

DANGEROUS PRODUCTS ON THE CONTEMPORARY EU MARKET – CHARACTERISTICS OF THE NON-FOOD PRODUCTS

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Purpose: For most products, for example, toys, food, cosmetics, there are regulations in European law that define safety requirements. However, each year, several thousand products potentially dangerous for consumers appear on the market. Producers' organizations, as well as public institutions and consumer organizations are fighting to keep them as few as possible, yet, different market forces play a role here and they are still on the market. Therefore, consumers should be educated and knowledge about such products should be disseminated.

Design/methodology/approach: In the research part, the products deemed unsafe in years 2015-2021 were analyzed. Additionally, the 80 latest alerts on dangerous products were also thoroughly analyzed. Data was collected from The European Commission Safety Gate system, The comparative analysis method was used as well as the documentary analysis.

Findings: The aim of this article was to identify the main types of risk to consumers, related to the consumption of non-food products. The conducted analysis shows that it is mainly a risk of injury, poisoning, allergic reaction, as well as choking and suffocation, but the risks vary greatly depending on the product group. It is significant that dangerous products are often intended for children, therefore the conscious attitude of parents is important.

Research limitations/implications: It should be taken into account that the situation may change over time, that may be related to new legal norms, to a change in the economic situation on international markets due to new products, to greater awareness of producers, for example. Therefore this type of research should be discussed in a broader context.

Practical implications: The analysis shows the need for an alert system against dangerous products. The results indicate that stereotypes about the 'safe country of origin' can change; in practice, therefore, consumers need new knowledge about dangerous products which will help them make informed decisions. Up-to-date knowledge is also needed by the sellers – they can make decisions about cooperation with suppliers that will be more favorable to them.

Social implications: The awareness of the presence of dangerous products on the market is important for the health of consumers, but it is also important for producers themselves due to the potential damage that can be caused to consumers and the environment.

Keywords: conscious consumption, consumer rights, RAPEX, safety of consumption.

Category of the paper: Research paper.

1. Introduction

Now, when the pandemic seems to be behind us, all sorts of gaps in manufacturing and security systems have emerged. Many emphasize that "business as usual" will not come back, because the changes have gone far, and there is the need to adapt to deal with complex challenges. Action is needed in the fields of technology, business, social affairs, health and science - and these require coordination to achieve policy coherence (Bragge et al., 2022). All of this also applies to the issue of unsafe products on the market. Thus, coordination tasks include facilitating a common understanding of problems and solutions, as exemplified by RAPEX. It should be emphasized that the European Union countries have been developing the warning system against dangerous products for many years. But, although European regulation aims to develop healthy societies geared to shared prosperity, there seems to be a lot of work to be done in terms of product safety. This is mainly due to the changing economic and political environment, changing technology (also new products), and new ways of purchasing. Some experts believe that commendable efforts have been made, but there has been a lack of coordination and solid partnerships in the public, private and pluralist (civil society) sectors, which results, *inter alia*, in the problems with the quality of products available on the market (Saxena, 2021).

Consumer safety should be secured on two sides: from the side of producers and sellers, and from the side of relevant state authorities. Of course, companies are required to only place on the market products that are safe, and to inform consumers of any risks associated with the products they supply, and to make sure that any unsafe products on the market can be traced. At the EU level, it is regulated by The general product safety directive (Directive 2001/95/EC).

Within the EU, there are two alert systems for dangerous products: RASFF – the rapid alert system for food and feed and RAPEX – the EU rapid alert system for dangerous non-food products. Both operate under the Directorate-General for Justice and Consumers of European Commission. Due to the huge amount of data and the complexity of the issues, as well as separate regulations, in this article only the non-food products present on the European market will be discussed. It is worth noting that there are new areas that require regulations, such as artificial intelligence, autonomous vehicles or robots, which will soon be used on an equal footing with other products of everyday use. Thus, the safety of products available on the market is an up-to-date and important issue.

Dangerous products can be defined in various ways - in this article we assume the perspective of consumers, so a dangerous product is primarily one that may endanger health or life of the user. Against this background the aim of the article is to identify the most common types of risks for consumers and to establish links between unsafe products and the countries of origin. We believe that, apart from low-quality products from China, also European companies have difficulties in maintaining appropriate safety standards, which will be analyzed

in the empirical part. The research was carried out in two paths: in one part the data prepared by RAPEX was obtained, in the other part, the own analysis of alerts from 2022 was performed. In this part the content analysis method was used.

