perform an additional survey with in-depth interviews to some chosen retailers.

The Retail Survey was based on questions about the 9 different sensor technologies and the survey concluded that the retailers in general have a "wait and see-attitude" towards communicative packaging. The retailers would not accept that the consumers should be able to read the output from the sensors. On the other hand it was important for the retailer that the consumer accepted the technology – a paradox.

A reason for that could be that the retailer wanted to use the technology to prove for the consumer that systems for quality control internally were in place. Maybe this could also explain the high rating on the logistics and quality indicators which the survey showed, while indirect indicators as maturity, light and RH were rated low. This conclusion was also confirmed by statements that retailers accept indicators on trade units only. The benefit for the retailer should be a possibility to optimize the supply chain by using communicative packaging from the supplier to the store, but not in the store itself.

The following in-depth interviews showed that the difference between the two surveys is small. It is still the most "common known" technologies, which are rated the highest. Even though the technologies were explained more in details during the in-depth interviews, the over all rating did not change considerably. This can of course be due to the fact that it is difficult to see the possibilities from an explanation or that the knowledge still is too little to change the perception. RFID is the highest rated in both surveys. In the in-depth interviews, the RFID technology is followed by TTIs and RFID extended. RFID can be used on all products, whereas TTIs and RFID extended will primarily be limited to the cooling chain.

The maturity sensor has climbed up, which might be due to the fact that the sensor can be used in a positive way, that is not telling something is wrong, but indicating a maturity level. Leak is rated less important in the interviews than in the retail survey. The reason for that could be that the problem is not yet realized in the supply chain. Light and RH are lowest rated in both surveys.

In the retail survey, the retailers suggested that the technology mainly should be used within the logistics area. There is nothing in this survey that contradicts those statements. Retailers want to use the technologies on pallets and cases and not on the specific consumer package.

However, some retailers are open to use for instance maturity sensors or other technologies, which somehow (only) can be used in a positive may. That is, not telling that something is wrong, but more being an added value to the consumer.

In the survey there was a contradiction between the fact that retailers do not want consumers to read the indicators, but still wanted their "consumer acceptance".

If the consumers should be allowed to access the technologies at all, it is important that the consumers understand the functions of the indicators and sensors and it is of highest importance that the technologies can be trusted. Otherwise it will only be a confusing element, which might give some bad will to both brand and retailer.
The consumer has to be educated to understand the functions of the specific indicator or sensor. The fact that different information can occur on the packaging (which can result in confusion) is a main issue that has to be taken care of, if a technology shall be implemented. The issue that an indicator can change colour after having left the store, is also a major topic. The retailers want to avoid disputes with claims because an indicator changes signal after having left the store.

In the *Finnish study by Mikkola, 1995, (source Novel food packaging techniques)* 21 people involved in packaging issues were interviewed about among other things their knowledge of several absorbers and indicators. 57% recognised the moisture absorbers, 52% recognised the oxygen absorbers and 42% the TTI. "The interviewees had a positive attitude towards these examples of active and intelligent packaging, especially if applied to foods that are easily perishable, such as chilled food, vegetables, some bakery products, meat or fish products".

As positive benefits of absorbers or emitters "food products retain their good quality longer, which may be especially helpful to small households and those who shop once a week" was mentioned. On the negative side "the added components can increase price and produce more waste. People may also eat older food if it keeps a longer time in good condition. Furthermore, the possibility that these absorbers or emitters could contain harmful substances that may be ingested by vulnerable consumer groups, such as older people and children, causes concern".

4.4.3 Situation overview

Surveys and studies, where the end user is the consumer

Only two surveys about consumer acceptance on communicative packaging, including indicators and sensors were found.

VTT has published ***Novel food packaging techniques*** in 2003. An entire chapter has been dedicated to the subject: Testing consumer responses to new packaging concepts and Pira International has conducted the ***European Consumer Acceptance Studies On Active & Intelligent Packaging*** as a part of the EC sponsored project Actipak in 2001.

One of the sources state that consumers in general tend to be suspicious towards any novelty in food products as any new element can be potentially harmful. To get passed this fact, advanced consumer education is required.

The VTT study mainly deals with attitudes towards oxygen absorbers and TTIs. The report concludes that "the idea of active and intelligent packaging has received a generally positive response from consumers and their representatives. The reason may be that they seem to provide solutions for consumer concerns". In another Finnish survey (Korhonen et al, 1999) "about half of the Finnish respondents did not trust that all food products would still be edible on their expiry date". "Half of the consumers also reported that they would choose packages from the bottom of a chilled counter to ensure the freshness of the product".

