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Information about chemicals in articles

The toy industry as an example

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Abstract

This study assesses the problems of loss of information about chemicals throughout the global product chain of toys, concentrated on import to the European Union. The aim of the study was to use qualitative interviews as well as available literature to describe the present situation regarding information about chemicals in the toy industry, to investigate whether information is lost and in that case where and why. According to the results, information about chemicals in toys is primarily lost in two different stages: high up in the supply chain due to patent issues and production secrets of the chemical supplier, and at the stage of import because the information was not requested here or in earlier tier of the supply chain.

This study also found out that information about chemicals in toys will be improved in the EU within the near future, due to ongoing legislative revisions. The entry into force of the recent EU chemical regulation REACH and the revision of the EU Toy Safety Directive will bring stricter requirements on chemicals in non-electrical toys that are not chemical products, and the Toy Safety Directive will also bring clearer provisions on responsibilities for information transfer as well as improved provisions for surveillance.

Further on, this study investigated suitable ways of transferring information about chemicals in toys. The findings on this issues suggest that even though it is not possible to require companies to show exactly which substances are present in their products, there seems to be benefits for the companies themselves about having as much information as possible. Most importantly, importing companies need to be transparent with what their products contain, to rebuild consumers' confidence in toys.

Executive Summary

Chemicals are present in articles that are put on the modern market, even though society began to realize that many of those substances are harmful to humans and to the environment. Because of this realization, the use of some chemicals has been restricted for many years. Chemicals are still present in articles, even though there is a lack of knowledge about the toxicological and ecotoxicological effects most substances have. Moreover, information about what substances that are contained in articles is often lacking, which is the primary background for this study. Further on, the global society offers product chains with roots in several parts of the world, making this a global problem. Long product chains mean several steps where information about the contents of an article could be lost.

Some articles are more important than others when it comes to knowing what substances that are present and what effects they may have, depending on how these articles are being used and by whom. There are several examples, such as cosmetics, that have direct contact with the human body, or foodstuffs that are ingested. The one that is being assessed in this study is toys for children.

Toys are important to consider since children are more sensitive to various threats than adults and are seldom quite as aware of these threats themselves. Small children tend to put things in the mouth and chew on them etc., a way of exposure where even lower amounts of substances may be hazardous. Toys are generally safe according to the interviews, but the year of 2007 showed a large increase in the amount of recalled toys, primarily due to the chemical content of the toys. The major part of these recalls has been due to excess lead or excess phthalate content, and the consumers' confidence in the toy industry have been damaged due to the amount of recalls.

This study assesses whether relevant information is lost throughout the product chain as well as in what stages this happens, while also discussing what information should be seen as relevant in this perspective. The study also attempts to find out what kind of information flow that would be suitable for the toy product chain.

The study is based on qualitative interviews with relevant actors in the later stages of the toy supply chain, i.e. primarily the industry that is importing toys to the EU (along with their trade organisations) and inspecting authorities within the EU. Also consumer organisations, environmental non-governmental organisations and a laboratory accredited for toy testing were interviewed. The interviews were initiated and complemented by a literature review, and the snowballing method was used to find further suitable readings as well as further suitable interviewees.

This study also found out that information about chemicals in toys will be improved in the EU within the near future, due to ongoing legislative revisions. The entry into force of the recent chemical regulation REACH (Regulation No. 1907/2006) and the ongoing revision of the Toy Safety Directive (Directive 88/378/EEC) will bring stricter requirements on chemicals, and the Toy Safety Directive will also bring clearer provisions on responsibilities for information transfer as well as improved provisions for surveillance.

The findings of this study suggest that information about chemicals in toys is primarily lost in two different stages: some information is lost high up in the supply chain due to patent issues and production secrets of the chemical supplier, and some information is lost at the

stage of import because the information is not properly requested. However, none of this says anything about whether this information is relevant or not, and it would require further research to find out exactly what level of information that is to be considered as relevant.

Further on, this study investigated whether information about toys should be transferred in the way that companies show what substances that are not in their products or whether they should show what is in their products. The findings on this issue suggest that it may not be possible to require from the importing companies that they should describe exactly what is in their products, considering that such information might be difficult for them to get hold of from their suppliers. This also depends on what level this information should be put on though – perhaps it does not have to be specified down to the substance level as long as it is not Substances of Very High Concern (since information about those substances should be on substance level already with the existing legislation). Regardless of whether it would be possible or not, there seems to be benefits for the companies themselves in having as much information as possible about what chemicals are in their products. Most importantly, importing companies need to be transparent with what their products contain, to rebuild consumers' confidence in toys.

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1 Introduction

It is a well known fact that most articles¹ that are put on the modern market contain different kinds of chemicals; either chemicals that have been deliberately put into the product to provide some benefit, or residues of some chemicals that were used while processing the product. The modern society has now realized that many of these chemicals are or may be hazardous for ourselves or for our environment. It is also a well known fact that there is a lack of information regarding the effects of most chemicals, and it is therefore difficult to regulate the use of chemicals so as to keep the hazardous ones away from applications where they may pose a threat. Moreover, it is not only the fact that there are chemicals that is a problem for the modern society, but also that the information about what chemicals that are present in products often is missing in the final stages of the product chain. In other words, the information about the chemicals is lost somewhere amongst the many transactions in the chain.

The global society displays product chains with roots in several parts of the world, making this a global problem. The different stages of production may take place in several different countries, while the final product is sold in yet another country, which makes it difficult to trace information backwards. Consumers do often not have the knowledge needed to require proper information, which means that there is a need for other requirements regarding the information about chemicals in products. Most countries of the modern world have therefore developed restrictions on what kind of substances that are allowed to be present in products, as well as what kind of information a manufacturer has to provide when putting a product on the market.

One of the requirements in the REACH Regulation², the new chemicals legislation within the EU (The European Union) composes a related problem. Most provisions in REACH do not cover articles very well at all, and especially not imported articles. The only provision there is is that there is a requirement for information about the presence of SVHCs (Substances of Very High Concern) in articles, if the concentration of these substances is higher than 0.1% and exceed 1 tonne per year (ECHA, 2008). However, the wordings in REACH do not make it clear whether this limit should apply to the percentage of a finished article or to a component or micro-structure of an article (Johansson, interview 9 June 2008). This distinction makes a significant difference, since it would allow higher percentages in a micro-structural part of an article if the article is assembled outside the Union than if it would be assembled within its borders. In perspective, it could also be so that the point of exposure could be the micro-structural part, for example a surface layer that is of a different material than the rest of the article, or a smaller part that are exposed.

When it comes to information about what chemicals are present in articles along with the potential risks with these chemicals, there are some products that are more important than others, due to how these products are being used and by whom. There are several examples, such as cosmetics that have direct contact with the human body, or foodstuffs that are ingested.

¹ The word 'article' is in REACH defined as the following: "*Article: means an object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition*" (Quote from Regulation (EC) No 1907/2006 of the European Parliament and of the Council, Article 3). In this report, the word 'article' is therefore going to be used as a synonym to the word 'product', although primarily in the European context.

² Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

The one that is being assessed in this study is toys for children. Why is it important to assess the flow of information regarding chemicals in toys, then? First of all, the safety issue overall is very important when it comes to children, since they are more sensitive to various threats than adults due to their developmental stage and they are not as aware of these threats themselves. Small children tend to put things in the mouth and chew on them, a fact that is addressed by many safety regulations regarding toys, but these safety regulations mostly cover the risk of suffocation and similar threats. However, even though a toy may not pose any threat of that kind, it may still be dangerous if it contains substances that migrates from the toys into the child's skin or into the mouth tissue when put in the mouth, or fragrances that are inhaled.

Toys in general are designed to be safely used by children, but in spite of this there has been a high amount of non-compliance cases during the last year, compared to previous years (European Commission, 2008a). Most of all, there has been a high amount of recalls of toys containing high amounts of lead and phthalates, both being potent substances that are already heavily regulated if not completely banned. These recalls could be the effect of improved inspection, but could also be a result of increased non-compliance.

As mentioned, the information we have today about most chemicals is insufficient for judging which chemicals are actually harmful, and it is therefore difficult to regulate which chemicals may be allowed in toys as well as in articles in general. The substances already classified as dangerous have been regulated throughout the years, but many substances that may be hazardous are still in use. For anyone in the product chain to be able to take safety measures, they need to know what chemicals are there, as well as what is known about these substances. Therefore, the flow of information throughout the product chain is highly important.

The problem about hazardous substances in toys has been recognized in the EU for a long time, but the recent amount of recalls caused by chemicals has put the issue on the political agenda at the moment. Consequently, the European Toy Safety Directive³ (TSD) is therefore being revised at the moment, and the chemical requirements are one of the major targets of the revision.

1.1 Purpose & Research Objectives

The research objective of this assessment was to clarify the process of information flow regarding chemicals in articles, using the toy industry as an example. This was done by trying to answer the following research questions:

- Is relevant information regarding chemicals in toys lost throughout the product chain?
- In what stages is the most critical information lost, and why is it lost?
- Is it suitable to have the kind of information flow system that is presently used for toys (i.e. that companies assure that forbidden levels of certain substances are not included in their products), or would it rather be suitable to have a completely different system that is using the opposite approach compared to the present one (i.e. where companies provide information about what substances that are included in toys, for example through a complete list of the chemical content)?

³ Council Directive 88/378/EEC on the approximation of the laws of the Member States concerning the safety of toys

These research questions contain a problematic issue though, at least the first two. This is because they contain the word 'relevant', which is in itself going to produce highly subjective answers. The level of information that is relevant is completely based on whom is being asked, and different actors within this subject will have highly different opinions on this. The objective of this assessment is however not to determine what level of information that actually is relevant to get since that would be too ambitious for the scope of this assessment, but rather to collect those different opinions and discuss around them.

In addition to the scientific use of additional information within the field, there is also a practical purpose of this study. This is to provide the Swedish Chemical Agency (a governmental agency under the Ministry of Environment) and the International Chemical Secretariat (a non-profit organisation dedicated to working towards a toxic-free environment) with information that can be used as background material, directly or indirectly, for their purposes.

1.2 Scope & Limitations

To keep the scope of this assessment within reasonable boundaries, some limitations had to be drawn already at the beginning of the work. These limitations are outlined here:

- Only simple toys have been considered in this study, i.e. no electronic toys and no toys that are also chemical products. The reason for this limitation was to reach the problems of information about chemicals in toys that are not covered by regulations specific for chemical or electrical products.
- Since the major part of the world's toy production is in South-east Asia, this area has been used as exporting area for the final product (the toy).
- The EU has been used as main importing area, due to convenience from the fact that the study was performed within the borders of the EU.
- When it comes to restrictions and legislation, this assessment primarily brings up those that are specifically intended for toys.
- The assessment is qualitative, i.e. it is primarily an attempt to understand the present situation.

1.3 Outline

Chapter 1: Introduction. This chapter introduces the study and explains the problem. The scope is also defined, along with research objective and research questions, and is finalized with an outline of the report.

Chapter 2: Methodology. The methodology describes how the study was performed, how data was gathered and analysed and finally some practical limitations of the study.

Chapter 3: Background. This chapter contains general background to the toy industry, as well as an introduction to the relevant legislation in the EU. It also contains some information about the amount of toy recalls caused by chemicals.

Chapter 4: Results from interviews. This chapter contains the summarised results from the interviews that were performed during the study.

Chapter 5: Discussion. The results from interviews and the findings from the literature review are critically viewed and discussed in this chapter, to form a base for the conclusions.

Chapter 6: Conclusions & Recommendations. In this final chapter, the main points of the discussion are condensed into conclusions, in an attempt to provide answers for the research questions. Moreover, this chapter contains some recommendations for different relevant actors, based on the discussions and findings in the study.

2 Methodology

2.1 Initial work

The first thing that was done within this thesis was to define the problem about chemicals in toys, and define a research objective and research questions based on this problem definition. Basic information about the problem was accessed from supervisors as well as other relevant persons within ChemSec, IIIIEE, KemI and the Swedish Ministry of Environment. This basic information was then developed by performing a literature review on the subject.

2.2 Literature review

The literature review consisted of scanning relevant organisations' web pages for useful reports, as well as using the snowballing method by asking relevant individuals for useful readings and other potential interviewees. Databases containing academic articles were also searched to find relevant information.