2. Literature review

From the point of view of the number of publications, the safety of product consumption reached its peak in the mid-70s. of XX c. At that time, for example, the situation in the hairdressing industry, which did not agree to legal regulations regarding the safety of hair dyes, was widely discussed. The hairdressing industry motivated its resistance with the vision of bankruptcies and the closure of hairdressing salons (Cancer-causing chemicals, 1978). However, studies showed that the ingredients in cosmetics are carcinogenic and the necessary changes must be introduced immediately. Therefore, in the early 1970s, the then EU Member States decided to harmonize their national cosmetics legislation to protect consumers, while allowing cosmetic products to circulate freely within the Community. As a result of numerous discussions among experts from all Member States, the Cosmetics directive of the Council no. 76/768/EEC was adopted. The rules set out in the Cosmetics Directive took into account the needs of the consumer, with the introduction of the principle that if a product is to move freely within the EU, the same labeling, packaging and safety systems must apply (Hodges, 2005; Pauwels, Rogiers, 2010). Similar discussions and regulations have arisen in the United States, as evidenced by the cosmetic safety hearings in front of the Congress. Also in the 1970s, problems were noticed regarding the poor quality of footwear, TV sets, toys, Christmas decorations or flammable fabrics imported then from Taiwan and Hong Kong. Therefore, the necessity to introduce broader regulations was emphasized, and the point of view of consumers was also stressed, especially that they are always in a weaker position than a producer and a seller (Dine, Fagan, 2006). These issues have received more and more attention as international trade, globalization, and the internet and online commerce expand. As a result, in 2001, the European Union introduced common product safety regulations, as well as an international system for the rapid exchange of information (Purves, Echikson, 2021). Of course, not only cosmetics are regulated, but also various groups of products, such as medical and food products, for example. Although European and American regulations and those in force in other countries are not identical, it should be emphasized that consumer safety has become one of the key social and economic issues, especially during the covid-19 pandemic. J. Ruohonen (2022) emphasizes that from the 1960s to the present day new safeguards are created, allowing consumers to minimize their weaker position vis-à-vis producers and sellers. The literature also emphasizes the importance of a holistic view of the security problem – not only consumption should be safe, but also the production, and later disposal of waste (Hall, 2019).

3. Dangerous products - definition and rules of conduct

The presence of dangerous products on the market is restricted in four areas: 1) labeling, packaging, waste; 2) accident prevention; 3) transport and 4) liability for damage (Pozzo, 2009). Nevertheless, dangerous substances are around us. Although, as already mentioned, the product cannot be dangerous for its user, however, there are many natural substances that may pose such a threat - they are listed in Fig. 1. Dangerous substances are, for example: explosive ones present in car batteries; exhaust gases (such as nitrogen oxide) from internal combustion engines; oxidizing substances, such as sulfuric acid and nitric acid, used in the plastics industry; an example of a toxic substance is also hexane – a solvent used in the food industry (Zhang et al., 2022). Dangerous substances are not the only source of risks for consumers. One should add here defective technical solutions that may cause damage to the body, eyesight or hearing, burns, poisoning, or even fertility problems. Such effects may result from the use of too strong light or sound emitters, from faulty workmanship of parts, bad security and insulation, which, in combination with electricity or the previously mentioned harmful substances, has negative effects on health.