One of the questions is, if consumers are willing to pay extra for the indicator. The respondents of a Finnish survey said that they were willing to pay 0.15 € more for the oxygen absorber.

In a Finnish study, over 80% regarded TTIs necessary in certain food product groups, although they were told that TTIs would increase the price of the product by 8.5 cents".

A report about TTIs concludes that the "concept of time-temperature indicators (TTIs) has been well received in consumer studies". In a UK study "The majority of the respondents (95%; n = 511) considered TTIs as being a good idea because they show whether the food is safe (28%), whether it is kept at the right temperature (21%) and whether food is fresh (16%). In an American study (n = 114) "90% considered TTI tags as a desirable addition and 97% believed that they could increase confidence in the freshness of the product".

In more of the studies it was mentioned as a drawback that "the suspicion that these indicators may give inaccurate information and thereby cause a safety hazard. Some worries have also been mentioned about "possible tampering with TTIs in the shop" in a Finnish study. And one worry is "that the shopkeeper could possible change the indicator and thus misleads consumers".

The publication concludes that "The technological possibilities are way ahead of commercial applications, which may be due to suspicion about consumer attitudes towards these new devices. Consumers tend to be sensitive about novelty in the food domain, as food ingested and incorporated in the body could be an unknown substance and a potential source of risk".

"The challenge for new packaging solutions is how they and their benefits are made familiar to the consumers".

"In the future, it is likely that intelligent and smart tags can contain abundant information about the product characteristics, the amount of information now being limited by the available space on the package".

In the Pira International conducted survey from 2001, the objective was to investigate consumer reaction to current active and intelligent packaging devices and to get an idea of reactions to future use of such devices. Several focus groups were held in different European countries in order to detect any regional differences.

The participants in the focus groups were asked questions about packaging in general, packaging which extend shelf life (modified atmosphere packaging, removal of oxygen and micro perforations). As the last part, the focus group was asked questions about active devices to extend shelf life or indicators to show correct storage conditions. The devices were: oxygen absorbers, moisture absorbers, ethylene absorbers, time/temperature indicators, carbon dioxide indicators and oxygen indicators.

Some of the findings are:

Consumers in all countries trusted the supply chain and packaging to be safe.

UK and German consumers felt the retailers and upstream suppliers had more to gain from these systems than the consumer.

TTIs: Spanish consumers were particularly keen on indicators; as proof that the supply chain has done its best to deliver products in good conditions and shows up retailers if the have not taken care. There was widespread dislike of the tablet indicator by all consumer groups. The need for standardisations was expressed in more countries.

Active devices: A particular dislike for sachets was expressed in Germany and Finland. There was some concern about the contents of the sachets and the way in which consumers might misuse them. UK, German and Dutch consumers indicated that they had no concern about non visible absorbers/emitters. Spanish consumers prefer visibility of devices and saw that as presenting a positive advantage and also expressed a preference over preservatives in food.

Information: Consumers in all countries wanted information and explanation of devices. Minimum amount on pack with detailed supporting information via leaflet, poster or advertising is required.

Pricing: UK, Italian and Finnish consumers would not knowingly pay more. German Dutch and Spanish consumers would pay more particularly on premium lines.

Again information and education are considered important.

Surveys and studies, where the end user is a an actor in the supply chain a brand owner or retailer

It has only been possible to find very limited material concerning issues about end user acceptance, when the end user is an actor in the supply chain. The exception is the Retail Survey which was made in Sustain Pack and the following report on results.

In the publication ***Novel food packaging techniques*** there are references to a Finnish study.

There can be several reasons for the lack of material. 1) Surveys or studies on the subject are non-existing, 2) there are studies, but they are not public and 3) the results are "hidden" as parts of broader studies and do not give any hits when searching. Having talked to contacts, who are involved with packaging issues, it is more likely that the material is non-existing.

One of the reasons why it was decided to perform the Retail Survey in Sustain Pack in the first place was the fact that knowledge of end user acceptance (supply chain actor) is lacking, so the result is not near surprising.

The Retail Survey concludes that the retailers in general have a "wait and see-attitude" towards communicative packaging. The retailers do not accept that the consumers have access to read the output from the sensors.