2.3 Interviews

At an early stage, relevant actors were contacted for interviews, even before the major parts of the literature review were performed. The choice of doing the interviews that early was taken due to the fact that the thesis work was performed during summertime, and interviewees' vacations had to be taken into account when planning. Choosing whom to interview is in a way always a sensitive task, since the outcome of these choices clearly could affect the results of any assessment. Still, since this assessment was about understanding the topic, all viewpoints on the subject were essentially interesting to collect, although they had to be critically viewed due to the issue of subjectivity. That part is however dealt with in Chapter 4. The task of identifying the interesting actors to talk to were therefore basically founded on the question "What organisations may have useful and reliable information within this subject?". This question was first of all used to contact the first obvious actors, and was then also posed to those first actors in accordance with the snowballing effect, in order to find all other interesting actors. The following types of organisations were identified:

- Companies importing toys to the EU, either from own production in South-east Asia or buying from local companies in this area. Along with this group comes the trade organisations for toy industry,
- Authorities within the EU responsible for surveillance of toys and chemicals,
- Consumer organisations, environmental non-governmental organisations (NGOs) and other environmental or health & safety-related organisations, and
- Other related actors, such as accredited laboratories for toy testing etc.

The industry was intentionally chosen to have several representatives, to catch the differences in how various companies act, and to gain insight in the trade perspective of the situation. In total, 20 interviews were performed, divided between the different actors in the following way:

- 8 company representatives (COOP Sverige AB, IKEA Sweden, LEGO Group, Magtoys AB, Scanditoys, TOP-TOY Denmark, TOP-TOY Hong Kong and Viking Toys),
- 2 trade organisation representatives (American Toy Industry Association and Swedish Toy Association),
- 5 authority representatives (the Swedish Environmental Protection Agency (Waste Department), the Swedish Consumer Agency and 3 representatives from the Swedish Chemicals Agency),
- 1 environmental NGO representative (Swedish Society for Nature Conservation),
- 1 consumer organisation (The Information Centre for Environment and Health (Denmark)),
- 2 representatives from a laboratory accredited for analysis according to EN 71 (SP Technical Research Institute of Sweden), and
- 1 expert on environmental information systems (The International Institute for Industrial Environmental Economics).

A list of all interviewees along with which organisation they are part of is to be found in the bibliography, and all of these interviewees were deemed to be both relevant and reliable. However, also other interviewees would have been relevant to get hold of to get a more diverse perspective of the situation. This is further explained and discussed in Section 2.6.

The interviews were qualitative telephone interviews, apart from one face-to-face interview. All interviews were focused on understanding the situation in the toy industry, and in the end to discuss relevant issues around the research questions. Different actors had different knowledge, and all interviewees were specific persons with specific knowledge on the subject at hand. The only group of interviewees that were more or less homogeneous were the industry representatives, although differences were present also there depending on company structure and size of company. Individual sets of questions were therefore developed for each interviewee, based on who they were and what positions they had within their organisations. All discussions were as far as possible based around the following six core questions:

- 'Q1: Where are toys produced and what is the reason to have the production there?',
- 'Q2: What supply chain management (SCM) practices are there within the toy industry?',
- 'Q3: What is the format of information transfer regarding chemicals in toys?',
- 'Q4: Is relevant information lost somewhere throughout the life cycle, and if so, where is it lost and why?',
- 'Q5: Would it be relevant for downstream actors (after the point of selling to consumers, e.g. consumers and waste managers) to get more information?' and
- 'Q6: Would it be possible and/or suitable to have a list of content to show what substances that have been put into the toys?'

The first three questions were posed to get a basis and a context for discussion during the interview as well as understanding the industry, even though a lot of this information was also to be found in the literature. The third one had however more relevance for the research questions, as it connects to the third research question, in the way that it gives a baseline to compare with regarding how information is transferred within the industry today. The fourth question was supposed to provide the different actors opinions on what level of information that for them is considered to be relevant, since this is crucial in determining how much information that is reasonable to require. This question was also supposed to bring up opinions about where in the product chain loss of information occurs and why it occurs, all in order to provide a base for discussion around the two first research questions. Also this information was to some extent possible to get from the literature, although the specific opinions of different actors were as interesting to get as the stated facts from the literature. The fifth question was yet again supposed to explore the area about what level of information that is relevant, and to whom. The sixth question was solely intended to provide a base of discussion for the third research question, and it was posed in this way to provoke a spontaneous reaction from the respondents, to catch their honest opinions. The topic was then discussed more deeply. The discussions that arose during the interviews extended beyond the basic set of questions, since there could be spontaneous follow-up questions from both ways depending on how the discussion developed and what the interviewees answered. This was especially the case with the last one of the described questions. Because of this, the length of the interviews could vary between 20 – 60 minutes. This also meant that the basic set of questions were themselves developed during the thesis work, and some of the early interviewees were therefore contacted again at a later stage (when they had come back from vacations) to complete the set of answers.

2.4 Other sources of information

One important part of the background information for this assessment was to find toy recall statistics in the EU. The responsible person for statistics at the Rapid Alert System for non-food consumer products (RAPEX) was contacted and raw statistical data on all toy recalls was acquired (i.e. from European Commission, 2008c). From this data, the amount of toys recalled due to chemical hazards was identified, as well as the most common types of chemical hazards. This information was complemented by information from the RAPEX website (i.e. from European Commission, 2008b), where notifications are listed and described in detail. Information acquired from those two sources together will be referred to as European Commission 2008c from now on. The same kind of data was also extracted from the US equivalent, the US Consumer Product Safety Commission (CPSC), to compare the statistics from the EU with. The data from the US SPCS was however not available in summarised form. Instead, the data was manually extracted from the web page where recalls of toys are published (i.e. US CPSC 2008), and then treated in the same way as the European data.

2.5 Data analysis

To summarise the results of the interviews, everything that the interviewees answered was categorized as bullet points to the six core questions. Those answers that were not possible to relate to any of the core questions were instead categorized into one of the following:

- 'General viewpoints of industry associations',

- 'General viewpoints of companies',
- 'General viewpoints of authorities, NGOs / consumer organisations and others' and
- 'General viewpoints common for all interviewees'.

When everything was categorized, it was summarised to become a readable text that is shown in Chapter 4. Once the results from interviews were summarised, they were critically discussed in Chapter 5 along with the results from the literature review.

2.6 Limitations of the study

The study suffered from several limitations that emerged during the work. These are listed here for the reader to be aware of them, so that the results and the conclusions in this report may be viewed with these limitations in mind.

First of all, the study was being performed during summertime, which means that the most relevant people often were out of office due to vacations. Apart from being time-consuming to get hold of people, this actually made it impossible to get hold of the most suitable persons within some organisations, while other organisations had to be excluded completely due to the lack of relevant people, such as for example Toy Industries Europe (TIE) and The European Consumers' Organisation (BEUC). This is the most important weakness of this assessment, since important opinions potentially may have been lost due to this. Still, the industry as a whole seemed to have similar opinions on most of the issues touched upon, and especially the opinions of the industry associations were important in confirming this. Moreover, the interviewed persons in industry as well as in authorities and other organisations had opinions that generally corresponds to the opinions that could be found within the literature as well as on the respective organisation's websites. Because of this, the opinions were deemed to be representative, even though it would have been good if it would have been confirmed by more interviews.

The choice of interviewees is also biased towards Scandinavia, especially Sweden, since the author of the report found it easier to get in contact with relevant persons within companies, authorities and other organisations in this geographical area. This means that in practise, Sweden has been used as the main pool of samples for this assessment, and the conclusions for a wider geographical area than Sweden (i.e. the EU and for some conclusions also globally) are an extrapolation of conclusions that are valid for Sweden. Sweden is however a part of the EU and therefore have the same legislative base for the matters that are touched upon, and all interviewed companies have either own operations or at least suppliers in other parts of the world both inside and outside the EU. Adding up to this, a few representatives outside Sweden and even outside EU was also contacted, with the intention of making sure that this bias would not affect the outcomes too much by adding more international perspective to the assessment.

Moreover, some information that would have been useful for the study was unavailable for various reasons. For example, some questions that would have been relevant to get opinions on from the interviewees turned out to be pointless to ask, since the information was too detailed for the interviewees to be able to provide an answer. Another example is that the standard EN 71 itself was unavailable for the author due to budgetary reasons, only the general content of

the standard was available. These limitations may have affected the quality of the assessment to some degree, but most likely not to any large extent.

Since the study performed was a qualitative study, there were some inherent limitations related to this, such as for example the subjective nature of opinions. These kinds of opinions have been critically viewed, so that single opinions that are not representative would not affect the outcome of the study. Especially the word 'relevant' is highly subjective, and since some of the research questions were based upon this word, the meaning of the word also had to be discussed (this discussion is included in Chapter 5).

3 Background

3.1 Facts about the toy industry

The global toy industry was in 2006 worth 67 billion USD (NPD, 2007). This along with the simple notion that toys are a part of virtually all human individuals' life makes it an important industry worldwide. Toys are typically divided into two different groups – traditional toys and video games (Wong *et al.*, 2005). Traditional toys include dolls, crayons, puzzles etc., but also vehicles and other toys that are not video games. Video games also include computer games and internet games etc. The total sales of traditional toys have experienced a period of very little growth recently, while video games are taking up more and more of the market.

Some special characteristics of the toy industry compared to other sectors are the volatility of the market as well as the composition of companies acting within the sector (Europe Economics, 2007, p. 68). The volatility in this sense is partly the seasonality of selling opportunities driven mostly by holidays that are associated to gifts, i.e. mostly Christmas (consisting of 70% of annual sales, according to Ad hoc expert group, 2008). The volatility is also about the generally short product life cycles of toys (Wong *et al.*, 2005). The life cycles of toys are shorter because of a changing child mentality, most of all among the group called 'tweens' (children of the age 8-10), who are becoming more and more conscious about the quick fashion changes of the modern world, for example movies (Wong *et al.*, 2005). More challenges of this kind are posed by the tendency that is called 'kids are getting older younger' (KGOY), which means that kids nowadays have grown out of traditional toys already at the age of 10, further narrowing down the window of opportunity of toy companies (Garner, 1996). These and other factors cause many new toys to fail on the market, making innovation highly important within the industry (Wong *et al.*, 2005). The importance of innovation has also brought a high importance of licensing into the toy industry, for intellectual property owners to ensure profitability (Europe Economics, 2007, p. 68).

The composition of companies within the sector could be divided into original equipment manufacturers (OEMs), retailers and traders, all of which have different insights into their supply chains (Ad hoc expert group, 2008). OEMs are described as companies who design their products themselves, retailers are described as companies who buy ready-made toys and sell them to consumers, while traders are described as companies who buy ready-made toys, import them to Europe and sell them to other companies. As in many other sectors, there is a minority of actors owning the majority of the market, with five large players holding more than 75% of the market (Europe Economics, 2007, p. 74). In spite of this, 85% of the companies are reported to be small and medium enterprises (SMEs), although many SMEs cooperate with the larger companies in different ways instead of competing with them (Europe Economics, 2007, p 68 & 74). What is different about SMEs in the toy sector is that they are reported to be generally more involved into the global market compared to other industry sectors.

The change of the composition of company interactions consists of a tendency among toy retail companies in the EU and the US (large corporations and SMEs alike) to begin to design their own products and outsource the manufacturing to third countries, thereby competing with the same companies that have previously been their suppliers (Wong *et al.*, 2005). This outsourcing of manufacturing has primarily gone to South-east Asia, and specifically to China

that for a long time has been the main supplier of toys. It is estimated that China holds about 85% of the manufacturing for toys intended for the European market (Ad hoc expert group, 2008).

The general division of toy companies into OEMs, retailers and traders can be used to show up a simplified view of how much control these different actors typically have over their supply chains (Ad hoc expert group, 2008). This is shown in figure 3-1. Observe that many OEMs do not have their own production, but rather have the production outsourced to other companies – their control of product manufacturing are in those cases somewhat weaker, but still strong.