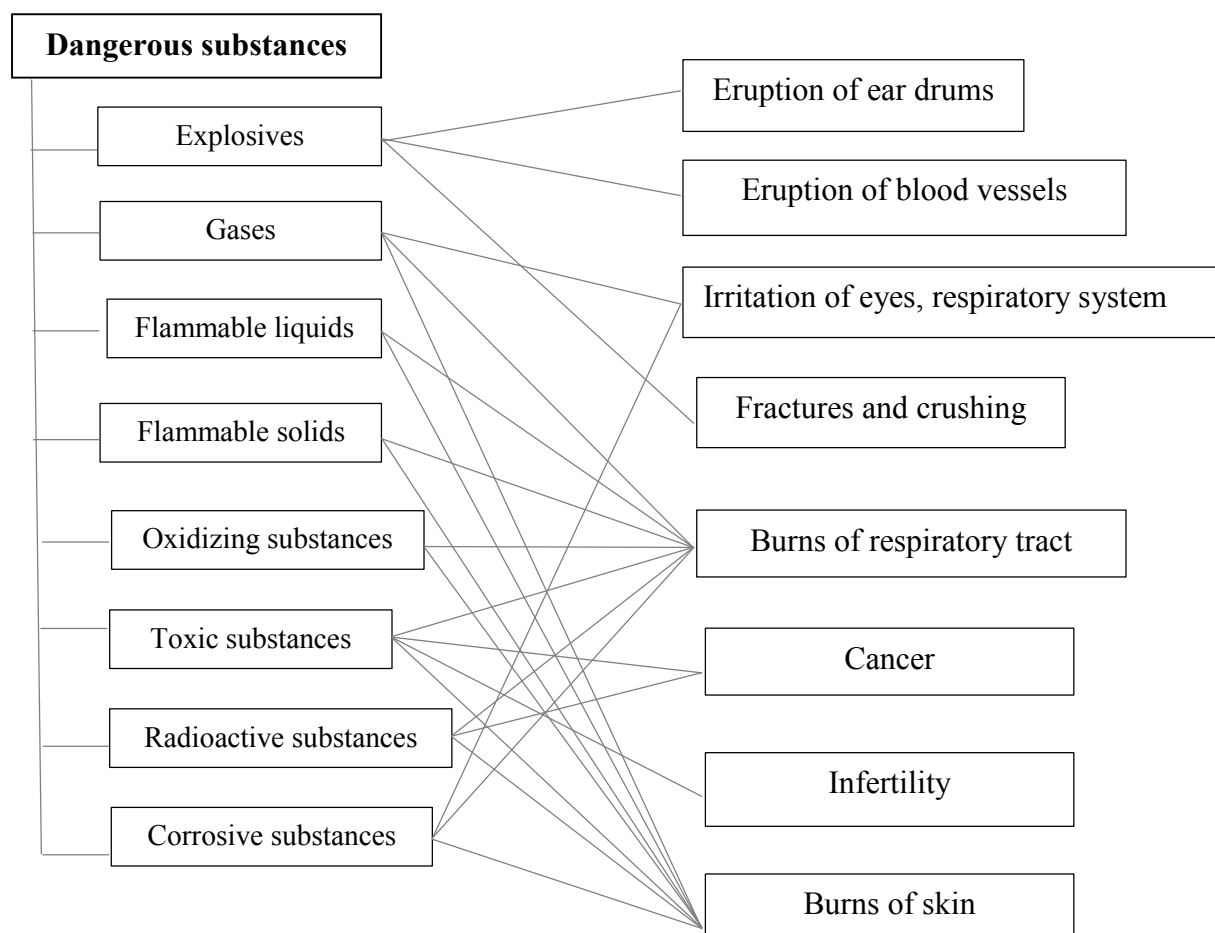


Figure 1. Substances and processes that affect product safety.

Source: Own study based on: <https://blog.storemasta.com.au/risks-dangerous-goods>.

In EU legislation, dangerous products are primarily defined by the aforementioned The general product safety directive (Directive 2001/95/EC), which considers as a dangerous product anything that does not provide safety that can be expected given the normal use of the product. A similar approach to defining products dangerous for the consumer is in force in other EU countries, and thus also in Poland (it is regulated by Art. 449 of the Civil Code). Whether a product is safe is determined by the circumstances at the time of placing it on the market, in particular the way it is presented and the information about its properties provided to the consumer. Thus, a product is dangerous, if in normal conditions of its use poses a threat to the health or life of consumers, as well as a threat to the natural environment. In other words, a safe product may not carry any risk, or only the minimum risk corresponding to the use of the product and related to its proper operation. The potential consequences of using hazardous products may be as follows:

- choking, suffocation,
- skin infections,
- bruises, wounds, fractures,
- internal organ disorders,
- damage or loss of vision /hearing,
- nervous system disorders,
- fertility disorders,
- poisoning,
- burns,
- death.

The likelihood of negative consequences for the product user is not easy to estimate. Therefore, workflows have been developed, which take into account the type of users, their knowledge of the risk and possible precautions. As a result, there are three levels of negative effects of using the product: low, medium and high risk. In the case of medium and high risk, the entrepreneur is obliged to report this fact to the relevant authorities.

The already mentioned RAPEX system enables the exchange of information on non-food and non-medical products, which was released in 2003 pursuant to the provisions of the General Product Safety Directive. Currently, the system includes 30 participating countries – EU27 plus Iceland, Liechtenstein and Norway (Safety Gate 2021 results, European Commission, 2022). The RAPEX notification is filled in by the entrepreneur responsible for the product and contains, inter alia, risk type, name of notifying country, information about the packaging and brand of a product, bar code, as well as the country of origin of the product. The notification also includes information on the corrective measures taken (most often it is 'Withdrawal of the product from the market' or 'Recall of the product from end users').

As a rule, the producer is responsible for the effects caused by a dangerous product, however entities that may be responsible for a dangerous product also include co-producers of the product, importers and sellers. The key legal act here is the 'The general product safety directive', which says that within the limits of their typical activities, manufacturers provide consumers with appropriate information to enable them to assess the risk associated with the product throughout its reasonably foreseeable period of use. When the overall risk is assessed by the manufacturer as medium or high – so it goes beyond the permissible framework – he must inform the relevant market surveillance authorities by providing them with information such as: all available data on product identification, a full description of the risk associated with the product and a description of the measures taken (and planned) to protect consumers. Importantly, producers and distributors should inform the relevant authorities in each of the EU member states where their products are sold, which is why the RAPEX platform is so important.

An entrepreneur burdened with placing a dangerous product on the market is obliged to take corrective actions aimed at eliminating the risk. Apart from withdrawing the product from the market, it may also include: modification of product design, sending information and warnings to consumers regarding the proper use of products, modification of products at consumers' premises or elsewhere, replacement of the product at the consumer. If the entrepreneur is based in the EU, the costs of product recall and other corrective actions shall be borne by him and jointly by other entities involved in the sale. In the case of products originating outside the EU, the costs of withdrawing the product from the market and its re-export or destruction are borne jointly and severally by the person who took responsibility for its import and the person who brought the product into the European customs territory, i.e. the importer and the seller. Each RAPEX country has notified an authority responsible for monitoring dangerous products. In Poland, such a national institution is the Office of Competition and Consumer Protection (Market Surveillance Department), in Bulgaria, for example, it is the Commission for Consumer Protection, and in Estonia it is the Consumer Protection and Technical Regulatory Authority.

4. RAPEX notifications of dangerous products

RAPEX alerts may come from relevant national institutions responsible for product safety, but above all from the entrepreneurs themselves involved in corrective actions. In 2021, from all countries belonging to the system RAPEX received 2,142 notifications – the dynamics of these notifications in 2010-2021 is shown in Fig. 2.

