



# Business Innovation Observatory



## Traceability across the Value Chain

### New anti- counterfeiting methods

*Case study 41*

Internal Market,  
Industry,  
Entrepreneurship  
and SMEs

*The views expressed in this report, as well as the information included in it, do not necessarily reflect the opinion or position of the European Commission and in no way commit the institution.*

# **Traceability across the Value Chain**

New anti-counterfeiting methods

Business Innovation Observatory  
Contract No 190/PP/ENT/CIP/12/C/N03C01

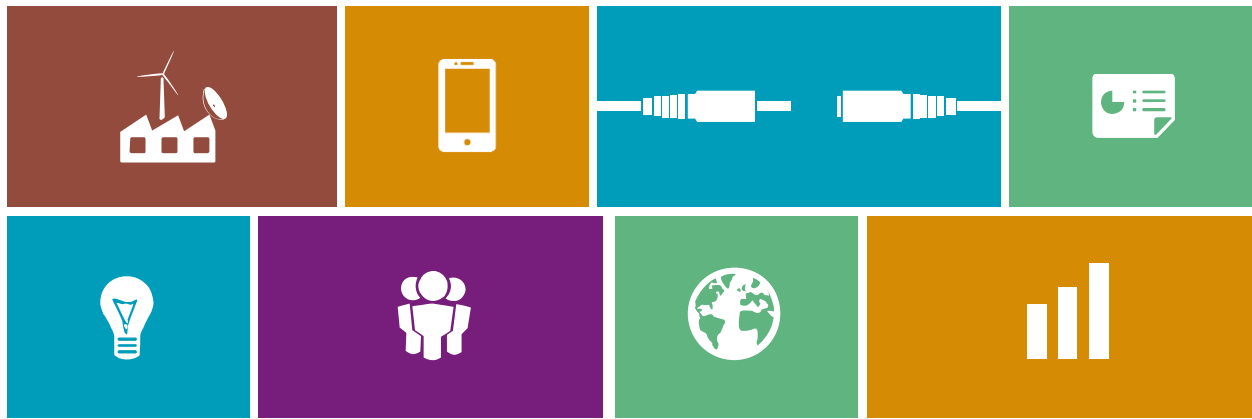
**Authors:** Laurent Probst, Laurent Frideres & Bertrand Pedersen, PwC Luxembourg.

**Coordination:** Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs, Directorate J “- Industrial Property, Innovation & Standards”, Unit J.3 “Innovation Policy for Growth”.

European Union, February 2015.

# Table of Contents

1. Executive summary	2
2. New anti-counterfeiting methods	3
2.1. Presentation of the companies referred to in the case study	5
3. Socio-Economic Relevance	6
3.1. The market potential of the trend	6
3.2. The social potential of the trend	7
3.3. Impact of Anti-Counterfeiting Methods on the value chain	8
4. Drivers and obstacles	9
4.1. Continuous growth of counterfeit products due to new distribution channels for counterfeiters	9
4.2. Directives spurred the demand	9
4.3. Anti-counterfeiting is not positively perceived by potential clients	9
4.4. Inadequacy of Horizon 2020 with the anti-counterfeiting	10
4.5. Consumer unawareness of counterfeit consequences	10
5. Policy recommendations	11
5.1. Create tools to better evaluate the impact of counterfeiting	11
5.2. More cooperation with developing countries	11
5.3. Reinforce intra-EU collaboration	12
5.4. Tougher IP enforcement	12
5.5. Educate end-users on the issues related with counterfeiting	12
6. Appendix	13
6.1. Interviews	13
6.2. Websites	13
6.3. References	13



# 1. Executive summary

Counterfeit goods entering the EU are a growing problem for European companies. Nowadays, a large number of companies, regardless of their size, are touched by this phenomenon. Even worse, the scope of counterfeit goods keeps widening from the traditional sectors such as money, jewellery and fashion to embrace more sensitive ones like food, pharmaceutical products or automotive parts.

New anti-counterfeiting methods are surfacing to propose concrete and applicable solutions to tackle these issues. They have two main objectives. First, they intend to act as deterrent by making the good too difficult and costly to copy. Secondly, they provide a technique to verify the authenticity of the item.

Estimating the impact of counterfeit is tough, as it is an illegal activity. Yet, studies have valued the annual global impact around EUR 530 billion. In Europe, circa 40 million products were seized by the EU customs in 2012, reaching an estimated EUR 1 billion, according to the EU Commission's annual report on customs actions. This magnitude forces companies to invest heavily in new anti-counterfeiting methods. Hence, the market is anticipated to continue growing up to EUR 67 billion by 2015.

Counterfeiting is a not a victimless crime and has unsuspected serious economic and social impact on both micro- and macro-economic levels. On top of obvious revenue losses, private companies are suffering from a damaged brand reputation, due to lower quality copies. Meanwhile, the European economies are witnessing the destruction of jobs by counterfeiters, as well as scepticism around the soundness of investing in innovation. Yet, doubting the value of innovating is a major threat for the continued development of a healthy economy.

Several drivers for the companies offering anti-counterfeiting methods were identified in the interviews. The main one resides in the lack of enforcement of intellectual property rights. The balance between the risks and the reward is currently largely weighted in favour of counterfeiting, due to the low probability of getting caught and the limited penalties. Another driver is the rise of new distribution channels. It can be tough for counterfeiters to enter traditional supply chains. The emergence of the Internet has offered a quick and easy channel to access an immense pool of customers.