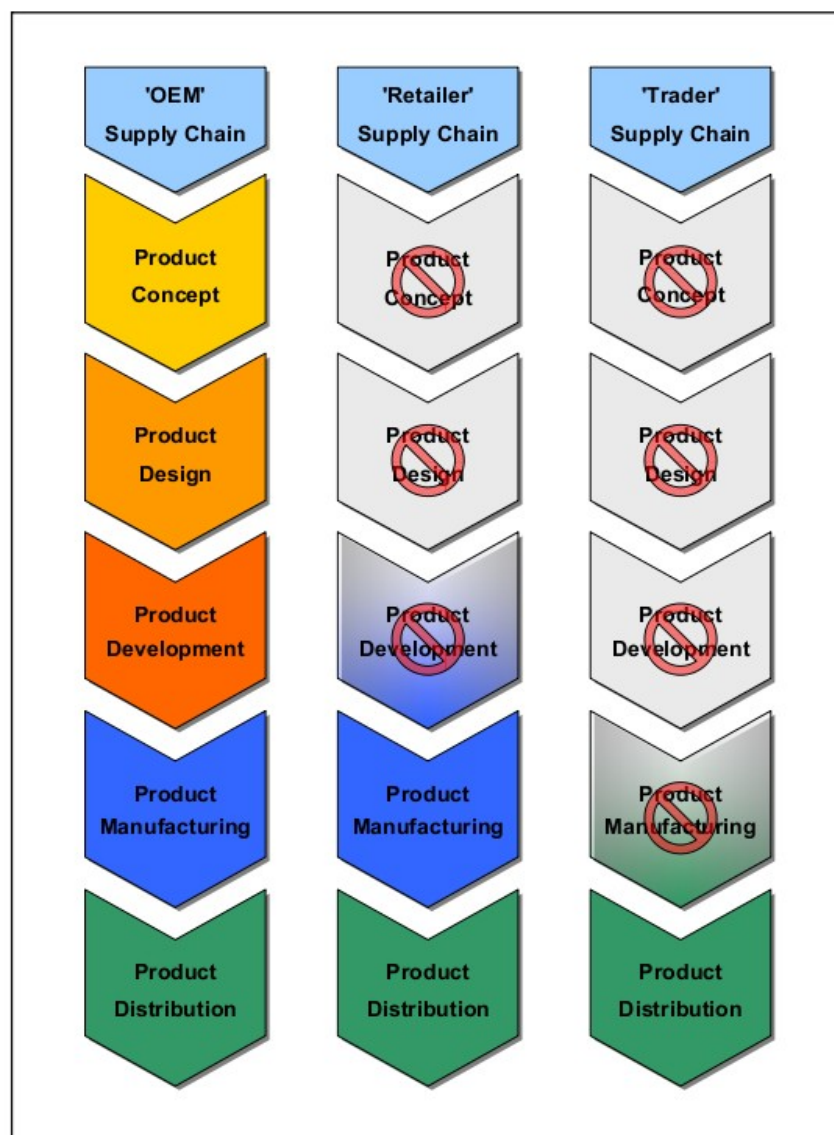


Figure 3-1; Simplified overview of the typical control that different types of companies that put toys on the European market have over their supply chains. Source: Ad hoc expert group (2008), p. 27.

While most of the toy production is localised in China, the main consumption of toys is in the EU and the US, although the Asian market has grown to become significant as well, as shown in figure 3-2 (NPD, 2007). The Asian market is dominated by Japan and followed by China (NPD, 2004).

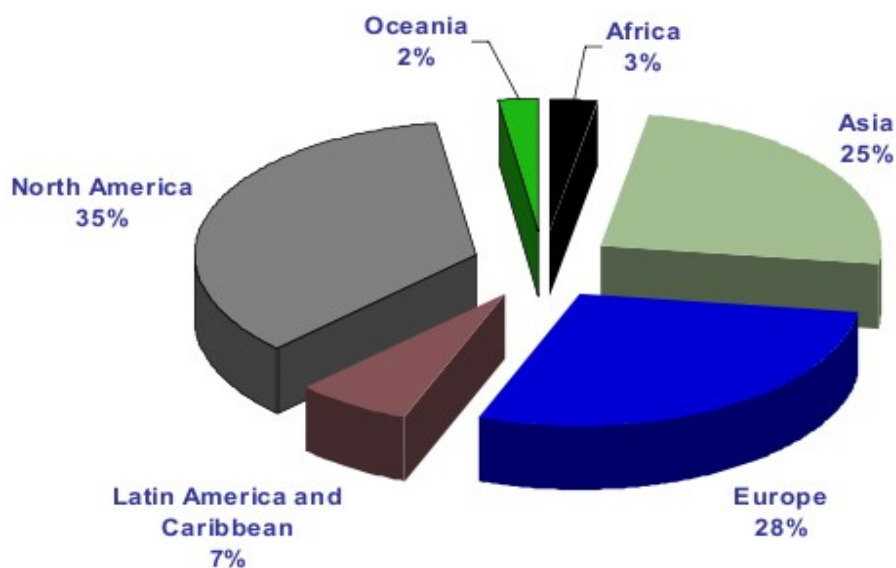


Figure 3-2; Share of toy market by key regions in 2007. Source: NPD (2007), p. 11.

3.2 Relevant legislation in the EU

3.2.1 The EU chemical legislation – REACH

'REACH' is the name for the recent European Parliament and Council Regulation, (EC) No 1907/2006, that entered into force in June 2007. The name is an abbreviation for 'Registration, Evaluation Authorisation and Restriction of Chemicals' (ECHA, 2008). In some certain provisions, REACH is highly different from traditional chemicals regulation. Most of all regarding a switch in the view of who bears the responsibility of proving that a certain chemical is safe. Traditionally, it has been the task of authorities to prove that certain chemicals are unsafe, while the responsibility of proving the safety of their own products is now put on the manufacturers and the importers. REACH also requires manufacturers to have safety information about the chemicals available for professional users with the aid of safety data sheets, and the requirement for information about contents of chemical products is therefore thoroughly increased along with this Regulation, also throughout the supply chain since manufacturers are required to provide downstream users with the relevant risk information.

REACH does however primarily cover chemical products, and the coverage for chemicals in articles that are not chemical products is limited (Falk, interview 11 June 2008). The relevant provisions are essentially found in Article 7. This matters less for articles produced within the EU, since REACH still covers the manufacturing process in these cases. When it comes to the chemical content of articles imported to the EU from abroad however, REACH requires a registration if substances are intended to be released during normal use and foreseeable conditions, e.g. fragrances, and the substance is present in amounts exceeding 1 tonne per year per importer (Regulation (EC) No 1907/2006, Article 7). There are also additional provisions for the so called 'substances of very high concern' (SVHC), substances that are carcinogenic,

mutagenic or toxic to reproduction (CMR), persistent, bioaccumulative and toxic (PBT) and substances that are very persistent and very bioaccumulative (vPvB) (ECHA, 2008). If SVHCs are present in an article at concentrations above 0.1% (by weight) and exceed 1 tonne per year and importer, the European Chemicals Agency (ECHA) has to be notified (which means less than a registration does), even though the substance is not intended to be released (Regulation (EC) No 1907/2006, Article 7). This provision is not valid if the substances could not be foreseen to become exposed to humans or environment during the life cycle of the product, assuming normal usage. If the ECHA finds it necessary, it may require registration of a substance after such a notification and the substance may eventually be the target for a requirement of authorisation (ECHA, 2008). If this would be the case, the supplier has to provide sufficient information to downstream users.

Finally, there is also a requirement for information transfer in the supply chain about chemicals in articles, for the same kind of substances and at the same concentrations as in Article 7 (Regulation (EC) No 1907/2006, Article 33). Article 33 requires any supplier of articles with a higher concentration of SVHCs than 0.1% by weight to communicate sufficient information for safe use of the article, with the name of the substance as a minimum. This has to be given to all professional users downstream the supply chain, but the same article also states that consumers have the right to get equivalent information on request.

3.2.2 The EU Toy Safety Directive

The Toy Safety Directive (TSD) was put into force 1988, and the background for putting up this Directive was twofold (Council Directive 88/378/EEC). One part was that the toy safety regulations in the different member states differed from each other so as to limit trade between the countries. The second part was that the different ways to deal with the safety issues did not always offer proper safety protection. Therefore, it was decided to put up an EU-wide Directive to deal with these issues. These two major intentions of the TSD are set out strongly by primarily basing the Directive on Article 100A in the Treaty establishing the European Economic Community. Article 100A states that *“The Council shall [...] adopt the measures [...] which have as their object the establishment and functioning of the internal market”* and *“The Commission, in its proposals envisaged in paragraph 1 concerning health, safety, environmental protection and consumer protection, will take as a base a high level of protection”* (quotes from EEC Treaty, 1987). The TSD also states that even though the safety requirements of toys should be based on the intended use of the toy, they also have to take into account foreseeable use that may occur, considering children's sometimes less careful behaviour (Council Directive 88/378/EEC).

Further on, the TSD is a so-called 'New Approach Directive', which means that only the most essential requirements are set out in the Directive itself, while the more detailed requirements are set in harmonised standards (Commission Proposal SEC(2008) 39). These standards are EU-wide and have to be the same throughout the different member states (Europe Economics, 2007, p 87). CEN and CENELEC are the European Committee for Standardisation and the European Committee for Electrotechnical Standardisation, respectively, and they are the organisations responsible for preparing the harmonised standards. The standard that applies to toys is named EN 71, 'Safety of toys', with the following sub standards (CEN, 2008):

- EN 71-1 – Mechanical and physical properties

- EN 71-2 – Flammability
- EN 71-3 – Migration of certain elements
- EN 71-4 – Experimental sets for chemistry and related activities
- EN 71-5 – Chemical toys (sets) other than experimental sets
- EN 71-6 – Graphical symbol for age warning labelling
- EN 71-7 – Finger paints – Requirements and test methods
- EN 71-8 – Swings, slides and similar activity toys for indoor and outdoor family domestic use
- EN 71-9 – Organic chemical compounds – Requirements
- EN 71-10 – Organic chemical compounds – Sample preparation and extraction
- EN 71-11 – Organic chemical compounds – Methods of analysis

Within the scope of this thesis, only part 3 and part 9 are relevant, since these are the only ones that cover requirements for chemicals in products that are not also chemical products. The EN 71-3 contains requirements and test methods for the migration of various heavy metals from different toy materials, as well as analysis procedures for the different materials (Konsumentverket, 2006). EN 71-9 contains requirements on chemicals in the groups of solvents, preservatives, plasticisers, flame retardants, monomers, biocides (wood preservatives), processing aids and colourants, when it comes to migration via ingestion and contact with mouth, skin or eyes. Especially accessible liquids in toys are restricted through the standard. The organisations that developed EN 71 consider this particular standard to be “a Standards success story” that succeeded well in acquiring the goal that was set out for it (CEN, 2007). However, Chinese manufacturers have expressed difficulties in understanding how it is that complying with this standard does not guarantee compliance with all applicable legislation in the EU (Ad hoc expert group, 2008).

The TSD has been amended once, which was when the CE Marking Directive 93/68/EEC came in 1993 (Commission Proposal SEC(2008) 39). Since that Directive entered into force, the CE marking is mandatory on some specific product groups, among others toys (Council Directive 93/68/EEC). The CE marking is a self-certification, where the manufacturer guarantees that the article fulfils all essential health, safety and environmental requirements set out in the relevant European Product Directives (CE-marking.com, 2008).

The definition of a 'toys' is in the TSD set out to be products or materials that are intended for children's play, with 'children' being of lesser age than 14 years (Council Directive 88/378/EEC). There is also in the TSD an appendix listing some articles that might fall under this definition, but that are not to be regarded as toys, such as fashion jewellery for children, toy steam engines, video equipment operated at more than 24 V or playing equipment for common playgrounds, among others.

One part of the TSD that is important to note regarding information about chemicals is the requirements set out in Article 8, which is about what information any manufacturer or authorized representative should have prepared in case of inspection (Council Directive 88/378/EEC). This article begins by requiring the CE marking to be put on all toys before they are put on the market, but more interestingly for this matter, it requires manufacturers to have some kind of description of how compliance with the harmonised standard is ensured, for example test results or a technical file, and it should include a so called EC type-certificate (see below) for the product along with its relevant documents. However, it is noted in the literature that the industry often finds it difficult to provide complete technical files (Ad hoc expert group, 2008). Further on, contact information such as addresses to places of manufacture and storage is also mandatory to provide, as well as “*detailed information concerning the design and manufacture*” (quote from Council Directive 88/378/EEC, Article 8). It also lays out that if the manufacturer is not established within the EU, whoever puts the toy in question on the market is responsible for keeping this information available, although importers are not specifically mentioned until Article 11, where there is a requirement for contact information to the manufacturer, the manufacturer's authorized representative or the importer to go along with the CE marking.

The EC-type certificate is described further in Article 10 of the TSD, where it is stated that organisations set out to be approved bodies for this purpose may on request from manufacturers/importers perform EC-type examinations in order to provide the company with an EC-type certificate (Council Directive 88/378/EEC). Any application for acquiring such a certificate must contain the following:

- “*a description of the toy,*
- *the name and address of the manufacturer or of his authorized representative or representatives, and the place of manufacture of the toy,*
- *comprehensive manufacturing and design data; and shall be accompanied by a model of the toy to be manufactured.*” (quote from Council Directive 88/378/EEC, Article 8).