The results from the following in-dept interviews showed no major differences between them and the first Retail Survey. RFID is the highest rated in both surveys. Light and RH are lowest rated in both surveys. TTIs and RFID (extended) are rated a little higher in in-depth interviews, whereas Leak and Freshness are rated a little lower and the maturity sensor is rated higher. However, having a relatively small number of interviewees, it must be considered about the same. It is still the most "common known" technologies, which are rated the highest. Even though the technologies were explained more in details during the in-depth interviews, the over all rating did not change considerably.

In the retail survey, the retailers suggested that the technology should mainly be used within the logistics area. There is nothing in in-depth interviews which suggested otherwise. The retailers see the technologies used mainly on pallets and cases.

However, some retailers are open to use for instance maturity sensors or other technologies, which somehow (only) can be used in a positive may. That is, not telling that something is wrong, but more being an added value to the consumer.

If the consumers should be allowed to access the technologies at all, it is important that the consumers understand the functions of the indicators and sensors and it is of highest importance that the technologies can be trusted. Otherwise it will only be a confusing element, which might give some bad will to both brand and retailer.

The consumer has to be educated to understand the functions of the specific indicator or sensor. The fact that different information can occur on the packaging (which can result in confusion) is a main issue that has to be taken care of, if a technology

shall be implemented. The issue that an indicator can change colour after having left the store, is also a major topic. The retailers want to avoid disputes with claims because an indicator changes signal after having left the store.
The Finnish study showed that the respondents had a positive attitude towards oxygen absorbers and TTIs, especially if applied to foods that are easily perishable, such as chilled food, vegetables, some bakery products, meat or fish products.

As positive benefits of absorbers or emitters "food products retain their good quality longer, which may be especially helpful to small households and those who shop once a week" was mentioned. On the negative side "the added components can increase price and produce more waste. People may also eat older food if it keeps a longer time in good condition. Furthermore, the possibility that these absorbers or emitters could contain harmful substances that may be ingested by vulnerable consumer groups, such as older people and children, causes concern".

4.5 I do not harm - Sustainability

For this category, issues about sustainability were searched.

4.5.1 Size of reports, surveys and studies

Also in this category, only little material has been found. However, a Danish study from 1995 has been carried out:

Tino Bech-Larsen, ***”Consumer attitudes towards food packaging – focusing on environmental and functional packaging attributes’ influence on the buying decision”, 1995.***

4.5.2 Examples

In 1995 Tino Bech-Larsen from MAPP Centre/Aarhus School of Business in Denmark wrote a PhD about ***“Consumer attitudes towards food packaging – focusing on environmental and functional packaging attributes’ influence on the buying decision”.***

<u>Part of *Background and purpose* (taken from the study)</u>
“By experience most consumers know of the disposal of empty food packaging and thus of the contemporary environmental problems used packaging is one of the most visible. However, food packaging is also an important marketing tool as well as an important source of consumer convenience”.

“The purpose of this dissertation is to study different aspects of Danish consumer views about the functional and environmental consequences of packaging, as well as to study cognitive barriers that can prevent consumer attitudes to environmental consequences of food packaging to influence the buying of food products. The results of these studies will be employed to consider whether and how to influence Danish consumers to buy products with environmentally sustainable packaging”.

<u>General conclusions and implications (taken from the study)</u>
“Together the results of the four studies indicate a) that many consumers are concerned about the environmental consequences of packaging (other environmental problems are perceived as more serious, however), b) that this concern is influenced by the personal values of consumers, and c) which can imply a preference for environmentally sustainable packaging, but d) that such a preference seldom has any effect on the buying of food products, because consumers are unable to distinguish between more and less environmentally benign packaging, because other preferences are more important to the consumer and owing to the fact that the buying of food products often is habitualized”.

“On the basis of the results recommendations are given concerning how the individual packaging, food producers and the public authorities may prosper from and stimulate the demand for environmentally benign packaging. In this connection is it recommended that the public authorities implement an environment sign for packaging and that a public information office be established for the purpose of informing consumers about environmental consequences of packaging. However, it is also assessed that it is unwise to educate consumers concerning the complicated aspects of the environmental consequences of different packaging".

"A number of the studies in the project indicate that the functional attributes of packaging are important for the buying decisions regarding food products, but that the environmental consequences of packaging are of a very low importance. For the individual packaging or for the individual food producer, however, this situation can change quickly if a journalist or an environmental organisation become interested in the type of packaging used or produced by the company in question. Therefore any development of new packaging should be based on an improvement of both the environmental and the functional attributes".

