COALITION
AGAINST ILLICIT TRADE

The role of new technologies in

combatting counterfeiting and illicit trade

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According to a report published by the OECD and the EU's Intellectual Property Office in April 2016, imports of counterfeited and pirated goods have doubled in less than a decade and are worth nearly 0.5 trillion dollars a year, or around 2.5% of global imports, with US, Italian and French brands being the hardest hit and many of the proceeds funding organised crime[1].

For the European Union market, counterfeited and pirated goods represent up to 5% of total imports with an approximate value of 85 billion euro in 2013. From handbags and perfumes to machine parts and chemicals, from footwear to pharmaceuticals, trademarks are infringed even in the cases of roses, strawberries and bananas. This leads to substantial economic losses for legitimate producers, as well as a significant impact on governments in the form of diminished profits and tax revenue, while putting at risk the health and safety of citizens consuming bogus products.

Illicit trade is a well-organized, large scale transnational crime, run by extensive and complex networks of criminal enterprises. It is a multifaceted phenomenon, fueled by a combination of economic and geo-institutional factors such as tax and price differences, a weak legal framework to prosecute offenders, the absence of measures (in both technology and process) to identify illicit products. As a consequence, illicit trade represents a threat to all levels of society in developed and emerging economies.

New advanced technological solutions are being applied and further developed to support brand owners and public authorities along the supply chain to better track, trace and authenticate products from manufacturer to retailer and consumers.

The Coalition Against Illicit Trade[2] supports the need for strengthening the cooperation and exchange of information between interested parties towards the goal of adopting cost effective, interoperable and efficient technology standards and systems.

This paper aims to raise awareness about the role and benefits of technology solutions and eventually inspire further research and public-private cooperation to the benefit of governments, brand owners, service providers and consumers.

[1] OECD/EUIPO (2016) Trade in counterfeit and pirated goods : mapping the economic impact, OECD Publishing, PARIS.

[2] The Coalition Against Illicit Trade (CAIT) is a dedicated forum on advanced technological standards contributing to the fight against illicit trade. CAIT was launched in 2015 by a group of leading companies with broad experience in implementing track, trace and authentication solutions. Current member companies and contributors to this paper are Aegate, Atos Worldline, Arjo Solutions, Domino Printing Sciences, Essentra, Fata Logistic Systems, FractureCode and VidiTrust. For more information about CAIT : www.coalitionagainstillicittrade.org - inquiries@cait.org.

Tracking is the ability to record information about the movement of the product along the supply chain.

Tracing is the ability of these operators, but also of the controlling authorities and, in many cases, final consumers, to access all the tracking information associated with the given product in order to understand its properties and the path taken for it to arrive at the location monitored.

Product authentication is the capability to check that that product is genuine, and not counterfeited. Such solutions can come in different forms - overt, covert and forensic. Overt solutions are obvious to the naked eye and enable instant authentication through visual inspection, such as holographic devices and colour-shift inks. Covert solutions, on the other hand, often require specialist equipment to identify their presence, such as microtext and UV fluorescent inks. For a further layer of authentication there are also forensic solutions, which include using intrinsic features within packaging to create a unique signature or molecular markers that can only be identified using laboratory equipment.

The product authentication may be carried out by a nominated party, controlling authority or even the consumer.

An effective and efficient TT&A system is based upon some simple concepts:

- Unique identification of the product unit (the minimum piece of a product which is sold in the marketplace such as: a single bottle of wine, packet of cigarettes, a medicine pack, a securely wrapped and labeled piece of cheese, a spare engine part, a small cosmetic container, etc.);

- Defined standards shall integrate the technical requirements applicable to high speed production lines;

- Unique identification of any other outside packaging (shipping and selling aggregation) of that product from production to market (a case of wine, a pallet of mechanical components, etc.);

- Aggregation of identifiers, from minimum product units to containing units in a parent-child relationship, to allow for and facilitate tracking and tracing along the supply chain, from end to end;

- Ability to quickly and easily read each identifier so that information sources can be queried remotely to check tracing data at any point along the supply chain, and by consumers;

- Ability to authenticate the product throughout the supply chain and by the consumer post-purchase – ensuring that the original packaging has not been tampered with;

- Smart reporting tools to make relevant data available.