More detailed provisions of what “comprehensive manufacturing and design data” means are not given. The approved body shall from this information examine whether the essential requirements of the TSD are followed, and they should preferably use the harmonised standard EN 71 (Council Directive 88/378/EEC).

3.2.3 Revision of the EU Toy Safety Directive

The aim of revising the TSD is to increase health benefits for children both in the short and in the long term, while at the same time ensuring the internal European market to have a free movement of toys, essentially the same aim as the original TSD (Commission Staff Working Document SEC(2008) 39). It is recognized in this working document that the present TSD has been functioning well when it comes to keeping toys safe and to eliminate trade barriers, and the revision is therefore primarily supposed to enhance and update the Directive. The new TSD is also the same type of Directive, i.e. the essential requirements are set out in the Directive itself while the detailed requirements will be available in harmonised standards (Commission Proposal COM(2008) 9 final).

One of the most important elements in the revision is that there are more stringent requirements for chemical substances in toys, mostly regarding CMRs (Commission Proposal COM(2008) 9 final). The new provisions ban CMRs of higher concentrations than 0.1% from being present in toys and in distinguishable micro-structures of toys, although with exceptions for CMRs if they could be proven to be safe for the usage, or if they are present only in non-accessible parts.

The revision also introduces more requirements on what technical information that has to be provided by manufacturers of toys, and provides Member States with more possibilities as well as obligations to enforce the Directive (Commission Proposal COM(2008) 9 final). There is also more provision on market surveillance, including requirements of more cooperation between the Member States, since it has been observed that enforcement and market surveillance have not been sufficient under the present TSD.

One provision in the revision that is important for this study is a requirement to also have information about what chemicals that should be included in the technical documentation that has to accompany the toy at the entrance on the European market (Commission Proposal COM(2008) 9 final). Along with the technical documentation, there also has to be a safety assessment that analyses what hazards the toy could present. There are further provisions on the obligations of manufacturers or their authorized representative to provide such technical documentation as well as ensuring legal compliance. There are also more clear provisions on what obligations importers and distributors have to ensure that the products they bring in to the EU conform with legislation, which includes verifying that the manufacturer has performed proper conformity assessment procedures.

Finally, regarding conformity costs for the industry. The Commission concludes that the costs for the industry are less than the benefits for society, and estimates the toy industry to be competitive enough to be able to pass the extra costs on to customers (Commission Staff Working Document SEC(2008) 39). The costs that do emerge for the industry are due to safety improvements, and are therefore deemed as reasonable.

3.2.4 Other relevant EU legislation

The EU has a Directive where the marketing and use of some substances are restricted, and this Directive also contains some restrictions for substances used in toys (Council Directive 76/769/EEC). With amendments during recent years, this Directive restricts for example the level of benzene, substances for treatment of wood, azo-colourants, and phthalates in toys. Worth noting is that the threshold values set out in these restrictions are valid also for parts of toys.

3.3 Toy recalls

Recently, there has been a rise in the amount of recalled toys in the EU and the US, and 2007 has been called "*the year of the recall*" regarding toys (European Commission, 2008a & U.S. PIRG 2007, quote from U.S. PIRG 2007). This rise in the amount of recalls has also reduced consumer's confidence in the toy industry, since there has been a high political and media attention around it (Ad hoc expert group, 2008). In the US, the Consumer Product Safety Commission (CPCS) is the authority responsible for protecting consumers from dangerous products, and they are therefore announcing recalls on their web page for public access (US CPCS, 2008). In the EU, this is managed by authorities on the member state level, but these

authorities report recall cases to RAPEX, thereby keeping EU-wide recall statistics available for public access (European Commission, 2008b). More recently, a cooperation has also begun to emerge between safety authorities in the EU and in China, to form a system for rapid information transfer called RAPEX-CHINA. This cooperation is related to the fact that a high amount of the recalled toys have been manufactured in China (Ad hoc expert group, 2008). It has also been reported that Chinese toy manufacturers have found it to be difficult to understand that conformity with the harmonised standard not necessarily means that the toys are in compliance with all related legislation.

During 2007, the total amount of recall notifications qualified as a serious risk in the EU was 1 355, compared to 924 during 2006 (European Commission, 2008a). Of these notifications, 31% were toys, compared to 24% during 2006. The recalls of toys have traditionally been mostly regarding choking or other mechanical risks, but also electrical, fire or chemical risks. During 2007, chemical risks rose to 34% of the total number of toy recalls, i.e. 142 cases out of totally 417 toy recalls (toys that are also chemical products are not included in the 34%, but they are included in the total sum) (European Commission, 2008c). Although still less than the amount of toys recalled for risk of choking, it is a sharp increase compared to the equivalent number for 2006, 11% out of the total number of 201 toy recalls. This could also be compared to the amount of chemical recalls amongst all product groups, 13% during 2007 (European Commission, 2008a). Further on, of those toys that were recalled due to chemical content during 2007, 21% contained lead or other heavy metals, while 82% contained organic substances (European Commission, 2008c). A few cases contained both metals and organic substances, which is why the total exceeds 100%. Of the toys containing organic substances, 84% contained phthalates, 4% azo-colourants and the rest (11%) were due to various other organic compounds. These numbers are summarised in figure 3-3, although expressed as percentages of the total amount of toys recalled due to chemical non-compliance (not counting toys that are also chemical products).

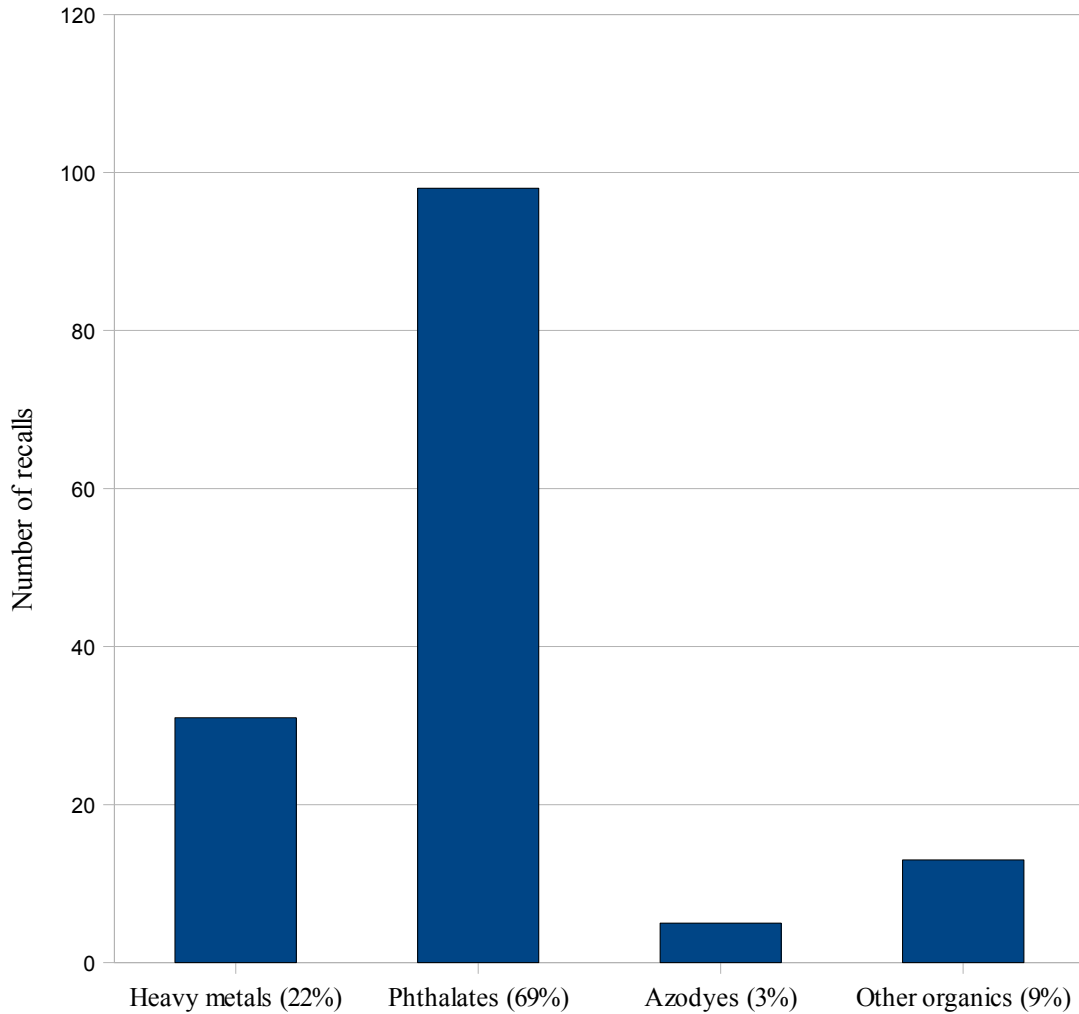


Figure 3-3; Chart of the different kinds of chemicals causing recalls of toys in the EU during 2007, expressed as percentages of the total amount of toys recalled due to chemical non-compliance (not counting toys that are also chemical products). Observe that a few cases of toys were recalled due to several chemical hazards, and the total is therefore more than 100%. Source of raw data: European Commission (2008c) complemented by European Commission (2008b).

When it comes to the recalls caused by the content of heavy metals, it is mostly the paint that has too high levels of metal content (European Commission, 2008c). Such paints are used on many different kinds of toys, and on many different types of toy materials. Most common in these recalls are paints containing lead, but also chromium is common. In a few cases, other metals such as barium are involved. A few cases based on the content of heavy metals were due to the content of lead in metal parts or in plastic material. Recalls due to high levels of phthalates are in plastic toys or in plastic parts of toys, while azo-colourants are found in textiles, for example in dolls' clothings. Other organics are mainly found in plastic toys or in plastic parts of toys, but could also be found in for example wooden toys. Further on, the ratio between voluntary measures and compulsory measures laid upon companies by authorities is

approximately 50/50, although the statistics do not tell whether the non-compliance originally was found by companies themselves or by any other means.

Worth noting is that among the phthalates referred to in the recalls, some are classified as CMRs (substances that are carcinogenic, mutagenic or toxic to reproduction) and some are classified as to be posing a risk, even though there is a lack of scientific information for them to be classified as CMRs (KemI, 2007).

4 Results from interviews

This chapter contains the findings from the qualitative interviews that were performed within this study. The results are summarised within the key questions of the study, as described in Chapter 2. Results that were sprung from the discussions around the topic but that do not fit within any of those questions are put together afterwards, as general viewpoints of the different groups of actors.

Q1: Where are toys produced and what is the reason to have the production there?

All companies buy most of their toys from China, and to some extent also from other South-east Asian countries, except for one company that buys all of its toys from Thailand and one company that has most of its production in Europe (own production). Industry associations conclude that approximately 80% of the world's toy production is in China.

Most companies refer to the fact that this is where toys are traditionally produced, and mention the competitive price levels as one reason for this. Industry associations develop this by meaning that toy companies from Japan and Korea migrated to China around 30 years ago, due to favourable labour rates and better quality management. On the contrary, one company moved their outsourced production from China to Thailand about 15 years ago, due to quality reasons. They did however not try out any other Chinese manufacturers before moving to Thailand.

Q2: What SCM practices are there within the toy industry?

The level of SCM varies a lot within the industry, depending on what kind of business strategy the company has. Companies with own production seem to have a high amount of SCM, but also companies that design their product and outsource the production claim to have a rather high amount of insight into the supply chain, also when it comes to sub-suppliers. Summarised, it could be said that OEMs overall have a lot of control over their supply chain, regardless of whether they have own production or not. Companies that buy toys without being involved in the manufacturing process had less insight in the supply chain, and even more so if there are any extra actors between the importing company and the manufacturer. These notions on SCM practices was found to be more or less regardless of company size amongst the respondents.

Q3: What is the format of information transfer regarding chemicals in toys?