The major barrier described in the interviews lies in the fact that potential customers have a bad image of anti-counterfeiting. They see these methods as unexpected costs and not for their added-value. Indeed, anti-counterfeiting methods are usually implemented in reaction to a loss of revenue or brand reputation. Further, Horizon 2020 is not setting anti-counterfeiting as a priority. Yet, to maintain innovation and growth, it is vital that companies can fight for their rights and protect their findings from copycats. Without effective anti-counterfeiting methods, innovation would suffer greatly and thus the EU initiative to support innovation should also take into account the protection of the innovation outcomes.

Consumer behaviour towards this issue is essential. According to a PwC survey in the UK; purchasing fake goods became commonplace and accepted in mainstream society. Hence, it is vital that more awareness campaigns are conducted to educate the general public. Other recommendations also include the creation of indicators to assess more precisely the phenomenon, the deepening of the collaboration intra-EU and with other countries. Overall, tougher enforcement of intellectual property should be set as the main priority.



## 2. New anti-counterfeiting methods

Counterfeiting is a growing high-margin sector, often controlled by criminal organisations. Traditional anti-counterfeiting methods, such as barcodes, are proving to be less effective and are presently easily copied. Yet, a new wave of anti-counterfeiting methods is now rising to protect legitimate companies and consumers.

This case study is part of a series of three case studies on traceability across the value chain. This case study focuses on the technological innovations that drive developments in anti-counterfeiting. The second case study also concentrates on technological innovations, related to tracking systems. Finally, the third case study analyses developments in traceability across the value chain specifically through the lens of standards and processes.

Counterfeiting corresponds to an imitation, which is passed off fraudulently or deceptively as authentic. According to the OECD<sup>1</sup>, counterfeiting and piracy are terms used to describe a range of illicit activities linked to intellectual property rights (IPR) infringement. Meanwhile, anti-counterfeiting methods can be broadly defined as the technologies used to avert and potentially identify forged and imitated goods.

Anti-counterfeiting methods have two main purposes. Firstly, they aim to act as a deterrent. By increasing the complexity, and thus the costs related to the replication of a product, they transform counterfeiting into an unsound financial operation. They are also designed to make it easier to detect counterfeit products, and hence augment the risks of prosecution. Secondly, they intend to facilitate the authentication of a good (whether by authorities, industry investigators or the wider public).

Several types of anti-counterfeiting methods are currently available to manufacturers, brand owners or authorities. They can be applied on the packaging of the item or even directly on the product, either by direct marking or by using physical or chemical components. These types of methods can be categorised as detailed in Table 1 and as follows:

- Overt features are directed toward end-users. The visible features allow end-users to authenticate an item. The features are conspicuous but supposedly challenging and costly to copy. They entail a high level of security in the supply chain to prevent unapproved diversion. Figure 1 shows examples of on-product marking (1), holograms (2), optically variable devices (3), security graphics (4), and colour shifting inks (5).

Figure 1: Overt features on a EUR 5 note



Source: European Central Bank<sup>2</sup>

- Covert features are mainly beneficial to manufacturers and brand owners, who can verify the authenticity of a product. However, authorities and general public are not concerned, as they are usually not even aware of the features. Covert features are normally harder to copy, let alone detect.
- Forensic techniques can be considered as a subset of covert features. However, the use of forensics features necessitates the use of field test kits to scientifically prove the authenticity of an item. The scientific methodology behind the forensics features are usually patent protected, making them very expensive and limit their scalability.
- Track and trace includes the technologies related to advanced tracking systems, such as Radio Frequency Identification (RFID) and Near-Field Communication (NFC). These technologies are analysed in more details in another case study called “Advanced Tracking Systems”.

Anti-counterfeiting methods are beneficial to all the actors except counterfeiters. Businesses can defend their brand image and revenues, while governments can protect their economies and employment. Meanwhile, end-users know that the bought items are in line with expected quality and safety standards.

New anti-counterfeiting methods are applied in almost every sector, as the scope of counterfeiting keeps increasing. It used to be limited to luxury items and currencies, but is slowly shifting toward all consumer goods. A non-exhaustive list provided by the OECD includes numerous industries such as: apparel, footwear and designer clothing, audio-visual, literary and related copyrighted work, automotive, chemicals/pesticides and pharmaceuticals, electronics, food and tobacco<sup>3</sup>.



When considering counterfeiting, digital data is a major industry not to be overlooked. Piracy of movies and music is a well-known problem, but maintaining the integrity of credentials, documents and data is another major challenge.

Currently the leading technologies in terms of market share are holograms and tamper-evident closures. Two of the showcased companies are offering overt methods with holograms (Optrace's individualised hologram and AlphaFox Systems' random hologram). SEiD is proposing a method with two secure codes (overt and covert), while Guardtime could be considered as a covert method in the digital world.