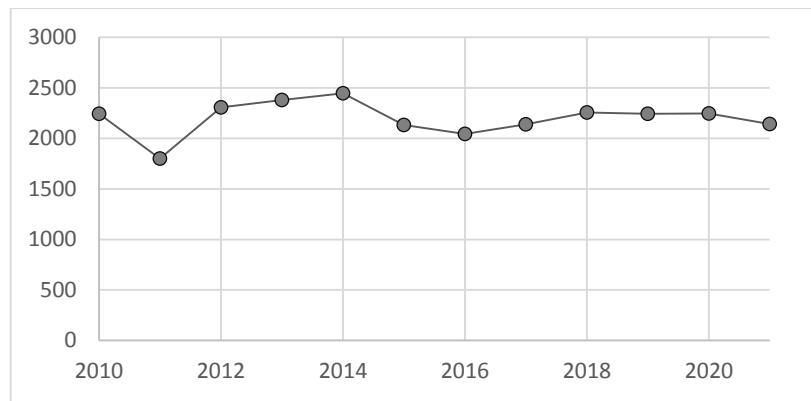


Figure 2. Alerts in the RAPEX system in 2010-2021.

Source: Safety Gate 2021 results, European Commission 2022.

In 2021, 26% of all alerts came from Germany and they most often related to cars, which will be discussed later in this article. The next places in terms of the number of alerts were followed by France, Sweden and Poland. In 2019-2020, particular emphasis was placed on products sold online and common procedures were developed for the countries participating in RAPEX. This is extremely important as 71% of consumers made online purchases in 2020, according to Eurostat (Key Consumer Data, 2020).

The most frequently reported products are toys, car parts, jewellery, and textiles (Fig. 3). As can be seen from the comparison of data for 2021 – reports on passenger cars have become the dominant product category (550 alerts). Toys are second, followed by electrical appliances. A more detailed analysis of the alerts is presented in the following section, however, a change in the dominant product category should be noted here – for the first time, most notifications concerned passenger cars.

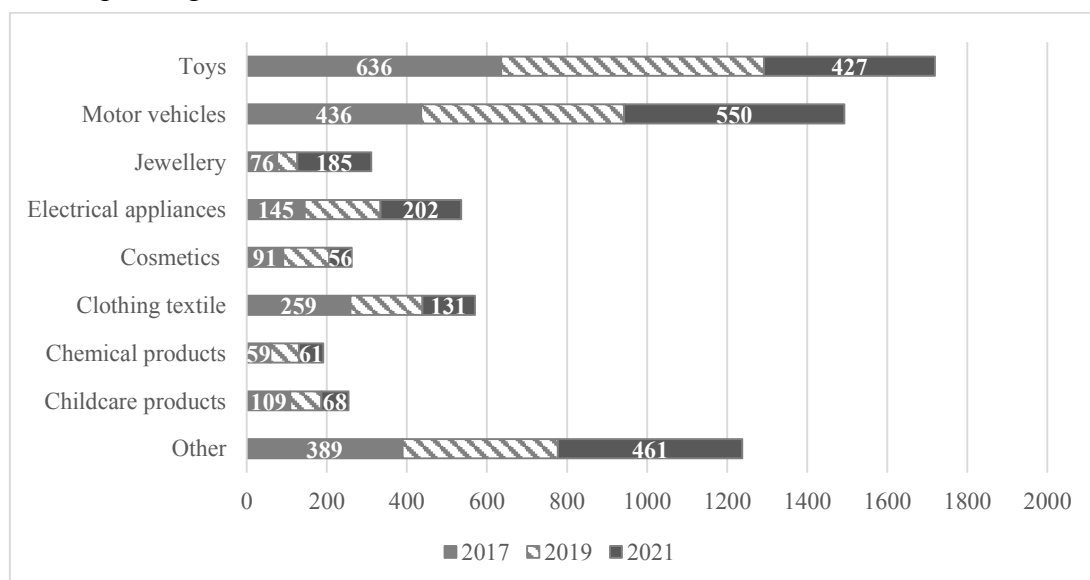


Figure 3. The most frequent product categories alerts in 2017, 2019 and 2021.

Source: own work based on: Safety Gate 2021 results. Modelling cooperation.

The RAPEX platform provides a lot of aggregate information, but does not describe the nature of the threats detected, therefore the 80 most current notifications, which were described as 'recent' (all from 2022), were carefully analyzed. In this group, exactly half of the analyzed cases concerned passenger cars and, significantly, only 27.5% (i.e. 11 out of 40 notifications) concerned cars from outside the EU. This means that the main category of hazardous products are passenger cars, largely produced in EU countries. Therefore, the sample of 80 reports was divided into two parts: 1) alerts concerning passenger cars, 2) other alerts – each group includes 40 cases.

As for the sources of risk identified in group 1 (passenger cars), these were poorly secured or unsecured cables, inoperative airbag sensors, overheating or falling off parts, fuel leaks from pipes, inoperative brake assist and many others. According to the description of potential consequences, it can be said that the revealed defects posed the risk of an accident, injury, fire and even death of users (Fig. 4).