The format of information about chemicals simply depends on what the importer requests – some companies require complete information about what is included in the article, while others require material safety data sheets (MSDS) for substances and chemical preparations⁴. In general, companies require legal compliance and sometimes they have more requirements based on their own risk assessments. Showing compliance with such requirements could be MSDS, test certificates or self-declarations. According to the Swedish Chemicals Agency, the most common way of showing compliance in Sweden is to show test certificates from third

⁴ The word 'preparation' is in REACH defined as the following: "Preparation: means a mixture or solution composed of two or more substances" (Quote from Regulation (EC) No 1907/2006 of the European Parliament and of the Council, Article 3).

party, verifying that the product does not contain certain substances that are regulated, thereby showing compliance with the harmonised standard, but also other means occur. A manufacturing company (with manufacturing mostly in Europe) points out that at present (since the raise in number of toy recalls during 2007), companies in the US always require test results, while companies in the EU do not require them to the same extent. The American Toy Industry Association (TIA) states that they are fighting for legal requirements of verifications from third party, since they believe that pre-market certification is better than post-market surveillance.

Q4: Is relevant information lost somewhere throughout the life cycle, and if so, where is it lost and why?

Consumer organisations and authorities with surveillance functions are of the opinion that information is lost, and they mean that this information is lost to some extent in the import phase, but mostly higher up in the supply chain. Along with this, it is pointed out that the original source flows of information may be very small, and where the knowledge about effects of chemicals may be lesser - the information is therefore not considered important, and is lost due to this. Some within the industry is of the opinion that more information is always better, while most companies rather believes that the relevant information is already there, and will definitely be so after the present revisions with REACH and the new TSD. Most companies also refer to the fact that they do get the information they require from their suppliers, which usually is equal to what the legislation requires. They consider this to be the relevant information. One company representative expresses that they hope it will be easier to request information about chemicals in the future, as it is quite difficult at present.

The industry associations raised two issues, relating to the two different ways that importers bring toys to EU: companies that design their own toys but outsource the production to companies in other countries and purchase them from there, and companies that buy ready-made toys at for example toy fairs, i.e. where many manufacturers demonstrate their products but where less information about the contents are available and seldom asked for. In the former case, the problem is not about loss of information, but rather about incorrect information, that suppliers do not comply with the information that is given. In the latter case, it is recognized that there could be an actual loss of information that could be relevant, but that the legally required information usually is available. Further on, some companies pointed out that they do get the information they require - if information is not there, it is because it was never requested. In opposition to this, it is also pointed out by other companies that information about individual substances indeed could be stopped high up in the supply chain, i.e. at the chemicals supplier. Such information is hard to get since it is often an issue about patents and company secrets.

One viewpoint that most of the industry is united on is that toys are not dangerous in the first place, and that there is not actually any relevant information that could be lost, having the present legislation as a baseline for what information that is reasonable to require.

Q5: Would it be relevant for downstream actors (after the point of selling to consumers, i.e. consumers and waste managers) to get more information?

The common opinion amongst all interviewees was that consumers do not need more information. The exception was the consumer organisation, that was of the opposite opinion.

The smaller companies believe that it might be useful for the waste managers to get more information than they get, while larger companies recognize the difficulties of this, in terms of toys often being composed of several inseparable materials. It was also pointed out that if separate disposal is required on a certain product, then this product is marked according to this. The industry as a whole does not consider this to be any primary focus at the moment. The authorities responsible for waste management in Sweden concluded that it is not actually relevant for waste managers to get more information, since there is no separate collection of toys anyway. They further mean that chemicals in toys are not any proven significant environmental problem, and it is therefore not relevant to have any such system for toys. Consumer organisations on the other hand, believe that the disposal of toys could be done in a better way, perhaps by introducing extended producer responsibility (EPR) systems, or at least inform consumers on how to dispose of toys in a proper way. The expert on environmental information systems recognizes the problem of toys ending up in the household waste, often even electronic toys that may or may not go under the provisions of the WEEE Directive⁵, and discusses that this along with the high amount of plastics in the household waste that comes from toys could mean that some kind of EPR system might be reasonable.

Q6: Would it be possible and/or suitable to have a list of content to show what substances have been put into the toys?

The industry generally believes that this is unnecessary for toys that are not chemical products, since toys are not dangerous products in their point of view. There were some exceptions though; two companies with outsourced production claim to already have more or less such information available about their products, but they normally do not pass it along to the toy stores unless it is requested - which it usually is not. Consumer organisations and authorities were of the opinion that it would be good if the information was available, at least for the companies themselves and for inspections. However, authorities pointed out that it would most likely not be politically possible within the EU yet. All actors, authorities as well as consumer organisations and the industry, seem to be of the opinion that consumers most likely do not have use of such extensive information, apart from a few extremely interested individuals. It was also recognized by industry associations as well as companies that a requirement of complete information could be seen as a threat to companies' production secrets. It was pointed out that even though it may be difficult and irrelevant to get such information for individual substances and amounts, information about what chemical preparations that the chemicals' provider have used to produce the toy material are relevant to get.

General viewpoints of industry associations

Industry associations are of the general opinion that toys are safe products already, which is what should matter for consumers. It is according to them not necessary to analyse everything on everything, as long as the toy can be guaranteed to be safe. Product safety could instead be

⁵ Directive 2002/96/EC on waste electrical and electronic equipment (WEEE)

ensured by doing risk assessments, and then analyse what needs to be analysed based on this assessment. It is also pointed out that when it comes to metals, there is no zero - trace amounts will always be found, and putting up a complete ban is therefore not relevant. Further on, an important issue for the American Toy Industry Association is that a ban of diisononyl phthalate (DINP) is not relevant according to them, since there is no scientific proof that this phthalate has any adverse effects. They point out that this is also supported by the US Consumer Product Safety Commission as well as an independent laboratory. Finally, the industry associations also pointed out that most of the recalled toys have been the result of non-compliance from Chinese manufacturers, meaning that the US/EU-based companies importing toys from China have been putting up requirements in line with the legislation, but that have simply not been fulfilled.

General viewpoints of companies

As well as the industry associations, the companies are of the general opinion that toys are safe products. It is recognized by the companies that the current revisions are highly ambitious, but also that it is a big system for a small problem, where compliance with the new legislation is going to be about satisfying the legislators rather than avoiding actual risks. One company concludes that it is too ambitious, meaning that there would be no toys left if all restriction suggestions would be passed. This company is of the opinion that the threshold values are politically set rather than based on science. Further on, it is pointed out that better control via inspections would be far more relevant than stricter legislations, and that an increased cooperation between inspection agencies of the different EU Member States would be good. The importance of good contact with the manufacturers as well as on site flying inspections is also raised, and having offices overseas is mentioned as a good way of dealing with this. Another company pointed out that one of the most important steps for safety of toys is in the product development phase, which is the reason for this particular company to do this on their own.

Further on, the lack of globally harmonised standards for toys is mentioned to be a large problem, since differences in test methods and threshold values etc. make it difficult to comply with the global market. One company mentioned that the Scandinavian market is a small market, but that it is the most demanding market in the world. Another company proposes that if the ingoing materials are tested and it is made sure that no illegal substances are included there, the final product would not need testing, implying that the analysis may be easier this way.

General viewpoints of authorities, NGOs / consumer organisations and others

The Swedish Chemicals Agency believes that stricter legislation in terms of banning hazardous substances such as CMRs and other SVHCs is the right way to go, with fewer exceptions. The Agency is confident that it should be possible to produce materials for toys without using these kinds of substances. Regarding inspections, testing of toys by authorities is to a high extent done in response to some kind of suspicion and not until then (although random samples are also taken, to some extent), which means that there has to be a trust for the companies to take their responsibility of complying, a notion that also the Swedish Consumer Agency agrees with. It is also pointed out that non-compliance is actually rather uncommon, and that companies themselves often discover non-compliance on their own. It is further noted that the

size of companies seems to be irrelevant for non-compliance, as well as the cost of products. Expensive toys as well as cheap toys have been found to be non-compliant.

NGOs are of the opinion that also very small amounts of certain compounds may be hazardous for the human health and for the environment. Threshold values are politically set from the viewpoint of what would be negotiable, rather than based on a scientific background, and they are therefore not really strict enough.

The expert on environmental information systems pointed out that those product groups that already have extensive environmental information systems got this due to business need. There were some significant environmental problems around those, and if there is no such problem, then it might not be reason enough for having such a system. Another prerequisite was the lack of globally harmonised standards, as well as the argument "you don't know what is going to be hazardous in the future".

The accredited laboratory notes that very few clients ask for analysis on any other organic compounds than phthalates. In general, only phthalates and heavy metals are what is analysed in toys, and it is all determined from experience of what is likely to be found in certain materials. The reason to why so few clients wants analyses according to the complete EN 71-9 is not known, but it could be a cost issue since a complete analysis would cost approximately 2 000 – 3 000 EUR, depending on materials and other factors. It was however also recognized that it could be that clients hire other accredited laboratories for those analyses.

General viewpoints common for all interviewees

Several actors, both from industry and others, refers to REACH when information about chemicals is discussed, and are of the opinion that REACH will require more information about the chemicals in toys, and make toys safer.

5 Discussion

In this chapter, the acquired data from the literature review and the interviews is discussed. The first part of the discussion is concentrated around understanding the industry, i.e. essentially discussions around the answers to the first three core questions. After that comes the more important part, which is the discussion around how the information flow could be enhanced to benefit all actors in the supply chain, partly based on the rest of the core questions but also on other results and other ideas. Along with discussions around the answers from the interviews, there are also angles and viewpoints found in the literature. Important to mention is that all interviewees had relevant knowledge of some part of the issue. The representatives of various organisations largely confirmed the views expressed by their organisations in other contexts and it seems fair to assume that their answers during interviews expressed not only their personal views, but the common view of their organisations. Those viewpoints also seem to be representative of those types of organisations in general.

The companies that have been interviewed confirm the norm that was identified from the literature, i.e. that most toys are produced in China. Most companies do not seem to take any further steps to consider why they are buying from China, but are rather accepting the fact that this is where toys are produced, most likely because of good price competitiveness and a high experience of toy manufacturing from Chinese manufacturers. One of the interviewed companies is a noteworthy exception, since it has had production in China but moved it to Thailand due to quality issues. On the other hand, this happened about 15 years ago and the company did not try any other Chinese manufacturers before turning to Thailand, which means that their experience of low quality from China does not necessarily have to be representative of Chinese toy manufacturers today.

When it comes to supply chain management (SCM) practices, the companies interviewed in this study fit rather well into the diagram developed by Ad hoc expert group (2008), judging from the level of SCM practices they claim to have. The exception is that there was not really any representative of the 'trader' group. The results of this study also support the notion about dividing the identified group of 'original equipment manufacturers' (OEMs) into two groups – the ones that have their own production and the ones that outsource production but still design and develop the toys themselves. They have total control over most steps in the supply chain, except the manufacturing – where they still have a very high degree of control, just not as much as companies with in-house production.

SCM practices were also found to be regardless of company size. This finding may be affected by the small amount of companies interviewed. Literature suggests that larger companies usually have a higher degree of control over their supply chains, which is likely to be true since there are few large traders within the industry. Large companies are rather either OEMs (with or without own production) or at least retailers. Still, the literature also suggests that small companies within the toy industry are more involved in the global market than small companies in other sectors, which in the best cases could mean that they could have better control over their supply chains.

When it comes to the present legislation changes in the EU, it was noted that many interviewees had a high faith in REACH. People seem to expect that REACH is extensive

enough to be sufficient. Whether that is true or not is out of the scope of this study when it comes to chemical products, which is what REACH is mostly about. An important notion here is that most provisions in REACH do not cover finished articles that are imported to the EU – such as for example toys manufactured in South-east Asia. This means that these beliefs are to some extent faulty. The only real provision regarding imported articles that are set out in REACH is about the notification to the ECHA if there is an amount of substances of very high concern (SVHCs) that exceed 0.1% by weight and exceed 1 tonne per year. From a perspective of environmental and health protection, this is a weak point of REACH regarding imported articles. From a trade perspective however, it could be seen as a competitive advantage for non-European manufacturers on the European market.

This provision in REACH is also limited by other factors as mentioned in Section 3.2.1, but a significant problem with this 0.1%-limit is that it does not distinguish between whole articles and micro-structural parts. If interpreted to be 0.1% of the whole article, a certain micro-structural part of an article could contain high levels of these substances without exceeding the limit for the whole article. In the ongoing revision of the Toy Safety Directive (TSD) this issue is tackled by clearly addressing micro-structures for the levels of substances that are carcinogenic, mutagenic or toxic to reproduction (CMRs). The same kind of distinction is also made in Council Directive 76/769/EEC, where the use of benzene, wood preservatives, azo-colourants and phthalates is restricted in toys. This means that the new TSD along with the Directive on restriction of certain substances provide the European consumers with toys that are safer than average articles, which seems reasonable considering the sensitivity of children and their tendency to put objects in the mouth. Still, when it comes to other SVHCs that are not covered by the restrictions in the TSD or the Directive on restriction of certain substances, toys are – as well as other articles – only covered by the provisions in REACH. REACH is however still a large step forwards, also when it comes to chemicals in imported articles, but perhaps not as strong as many tend to believe and others would like it to be.