**Table 1: Types of anti-counterfeiting methods**

Categories	Advantages	Drawbacks	Example
<b>Overt</b>	<ul style="list-style-type: none"> <li>- End-users can verify features</li> <li>- Features can be appealingly designed</li> <li>- Features are a deterrent</li> </ul>	<ul style="list-style-type: none"> <li>- End-users needs to be educated</li> <li>- End-users might be misleadingly reassured</li> <li>- Features can be copied</li> <li>- Features can be costly</li> </ul>	<ul style="list-style-type: none"> <li>- Hologram</li> <li>- Tamper evident labels, tapes</li> <li>- Optically Variable Devices</li> <li>- Colour shifting inks</li> <li>- Security graphics</li> </ul>
<b>Covert</b>	<ul style="list-style-type: none"> <li>- Features can be cheap to implement</li> <li>- Features do not require approval from authorities</li> <li>- Features can be added or modified effortlessly</li> </ul>	<ul style="list-style-type: none"> <li>- Features need secret to be efficient</li> <li>- Features can be compromised if shared with suppliers</li> <li>- Cheaper features are less deterrent</li> </ul>	<ul style="list-style-type: none"> <li>- Invisible printing</li> <li>- Embedded image</li> <li>- Digital watermarks</li> <li>- Hidden marks</li> <li>- Substrates</li> </ul>
<b>Forensics</b>	<ul style="list-style-type: none"> <li>- Features are based on high-technologies</li> <li>- Features are more secure</li> <li>- Features can be added or modified effortlessly</li> </ul>	<ul style="list-style-type: none"> <li>- High-technologies are often licensed</li> <li>- Features can prove very costly</li> <li>- Features can be hard to scale on many markets and products</li> </ul>	<ul style="list-style-type: none"> <li>- Isotopes ratios</li> <li>- DNA taggants</li> <li>- Chemical taggants</li> <li>- Biological taggants</li> <li>- Micro taggants</li> </ul>
<b>Track and Trace</b>	<ul style="list-style-type: none"> <li>- Additional benefits in inventory, supply management</li> <li>- Eases of recall</li> <li>- Remote authentication possible</li> </ul>	<ul style="list-style-type: none"> <li>- Data privacy issues</li> <li>- High costs to implement</li> <li>- Standards differ across markets</li> </ul>	<ul style="list-style-type: none"> <li>- Serialisation and bar-codes</li> <li>- RFID</li> <li>- NFC</li> </ul>

Source: PwC Analysis

**Table 2: Overview of the company cases referred to in this case study**

Company	Location	Business innovation	Signals of success
Optrace	Ireland	Optrace uses patented technology for the mass production of unique serialised holograms where each hologram is different.	<ul style="list-style-type: none"> <li>- Received funding from the National Digital Research Centre</li> <li>- Backed by the Dublin Institute of Technology</li> </ul>
SEiD	Italy	SEiD is a global platform which provides a unique identity to products by the assignment of visible and hidden secure codes.	<ul style="list-style-type: none"> <li>- Red Herring Top 100 Europe Award 2014</li> <li>- Selected for the SetteGreen Award 2014</li> <li>- Took part in EICMA 2014</li> <li>- Founder Member of The Global Compact Network Italy Foundation</li> <li>- Technical partner of "Unione Nazionale Consumatori" (National Consumer Union)</li> <li>- Takes part in Vinitaly 2015 (Enolitech exhibition)</li> </ul>
Guardtime	Estonia	Guardtime has developed Keyless Signature Infrastructure (KSI) is an exabyte-scale real-time authentication scheme for the world's networked digital assets.	<ul style="list-style-type: none"> <li>- CTO Matt Johnson delivered a keynote at the European Voice Conference on Cyber-security</li> <li>- Recognised as the Leading Technology Company in Estonia in 2014</li> <li>- Partnered with Ericsson to create secure cloud and big data</li> <li>- Extensive press coverage</li> </ul>
AlphaFox Systems	United Kingdom	AlphaFox has patented a unique brand protection and identification tag system called Crystal Chip®.	<ul style="list-style-type: none"> <li>- Finalist in Cambridge Wireless Discovering Start-Ups competition in 2013</li> <li>- Finalist at the UKTI competition for funded participation at CeBIT 2014</li> <li>- Shortlisted for Smart UK project (2014)</li> <li>- Recognised by the Duke of York at Technology Reception at Buckingham Palace</li> </ul>



## 2.1. Presentation of the companies referred to in the case study

**Problem 1** – Holograms are a traditional anti-counterfeiting method. They are based on a master and copied from it. Even though hard to copy, they are not unique and so not secure.

*Innovative solution 1* – Optrace specialises in the production of serialised holographic labels for anti-counterfeiting and brand identification. A novel ink is digitally printed on a light sensitive-polymer. This polymer is then exposed to laser light in a controlled pattern, which transform the design into a unique hologram. Each hologram from Optrace is as unique as a human fingerprint.

Even though unique, Optrace can produce individualised holographic labels in unit volumes to match most production runs, ranging from low thousands through to several million.

Further, with traditional holograms, the cost of copying the master are amortised in volume. However, the unicity of Optrace's hologram means the costs of counterfeiting each label outweigh the reward.

*The hologram can include data such as serial number, company name, logo, or barcode.*



*Holograms can be transparent (see above) or tamper-evident (as below) or reflective.*



Source: Optrace<sup>4</sup>

**Problem 2** – A direct line of communication between the manufacturer and the end-users is lacking. Such a tool would allow consumers to authenticate.

*Innovative solution 2* – SEiD has developed a tool by which the manufacturer certifies the information and the consumer has access to them. A unique code is added on every product. The consumer can thus check its authenticity, thanks to free applications for smartphones and tablets or through the SEiD website.

By reading the second code, after the purchase, the consumer has the certainty of the originality of the product, and then he receives the warranty with suggestions for the best use of the product and other information provided by the manufacturer.

The SEiD solution can be implemented during any stage of the production and supply chain. With the SEiD system, the market has a virtual venue in the commercial chain which becomes a point of contact between product, manufacturer and all the operators involved in distribution, including the final consumer as well.

Therefore the benefits provided by the SEiD platform are easy tracking, traceability, anti-counterfeiting, anti-theft, anti-fraud, and finally the exchange of data between the consumer and the producer through the passage of data, information on reasons behind the product choice, promotional messages, instructions and warnings.