"Until recently research in packaging and consumer behaviour has mainly focused on the communicative aspects of packaging. The results of this dissertation demonstrates a need for further research in the importance of functional and environmental packaging attributes with regard to the buying of food products. It should be stressed that this research should focus on three types of packaging attributes (function, communication and environment) and other product attributes simultaneously".

"Based on experience from the empirical studies done in connection with this dissertation, it must be recommended that more projects in the area of environmental behaviour use a variety of methods. This makes it possible to cross validate the results and to assess the social sensitivity of the different methods and to study the problems at different levels of abstraction".

4.5.3 Situation overview

A very small amount of material has been found in this category also. A Danish study from 1995 has been found; ***"Consumer attitudes towards food packaging – focusing on environmental and functional packaging attributes' influence on the buying decision"***, conducted by Tino Bech-Larsen from MAPP Centre/Aarhus School of Business.

The results of the study indicate " a) that many consumers are concerned about the environmental consequences of packaging (other environmental problems are perceived as more serious, however), b) that this concern is influenced by the personal values of consumers, and c) which can imply a preference for environmentally sustainable packaging, but d) that such a preference seldom has any effect on the buying of food products, because consumers are unable to distinguish between more and less environmentally benign packaging, because other preferences are more important to the consumer and owing to the fact that the buying of food products often is habitualized".

4.6 Consumer acceptance of technology in general in connection to the retail industry

In this category, there has been searched for material dealing with consumer acceptance of technology in general in connection to the retail industry.

4.6.1 Size of reports, surveys and studies

As there have been found very little material about consumer acceptance on communicative packaging, the examples in this category have been brought forward in order to see if it might be possible to draw a parallel between consumer acceptance of communicative packaging and consumer acceptance of technology in general (however, still in connection to the retail industry).

In this category studies about consumer acceptance among others Internet and Supermarket Technology has been found. Studies about consumer acceptance of GM foods (genetic modified) have not been taken into account, as this technology issue deals directly with the food product itself.

4.6.2 Examples

Friese, Susanne; Bjerre, Mogens; Hansen, Torben; Kornum, Niels and Sestoft, Christine Partsch (2003), Barriers and Motivators of Online Grocery Shopping in Denmark. Ebizz Øresund Report, Research Report January. Department of Marketing, Copenhagen Business School

Hansen, Torben (2003) The Online Grocery Consumer. Results from Two Scandinavian Surveys. Ebizz Øresund Report, Research Report January Department of Marketing, Copenhagen Business School

Some of the findings are:

"*Consumers who already have purchased groceries online* in general have a more *positive attitude* towards this new channel compared to non-adopters. Thus online grocery shopping adopters attach higher compatibility, higher relative advantage, more positive social norms, lower risk, and lower complexity to Internet grocery shopping when compared to consumers who have not yet bought groceries online (Hansen 2003)".

The findings show that there is a large difference between those, who have used the technology and for those, who have not. Familiarity to online grocery shopping plays a major role.

What's "In-Store" for the 21st century shopper? IU/KPMG study measures consumer acceptance of retail technology, 1999

“Online shopping may be exploding, but consumers are willing to embrace in-store technologies that will give them more product information and make shopping quicker and more convenient, according to a major Indiana University/KPMG retail study” from 1999.

"While everyone is focusing on the Internet, in-store technologies and the integration of online and in-store activities may have an even greater impact on the future of retailing. Many of the benefits of online shopping can be delivered in the physical store. Our survey shows that consumers respond enthusiastically to these in-store technologies”.

The IU/KPMG study found that “more than 70 percent of consumers believed they would benefit from retailers' adoption of in-store technologies, such as touch-screen kiosks, self-scanning, electronic point-of-sale signage, hand-held shopping assistants, and even body scanning, which allows consumers to custom-fit clothing. Only 9 percent or less of the respondents believed that these new technologies would be a disadvantage”.

“The survey tested 11 different technologies (three online, eight in-store) that directly impact how retailers interact with customers”. “Some are already in use in the marketplace, while others have not yet been implemented”.

“Consumers responded most positively to electronic point-of-sale signage -- liquid crystal displays (LCD) that shows the names and prices of merchandise. They are attached to the store shelves or directly to the products, taking the place of price tags and printed shelf labels. Ninety-two percent of consumers said they would use the technology at least some of the time they shop, and 50 percent said it would be a big advantage when shopping. Thirty percent of respondents said they most liked the technology's ability to verify the sale price of an item. Sixty-four percent of consumers felt that a store that implements this technology provides better service”.