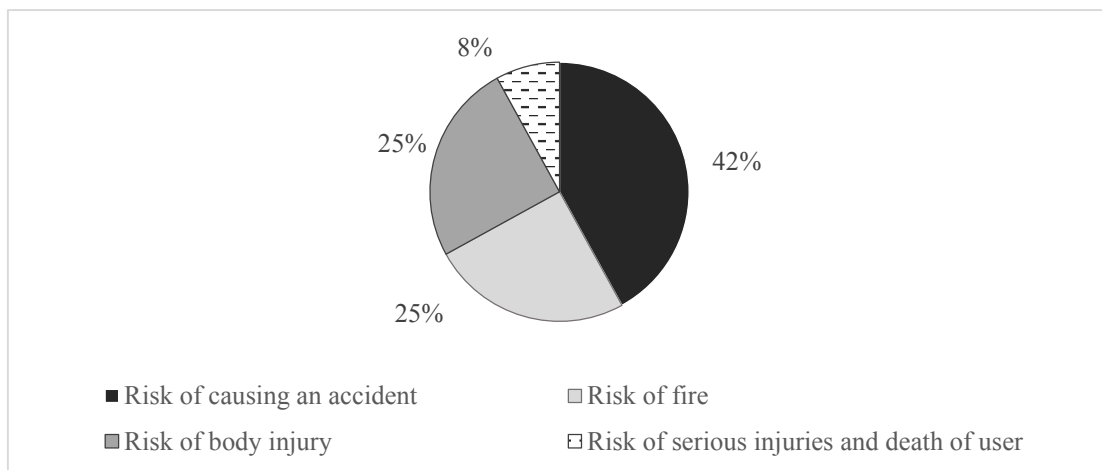


Figure 4. Types of threats to consumers in group 1 - passenger cars (n = 40).

Source: own study based on the analysis of the content of notifications at RAPEX, <https://ec.europa.eu/safety-gate-alerts/screen/webReport>.

The country of origin of the faulty car part is a surprising issue as most of the faults were reported in Germany. The development of the automotive industry in this country is probably important here, but on the other hand, no one associates Germany with faulty cars. The data presented in the comparison seem to be different, because Germany was indicated as the country of origin of the defective product (Fig. 5).

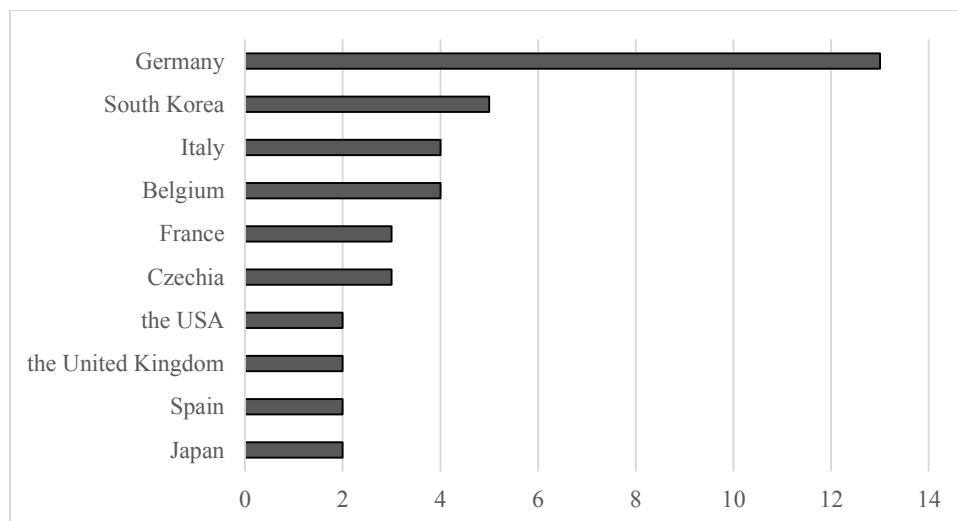


Figure 5. Country of origin of the faulty car part (n = 40).

Source: own study based on the analysis of the content of notifications at RAPEX, <https://ec.europa.eu/safety-gate-alerts/screen/webReport>.

It is very interesting that the alerts often concerned very reputable car brands, such as Mercedes (as much as 22.5% of the notifications concerned this brand), as well as Opel, Skoda, Toyota, KIA, and also Volvo, McLaren, and BMW. This means that even trustworthy manufacturers have problems with maintaining safety standards. The product alerts indicate the country of origin of the defective product and the reporting country – in the analyzed sample, 67.5% of reports came from Germany, 10% were reported by Bulgaria and Poland, 5% were from France and Portugal, and 2.5% from Spain. It means that predominantly German entrepreneurs reported a defective product produced by German contractors.

The second part of the analyzed notifications (also 40, but excluding passenger cars – Fig. 6) was more diverse – from the product category point of view, there were mainly toys (32.5%), followed by children's articles (15%), motorcycles and jewellery (each group of 4%). An interesting category are chemical products, which mean electronic cigarettes here.