*The end-user can verify the authenticity of a purchased product and receive useful information such as manual or promotional messages.*



*The manufacturer can access new information on sales, to improve its reporting and increase customer satisfaction*



*The distributor can monitor, forecast and check sales phenomena, predicting purchasing trends.*



Source:SEiD<sup>5</sup>



**Problem 3** – Counterfeiting can also happen in the digital world. It is difficult to secure and validate electronic data. For example, e-mail messages are known for their vulnerability to phishing, erratic spam filters and man-in-the middle attacks.

*Innovative solution 3* – Guardtime is a systems engineering firm that invented Keyless Signature Infrastructure (KSI) a digital signature technology for real-time validation of electronic data.

When implemented on networks, KSI monitor the integrity state of the network with real-time alerting and mitigation to manipulation of those assets. KSI technology can secure all digital assets on a network (configuration files, executables, data storage). It also transforms regular email into tamper-evident messaging solution.

*Guardtime aims to grow from an Estonian cryptography start up to become the Qualcomm of data security<sup>6</sup>*

**guardtime** 

*Scrive is the e-signing service from Guardtime*

**scrive.**

*Source: Guardtime<sup>7</sup>*

**Problem 4** – Key problems with many anti-counterfeiting methods rely in the fact that they are predictable and with man-made design. Hence, there is a need for methods with random features, where even the creator cannot anticipate in advance what the features will be.

*Innovative solution 4* – Crystal Chip<sup>®</sup> is an optical-based anti-counterfeiting 'marking' system. It is based on the creation of a different and unique pseudo-random 3D array

of 'particles' in each individual tag, label, or seal, so that each item is individually marked.

The Crystal Chip<sup>®</sup> is a Physical Unclonable Feature (PUF), which means it is almost impossible to replicate, even given the correct manufacturing procedure to produce it.

The Crystal Chip<sup>®</sup> tamperproof tag can be secured on an article or its packaging. Depending on the application, the tags can be incorporated onto/into paper, card or plastic labels, seals and packaging, and on the protected objects themselves, including those made of metal where other security methods, such as RFID tags, can be a problem.

*Crystal Chip<sup>®</sup> logo*



*Crystal Chip<sup>®</sup> label on a product and hand-held reader*



*Source: AlphaFox Systems Ltd<sup>8</sup>*

## 3. Socio-Economic Relevance

According to Havoscope<sup>9</sup>, counterfeiting is a flourishing industry, estimated above EUR 530 billion. When comparing this number with the worldwide 2013 GDP of the World Bank (EUR 60 trillion), counterfeiting would contribute to more than 1% of the global GDP.

### 3.1. The market potential of the trend

The market potential of the anti-counterfeiting methods is closely related to the scale in counterfeiting of the goods. The two main characteristics of the anti-counterfeiting market is that it has to be considered on a worldwide scale and that almost every sector is concerned.





Because counterfeiters are working outside the law, it becomes difficult to track exactly the breadth of the phenomenon. The illegal practice has no reporting activity. Any attempt to assess the size would need to focus on indirect indicators.

However, estimates show that hundreds of millions of euros in sales revenues are lost each year due to the manufacturing of counterfeit. For instance, Frontiers Economics based its calculation on OECD reports from 2007. They assessed the total value of counterfeiting in 2008 between EUR 370 and EUR 530 billion. The breakdown of their results is provided in Table 3.

**Table 3: Estimates of the total value of counterfeit and piracy in 2008 and 2015**

OECD Category	Estimates for 2008	Estimates for 2015
Internationally traded counterfeit and pirated products	EUR 230 – 290 bn	EUR 625 – 780 bn
Domestically produced and consumed counterfeit and pirated products	EUR 115 – 175 bn	EUR 300 – 465 bn
Digitally pirated products	EUR 25 – 60 bn	EUR 65 – 195 bn
<b>Total</b>	<b>EUR 370 – 525 bn</b>	<b>EUR 990 – 1440 bn</b>

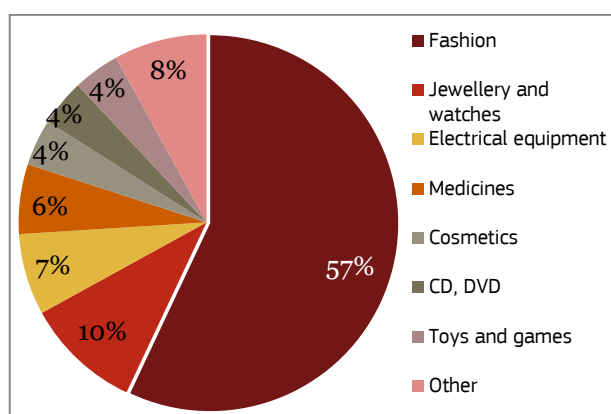
Source: Frontiers Economics<sup>10</sup>

Since these estimations, the European Union customs have witnessed a double in the number of cases involving IPR infringements between 2009 and 2011. They reached over 91,000 in 2011. In 2013, a total of 36 million items were detained at the European customs.

The total retail value of these items was estimated to amount EUR 768 million. These numbers may have two root causes. It can either be due to the expansion of counterfeiting or due to better anti-counterfeiting methods, which increase detection rates.

This escalation essentially involved fashion (clothing, shoes, personal accessories), electronics, and medicines, as illustrated in Figure 2. Since 2011, the ceiling was potentially reached, as the case numbers slightly decreased to attain 86,000 last year.

**Figure 2: Counterfeit seizures at European borders by product type in 2008**



Source: European Commission

In response to this rise, it is no surprise the global market for anti-counterfeiting methods is aggressively growing. According to Global Industry Analysts<sup>11</sup>, it could reach EUR 67 billion by 2015. The recent slowdown of the economy is not hindering the growth of the trend. On the contrary, it acts

as a driver because companies try to recuperate the sales loss due to counterfeiting.

