

**Summary**

**New approaches for communicating risk factors with regards to  
REACH, GHS und Nanotechnology**

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## 1. Introduction

Many products which are dealt with, used or consumed in households contain substances which can lead to health impairments when they are inhaled, swallowed or come into contact with the skin. Dealing with such substances inappropriately can also be a source of pollution in the water, soil and air. While many of these substances used in the manufacturing process can be avoided or at least replaced by other substances which are not as harmful, it is not possible to do so in many cases. To avoid adverse affects to their health or the environment, consumers should be made aware of the potentially harmful properties which many commonplace products have.

The backdrop of this project assumes that those using and consuming commonplace products expose themselves to a variety of risks when they decide

- to use certain commonplace products and
- to use these products in a certain manner.

It goes without saying that individual products very seldom have a grave and negative impact on consumers. However, there are many arguments for giving more weight to this topic as well as for developing programs which would emphasize how to deal with familiar, commonplace products safely.

- An increasing number of people with allergies need to know in as much detail as possible what substances are included in a product.
- Tradesmen and craftsmen who come into contact daily with glues, paint, lacquer, cleaning solutions, etc. especially have to worry about long-term impairments from dealing with such products in an inappropriate manner.
- While some substances can easily be broken down by the body, there are other substances whose negative effects can be seen in the long term. Furthermore, they (can) occur in combination with other substances.
- Up to now, there is little known about the health risks of some substances, especially nano-sized substances.

If these points are taken into account, a purchasing decision can be considered as a decision either for or against certain risks from undesired side effects when using a product. If risks to one's health or the environment are known, then it is imperative that those using the products are informed of such risks. There should be enough information available that consideration of these risks play a role in the decision to either purchase or use a product. Observational research, however, conveys the impression that the decision to buy and use everyday products tends to be rather spontaneous and intuitive. Very seldom are the risks even considered. For example, in many cases people do not make an effort to verify which substances a product contains or how the product should be used appropriately.

## 2. The Procedure

The goal of dealing safely with chemical substances, preparations and products is being aspired to with the European Community Regulation on chemicals REACH which entered into force on 1 June 2007. To accomplish this, explicit reporting requirements throughout the supply chain have been defined legally. However, the reporting requirements do not include the end consumer (i.e. households or craftsmen). Neither of these are “REACH players”. These groups rather have been given the right to obtain more precise information about the substances directly from the manufacturer. A distinction can be made between push and pull media with regard to communication and the media used. If the aforementioned regulation is taken into account, the communication and reporting requirements follow the push-mode as players later in the value-added chain must be given the information. However, when the information is to be given to the end consumer, the reporting requirements are now changed over to the pull-mode. As a result, the direction from which initiative has to be taken is “reversed” and a gap in communication is pre-programmed to occur at this spot.

One of the main questions of this project is to determine how the gaps in communication which are opening up can be closed again. Furthermore, this project aims to determine which options would be available to inform consumers of the substances of which a product is made and to give consumers essential information on using these items safely. Between July 2007 and May 2008 a special research group examined these questions with an institutional analysis on the basis of three product groups. The three product groups were

1. textiles,
2. paint and lacquer,
3. chemicals commonly found in hardware stores (e.g. methylated spirits, hydrochloric acid, paint remover, etc)

These three product groups were chosen collectively by representatives of the Federal Ministry for Economics and Technology. These product groups are distinguished by the fact that there are no specific rules and regulations relating to these product groups. On the other hand, these are items which are familiar and often well-known. This certainly applies to textiles. A similar situation is also present with regard to paint and lacquer. This familiarity is not as clear with products from hardware stores as these items are only used occasionally by an average household. Furthermore, the product groups are given ratings from 1 to 3 so that the character trait of being either a “chemical product” or a “chemical” becomes increasingly clear.

It was necessary to determine how consumers evaluate the health risks of substances in the product they are buying and how the evaluation of these health risks affects the decision to purchase the product or how the product is used. This information allowed us to prepare recommendations that can offer consumers support when selecting and utilizing readily available products. The currently established research status in various areas were brought together and analyzed. Such areas included risk awareness and risk assessment, risk communication, economic risks, decision making theory, consumer behaviour, and design

and usage of instruction manuals. The identified status of research was correlated to the existing legal situation which resulted from the development of the European Community regulation REACH, the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), and further rules in other areas such as laws covering the sales of goods, product liability, product safety, and general European Law.