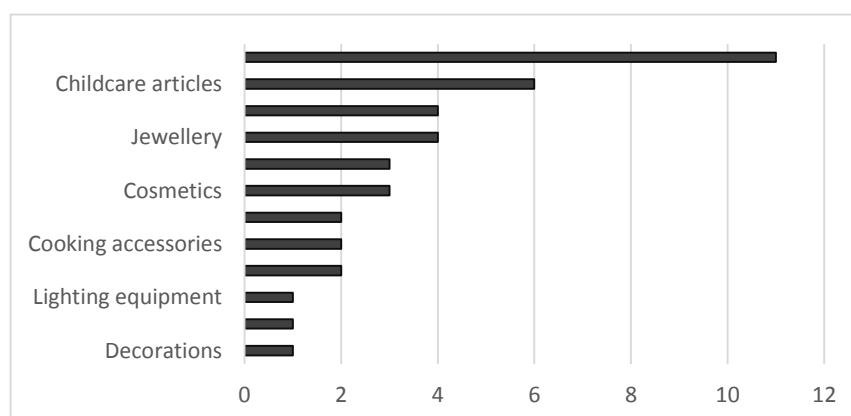


Figure 6. Groups of notified products, excluding cars (n = 40).

Source: own study based on the analysis of the content of notifications at RAPEX, <https://ec.europa.eu/safety-gate-alerts/screen/webReport>.

Due to the variety of products, there are many different risks as well, such as injuries, poisoning and infections, choking and suffocation or burns. Sometimes, of course, several hazards can occur simultaneously, such as burns and damage to internal organs in explosions. For toys, the most common hazard was ‘small parts that may be swallowed’, which poses a choking or suffocation risk. Excessive concentration of lead and cadmium was also mentioned, which can have wide-ranging effects on health, such as, for example, infertility. For childcare articles – cots, high chairs – there was a fall and injury hazard, which was also a major risk in the motorcycle category. In turn, in the case of jewellery, it was a risk of an allergic reaction caused by an excessive amount of nickel (Fig. 7).

In the second group of notifications, the products came from 13 countries, but as much as 57.5% came from China. This is where the issue of cheap, low-quality products becomes apparent. Only single cases concerned products from Austria, Turkey or Poland (5% each). This issue is referred to in Fig. 8.

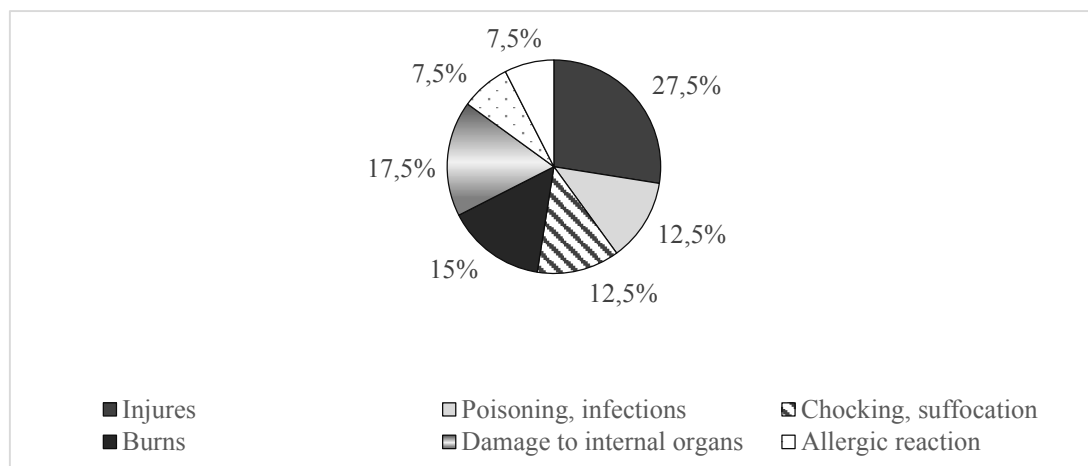


Figure 7. Types of threats to consumers - group 2 (excluding cars, n = 40).

Source: own study based on the analysis of the content of notifications at RAPEX, <https://ec.europa.eu/safety-gate-alerts/screen/webReport>.

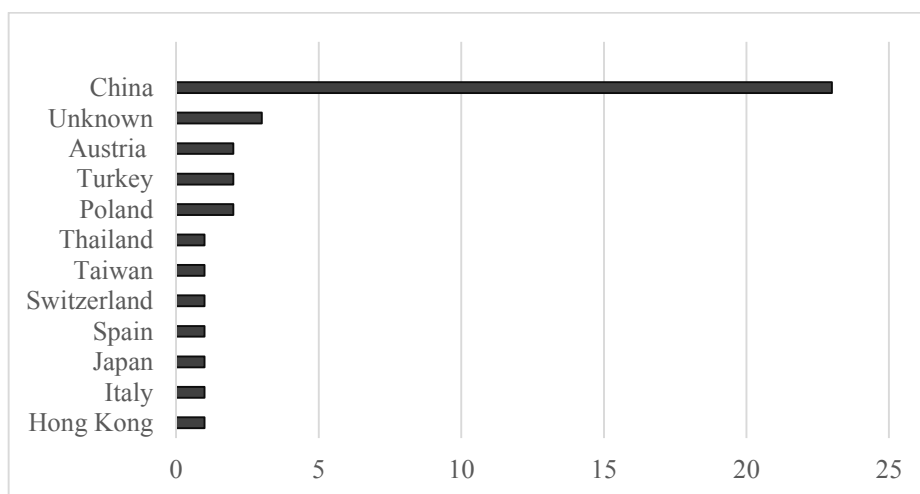


Figure 8. Country of origin of defective products (excluding cars, n = 40).