One company suggested that better control is far more important than more restrictions on what substances that are allowed in toys. Since the EU already has concluded that the lack of proper enforcement and surveillance of the present TSD has been one of the reasons for amendment, this notion is likely to be true. The EU apparently also found it relevant to strengthen the restrictions of various substances. The new TSD is intended to bring with it better and more coordinated surveillance from Member States, which means that the wishes of this company will be fulfilled, at least regarding better control. On the other hand, the new TSD is also intended to increase the companies' self control of their own products, which is shown by clearer provisions on what responsibilities different actors have, making it obvious that it is their responsibility to show that they are complying with the laws. This all goes back to the notion from authorities in the interviews, that there are responsibilities laid on the companies that they will have to take and that authorities have to trust them to take. These responsibilities will now to some degree be sorted out to avoid misunderstandings. It is however also important to remember that companies indeed do perform self-control, which is proven by what was mentioned in the interviews about companies often discovering non-compliance on their own. In the end, the present TSD has already been deemed to be a success according to the Commission, and the revision will strengthen it further. Still, there are some provisions in the revision that may need further strengthening, such as the exceptions regarding CMRs. Some Member States are apparently of the opinion that these kinds of substances simply should not be present in toys. Considering the effects that CMRs have along with the

sensitivity of developing children when it comes to these effects, it may very well be so that it would be a mistake to allow such exceptions.

When it comes to the efficiency of toy standards, the organisation that developed them is apparently satisfied with them. According to a report written by a group of consumer organisations in the US, there has been an industry standard for chemicals in toys called ASTM F-963 available in the US for a while, although the standard is voluntary and these organisations are suggesting that it would benefit the safety of consumers if it would be mandatory (U.S. PIRG *et al.* 2008). Also the industry seems to like the idea of standards, although interviewees in this study complained over the lack of globally harmonised standards. Having standards may be a good way to provide companies with a clear provision of what they have to comply with, thereby keeping the legal compliance on a high level. Since the toy industry is reported to be a highly globally integrated industry, globally harmonised standards may very well be needed. In the end, this kind of standards will be useful for most other industries as well, and could be a suitable target for international cooperation. Such standards would however have to be accepted by the majority of the world's countries to be effective, which means that it would not be an easy process to develop. Further on, they would need to contain requirements for products to comply with all legislation, as the European standards have been criticized for not ensuring legal compliance with all applicable legislation even though a product is complying with the standard.

The format of information transfer is obviously different from company to company, although test certificates from third party seem to be the most common, at least in the US and in Sweden. It is difficult to say anything about Europe in general from the selection of companies interviewed, although the notion from the manufacturing company suggests that test certificates are more common in the US. It might also be so that European companies are not requesting test certificates from this manufacturer to the same extent as they do from other manufacturers, since the production is in Europe and European retailers may have more trust in a large European manufacturer. This is also a valid point when looking into the future, since all provisions of REACH are applicable to the production of this company, but not when the production is outside Europe.

No matter whether it is more common with test certificates in the US than in the EU, it is still not surprising that test certificates are common, since the legal requirements state threshold values of some substances that are restricted or banned. It is convenient for companies to prove that they are complying with this requirement by showing a third party verified certificate telling that certain substances are not included or not above certain levels, or simply stating that certain standards are fulfilled. As long as the legislation is built this way, it seems reasonable to provide the information in this way, since it all comes to proving that the requirements in the legislation are fulfilled. A derivative could be a test report rather than a test certificate, stating the exact levels of all analysed substances. A drawback with this would be that the information would be less easily accessible, since it would be far more advanced. On the other hand, it is also a lot more comprehensive since it would tell inspection agencies exactly what substances have been assessed. A skilled inspector with knowledge on what kind of substances are likely to occur may thereby immediately see not only the levels of restricted chemicals, but also whether the relevant substances have been assessed or not. This is a benefit related to the notion from the accredited laboratory that there is usually no screening for any other organic substances than phthalates, due to the high cost of these tests. In spite of this,

there has been recalls due to other organic substances, as shown in the recalls statistics in 3.3 'Toy recalls'. The few recalls that were due to other organics often emerged after children had already been harmed (for example recall No. 1171/07 in European Commission, 2008b), which raises the question about what other organics that may never be found since they are never tested for and do not have any acute toxicity. After all, the toxicity of many organic chemicals is not acute but rather a chronic effect of long-time exposure, especially if the levels are low. This is for example the case with most CMRs, which some authorities want to ban.

When it came to the issue of whether information was lost, the answers from interviewees were largely divided between the corporate world and the other stakeholders. NGOs and authorities were of the opinion that information is indeed lost while most companies believed that the relevant information is acquired. This also means that most companies acknowledged that some information is lost, but they were of the opinion that this information is not relevant. However, considering what was mentioned by the expert on environmental information systems, the issue of not knowing today what the future research is going to find out about substances turns the word 'relevant' into a dangerous word when used to exclude certain information from further transfer. History has proven several times that substances that have been considered harmless turned out to be hazardous, and it is also a fact that we still today lack proper toxicological and ecotoxicological information on most chemical substances. Still, it might not be reasonable to require complete information due to various reasons as further discussed later in this chapter, and the word 'relevant' is therefore still necessary, even though it is a difficult word, as pointed out already in Chapter 1. It was never the purpose of this assessment to define the word 'relevant' in this context, neither is it possible to do so from the results of the interviews – the opinions about what level of information that should be seen as relevant vary too much between different actors, as foreseen. However, defining what level of information that is to be seen as relevant would indeed be beneficial for all actors within the sector. The main issue is who should define this, since the definition will depend on this. It could be argued that authorities acting in the interest of their citizens' health and safety should be the ones to state the definition, and the legislation could therefore be used as a guideline – this is what the industry is currently using as a guideline. A definition of this level would have to take costs for companies and authorities in account, balancing those costs towards health benefits for humans and for the environment, and legislators usually attempt to take economic interests in account as well as health and environmental interests. On the other hand, several actors within the field – both among companies and among NGOs and authorities – were of the opinion that the legislation was not enough, perhaps not even with the ongoing revision. Other actors among the industry were however of the opposite opinion, which means that different companies have a very different view of this issue. Most likely, the views also differ between individuals within companies, and the same thing is likely to be prevalent among authorities, i.e. that some authorities would like to aim for a higher level of information than others. Within the following discussion, the concept 'relevant information' should be seen as a concept that in itself is relative to whose opinion that is being discussed at the moment.

The conflict about whether the legislation is a good guideline or not is displayed by the different opinions from the NGO representative and one representative from the corporate world regarding the threshold value determination. Both agreed that the threshold levels were politically set rather than based on science, but the company representative that commented on this was of the opinion that they were unnecessarily strict, while the NGO representative was of the opinion that they were too generous. Another example is about the phthalate diisononyl

phthalate (DINP), that according to the American Toy Industry Association along with other organisations is safe to use in toys, but that is already banned in the EU for use in toys at higher levels than 0.1%, along with three phthalates that are classified as CMRs and two other phthalates that together with DINP has not gotten that classification due to lack of scientific data. In this case, authorities in the EU acted with precaution in mind, to the joy of consumer organisations and NGOs – even though there are exceptions from the ban. Still, the EU apparently considered it to be relevant to put up the ban in the first place, in spite of the lack of full scientific evidence. Political pressure also played a role in this, since several Member States already had banned these substances (Rosander, supervision session 30 August 2008).

The industry associations also recognized that there may be a loss of relevant information when toys are bought off the shelves at toy fairs etc. This could on the other hand in fact rather be an issue about the purchasing company not asking for the information, or at least not being stubborn enough to really get it. If the choice is between getting a good price for toys and getting the information needed to ensure the safety of the products they sell, or for legal compliance, the choice should be easy for any company that is a serious actor. On the other hand, this is most likely a situation where the common belief that toys simply are harmless enters, and therefore the chemical information is not seen as that important.

Further on, even though authorities and NGOs were of the view that information may be lost high up in the supply chain, most companies – but not all – seemed to be of the opinion that it is possible to get information as long as it is requested, and some companies even claimed to have complete information on what substances that are included in the toys. If information is available for those who asks for it, then this implies that many companies simply do not ask for the information. On the other hand, most of the companies stated that they had good contact with their suppliers, and they often bought toys directly from factories. This means that the amounts of supply chain steps may be fewer in these cases than in the toy industry in general, especially since it has already been stated that the identified company type 'trader' is missing amongst the interviewed companies. Bearing this in mind, what authorities and NGOs were referring to may very well have been the kind of supply chain that is more common if the importing company do not buy directly from factories. Still, it could also be so that the interviewed representatives who claimed that their companies had complete information may also have been referring to another level of detail than down to substance level. It could for instance be that they referred to the level of chemical preparations rather than individual substances. A chemical preparation in this sense is a chemical product, and would go under the provisions of REACH if it was to be imported to the EU, and there would be a high level of information about the contents of the preparation. However, if a certain chemical preparation is never imported to the EU, but instead used outside the EU to produce an article that is no longer a chemical product – for example a toy – there are very few requirements on knowledge about the contents of the preparation. The exact information about the contents may even be confidential to the company producing the preparation, and it may also be protected by a brand name and patents. This issue was unfortunately not investigated further, and it is therefore impossible to tell whether these companies indeed have information on the substance level or not. This is further on related to what one company representative suggested about the relevancy and the possibility of getting information on substance level, and specifically distinguishing substances from chemical preparations. This representative was of the opinion that it would be relevant to get information about what chemical preparations that have been used when producing the products, but that information on substance level would be difficult to

get due to patents and production secrets of the chemical suppliers. The thought about information disappearing high up in the supply chain can therefore not be discarded. Still, companies will normally not request any more information than they need to show legal compliance regardless of whether it would be relevant for safety to get more information, unless they identify some kind of other benefits from having this information – which some companies in this study on the other hand obviously have. If companies would get the name of the preparations that have been used to produce the article, it may not be as good from an information point of view as knowing the exact substances, but it would certainly be a step in the same direction. Knowing the name of the preparation will still enable some knowledge about the chemical contents – even though the exact details may be confidential, it will still be possible to get some information about what substances that are put into the preparation.

Regarding the issue of non-compliance when the production is outsourced to overseas companies that were raised by industry associations, it was clear that this is not an issue of the importing companies not knowing about the rules. Still, this indicates a lack of internal monitoring from the companies' side. This is probably why the American Toy Industry Association is of the opinion that third party test certificates should be mandatory, since this means that such certificates are guaranteed to be requested, and the industry will therefore have clear provisions on what they need to do, as well as equal provisions for every importer within a country. Having test certificates would put the companies on the safe side, but it would also cost them money. If there is a legal requirement for those certificates, the cost will be equal for similar products and the competitiveness of those products will therefore not be disturbed.

Going on with the results, most interviewees were of the opinion that consumers do not actually need more information than they get today. Something that was not brought up during the interviews however, is whether other interested actors could have use of the information, for example consumer organisations and environmental NGOs. These kinds of organisations could potentially have use of more information for problem surveys etc. Since the only interviewee who clearly expressed a usefulness for consumers to get more information was the representative of a consumer organisation, it could indeed be useful for them. It is however obvious that there is no need for waste managers to get more information about what toys are composed of than they get today, looking at how the present system works. Since toys end up in the household waste, they will not be treated separately anyway. The question is therefore rather whether there is any point of separating toys from the rest of the waste stream or not. A waste fraction has to be considered a recognized environmental problem for separation to happen, which is not likely to be the case with toys, considering the common belief that toys are safe. After all, there is most likely some truth behind that belief. What could be considered a serious problem with toys is the issue raised by the expert on environmental information systems, i.e. the problem that many toys contain electronics but are discarded as “normal” toys – i.e. in the household waste, while it may be so that they should be disposed of under the provisions of the European Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). For the discussion at hand, it is irrelevant whether some toys go under the provisions of this Directive or not, since it is also a matter of whether the electric part of the toy is something that the consumer will think about when disposing the toy. If the WEEE marking is not noticed, and the electrical function of the toy is not considered to be its primary function in the eye of the consumer, this will affect how toys in practice are disposed of, no matter how they should be disposed of.