The report also underlines that pharmaceutical and food sectors endure "substantial" losses annually due to counterfeiting. Hence, these two sectors are the most active in implementing diverse strategies to limit brand damage, including heavy investments in new anti-counterfeiting methods.

RFID, which is detailed in another case study called "Advanced tracking systems", is experiencing a strong growth. In terms of geography, the main markets consist in North America and Europe. In these markets, right holders invest ever more in multi-layered anti-counterfeiting methods mixing overt, covert and forensic features.

### 3.2. The social potential of the trend

When thinking of counterfeiting, the prominent repercussion is necessarily the loss of a sale opportunity. Yet, counterfeiters are impacting stakeholders in much wider outcomes. Whilst often difficult to quantitate, several dimensions should be taken into account: trade, foreign investment, employment, innovation, criminality and the environment.

Firstly, on a micro-economic scale, the sales numbers of right holders are noticeably declining due to counterfeiting. These companies are losing market share and forced to drive their prices down, resulting in the eventual decrease of their investment capacity.

The brand image is also negatively impacted. Consumers may not always be aware that they are buying in fact a counterfeit. The lower quality standards of the counterfeit will thus not meet the expectations and reflect badly on the right holders. The reputation of the firm will be damaged, lessening its brand value.



For the end-users, counterfeit goods may have an appeal due to lower prices and do not take into account the inferior quality of the good. Counterfeiters are usually not concerned by the safety standards which can be affected by inferior quality. Hence, in some specific sectors such as pharmaceutical, cosmetics or clothing, health and safety might be endangered. For instance, according to Frontiers, almost 3,000 people die each year from counterfeit drugs<sup>12</sup>.

Secondly, on a macro-economic scale, Frontier Economics<sup>13</sup> estimated in 2011 that the yearly cost of counterfeiting on the G20 economies over EUR 100 billion, among which:

- EUR 63 billion in tax revenues and higher welfare spending;
- EUR 20 billion in increased costs of crime;
- \$15 billion in the economic cost of deaths resulting from counterfeiting; and
- EUR 100 million for the additional cost of health services to treat injuries caused by dangerous fake products.

Employment is also severely affected. This study from Frontier Economics estimated 2.5 million jobs were lost by counterfeiting in the same G20 economies. This number does not cover the indirect jobs from other part of the value chain such as suppliers or retailers. Further, the working conditions for the jobs in the shadow economy created by counterfeiters are usually extremely difficult.

Innovation is accepted as an engine for growth. However, the intellectual property of innovators is not respected, even though patents, copyright or trademarks are filed. There is therefore less incentives for innovators to invest in R&D. Counterfeiters are thus indirectly hampering the overall economic growth of European countries.

Counterfeiting is also taking its toll on the environment. In 2011, over 114 million items were seized by customs at the EU borders, for suspected IPR infringements. This creates an enormous amount of waste, which will inevitably end up being destroyed. Moreover, some counterfeit products are potentially dangerous for the environment. For example, according to Europol<sup>14</sup>, more than a quarter of pesticides used in some EU Member States in 2011 originate from the illegal pesticide market.

### 3.3. Impact of Anti-Counterfeiting Methods on the value chain

The impact of anti-counterfeiting methods on the value chain is undeniable. To protect their intellectual property, rights holders need to think upstream and downstream of their manufacturing.

Considering up the value chain, companies must establish that all the components needed for their manufacturing meet the safety and quality standards to avoid compromising their own final product. Unfortunately, this can prove to be costly for SMEs to verify and continuously audit whether their partners are in line with the requirements. This is why SMEs are heavily relying on certifications and standards, as explained in the case study on 'Standards and certifications as enablers of traceability' (Case Study 42).

Downstream, retailers must also be able to trace the life of the products. Traceability is increasingly imperative to recall defective and below standard products. They also must ensure that the goods are legitimate. This is further explained in the case study on 'Advanced Tracking Systems' (Case Study 40). Hence, in the value chain, anti-counterfeiting methods are often used for multiple purposes.

However, the efficiency of the anti-counterfeiting methods depends on their secrecy. When sharing the "recipe" with suppliers and retailers, companies lose some control on the protection. This can also prove more difficult to prevent leaks. This explains why some anti-counterfeiting methods aim to create a direct communication channel between the manufacturer and the end-user.

Further, some sectors are facing higher difficulties to implement efficient anti-counterfeiting methods through the whole value chain. For instance, electronics or computer equipment requires a high number of components from numerous sources.

Outsourcing of manufacturing has increased the risk by providing more opportunities for infiltration of counterfeit parts in the production process. Value chains are becoming more intricate with numerous suppliers. Counterfeiting can then penetrate the supply chains as intermediary products. The resources needed to monitor suppliers rise quickly. . Anti-counterfeiting methods are thus a solution to ensure the authenticity of manufactured products and support the globalisation of value chains.



## 4. Drivers and obstacles

The drivers behind the growth of anti-counterfeiting methods result from free trade agreements and the rise of unregulated supply chains, such as e-commerce. They increase the number of counterfeit goods in Europe. EU directives aiming to limit this influx are also considered as a driver. Nonetheless, anti-counterfeiting methods are still frowned upon by their potential clients, because they are considered as additional costs. Further, the sector is suffering from the lack of R&D funding opportunities related to the Horizon 2020.