Source: own study based on the analysis of the content of notifications at RAPEX, <https://ec.europa.eu/safety-gate-alerts/screen/webReport>

By relating the results of the analysis to the entire group of tested alerts ($n = 80$), it can be said that:

- in the case of cars, most notifications about dangerous products concerned Germany as the country of origin (16,25%); and China does not appear in this group at all,
- there seems to be quality and safety issues in the passenger car industry,
- although we are all aware of the importance of child safety, many reports concern toys and childcare products; in this group, 28,75% of the notifications referred to China as the country of origin. Fig. 9 addresses this issue.

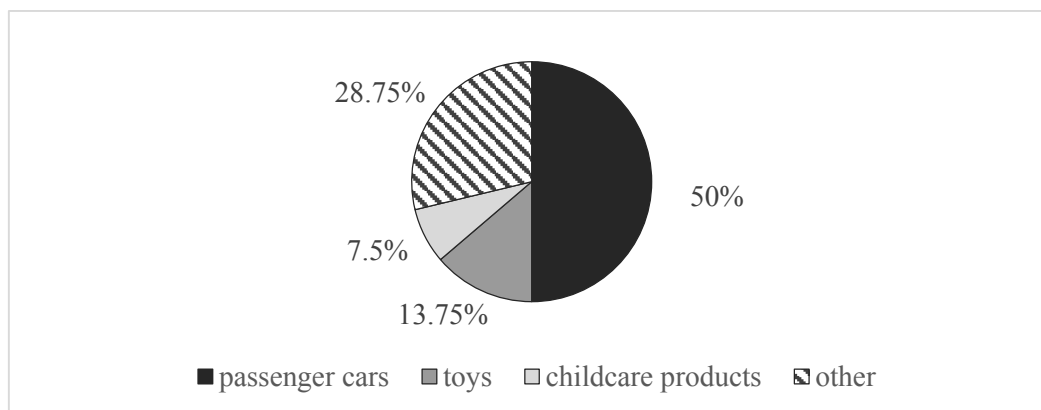


Figure 9. Major product groups reported as unsafe ($n = 80$).

Source: own study based on the analysis of the content of notifications at RAPEX, <https://ec.europa.eu/safety-gate-alerts/screen/webReport>.

It should be added that the above-mentioned 80 notifications concerned 18 countries of origin of the product, and nearly half of which are European Union members. As already mentioned, the group of reported countries includes Germany, but also Austria, Belgium, Poland, Italy, Spain, France, and Czechia. China is of course included in the group of countries outside the European Union, and next to it there is Japan, South Korea, Taiwan, Thailand and Hong Kong, but also the USA, the UK, Turkey and Switzerland. So it is clear that many countries have problems with maintaining product safety.

5. Discussion and conclusions

The aim of this article was to identify the main types of risk to consumers, related to the consumption of non-food products. The conducted analysis shows that it is mainly a risk of injury, poisoning, allergic reaction, as well as choking and suffocation, but the risks vary greatly depending on the product group. In the case of toys, small parts that can be easily torn off and swallowed carry a risk, as well as an excess of harmful chemicals, such as lead. In the case of passenger cars, for example, the most common risks are burns from fire, injury and death of the user.

The second aim was to establish a list of countries of origin of dangerous products. Here we put into question the claim that only dangerous products come from China. Once again it can be said that it all depends on the product category – in the case of passenger cars, there are no dangerous parts imported from China at all. Moreover, it was quite surprising that a large proportion of the dangerous parts came from Germany. The situation is very different for other product groups, as there a large proportion of the dangerous items actually come from China. It should be noted, however, that in the sample of 80 notifications there were as many as 18 countries of origin of the product. This means that not only China has problems with maintaining product safety and meeting production standards.

A few years ago, in the trade press appeared information that German cars are among the most defective (Milligan, 2015). So it turns out that the long-standing tradition of solid German products is a thing of the past. Moreover, the quality of cars produced in Asia has improved a lot, while the German car industry is stagnating. This can be seen in the results of the analysis carried out, as most of the reported defective cars came from Germany. Many industries, especially transport sector, develop technologies, introduce innovations, improve quality in order to provide travelers with the greatest possible safety (Hernik, Mazur, 2018). It turns out that the German automotive industry has problems with this. Despite the fact that German cars have long enjoyed a reputation ahead of their time, there are now problems with quality apparently. Manufacturers for decades have justified their high prices on the grounds of unprecedented safety features, which may now be up for discussion.