In addition to secondary research, a significant amount of qualitative data was collected. The empirical quantitative goal in the collection of the data was to obtain an overall impression of how consumers evaluate the mentioned product groups and the range of information which belongs to these groups. The focus of this empirical investigation was as follows:

- assessment of hazards from substances contained in the product groups mentioned ,
- assessment of “chemicals” in general and “nano-materials” in particular,
- established forms of behaviour when seeking information and how information is sought,
- information media and channels which are used,
- evaluation of established forms of product information,
- recommendations (as given by consumers in the survey) for improving the available means of product information.

The empirical data was collected in a semi-standardized survey given to customers shopping in three different situations. The survey consisted of questions by an interviewer

- in the city centre of Darmstadt,
- in various branches of a major chain of hardware stores,
- at the premises of an ecologically oriented textile shop

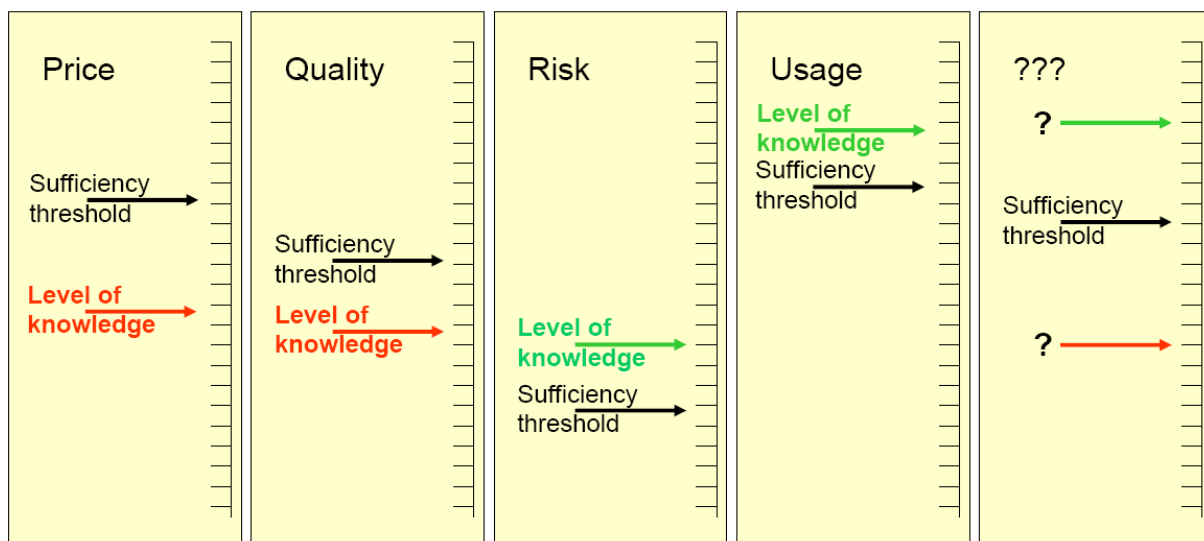
A total of 256 interviews were completed and statistically analyzed. Furthermore, a number of craftsmen were surveyed. Although they often use products with chemical substances in their occupational environment, the craftsmen often did not have the necessary know-how regarding questions about the substances contained in products they use. Because of this, they were considered semi-professional consumers in the scope of this project. Another source for collecting information came from surveying people in the third year in their career training program to become painters.

Furthermore the quantitative research was augmented by using the qualitative instrument of group discussion. There were a total of four group discussions (focus groups) with residents of Darmstadt. The participants were confronted with the topics from the project and were encouraged to discuss their experiences and impressions. This made it possible to determine the motives and attitudes of the participants. This, in turn, turned out to be instrumental in developing recommendations on how to use products with potentially harmful substances properly.

### 3. When do consumers look for product information?

With regards to most products which are being offered, their labels are usually covered with a vast amount of information. Sometimes this information includes a list of substances, sometimes safety information, sometimes information on proper use. All of these facets should make it possible for consumers to make an educated decision when purchasing or using a product. However, consumers are not always willing to read the warning or information, at least not with all products. Certain incentives are needed to do this.