### 4.1. Continuous growth of counterfeit products due to new distribution channels for counterfeiters

Diverse explanations justify the recent needs for new anti-counterfeiting methods. The main one resides essentially in the continuous growth of counterfeit items, costing business around the world billions of euro each year. Counterfeit products are available in almost every sector and are easier to access through e-commerce than through traditional brick and mortar.

Traditionally, unregulated supply chains such as informal markets represented the only source of distribution for counterfeit products. Yet, they are now accessing genuine supply chains.

Unregulated supply chain still amount for the major part of counterfeit sales. The rise of the e-commerce is constant and important for both Business-to-Business (B2B) and Business-to-consumer (B2C)<sup>15</sup>. However, e-commerce is a high distributor of counterfeit products. For example the World Health Organisation estimated that half of the online pharmaceuticals are counterfeit drugs<sup>16</sup>.

The Internet is offering counterfeiters and consumers with effective ways to connect. Auction or e-commerce sites, email solicitations are direct, anonymous, and flexible. And they still have a bright future ahead, notably thanks to rise the rise of e-commerce. B2C ecommerce sales reached EUR 1.2 trillion in 2014, a growth of almost 20% compared to 2013. As worldwide internet adoption carries on, e-commerce growth will decelerate to reach EUR 1.9 trillion in 2018.

Another window opened to counterfeiters is the trade agreements. To foster legal activities, regulations are reduced to the minimum inside the zones. This allows businesses to produce and retail products across borders.

Such zones are used by counterfeiters to set up distribution centres for their goods, with limited enforcement of IPR.

### 4.2. Directives spurred the demand

Two main types of regulations have positively influenced the anti-counterfeiting trend: goods control at customs and sector specific regulations.

Reinforcing of control for goods was needed since the first Counterfeit Goods Regulation 1383/2003/EC more than a decade ago. It was updated in a new regulation 5129/2013/EC early 2013. The New Regulation describes the procedures implemented by the customs against goods suspected of not respecting IPR. Clear identification methods are thus needed to support customs.

Some specific sectors are pioneers in the adoption of new anti-counterfeiting methods. The higher level of regulations to which they have to comply is one of the main explanations of these discrepancies. The pharmaceutical industry is arguably the best example to illustrate it. Drugs can save lives, while at the same time fake medicines can potentially kill. According to Interpol, 10% to 30% of all pharmaceutical drugs circulating around the world are fakes. It thus represents a severe menace to global health.

The European Commission has introduced several directives, which spurred the demand in the sector: Directive 2001/83/EC on the Community code relating to medicinal products for human use, Directive 2011/62/EU as regards the prevention of the entry into the legal supply chain of falsified medicinal products.

### 4.3. Anti-counterfeiting is not positively perceived by potential clients

For private companies, anti-counterfeiting is considered as cost rather than a benefit. Businesses tend to react instead of anticipating counterfeiting. Hence, they end up being affected twice by counterfeiting.

When a good is counterfeited, it impacts negatively the rightful company, which winds up harms the firm. The quality of the product is below usual standards. The lower quality can even represent a direct threat to the physical integrity of the users. Since consumers are not always able distinguish between a fake and a genuine product, it can reflect badly

*“Anti-counterfeiting is often seen at first as a cost by brand owners, they don’t see the benefits right away”*  
– **AlphaFox Systems**



on the victim company. On top of losing revenue from the initial sale, the firm will suffer from the loss of potential future sales, a negative brand image, and a bad reputation.

Frequently, it is at this point that the company acknowledges that it is facing a counterfeiting problem. Introducing anti-counterfeiting methods is then the logical next step, but it induces additional costs compared to the expected costs of manufacturing. The cost/benefit also often appears asymmetric for the potential clients. It is complicated to assess the costs of counterfeiting on a company, and potential clients often feel anti-counterfeiting methods are too expensive compared to the expected benefits. Hence, the firm ends up seeing the anti-counterfeiting as a burden.

#### 4.4. Inadequacy of Horizon 2020 with the anti-counterfeiting

Horizon 2020 is the biggest EU Research and Innovation programme in its history with nearly €80 billion of funding available over 7 years (2014 to 2020). Horizon 2020 is divided in three research areas, each containing multiple sub-programmes:

- Excellent Science;
- Leadership in enabling and industrial technologies; and
- Societal challenges.

The showcased companies had mixed feelings regarding Horizon 2020, following their own experience. They widely recognised it as a positive initiative to support R&D. Yet, several CEOs regretted that anti-counterfeiting would not fit in any of the sub-programmes. Counterfeiting corresponds to a societal challenge, and could be categorised as such. But at the same time, it could also fit in the category of “Leadership in enabling and industrial technology”. As shown in chapter 2, anti-counterfeiting methods and techniques are extremely diverse. They are transversal to multiple sub-programmes of the Horizon 2020.

*“Horizon 2020 is too narrow, we do not fit in any category”*  
– **Optrace**

This explains why their applications for funding were made more complicated when they decided to apply anyway. Horizon 2020 aimed to achieve lighter paperwork for candidate companies.

*“There is not a specific Horizon 2020 call fitting anti-counterfeiting”*  
– **AlphaFox Systems**

However, in the specific cases of companies not perfectly fitting the predefined sub-programmes, it caused heavier administrative burden and lower chances of success. Hence, **none of the showcased companies have benefited from the support of Horizon 2020.**

#### 4.5. Consumer unawareness of counterfeit consequences

Another major issue explaining the need for new anti-counterfeiting methods was highlighted in a 2013 PwC survey on counterfeiting<sup>17</sup>. Despite 90% of respondents believing it to be morally wrong, they were far more concerned about losing their bank account details than getting caught.