Source: Extract from http://newsinfo.iu.edu/OCM/releases/21censh.htm

Supermarket Technology, Supermarket Strategic Alert, Special Report 2002

Shopper adaptability
“Shoppers adapt quickly to self-checkout systems, find them simple to use and appreciate their perceived potential for reducing waiting time”. “Of those polled, about 60% had not used the self-checkout lane. Men were more likely to try the systems than women - confirming other findings that showed men are more accepting of the technology. Both men and women are confident (80%) that with practice they would be faster at these lanes than cashiers are in conventional lanes. This has been consistently shown to be wishful thinking, but not unforeseen, since users perceive them-

selves to be more in control of the entire process. For small orders, a majority of those who have used the machines prefer them to cashiers. One quarter of those polled who haven't used self-checkout said they'd prefer them in that circumstance. Among those who have used the systems, 50% are more likely to select a supermarket that has them; among non-triers, 40%".

Source: SN-Supermarket News, April 2001. The Fast Lane.

Consumer irradiation acceptance
"The Food & Drug Administration considers irradiation - exposing food to controlled levels of ionizing radiation to kill pathogens - a food additive. Therefore, it has approved irradiation use at varying levels for limited food products, despite its ability to prevent over 5000 food contamination-related deaths annually.

"Consumer groups are divided: The National Consumers League sees irradiation as a useful food safety net. Public Citizen worries about health issues. Consumers seem firmer in their own convictions: In one survey, the majority of households said they advocated clear labelling calling irradiation what it is. In another survey, conducted by Costco after it voluntarily recalled ground beef products, consumers said they did not like the idea of irradiation...by any name".

Source: *The Wall Street Journal*, August 14, 2001. Irradiated Food by Any Other Name Might Just Win Over

4.6.3 Situation overview

Consumers tend to be more positive towards technologies, which they know and are familiar with.

Consumers are not at all reluctant to technologies in the stores, when they can see (and understand) a technology, which can remove certain discomforts i.e. in the store, such as waiting in line.

Technologies, which can give some added possibilities, like here in the example, hand-held shopping assistants, are also looked positively upon. A technology like body scanning, which allows consumers to custom-fit clothing can be seen as both a tool to get the right size of clothes and maybe also be considered as a sort of event for the consumer in the store.

The outlines from this category can probably very well be transferred to consumer acceptance of communicative packaging. Especially when it comes to technology, which might tell if a certain food product is safe to eat or not, it is very important that the consumers feel secure about the technology and is able to interpret the signal from for instance an indicator.

5. Conclusion

To get an insight in the opportunities of introducing new technologies regarding communicative packaging in the retail stores, it is important to understand how the actors in the supply chain think and react, before introducing these new features. It is therefore interesting to find reports and surveys, which already exist and find their conclusions on these specific areas. This present Desk Study includes studies and surveys made by organisations and institutes.

The Desk Study has been structured according to “The Talking Box” with an additional category about general approach to new technology:

1. Hello – Appeal and information
2. It is me - Identification
3. I am original – Anti-counterfeiting and security
4. I feel good – Indicators and sensors
5. I do not harm - Sustainability
6. Consumer acceptance of technology in general in connection to the retail industry

Even though all agrees that the packaging plays an important role in the buying decision, it can generally be said that for all categories only little material exists. The exception is studies concerning RFID.

It can also generally be concluded that consumers have more worries about technologies that they are not familiar with, and here are many myths, i.e. concerning RFID that have to be dealt with. This only emphasizes the needs for education and information.

The actors in the supply chain also need to get more familiar with the different technologies, so they can be assured that the technologies can be trusted. Furthermore, there are certain issues that have to be dealt with, before introducing i.e. sensor and indicator technology on consumer packages in the retail store. An important issue is to find solutions to the problem that an indicator can change colour after having left the store and the potential problems that can give between the consumer and the store.

The studies also show that many consumers are concerned about the environmental consequences of packaging and have a certain preference for environmentally sustainable packaging. However such a preference seldom has any effect on the buying of food products, because consumers are unable to distinguish between more and less environmentally benign packaging and because other preferences are more important to the consumer and owing to the fact that the buying of food products often is a habitual matter.