Patent and product piracy

V Ignat1

1University of Applied Sciences, Hof, Germany

E-mail: valentina.ignat@hof-university.de

Abstract. Advanced industrial countries are affected by technology theft. German industry annually loses more than 50 billion euros. The main causes are industrial espionage and fraudulent copying patents and industrial products. Many Asian countries are profiteering saving up to 65% of production costs. Most affected are small and medium enterprises, who do not have sufficient economic power to assert themselves against some powerful countries. International organizations, such as Interpol and World Customs Organization - WCO - work together to combat international economic crime. Several methods of protection can be achieved by registering patents or specific technical methods for recognition of product originality. They have developed more suitable protection, like Hologram, magnetic stripe, barcode, CE marking, digital watermarks, DNA or Nano-technologies, security labels, radio frequency identification, micro color codes, matrix code, cryptographic encodings. The automotive industry has developed the method “Manufactures against Product Piracy”. A sticker on the package features original products and it uses a Data Matrix verifiable barcode. The code can be recorded with a smartphone camera. The smartphone is connected via Internet to a database, where the identification numbers of the original parts are stored.

1. Introduction
Advanced industrial countries are affected by theft technology. Germany industry annually loses more than 50 billion euros.

Product piracy is a crime of 21 centuries [1]. The main causes are industrial espionage and fraudulent copying patents and industrial products. Many Asian countries are profiteering, saving up to 65% of production costs. The most affected are small and medium enterprises, who do not have sufficient economic power to assert themselves against some large and powerful countries.

2. Aspects of product piracy
A product may be emulated, if it is reproduced exactly as an original product that already exists. Imitation is illegal only if the intellectual property (for example a patent) is violated.

A product may be plagiarized, if it is reproduced and more than that, the producer claims that he is the author or the inventor. A part of it is the trademarks piracy: characters, names, logos or trade names, especially in the textile, jewelry and consumer goods industry.

In 2014 the German automotive industry had a turnover of 367.9 billion euros. The estimated piracy damages were about 10 billion euros.

In the machinery industry we have a turnover of 212 billion euros and the damages from piracy are about 7.9 billion euros – in particular caused by infringement of patent rights.

In chemical and pharmaceutical industry, the material damage should be multiplied by the large numbers of deaths, due to fake drugs without effect.
Affected are small and medium enterprises, such as knife manufacturer Zwilling, porcelain manufacturer Villeroy&Boch and many large companies.

The origin of the plagiarized products confiscated by German customs: 70% China, 19% Hong Kong, 3.2% India, 1.4% USA, 1% Thailand. Counterfeit food and beverage products come mainly from Eastern Europe and fake luxury products come from China.

The products pirates are using all the distribution channels: counterfeit goods reach consumers through “mobile” traders in 41 percent and via the internet in 33 percent of cases. Also both retail and wholesale are affected by counterfeit goods in percent of 37 and 33 respectively.

In Germany, the purchase and possession of counterfeits is not an offense as long as it is for own use. For this, the counterfeiters exploit global flows of goods and prefer container traffic, using the “mixing” of originals and fakes in one and the same consignment. In this way, the frauditors are hoping to slip through the risk analysis and control of customs in the destination country.

Methods of protection can be achieved by registering patents or specific technical methods of recognition of product originality.

A legal way to use the experience of large corporations without making large investments in research refers to products like “generic”. Companies, like Mylan-USA, Stada-Germany, SUN Pharma-India, are producing medicines, using patented recipes that have 20 years of patent protection time – after 20 years the patents are not protected anymore.

Original drugs, which costs in US $ 1,000 and in Germany 700 euros, can be sold in India with $1, because the patent is not supported in India, but a competitor is using the original US patent to produce them [2]. Methods of combating product piracy can be achieved by means of low, for example registration of patents and trademarks, methods of organizational level which consist of specific technical methods of recognition of product originality.

Interpol, as well as WCO-PANGEA World Customs Organization are working together to combat international economic crime.

3. Techniques to combat product piracy

In the case of legal methods, it must be considered the following issues related to the endangered product:

- the risk of piracy: if the product is too complex or are required high-tech machines for fabrication, for example laser machining or tolerant in nano, the threat of piracy is low.
- the international patenting of the product, including design protection and trademark are favored, but are disadvantaged because some technical details must be disclosed and published. The international patenting is necessary, because product pirates can obtain patent licenses of the original products in unprotected countries, preventing the real author to export in the future or to manufacture these countries.

3.1. Identification and demonstration of prejudice.

It must be immediately analyzed the market and the alarm indicators and signals. Among these is included also the loss of market share. There must be observed the distribution channels, suppliers and service providers in order to collect clear evidence.

There is an online portal that informs the consumers and companies about the danger of counterfeiting.

The protection against counterfeiting and piracy consists of:

- organization of a department of safety management;
- the protection of company such as Know-how and future projects;
- the product protection from the initial idea to the customer.

Reduction of know-how lead-out by retaining of qualified employees with core competencies in R&D actions, with monetary compensations such as rewards, company shares or non-monetary incentives, such as tasks description and definition of jobs titles. A major role is played by economic, legal and geographical aspects as well as the period of time. Advantageous are considered the
collaboration with companies that had been affected similarly, foundation of harmed associations and very useful lobbying activities with political and administrative bodies.