It is beyond the scope of this study to assess how large portion of electronic toys end up in the household waste, but as has been pointed out, the amount of electronic toys in the household waste might be a reason to introduce some kind of Extended Producer Responsibility (EPR) system for toys. This problem could on the other hand also be tackled by introducing something that is not quite as extensive as EPR systems tend to be, but could be in the line of providing consumers with more information on how to dispose of toys. Yet again – with the present system, plastic toys are supposed to be disposed of as household waste in most parts of Europe, and to create any kind of collection system to enable recycling of the plastics and the electronics parts of toys, funding will be needed. In the end, it would require some kind of lighter EPR system, provided that the plastics and electronics parts indeed could be considered to be a large enough problem.

Regarding the suggestion about a list of content for chemicals, all interviewed actors seems to agree on that there is no point for most consumers to get such extensive information. That does not mean that it would not be useful for the companies themselves, or for inspecting authorities. It could also be useful for other organisations such as consumer organisations and environmental NGOs, for problem surveys. Some companies apparently believe that they do get some benefit from knowing exactly what is in the products they sell, which could be simply a reservation for future legislation changes. Other possible benefits would be for example in case of a child getting allergic reactions. If the company has information about what is in there, the causing substance can be quickly identified, while it might be difficult if an overseas manufacturer has to be contacted, especially if the contact is scarce between the importing company and the manufacturer. That point is primarily beneficial for the public health and not for the company itself, although such a situation would also mean a significant threat to the company's image. Even more so if the company is not able to provide a quick answer on the contents, that could aid the physicians in their attempts to find the cause.

There are also benefits during inspection; test certificates stating exactly what levels have been identified along with what substances have been analysed were mentioned earlier in this discussion, and the same benefit is also valid for a list of content. Such a list would provide the inspector with essentially the same information as such a test certificate, but more of it. Such a system would also require more knowledge from inspectors than what the present system does, which means that costs are not only on the corporate side.

The risk of information overflow is still important to have in mind though, since it is still possible that such extensive information would in practice be unnecessary also for companies and for authorities. This leads back to the discussion about what information is actually relevant. Another issue is costs for getting and keeping information. Such costs would of course have to be balanced towards the benefits. A full cost-benefit analysis may be too costly in itself to perform, but a simplified assessment with the aim of getting an overview may still be useful, to distinguish what level of information that is necessary to have compared to what level that is simply good to have but perhaps not necessary. It may be suitable if such research would be performed by authorities or independent researchers, since the various benefits (benefits for the public health, benefits for authorities during inspection, benefits for the security of consumers, benefits for the industry in terms of increased consumer confidence etc.) needs to be judged towards costs for the industry to get the information, as well as administrative costs for the authorities and costs for the society to keep a larger pool of information.

Yet another issue that could arise is that some of this information may be seen as production secrets by some producers, as brought up by the industry associations. On the other hand, requiring companies to have this information available does not necessarily mean that the information has to be publicly available, as long as the information could be classified as confidential. If that was the case, only inspecting authorities have the right to view it, thereby avoiding this problem while still keeping parts of the benefits. The possibility for other organisations to perform problem searching is lost, but the benefits for the companies are still there. The companies will also find it easier to require such information from their suppliers if they need it to prove their legal compliance. Still, the availability of information also has to be regarded. If it is so that information on substance level is indeed impossible to get, companies could still require approximate information, i.e. the names of all the chemical preparations that have been used, as discussed above. If at least such information could be made available, and a database containing approximate information about what different preparations contains would be created, it would still be a step forwards from a health and safety perspective. This database should in that case contain the most important toxicological and ecotoxicological information about preparations worldwide, which means that it would be a large project both to create it and to keep it updated at all times, since preparations may change in their composition as well as getting their names changes. It would therefore be difficult to maintain, although not impossible. Information about SVHCs may however not be compromised in any case, but should be known to the substance level. It should also be mentioned that the issue of not making sensitive information publicly available is valid also for the transfer of information between companies, i.e. it could be a part of the contract not to let anyone but authorities get hold of the information.

Another issue about the idea of authorities requiring such extensive information, is that it is not really politically possible in the EU at the moment, as brought up during the interviews. There is already legislative revisions going on in the EU that does not include any such requirement, and it would therefore not be reasonable to assume that such a system would be feasible at the moment. Member States would probably not be allowed to put up such a requirement on their own, since it potentially could be seen as a trade barrier within the EU. Still, it may be a possibility for the future, as long as the benefits of such extensive information is worth it. Also, it should be recognised that even though it may be too much for authorities to require that companies produce a list of the substances, it might be feasible for authorities to require knowledge about the chemical preparations that have been used.

Having a complete list of contents would however make companies more aware of what kind of substances that are actually present in their products, bringing the issues of chemical substitution to the surface in the corporate mind. Avoiding certain chemicals would not only be a part of legal compliance, but also a way for manufacturers to guarantee the chemical safety of their products; what has not been put into the product to begin with cannot pose any threat. Even though the industry is confident that toys are safe products, it is clear that consumers have lost some faith in them due to the recent rise in recall statistics. Being transparent with the chemical contents of their products may be one way for the toy industry to rebuild consumers' confidence in the chemical safety of toys. This way of rebuilding consumer's confidence is primarily related to being ahead of legislation. Consumers would primarily want safe toys for their children, and strict legislation is therefore important – the revision of the TSD will help rebuilding the confidence. Still, any company that can show they are doing even better than

what the strict legislation requires, will get more confidence. Proper control and surveillance is of course still important, to avoid the risk of consumers not believing in company claims.

Further on, the American Toy Industry Association expressed that they are fighting for requirements of having pre-market control rather than post-market surveillance. This pre-market control should then be based on risk assessments, identifying what hazards that are reasonable and then analyse from there. By having a high-quality internal pre-market control, the need for post-market surveillance would indeed be reduced if not eliminated. This line of thinking is also related to what one company mentioned about testing ingoing materials to avoid the need for testing of the final article. In any way, having a requirement for post-market surveillance does not remove the need for and the benefits from having pre-market control as well. It is rather so that a good pre-market control would make the post-market surveillance easier, and it all goes well together with the idea of companies showing a list of content for their products. If they know the contents all along, the risk assessment will be easier to perform and the whole surveillance process will be smoother – the companies will have more control themselves. Of course, companies that design their own toys down to substance level already have such control, but many companies do not have such an extensive design process. If complete information would indeed be possible to get, it would also mean that the presence of chemicals that are not the most common ones will still be known which may not always be the case with the present legislation. An example is yet again the issue brought up by the accredited lab about very few of their clients ordering analyses of any other organic compounds than phthalates. Since these tests are expensive, it would most likely be easier to get this information from the source rather than testing the final product, thereby keeping a precautionary approach rather than a reactive approach.

6 Conclusions & Recommendations

6.1 Conclusions

It seems as if the question about whether relevant information about chemicals is lost throughout the product chain is somewhat wrongly posed. It is from the results of this study clear that there is indeed a loss of information, although the important question is rather whether this information is relevant or not. Even though it may be the case that toys are generally harmless, several actors are still of the opinion that a high amount of information about the chemical content is important, also among the companies.

The reason for information loss seems to be that the information is not properly requested, although it happens in different stages depending on what route the products take to get to Europe. There seems to be more information transferred if the importer has a steady contact with the manufacturer, which in itself is highly reasonable. Patents and production secrets could also be a limitation for information transfer, and such limitations are often present higher up in the supply chain, which means that the contact between importer and toy manufacturer is of less relevance for this loss of information. Still, as has been noted, the main issue with the recent recalls of toys has not been that information was not requested or given, but rather about false information. This raises the issue of control – both internal control from the companies and proper surveillance from the authorities. This further means that third party verifications may be a suitable way of making sure that toys conform with legislation, but it is also a proof that contacts between importers and manufacturers indeed need to be strengthened.

The results of this study suggest that a list of the chemical content may be possible also for toys that are not chemical products, to some extent – although it would be difficult. Requiring that would mean a complete turnover in how compliance is shown, i.e. to show what is in the product rather than showing what is not in the product. It may for now not be possible from a political perspective for authorities to require such a list, and it also seems to be difficult for some companies to get complete information. Still, there are benefits for the companies themselves to have such information available, which means that it could be worthwhile for them to get such information even though legislation do not require it. Third party verifications would still be necessary to make sure that the information is correct, regardless of whether this kind of information is mandatory or not, bearing the issue of non-compliance in mind. The whole process of both internal control and authorities' market surveillance could further on be easier with such a list available. Still, it might not be completely possible since there may be difficulties of getting such information to the level of individual substances. On the other hand, the same type of system may be possible to a milder extent; a system where the information required would not be to the level of individual chemical substances but rather to the level of chemical preparations. It would mean that less information about the effects of the contents would be known, but it would still be in the same line of thinking. Most importantly, it may be feasible while requiring information to the level of chemical substances is probably not feasible. The benefits of having such information still has to be balanced against the costs of getting it, which is an assessment in itself. It is therefore not possible to determine for sure from this study which kind of information flow that is the most suitable. The kind of system that is already in use in the EU have some other advantages, taking the discussion of what level of information that is to be seen as 'relevant' in account, since the present system enables the

possibility of requiring information about the most hazardous chemicals while still avoiding data overflow. To determine whether it would be worthwhile to turn around the way of how compliance should be shown, it is required that it is determined whether information to that level could be seen as relevant when balancing the costs towards the benefits.

Finally, it should be acknowledged here that the findings of this study also suggest that the ongoing revisions of the EU Toy Safety Directive (TSD), along with the effects of the recent EU chemical regulation REACH, will provide the European market with more information about what chemicals are present in non-electronical and non-chemical toys, as well as safer toys for the European consumers. Still, some actors argue that there are exceptions and other weak points in the revision of the TSD that could be improved before accepting the revision.

6.2 Recommendations

It is recommended for toy companies to develop their SCM practices further. Preferably, the toy manufacturers should be used as suppliers to reduce the amount of tiers and the amount of information transfers, thereby decreasing the risk of information loss. The reason to do so is to strengthen the possibility of requiring a list of the chemical content of the products, which the industry is also recommended to do in order to build up their own awareness of the contents of their products and the effects that these substances have. In some cases, a complete list may not even be possible, but companies should at least work on getting as much information as possible, within reasonable costs for the acquired benefit. The reason for doing this is for the companies to be able to take informed decisions about what substances to avoid to be able to keep their products safe and to be ahead of legislation. The companies are also recommended to be transparent about what chemicals their products contain, which should not be seen as a way of imposing unnecessary information upon the consumers who generally might not need this information anyway. Instead, it should be seen as a way for the companies to yet again be ahead of legislation. The main purpose of all these recommendations is to rebuild the consumer's confidence for the industry as a whole. With the same purpose, it is also highly recommended for companies to improve their internal control, to keep non-compliant toys from even entering the market. The recall statistics needs to be turned, and the companies need to keep the amount of recall to a minimum in order to regain the consumer's confidence. Having test certificates on the ingoing materials may be one way of pushing the internal control upwards in the supply chain, to achieve the same goal, and it is therefore recommended that the companies give this approach a try. This essentially means that the companies need to make sure to know what is put into their products.

Authorities in the EU are recommended to sharpen the revision of the requirements further by eliminating the weak points that are left there. A specific example is the exceptions for CMRs, an exception that should be removed to ensure that toys are safe for children also in the long run. The surveillance needs to be strengthened, which is tackled already in the ongoing revision of the legislation, but authorities need to put some resources into seizing this opportunity for improvements. Furthermore, authorities should make sure that the new harmonised standards that will be developed for the revised TSD should include also provisions from other European legislation. If this is done, toy companies will be able to follow only one standard and thereby be sure to be in compliance with legislation, which means that it will be easier for them to keep track of what they need to do. This would reduce the amount of accidental non-compliance. Authorities should also encourage companies to provide as much

information as possible about what chemicals are included in toys, also for toys that are not chemical products, to get the most out of the surveillance. Even though it may not be possible to require the information on a substance level, authorities may still ask if such information is available and the companies will thereby become more aware about the fact that information is indeed missing. Authorities should also review what level of information that should be seen as relevant in this context, as well as to review the possibility of requiring a list of contents on the preparation level. Even though a list of contents on the level of chemical substances may not be feasible, a list on the level of chemical preparations would still provide useful information from a health and safety perspective. Further on, the cooperation of authorities in the different Member States of the EU are within the target for improvements in the ongoing legislation revision. The EU also has started a cooperation with authorities in China when it comes to discovering hazardous products, but international cooperation still needs to be further improved to deal with the issues of a global economy. This leads to a recommendation for the international community:

The common health of citizens all over the globe would benefit from safe products, since the global economy touches all of the international community. This is true both when one company have their customers in several different countries and when the production takes place in one part of the world but the intended market is in another. In the latter case, the health of the workers in the manufacturing country is equally important as the health of the customers in the receiving country. In the former case, it is cumbersome for companies to keep track of provisions from several different countries that all have different thresholds, different standards and different provisions on how to prove legal compliance. Globally harmonised standards would benefit the health of the international community as well as the companies themselves since it would provide more clear provisions. It is therefore recommended that the already existing international cooperation on chemicals management take globally harmonised standards in account when negotiating. Regarding the recommendation about requiring the companies to know what preparations that have been used in a product, a database containing toxicological and ecotoxicological information about preparations worldwide should be created. Since such a database would not only be useful for authorities, and not either only for actors within the EU, but rather for all actors worldwide, this issue should preferably be driven by international cooperation between all related actors. It could be so that the international environmental NGOs are actually the ones most fit for driving the issue, but authorities and companies worldwide would also benefit from it and should therefore contribute. Adding up to this, such a database would not only be useful for the safety of toys, but for the safety of literally all products. Such a database would never be able to be complete, neither when it comes to amount of chemical preparations nor when it comes to what information that is available about each preparations, but it would be useful nonetheless.