Consumers do not see themselves capable of making a sufficient decision with regards to the purchase or usage of a product based on the available information or their own knowledge of the product. This condition can be called “information insufficiency”. This causes consumers to lack confidence and increases the desire to minimize the risk of making an incorrect purchasing decision when looking for and evaluating the information. Only upon reaching a certain sufficiency threshold is the consumer ready or able to make a purchasing decision. Thus selecting a product is a multi-dimensional decision making process. Price, quality, usage and performance as well as risks associated with the product play a role here.



### 4. Empirical Results

Since the empirical results are comparatively comprehensive, the following text is an attempt to summarize the results and depict them exemplarily:

- The consumer groups in the project were classified as either “laymen” or “semi-professional”. The research and empirical results show that this distinction does not hold up. Even the craftsmen, who were essentially classified as semi-professional as they use the product groups in a professional setting, are laymen with regards to their knowledge of substances found in a product. A difference however can be seen in the

fact that professional training opens another channel of communication which can be used to convey information about and awareness of the inherent risks.

- The topics of nanotechnology and nano-material are widely unfamiliar subjects among consumers. Knowledge about nano-materials, especially regarding advantages and risks, is almost non-existent. It is rather seldom even considered.
- The substances in a product play a secondary role during the purchase of a product. Whereas approximately 75% of those surveyed claim that price and quality are important, only approximately one-fourth claimed the substances were a criteria. This was one of the primary criteria for only 5% of those surveyed.
- Around 70% of those surveyed said they assumed that modern products contain questionable contents. Furthermore, 90% believe that negative health consequences will result when exposed to harmful substances.
- Conversely, around 80% see chemical products as an indispensable part of modern life.
- Around 85% of those surveyed claim that they avoid handling dangerous products in their daily life.
- About 50% of those surveyed agree that they do not consistently follow simple safety procedures (e.g. ventilating while painting, washing clothes before wearing them the first time, etc).
- Around 70% of consumers who were asked claimed that they would like to know more about the substances contained in the product groups examined in this project. However, barely 30% regularly felt that they had the most current information regarding these products. Only one out of three of those questioned considered the available information as adequate.
- Approximately 55% of those who took part in the survey claimed that they consider the information from the manufacturer as reliable.
- Consumer eco-labels (*Blauer Engel*, *Ökotex Standard 100*, etc.) are held in a positive light and considered to be helpful guideposts to safe and environmentally products by half of those surveyed. However, it was conspicuous that around one-fourth of those surveyed avoided answering this question by choosing either “no answer” or “have some information but don’t have an opinion yet”. Many consumers are unsure about the significance of the labels.
- When asked how to improve the range of information which is available, those responding said that having advice readily available in the shop and having information on the internet would be their first choice. This shows that more information is sought at the point of sale and point of use. The most important point for selecting the source of information is that it has to have an accessibility rate of 60%.

Another factor examined in this research was whether certain social-structure variables played a role in taking chemicals/nano-materials into consideration. Furthermore, to what

extent these variables affected the gathering information and the assessment of available range of information was also examined.

- The differences among these groups were basically found to be marginal and not very conspicuously systematic. It does not seem to be necessary to develop methods of communication aimed at particular groups.
- The gender of the participants did play a role to a certain extent. Women evaluated chemicals more sceptically and gave more importance to having more information available. However, no difference in attitudes towards its use could be recognized.
- It was conspicuous that among the households with children, the participants did pay more attention to which substances were in product. This conscious evaluation however mainly occurred when selecting products for their children. When choosing products for themselves, the attitudes among those participants with children in their households showed no difference to those participants without children in their households.
- Younger participants (between 15 and 29 years old) generally take more risks with regards the substances contained in a product they are purchasing. They also pay less attention to simple safety measures when using a product. The substances in a product play a small role when deciding which products to buy. Furthermore, it was determined that this age group requests additional information with less frequency. When compared to older age groups, this group considers the available range of information to be adequate and they regard manufacturers as being more reliable.
- The level of education does not play a role in how consumers deal with inherent risks.
- Disposable income plays a role in product selection and apparently allows for a wide range of consumer behaviour. This is however not reflected in the attitude towards chemical products or in how these products are handled.

The following section deals with recommendations concerning communicating the risks involved with handling such products to the consumer. Further information about the qualitative results from the group discussion will be integrated to the results acquired from the quantitative survey.