Tracking, tracing and authentication technologies protect the supply chains in numerous industries and have been employed by brand owners, manufacturers and governments to combat smuggling of branded products and for control quality. These technologies enable supply chain partners to record, monitor and secure products as they move through the supply chain, and verify their authenticity.

Until a few years ago, most consumers never knew why products -from eggs to packs of medication - carry human and machine-readable codes. It is fair to assume their closest encounter with coding technology was usually checking the dates on the labels under 'best before' and 'use by' in the supermarket.

Things are starting to change due to a combination of factors. One of these is the inescapable presence

of the internet in our increasingly networked world. Equally significant are the 2.6 billion smartphones connected to the internet — a figure that is predicted to top 6 billion by 2020. Together, these factors have so transformed the shopping experience that a recent survey by Planet Retail and GS1 UK found that 28% of shoppers would like to use their smartphone in-store to find what they're looking for and 24% want to use a barcode scanner app to view more product information.

Such a mobile revolution in retailing would not be possible without the technological infrastructure to assign and apply unique, verifiable product identification mechanisms to a huge range of consumer and industrial products. The term 'mass serialisation', used until now to describe this process, no longer does justice to the immense contribution that human- and machine-readable codes have made to the safe, efficient functioning

of the world. Hence the growing adoption of Unique Product Identification (UPI), which better reflects the outcome of mass serialisation and the practical benefits that it brings.

UPI is more than giving products a simple lot number and linear barcode storing a Global Trade Identification Number (GTIN). Today the technology of assigning, applying and verifying codes is sufficiently robust and flexible to provide almost all products with a unique identity.

When it comes to fighting counterfeiting, brand owners can now choose from a range of highly sophisticated new technologies and methods to protect their products. Brand owners as well as authorities should be allowed to use the most appropriate solutions available, and to determine the most effective means of security and authentication.

03 The benefits of TT&A

The benefits are many and varied, and apply to all industries, from food to pharmaceuticals, cosmetics to automotive. These benefits fall into three principal categories:

- Those that help combat illicit trade (in all its forms) thus protecting brands in the process;

- Those that streamline the supply chain, from factory to consumer; and

- Those that enable businesses and brands to engage more closely with their customers.

FOR BRAND OWNERS

- More efficient and secure supply chains allowing manufacturers to access real-time performance data as a result of code-driven, item-level 'track and trace' systems;

- A host of new ways for brands to strengthen brand loyalty and increase sales through personalised interactions with consumers

through the application smartphone-readable codes to products;

- Strict control of the authenticity of industrial products, either directly or through the public authorities responsible for combatting illicit trade;

- Greater efficiency in the distribution process through more accurate identification of industrial products;

- Protection of intellectual property and industrial brands;

- Full traceability of the industrial products and their manufacturing processes (internal to manufacturing) increasing security and reducing costs in taking back products from the market through easy identification of components causing operational problems.

FOR PUBLIC AUTHORITIES

- Reduction of health and safety risks and public income and job losses due to illicit trade through item-level authentication;

- Recovery of excises and taxes income due to reduction in counterfeiting and smuggling and from increased revenues of bona fide manufacturers;

- In the case of medicine, ability to automate reimbursement process, reducing the potential for fraud;

- Guarantee of full individual product traceability, notably for bundled components or ingredients in the case of faulty parts or contamination in the food chain;

- Ability to understand and address leaks and diversion in legal supply chain supplying products to illicit trade;

- Opportunity to fight criminal organizations by cutting the financial sources to their activity.