**Figure 3: Global campaign to raise consumer awareness by the UNODC**



Source: UNODC<sup>18</sup>

Moreover, when analysing the responses by age group, it appears that younger respondents were more likely to buy counterfeit goods. The rate of these purchases include: films, music (60%) and clothing (55%), the same happens for other sector such as medicines (28%), auto parts (20%) or cigarettes (19%).



## 5. Policy recommendations

The intellectual property rights play a decisive role in fostering innovation, growth and jobs. The large-scale intrusion of counterfeit goods therefore has a negative impact on a macro-economic level.

In this framework, the efforts of policy makers to further fight counterfeiting should be seen as investments. Such strengthening can engender concrete results in terms of jobs and economic development.

Further, the efficiency of anti-counterfeiting methods is highly dependent on the controls put in place to identify copies.

The implementation of policy measures to fight counterfeit products is thus a great complement for anti-counterfeiting methods, turning them into a worthwhile investment. Tougher IP enforcement, improved collaboration between countries, and comprehensive reporting would all make a strong case to provide anti-counterfeiting methods with tangible track records.

### 5.1. Create tools to better evaluate the impact of counterfeiting

Today, evaluating the impact of counterfeiting is extremely difficult. By definition, counterfeiting is illegal and is not subject to bookkeeping. To clearly understand the size of the problem and its evolution, it seems important to establish a method to evaluate it.

Hence, an annual reporting system is needed to provide accurate statistics on the efficiency of anti-counterfeiting methods. Several dimensions can be taken into account for the creation of a composite indicator.

- The type of features counterfeited;
- The sector of the counterfeited;
- The estimated value of the counterfeit or pirated items seized;
- The country of origin of the counterfeit or pirated items seized;
- The number of prosecution and sentences against counterfeiters.

On top of this monitoring report, authorities should elaborate calculation methods to determine the appropriate amount of fines for counterfeiters. Counterfeiting is not a victimless crime: it does hurt individuals, businesses and economies. The objectives are to assess the real damages of a counterfeit item in order to set legitimate fines, which can act as deterrent.

The calculation to assess the resulting harm should take different levels into consideration. First, at a company level, one counterfeit does not necessarily mean the loss of a sale, but it also induces bad brand reputation, uncovered R&D costs.

For the government and the workforce, the potential impact on the economy and jobs loss cannot be ignored. Further, the safety and security costs on fake items such as automotive parts or pharmaceutical must also be compensated.

However, in setting up this indicator, it is highly important to carry out an impact assessment on the additional burden on the companies. The implied reporting that the new indicator would put on the firms could have a negative impact.

### 5.2. More cooperation with developing countries

Counterfeiting is a worldwide phenomenon, which hits almost all sectors. Improving cooperation is thus a compulsory step toward limiting it. More cooperation is required between companies and authorities, between countries of origin and destination.

#### **Bilateral agreements as pressure tool**

Except for preventing money counterfeiting, it appears that numerous governments do not consider anti-counterfeiting as a priority. On the contrary, counterfeit organisations offer employment (even though without respecting basic work conditions), inexpensive goods, and even in some case bribes are made to corrupt government officials.

Bilateral trade agreement should include disposition regarding anti-counterfeiting. Trade restriction should be lifted for legal authentic goods, but it should not be beneficial to counterfeiters. Such agreements would also allow standardising international guidelines and regulations. The implementation of worldwide best practices could also be carried out through intergovernmental organisations, both general ones (WTO, OECD) and specialised ones (WHO).



### Enhance cooperation between administrations

Promoting closer relations between national customs authorities and foreign competent authorities, which can differ depending on the sector, could provide valuable information to customs authorities. Information sharing, such as indicators and country-specific risk analysis, could help them more rapidly identify and more precisely potentially suspect items.

### 5.3. Reinforce intra-EU collaboration

Given that the majority of counterfeit items originate from outside the European Union, it is necessary for Europe to act as one against counterfeiting. This includes more collaboration between Member States but also between the private and public sectors. This is particularly in the “Follow the money” approach, outlined by the Action Plan to address infringements of intellectual property rights in the EU published in July 2014 by the European Commission.

#### Cooperation between businesses and authorities

Many companies victim of counterfeiting do not have the means to fight back. In particular, SMEs cannot afford long procedures against counterfeiters. Policy makers could assist European businesses to set up in third countries shared contact points to take care of counterfeiting. As issues in disputes can be shared by companies, class-action lawsuits would allow them sharing the burden of legal costs in pursuing counterfeiters.

Furthermore, national authorities should alleviate their rules and procedures to ease the access by business entities to relevant documents on counterfeiting relating to their trademark, which are collected by governments. Companies or trademark owners could then leverage on the information when filing complaints at courts or government agencies.

#### Catalogue of best practices

Member States can support each other in utilising the most innovative methods to controlling counterfeit goods. For example, relevant EU administrations could engage together to gather and disseminate best practices. A shared catalogue of best practices would help create a more hermetic border by levelling current differences in terms of legislation and regulations between countries.

## 5.4. Tougher IP enforcement

Counterfeiting currently gives criminals the potential to make huge profits with very little risks of prosecution. In many countries laws fighting counterfeiting are non-existent; and when they happen to exist, there is no wish to enforce them. This leaves the companies alone to cope with the flow of fakes from foreign jurisdictions. The amount invested by companies to protect IP is irrelevant if authorities do not take the required actions to enforce anti-counterfeit laws.

It is highly likely that counterfeiting will never be completely eradicated. Yet, tougher laws, and enforcement of those laws will help to reduce the problem. The EU cannot continue to perceive counterfeiting as a “soft crime”. It is currently fairly down on the list of law enforcement and trade policy priorities. The efficiency of anti-counterfeiting laws will be largely hindered if policy-makers do not awaken to this fact.