## 5. The requirements for communicating risk

The survey results have shown that consumers desire to have more information, yet seldom take the initiative to demand this information on their own. This is surprising as the participants claim to believe that, with regards to potential health risks, substances in a product are of dubious nature. One should keep in mind that the product groups which were considered are not only familiar, but also comparatively inexpensive. Furthermore, the participants do not associate these products with any clearly negative experiences. This is however not the case when individual products or substances have evoked allergic reactions.

When the act of communicating risks is mentioned in the next section, it should be taken into account that this differs from other acts of communicating risk which are dealt with in many publications and scientific literature. In this literature, it is generally assumed that the people receiving the warning have the impression that they are facing excessive risks. In the circumstances taking place in this research, the opposite situation occurs. In the aforementioned case of risks due to substances in the product, the people receiving the warning believe the risks to be (too) minimal and thus deal with the risks inappropriately. For the drafted strategy for communicating risks to be effective, it is important to first awaken a certain degree of risk consciousness. This risk consciousness can lead to consumers becoming more interested in the properties of products, i.e. the substances which are in a product, which in turn can lead them to requesting more information. The following aspects of the requirements for communicating risk should be viewed as a cascade. Only after the first phase has finished do the aspects 2 to 4 mentioned below play a role.

1. **Risk awareness**: In order to increase consumer interest for the issue of (risks due to) substances in commonplace products, it is necessary to raise the level of risk awareness. This issue also has to be made relevant with products which consumers have considered to be risk free.  
→ **Aim**: Consumers have a conception of the existing or potential risks associated with familiar products and that they take these risks seriously.
2. **Accessibility**: Many commonplace products are purchased by consumers spontaneously and without seeking enough information. (A typical example of this is buying clothing on sale. A counterexample is buying an expensive electronic item, such as something in the area of home entertainment). The willingness to deal with the act of finding product information depends on the product, and, to a certain extent also depends on the price.  
→ **Aim**: The range of information has to be made available at the point of sale as well as in the consumers' residences (point of use). Barriers to availability have to be kept as low as possible.
3. **Easy to understand**: When preparing the information, special attention should be given to the fact that consumers have different experiences and differing levels of knowledge with the products they come into contact with. Furthermore, the willingness to use this information is not always present. Both of these aspects should be taken into consideration when preparing the information. Most importantly, the information should be easy to understand upon the first reading.  
→ **Aim**: Information should be prepared in differing degrees of detail and technical background. It is imperative that the information on the product or at the point of sale is easy to understand. An important decision is made here. Generally, once a product is bought, it will be used. When purchasing a product, a consumer may become aware of potential risks and want to get more information. Because of this, a means of easily accessing information should exist at the point of sale.
4. **Practicability of the safety recommendations**: When creating safety guidelines, it should be assumed that few consumers are willing to spend much time reading them. Thus, the safety warnings which offer the most to the overall safety of the consumer

should be listed first.

→ **Aim:** As much safety as possible for consumers.

The criteria and behaviour patterns mentioned earlier regarding the gathering of information suggest making differing ranges of information available. When products are being bought or being used, this information should be able to quickly and easily give the consumer a first impression of the possible risks. This, in turn, will make it possible for consumers to use the product appropriately. Furthermore, this information presented in an easy-to-understand way should be supplemented by other means and channels of information, thus allowing access to more detailed information.

## **6. Creating risk awareness**

In order to effectively reach a vast majority of the population and to increase the awareness of the risks associated with using commonplace products, it is advisable to use mass media as the source of communication. There would not be a fundamental difference made between chemicals in general, as described in REACh, and nano-materials. The mass media offers many advantages here for distributing this information. As a means of advertising, this allows the information to reach numerous recipients passively, i.e. they don't have to actively search for this information. This is the so-called "push media". Radio and television have the advantage of being accessible by most of the population. Therefore there is no reason to be concerned that certain groups will be systematically excluded from receiving general information. It is advisable to utilize multiple channels of communication in order to reach the aim of increasing the level of risk awareness. The effectiveness of radio and television campaigns can be strengthened by newspaper advertising.