4. Patents and plagiarism in China

In the course of time were registered numerous renowned scandals. For example, a Chinese bank had copied the name, emblem and the architecture of the famous American bank under the name "Goldman Sachs Shenzhen Financial Leasing Co." A similar scandal was given by the imitation of Ikea stores and by the fake Apple stores created in Kunming. The Apple stores were not closed, but they were no longer able to use the Apple logo [3].

Starting 1984 in China was introduced, developed and continuously modernized the patents law. The patent conditions refer to novelty, creativity and practical utility. The novelty is ensured only if it is not at the level of the prior art and there are no patents to contain it.

The Chinese law does not recognize as illegal the use of a patent without a license. It is considered illegal the use of labels, logos or advertisements from the foreign patents and their use in contracts or falsification of certificates of patents. These issues do not prevent the production of piracy! In addition it is accepted the judgment only at a value of illegal production of over 28,000 euros.

A classic example of piracy refers to the copying products of Stihl Company from Germany. A Stihl chainsaw costs regularly around 750 dollars, the copy is 250 dollars, the discomfort gets the original Stihl dealer. In Indonesia, the market share has halved within a few years, from 80 to 40 percent.

The Zhejiang Province, located in the south of Shanghai, is considered the center of Chinese counterfeiters. Here blossoms the dream of Asia. So far, only 0.03 percent of Chinese companies have developed their own technology. Initially, the counterfeit dealers put some original photos of Stihl chainsaws on the internet, as bait. Then they wait to see if there is a demand for the offer. In the interests of traders, an original Stihl device is purchased and it is copied: the saw is dismantled, the individual parts are measured, drawings are created and the necessary tools are made. Everything is made without original drawings and industrial espionage. Then the dealer is looking for a company that has contracts and an export license [4]. In addition, in China exists industrial piracy via reverse engineering. The plagiarized and copied products are registered as utility models. The utility models enter in the Chinese Patent Office without examination of novelty. Then follows a dispute with foreign companies! China is member of WTO from 2001, but until now there is no evidence for decreasing of patent infringement.

There are three ways to combat product piracy:

- by administratively way: about 90% of cases aims at obtaining an omission, but the foreign Chinese companies must be represented by a lawyer of Chinese patents. There is necessary ample evidence. The result of the action can lead to damage of the copied property or to close the company. It is not possible to ask a compensation claim. The costs are relatively low, typically up to 10,000 euros.

- by judicial way at the court of civil law: it can be claimed a reclaimer of compensation. The adjudgement is excluded. The related costs are high, can reach up to 100,000 euros depending on the dispute. The claim is however depending on the damage caused to the inventor, not on the illegal benefits realized by the pirate company, which is difficult to prove. The award rises to a maximum amount of 20,000 euros, which often covers only a part of the costs of process. The period of lawsuit can take several years [5].

- by technical methods.

The legal system to combat piracy of products still does not show full efficiency, mainly due to the interest of the countries to protect their own companies in the detriment of foreign firms. Since there is a system, in which the staffs of state and party have shares in various companies, there is a great interest to disadvantage them!
5. Techniques to combat product piracy
Among the technical methods are the following: hologram, magnetic stripe, barcode, CE-marking, digital watermarks, DNA or nanotechnologies, security labels, radio frequency identification, micro color codes, matrix code, cryptographic encodings.

A technique used successfully in the design phase is not standardization, the use in the design and manufacture of elements that are not available as standard elements in the market, or a quality differentiation. The can be also used visible and invisible protection technologies: label stickers attached shortly before launch, engravings.

Cryptography is the science of encrypting information. Cryptographic and steganographic methods can be combined. Encrypting a message is effected by means of cryptography and in addition, the communications by means of steganography, a concealed secret channel [6]. The classical cryptography was symmetric key and the possession of a key allowed both encrypting and decrypting a message. In an asymmetric cryptosystem - public-key method is a pair of matching keys turned-sets. For encryption and decryption different keys are needed. With this method, only one Keyring-key pair for each participant will be provided. Public-key method can also be used for authentication in an interactive communication [6].

The automotive industry has the method MAPP code "Manufacturers against Product Piracy" developed. A sticker on the package features original products and it uses a Data Matrix barcode verifiable. The code can be recorded with the camera of a smartphone. Through internet is then searched in a database in which the identification numbers of the original parts are stored. The result is original or plagiarism.

RFID - radio-frequency identification with the aid of electromagnetic waves - is a technology for transceiver systems for automatic, contactless identification and localization of radio waves. The US Food and Drug Administration recommends the use of RFID technology in the fight against counterfeit drugs. For sea containers special mechanical seals have been designed with additional RFID tags that are already used in individual cases. They are from 2007 either repeatedly used the so-called semi-active RFID tags according to ISO / IEC 17363 or once used the passive RFID tags according to ISO / IEC 18185.

So far, there is no obligation to use such electronic seal. Some manufacturers of loading equipment offer solutions with integrated RFID transponders according to ISO / IEC 18000-6C. Examples are transport pallets made of plastic or wood and small load carriers.

It is also necessary to protect the enterprise software itself. Effect may be the integration of parts of the software to the hardware. When attempting the removal from the overall system destroy the chip itself.

6. Conclusions
Original products are expensive, due to the costs of research, development, sales and marketing. Product piracy makes the most of these foreign investments. At the same time lose some of the original manufacturer marketplace and potentially swelling, leakage know-how, image loss, decreased product quality, risk of product liability.

Methods of combating product piracy, whether administrative, judicial or technical in many cases bring the desired effect, but the global industrial piracy has not decreased. Unfortunately, it grows.

7. References
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