Tougher IP enforcement is also correlated to the fight against corruption. More specifically, in the communication COM(2011) 308, several measures are outlined to fight corruption in the EU. Sensitive checkpoints such as sea and airports should be targeted in priority for the implementation of these measures.

### 5.5. Educate end-users on the issues related with counterfeiting

On top of enforcing tougher laws, there is a lack of awareness of the issues related to counterfeiting from the general public. Some consumers deliberately buy counterfeiting because they are cheaper. They do not necessarily know or realise the high risks brought about by the lack of safety standards for these products. It is thus extremely important to get to the root of problem to have a greater impact. If there is less demand, the makers of counterfeit goods will suffer from the drop and could stop production altogether.

Hence, advertising campaigns directed toward consumers should be carried out. They would aim to educate the public on the importance of getting rid of the distribution and consumption of counterfeit items. For example, South-Korea is also confronted to the counterfeiting issues, notably in the electronics industry. The Korean intellectual property office organised public campaigns through various media channels via TV and radio broadcasts, newspaper, online websites, blogs, and social network to increase the awareness of end-users on the consequence of respecting IP. More specifically, public service announcements were made with the intended purpose to expose the damaging outcomes of counterfeiting such as slavery and child labour. Similar actions would likely lead to comparable positive results and contribute toward a shared consensus among the public to develop a culture against buying counterfeit good.



## 6. Appendix

### 6.1. Interviews

Company	Interviewee	Position
Optrace	Stephen McDonnell	CEO
SEiD	Francesca Rizzo	CEO
Guardtime	Martin Ruubel	Director
AlphaFox Systems	Keith Barfoot	Technical Director

### 6.2. Websites

Optrace	<a href="http://www.optrace.ie">www.optrace.ie</a>
SEiD	<a href="http://www.se-id.com">www.se-id.com</a>
Guardtime	<a href="http://www.guardtime.com">www.guardtime.com</a>
AlphaFox Systems	<a href="http://www.alphafoxsystems.com">www.alphafoxsystems.com</a>

### 6.3. References

- <sup>1</sup> Organisation for Economic Cooperation and Development, 2007, Economic impact of counterfeiting and piracy [www.oecd.org/industry/ind/38707619.pdf](http://www.oecd.org/industry/ind/38707619.pdf)
- <sup>2</sup> European Central Bank, 2014, The security features of Euro banknotes, [http://www.ecb.europa.eu/euro/html/security\\_features.en.html](http://www.ecb.europa.eu/euro/html/security_features.en.html)
- <sup>3</sup> Organisation for Economic Co-operation and Development, 2007, The economic impact of counterfeiting and piracy <http://www.oecd.org/industry/ind/38707619.pdf>
- <sup>4</sup> Optrace, 2014, Products, <http://optrace.ie/products/>
- <sup>5</sup> SEiD, 2014, What is SEiD ?, <http://www.se-id.com/>
- <sup>6</sup> ZDNet, 2013, The Estonian cryptography startup that wants to be the Qualcomm of data security, <http://www.zdnet.com/article/the-estonian-cryptography-startup-that-wants-to-be-the-qualcomm-of-data-security/>
- <sup>7</sup> Guardtime, 2014, Why Guardtime, <http://guardtime.com/why-guardtime>
- <sup>8</sup> AlphaFox Systems Ltd, 2014, <http://www.alphafoxsystems.com/>
- <sup>9</sup> Havoscope, 2014, Anti-Counterfeiting News and Counterfeit Goods Statistics; <http://www.havoscope.com/category/counterfeit-goods/>
- <sup>10</sup> Frontiers Economics, 2011, Estimating the global economic and social impacts of counterfeiting and piracy
- <sup>11</sup> Global Industry Analysts, 2010, Anti-Counterfeit Packaging: a Global Business Report, [http://www.strategyr.com/Anti\\_Counterfeit\\_Packaging\\_Market\\_Report.asp](http://www.strategyr.com/Anti_Counterfeit_Packaging_Market_Report.asp)
- <sup>12</sup> Frontiers Economics, 2011, Estimating the global economic and social impacts of counterfeiting and piracy
- <sup>13</sup> Frontiers Economics, 2011, Estimating the global economic and social impacts of counterfeiting and piracy
- <sup>14</sup> Europol, 2012, Europol warns of growing trade in counterfeit pesticides <https://www.europol.europa.eu/content/press/europol-warns-growing-trade-counterfeit-pesticides-worth-billions-euros-year-1237>
- <sup>15</sup> eMarketer, 2014, Worldwide Ecommerce Sales to Increase Nearly 20% in 2014 <http://www.emarketer.com/Article/Worldwide-Ecommerce-Sales-Increase-Nearly-20-2014/1011039>



- <sup>16</sup> World Health Organisation, 2012, Medicines: spurious/false-labelled/ falsified/counterfeit (SFFC) medicines, <http://www.who.int/mediacentre/factsheets/fs275/en/>
- <sup>17</sup> PwC, 2013, Counterfeit goods in the UK Who is buying what, and why? [http://www.pwc.co.uk/en\\_UK/uk/assets/pdf/anti-counterfeiting-consumer-survey-october-2013.pdf](http://www.pwc.co.uk/en_UK/uk/assets/pdf/anti-counterfeiting-consumer-survey-october-2013.pdf)
- <sup>18</sup> UNODC, 2014, New UNODC campaign raises consumer awareness of links between organized crime and \$250 billion a year counterfeit business, <http://www.unodc.org/>