The study also found another alarming thing: many unsafe products are made for children. Despite the regulations in force, manufacturers still produce, and importers introduce, products that may suffocate, choke, accident, damage the body, so they are definitely not for children. It turns out, therefore, that warning systems are very important to protect the rights of consumers to safe consumption. When it comes to products other than cars, the country from which dangerous products are imported is China. According to the statistics of the Chinese Statistical Office, the Chinese consumer market is the second largest in the world after the USA (Xinhua, 2021). Consumption is growing especially in the luxury segment. But, the old habits of Chinese producers significantly reduce the demand for domestic products, as they do not meet the consumers' requirements. A similar situation can be observed on the international market.

Safety issues of product consumption can be related to many areas: they can be analyzed from the point of view of sustainable development, from the consumer rights point of view, as well as the best production management standards, or human health and wellbeing. Collected data allow for the development of each of the mentioned paths. However, it is worth noting that the key here is information for the consumer who is in a weaker position than producer and seller. Therefore, information about the type of risks during consumption and the country of origin of the product should be widely disseminated in order to prepare consumers for conscious shopping and safe consumption.

References

1. Barbara, P. (2009). A Legal Framework On Dangerous Substances: An International, European And National Perspective. In: A. Bruognoli (Eds.), *Dangerous Materials: Control, Risk Prevention and Crisis Management*. Sofia: Springer.
2. Bragge, P., Becker, U., Breu, T. (2022). How policymakers and other leaders can build a more sustainable post-COVID-19 'normal'. *Discov. Sustain., Vol. 3, Iss. 7*, doi: <https://doi.org/10.1007/s43621-022-00074-x>.
3. *Cancer-causing chemicals: Safety of cosmetics and hair dyes* (1978). United States Congress, Washington: Government Printing Office.
4. Dine, J., Fagan, A. (2006). *Human Rights and Capitalism: A Multidisciplinary Perspective on Globalisation*. Cheltenham-Northampton: Edward Elgar.
5. Directive 2001/95/EC of the European Parliament and of the Council of 3 December 2001 on general product safety. Retrieved from <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A32001L0095>, 30.06.2022.
6. Hall, M.R. (2019). The Sustainability Price: expanding Environmental Life Cycle Costing to include the costs of poverty and climate change. *The International Journal of Life Cycle Assessment, Vol. 24*, pp. 223-236, doi: <https://doi.org/10.1007/s11367-018-1520-2>.
7. Hernik, J., Mazur, R. (2018). Innovations and safety in passenger railway transport – the travelers' perspective. *Economic and Social Development-Book of Proceedings, Vol. 33*, 71-81.
8. Hodges, Ch. (2005). *The Safety Regulation of Consumer Products in Europe*. Oxford: University Press.
9. *Key Consumer Data 2020*, European Commission. Retrieved from https://ec.europa.eu/info/sites/default/files/120321_key_consumer_data_factsheet_en.pdf, 03.07.2022.
10. Milligan, B. (2015). Vorsprung durch Technik? German cars 'amongst least reliable', *BBC News*. Retrieved from: <https://www.bbc.com/news/business-32332210>.
11. Minkov, N., Lehmann, A., Finkbeiner, M. (2020). The product environmental footprint communication at the crossroad: integration into or co-existence with the European ecolabel? *The international journal of life cycle assessment, vol. 25*, pp. 508-522, doi: <https://doi.org/10.1007/s11367-019-01715-6>.
12. Ohtani, H., Kobayashi, M. (2005). Statistical analysis of dangerous goods accidents in Japan. *Safety Science, Vol. 43, Iss. 5-6*, pp. 287-297.
13. Pauwels, M., Rogiers, V. (2010). Human health safety evaluation of cosmetics in the EU: A legally imposed challenge to science. *Toxicology and Applied Pharmacology, Vol. 243, Iss. 2*, pp. 260-274, doi: <https://doi.org/10.1016/j.taap.2009.12.007>.

14. Purves, J., Echikson, W. (2021). *Combating Unsafe Products: how to Improve Europe's Safety Gate Alerts*. European Centre for International Political Economy. Retrieved from <https://ecipe.org/publications/combating-unsafe-products/>, 30.06.2022.
15. Ruohonen, J. (2022). A review of product safety regulations in the European Union. *Int. Cybersecur. Law Rev*, June, doi: <https://doi.org/10.1365/s43439-022-00057-8>.
16. *Safety Gate 2021 results*. European Commission. Retrieved from <https://www.europeansources.info/record/safety-gate-2021-results-modelling-cooperation-for-health-and-safety-of-consumers-in-the-european-union/>, 03.07.2022.
17. Saxena, A., Ramaswamy, M., Beale, J. (2021). Striving for the United Nations (UN) Sustainable Development Goals (SDGs): what will it take? *Discov. Sustain.*, Vol. 2, Iss.20, doi: <https://doi.org/10.1007/s43621-021-00029-8>.
18. Xinhua (2021). China still world's 2nd largest consumer market in 2020. *China Daily*, January 30, 2021. Retrieved from: <https://www.chinadailyhk.com/article/156492#China-still-world's-2nd-largest-consumer-market-in-2020>.
19. Zhang, B., Sun, L., Liu, X., Liu, Y. (2022). An evacuation route planning approach considering individual risk under toxic gas release scenarios. *Environmental Engineering and Management Journal*, Vol. 21, No. 4, pp. 661-669.