Finally, the academic community is recommended to put further research into the waste streams of toys, to find out whether the amount of plastics and electronics that toys bring with them to the household waste should be seen as a significant environmental problem. If that would be the case, some kind of extended producer responsibility (EPR) system for toys, i.e. separate collection systems to enable recycling, could be a suitable solution. Further on, there is also a need for research on what amount of information regarding chemicals in toys – as well as other products – that should be seen as 'relevant' to provide consumers with safe products.

Bibliography

Ad hoc expert group. (2008). Evaluating Business Safety Measures in the Toy Supply Chain. A report written by an independent expert group with the support and technical assistance of the European Commission. [online]. Available: http://ec.europa.eu/consumers/citizen/my_safety/docs/safety_measures_toy_supply_chain.pdf [2008, July 30]

CE-marking.com. (2008). *What is CE Marking (CE Mark)?*. CE Marking Consulting Service, European Authorized Representative. [Online]. Available: <http://www.ce-marking.com/what-is-CE-marking.html> [2008, June 02]

CEN. (2008). The European Committee for Standardization. Search result on “EN 71” in the 'Search standards' function. [Online]. Available: <http://www.cen.eu> [2008, March 30]

Commission Proposal COM(2008) 9 final. *Proposal for a Directive of the European Parliament and of the Council on the safety of toys*. [Online]. Available: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0009:FIN:EN:PDF> [2008, July 08]

Commission Staff Working Document SEC(2008) 39. *Accompanying document to the Proposal for a Directive of the European Parliament and of the Council on the safety of toys – Executive Summary of the Impact Assessment*. [Online]. Available: http://ec.europa.eu/enterprise/toys/documents/sec_2008_0039.pdf [2008, July 8]

Council Directive 76/769/EEC of 27 July 1976 on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations. OJ L 262 27.9.1976. p.201.

Council Directive 88/378/EEC of 3 May 1988 on the approximation of the laws of the Member States concerning the safety of toys. OJ L 187 16.7.1988. p.1.

Council Directive 93/68/EEC of 22 July 1993 amending Directives 87/404/EEC (simple pressure vessels), 88/378/EEC (safety of toys), 89/106/EEC (construction products), 89/336/EEC (electromagnetic compatibility), 89/392/EEC (machinery), 89/686/EEC (personal protective equipment), 90/384/EEC (non-automatic weighing instruments), 90/385/EEC (active implantable medicinal devices), 90/396/EEC (appliances burning gaseous fuels), 91/263/EEC (telecommunications terminal equipment), 92/42/EEC (new hot-water boilers fired with liquid or gaseous fuels) and 73/23/EEC (electrical equipment designed for use within certain voltage limits). OJ L 220 30.8.93. p.1.

Directive 2002/96/EC of the European Parliament and of the Council, of 27 January 2003 on waste electrical and electronic equipment (WEEE). OJ L 37 13.2.2003. p.24

European Commission. (2008a). *Keeping European Consumers Safe – 2007 Annual Report on the operation of the Rapid Alert System for non-food consumer products – RAPEX*. The Directorate-General for Health and Consumer Protection of the European Commission. Printed by Office for Official Publications of the European Communities. Luxembourg. ISBN: 978-92-79-07332-8. [Online]. Available: http://ec.europa.eu/consumers/safety/rapex/docs/rapex_annualreport2008_en.pdf [2008, August 2]

European Commission. (2008b). *Rapid Alert System for non-food consumer products (RAPEX)*. Website of the Directorate-General for Health and Consumer Protection of the European Commission – Consumer Affairs. [Online]. Available: http://ec.europa.eu/consumers/safety/rapex/index_en.htm [2008, August 2]

European Commission. (2008c). Working document: Raw statistical from The Directorate-General for Health and Consumer Protection of the European Commission, Unit B3 'Product & Services Safety'. [E-mail]. Acquired: [2008, August 4]

ECHA. (2008). *About REACH*. European Chemicals Agency. [Online]. Available: http://reach.jrc.it/about_reach_en.htm (sub menus have also been used) [2008, June 4]

EEC Treaty (1987). *Treaty establishing the European Economic Community, part three – Policy of the Community, Title 1 – Common rules, Chapter 3: Approximation of laws, Article 100A*. OJ C 224 31.08.1992. p.0032

- Europe Economics. (2007). Revision of the chemical requirements of Directive 88/378/EEC on the safety of toys. [Online]. Available: http://ec.europa.eu/enterprise/toys/documents/toys_final_report_30_july_2007.pdf [2008, May 21]
- Garner, C. (1996). The loss of our innocence. The Independent, London [Online]. Available: http://findarticles.com/p/articles/mi_qn4158/is_19960815/ai_n14062080 [2008, May 29]
- Konsumentverket. (2006). Chemicals in toys – Inspection report 2005. Swedish Chemical Agency in cooperation with the Swedish Consumer Agency. Rapport 2006:15. [Online]. Available: http://www.konsumentverket.se/Documents/rapporter/2006/2006_15_Leksaksrapport_rev_eng_.pdf [2008, June 9]
- KemI. (2007). Fakta – Ftalater I leksaker. Fact sheet from the Swedish Chemical Agency. [Online]. Available: <http://www.kemi.se/upload/Trycksaker/Pdf/Faktablad/FbFtalaterDec07.pdf> [2008, June 9]
- NPD. (2004). World Toy Facts and Figures 2003. Prepared by the NPD Group for the International Council of Toy Industries. [Online]. Available: http://www.toy-icti.org/resources/wtf_2003/8.htm [2008, July 12]
- NPD. (2007). Toy Markets in the World. Prepared by the NPD Group for the International Council of Toy Industries. [Online]. Available: http://www.toy-icti.org/resources/wtf_2006_files/frame.htm [2008, June 15]
- Poupet, P. (2007). European Standards for a sustainable world. Presentation document found on the website of the European Committee for Standardization. [Online]. Available: <http://www.cen.eu/cenorm/news/events/poupet2.pdf> [2008, August 21]
- Regulation (EC) No 1907/2006 of the European Parliament and of the Council, of 18 December 2006, concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC. OJ L 396 30.12.2006 p.1.
- Rosander, Per. (2008). Director of The International Chemical Secretariat. Supervision session via telephone [2008, August 30]
- US CPSC. (2008). Toy Hazard Recalls. US Consumer Product Safety Commission. [Online]. Available: <http://www.cpsc.gov/cpsc/pub/prereel/category/toy.html> [2008, August 3]
- U.S. PIRG. (2007). Trouble in Toyland – The 22nd Annual Survey of Toy Safety. U.S. Public Interest Research Group Education Fund. [Online]. Available: <http://www.uspirg.org/uploads/8p/Q7/8pQ7y-4le4DGBMMhU2w0GA/US-PIRG-Toy-Report-11-07.pdf> [2008, August 4]
- U.S. PIRG *et al.* (2008). Total Recall: The Need for CPSC Reform Now, a report written by non-profit, non-partisan consumer and public health organisations: U.S. Public Interest Research Group, Public Citizen, National Research Center for Women & Families, Kids in Danger, Consumers Union & Consumer Federation of America. [Online]. Available: http://www.uspirg.org/uploads/Rh/AP/RhAPcP_-ZcJY-z9F4cUMHg/totalrecalljuly08.pdf [2008, August 22]
- Wong, Chee Yew, *et al.* (2005). Supply chain management practices in toy supply chains. *Supply Chain Management: An International Journal*. Vol. 10, No. 5, p. 367-378, ISSN: 1359-8546

List of interviewees

- Elm, Klas. (2008, June 3) Telephone Interview. CEO Swedish Toy Association.
- Falk, Ulla. (2008, June 11 & 2008 July 8) Telephone interview. Senior Technical Officer. Swedish Chemicals Agency.
- Gustafsson, Hans. (2008, June 4) Telephone interview. Responsible for assessment of hazardous chemicals. SP Technical Research Institute of Sweden.
- Gårlin, Hanna. (2008, September 5) Telephone interview. Chemical coordinator at children's IKEA. IKEA Sweden.
- Hansen, Jens. (2008, July 16) Telephone interview. General Operations Manager. TOP-TOY Hong Kong Ltd.
- Hartz, David. (2008, July 16) Telephone interview. Quality Compliance Manager. LEGO Group.

- Johansson, Anne-Marie. (2008, June 9 & 2008, July 8) Telephone interview. Senior Technical Officer. Swedish Chemicals Agency.
- Keithley, Carter. (2008, July 23) Telephone interview. President. Toy Industry Association (TIA).
- Kullberg, Göran. (2008, June 24) Telephone interview. Head of Quality. Scanditoys.
- Larsson, Christina. (2008, August 18) Telephone interview. Inspector. Swedish Chemicals Agency.
- Lindberg, Martin. (2008, June 18 & 2008, September 3) Telephone interview. Export Manager. Viking Toys.
- Lorén, Anders. (2008, June 27 & 2008, September 9) Telephone interview. Team leader for organic analytical chemistry. SP Technical Research Institute of Sweden.
- Nilsson, Helena. (2008, June 10) Telephone interview. Investigator. Swedish Consumer Agency.
- Norin, Helena. (2008, July 4) Telephone interview. Chemical handling officer. Swedish Society for Nature Conservation.
- van Rossem, Chris. (2008, July 9) Face-to-face interview. Research Associate PhD Candidate. The International Institute for Industrial Environmental Economics.
- Stuart, Magnus. (2008, June 19) Telephone interview. CEO. Magtoys AB.
- Sørensen, Jacob. (2008, July 14) Telephone interview. Environmental and Health worker. The Information Centre for Environment and Health (Denmark).
- Vastrup, Jon. (2008, July 7) Telephone interview. Product Safety Manager. TOP-TOY A/S.
- Wackborg, Rolf. (2008, July 8) Telephone interview. Purchase manager of toys. COOP Sverige AB.
- Westin, Erik. (2008, July 2) Telephone interview. Investigator. Swedish Environmental Protection Agency, Waste Department.

Abbreviations

BEUC	The European Consumers' Organisation (Bureau Européen des Unions de Consommateurs)
CEN	European Committee for Standardisation
CENELEC	European Committee for Electrotechnical Standardisation
CMR	Substances that are Carcinogenic, Mutagenic or toxic to Reproduction
CPSC	Consumer Product Safety Commission (USA)
DINP	Diisononyl phthalate
ECHA	European Chemicals Agency
EPR	Extended Producer Responsibility
EU	The European Union
IIIIEE	The International Institute for Industrial Environmental Economics
KGOY	Kids are Getting Older Younger
MSDS	Material Safety Data Sheet
NGO	Non-Governmental Organisation
OEM	Original Equipment Manufacturer
PBT	Substances that are Persistent, Bioaccumulative and Toxic
RAPEX	Rapid Alert System for non-food consumer products
REACH	Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (EU)
SVHC	Substances of Very High Concern
SCM	Supply Chain Management
SME	Small and Medium Enterprise
TIA	Toy Industry Association (USA)
TIE	Toy Industries Europe
TSD	Toy Safety Directive
US / USA	The United States of America
USD	United States Dollar
vPvB	Substances that are very Persistent and very Bioaccumulative
WEEE	Council Directive 2002/96/EC on Waste Electrical and Electronic Equipment (EU)