For example, advertising spots could point out why consumers need to spend more time understanding the products they use and the substances contained in those products. The underlying points of these campaigns are to stress safety on one hand and feasibility on the other. Certain substances found in some products which are being manufactured and offered for sell will always pose a certain degree of risk. This is a point which needs to be referred to in the product information. This point will be described in more detail later. The campaign should give the impression that the information is prepared in a way that is easy to access, simple to understand and uncomplicated to implement. Consumers should be able to gather information "bit-by-bit" as the easy to understand and helpful information they receive at first can be followed by further options.

## **7. Preparation of risk information at point of sale and point of use**

Existing risk awareness and a lack of desire to acquaint oneself with the risks can pose a barrier among consumers to gathering information. To prevent this, it is recommended that a low-threshold introduction of the potential risks be made available at the point of sale. Consumers have various needs and should be able to decide themselves to what degree they want to concern themselves with the products and the risks associated with these

products. Therefore, consumers will be able to either follow references to additional information or to ignore this additional information. As previously mentioned, it is important that the information at every level of complexity is complete and self-encompassing as to assure being an effective decision-making tool. In this context, a further result of empirical research must be considered – using information about the products is a question of trust. Consumers need to feel that they can trust this information as well as the organization supplying this information. This trust is necessary before consumers can consciously acknowledge and use this information when deciding on whether to purchase the product or deciding on how to use the product. Only when consumers feel that they can trust the information will they believe that using it can actually be worthwhile. The following text lists the various starting points needed for an improvement in the availability of information at the point of sale.

A simple labelling system (e.g. a traffic light system) would be a good starting point. This would give consumers an introductory overview of the risk information. It is recommended to divide the information into the following sections:

- health risks
- environmental risks. With regard to the aspect of trust, it is recommended that an additional section be made available:
- the current state of research (or information gap)

This rating system, as the name implies, can be conveyed as a traffic stoplight. As an option, this can be supplemented with point system that allows for a more detailed subdivision of the rating system. This is a simple tool which can be limited appropriately to the background information of the consumer while still informing consumers of a wide range of risks associated with the products. The more-detailed information should accomplish the following:

- offer advice at the point of sale.
- serve as an additional sales support at the point of sale as well as at the point of use. The range of information available for use while giving advice about a product or using a product can be increased by making brochures available. If the consumer desires even further information.
- be helpful. Consumers should be able to scan a product's barcode at a terminal and receive information additional information and instructions as appropriate. Because of the multimedia approach, the consumer will have the opportunity to obtain more information regarding risks associated with a product.

Brochures serve as a gateway at the point of use. Further channels of information can be presented using brochures. Typical channels include the following:

- hotlines,
- text-messaging services
- internet platforms

This allows consumers the choice of which form of communication they prefer and to what degree of detail this information should be made available. Hotlines represent the classical information source in business. Text-messaging services offer a limited scope similar to a brochure. Internet platforms however offer a distinct advantage. Similar to a scanner terminal, the information made available on the internet can be presented in an easy-to-

understand manner due to its multimedia format. This aspect makes a more extensive degree of information possible and various points can be linked together, e.g. comparing products containing the same substances among different categories of products, learning about research being performed by different companies, and comparing products. The following are also conceivable:

- newsletter service
- internet platform taking the opinions of consumers into account. Technical and organisational means can safeguard the accuracy of the information of this data against undesired events, such as product bashing, which can occur.

Educational programs have to be considered separately because the courses have to be attended. It is conceivable that information about potential risks and how to deal with such risks could be part of the curriculum in the following situation:

- in schools (i.e. chemistry lessons) and
- during apprenticeships (i.e. tradesman apprenticeship, sales training, etc).

These measures can only show their effectiveness in the long-term and can only reach small proportion of the population. Only over time would the necessary level of risk awareness take root in the general population.

To deal with the trust and organizational aspects, it would be beneficial to establish an institution which

- collects product data,
- verifies the data and
- makes the data available to consumers

Know-how and independence play an important role. A lack of know-how and independence in the eyes of the consumer can lead consumers to doubt the integrity of such an organization, which in turn would lead to consumers ignoring the information provided by this organization regarding the range of risks.

The potential of the suggested information system lies in the reciprocal references among the individual channels. This permits the consumer to follow links leading to additional information and allows this information to be categorized (e.g. by substance, product group, etc). Consumers who are looking for information will have many possibilities to begin their search, whether they desire cursory or detailed information.

Further information can be found at:

[www.sofia-darmstadt.de](http://www.sofia-darmstadt.de)

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