FOR CONSUMERS

- Empowered to make their own judgment as to the authenticity of their goods;

- Ability to control and check properties and value of what they buy, as:
  - Counterfeit/authentic
  - Stolen/legitimate
  - Safe/dangerous
  - Expired/usable
  - Ingredients-right-for-me

- Increased safety in all areas where counterfeiting represents both an economic loss, a serious risk to the health of the consumers and to the operational safety of industrial products used for example in the aerospace, automotive, railways, electrical equipment, etc.)

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04 The range of innovative technologies

When it comes to fighting illicit trade, brand owners can now choose from a range of highly sophisticated devices and methods to protect their products thanks to developments in technology over the last 10 years. Brand owners as well as national authorities should be allowed to use the most appropriate solutions available, and to determine the most effective means of authentication products, provided that the systems respect agreed inter-operable standards. Available tools include:

- Comprehensive systems and software to generate codes and to mark product units on any kind of packaging material;

- Powerful image processing software and systems that can associate the codes marked on the product to features of the product or

packaging in order to guarantee the security of the code itself;

- Efficient systems to aggregate product codes into their shipment/sale packaging codes and to build one-to-many relationships to simplify tracking along the supply chain;

- Very powerful devices to query the identifiers marked on the product and on the shipping cases;

- Secure and accessible internet network and apps.

05 Key features for defining technical operational standards across countries, regions and industries

Any TT&A solution must have at its heart the ability to uniquely identify products. Unique identification is the enabler for any aggregation process, building a correlation between different levels of packaging in a manufacturing process. Beyond this, though, there are some key principles that should be considered in defining the optimal operational standards across countries, regions and industries:

- The adoption of a commonly agreed standard-setting methodology with the involvement of recognised normalisation or standard setter independent bodies.

- Each industry sector concerned should be involved in the definition of which information should be collected and stored throughout the supply chain and make information accessible to relevant authorities intervening in the supply chain under the control of independent certified service providers;

- Where appropriate, the database could be under the control of an independent operator acting in coordination with relevant public authorities and support them in their controlling activity

- In case of products regulated at EU or global level (such as those related to pharmaceutical, tobacco agri-food, etc.), the statutory requirements for implementation should not be a barrier to using open standards and best-in-class technology to fulfill the policy objective of the regulator.

- The selection of relevant technologies to perform AT&T should be left to the economic operators of the supply chain, in compliance with defined standards Identification devices may differ along the supply chain. Operators should be in the position to select the most suitable ones for their processes.

06 Key conditions for effective implementation of standards and practical examples of application

Manufacturers of almost all mass produced products, be it food, beverage, car parts or electronics etc., have been deploying and operating coding systems for several decades. There is a wide choice of suppliers of such coding systems, who support manufacturers across the EU and globally. So the question of interoperability applies not only to the TT&A system as a whole or at governmental or factory level, but also about the equipment used at manufacturing line level.

Therefore any adopted TT&A standard must allow manufacturers as much choice as possible with regard to sourcing the equipment required at manufacturing lines. The question of interoperability is also critical when considering

overall system supply. There is no one single organisation or company anywhere that could accept, deploy, manage and maintain an EU wide TT&A system.

The optimal approach to protect against counterfeiting includes several layers of security and authentication features to combine both overt and covert technologies, track and trace systems and tamper verification, thus making it as difficult as possible for counterfeiters and the illicit trade to succeed. Furthermore, such layers should wherever possible be intrinsic to the item or packaging to ensure that the entire product is authenticated rather than the security feature alone.

Coding systems of various technologies are well proven on all packaging applications found in manufacturing. However the first thing to understand is that there is no 'off-the-shelf' solution. The right system needs to take into consideration the following key conditions.

SUBSTRATES

Primary, secondary and tertiary packaging calls for different substrates, ranging from cans, bottles, glass and flexible packs (primary), through cardboard boxes, trays and plastic sacks (secondary), to pallets and large containers (tertiary).

They have been deployed for a variety of uses including item level, flexible packaging, cartons & cases on a vast range of packaging machinery types. Data from an external source (i.e. IPC : inter-process communication) can be fed to any coding system device, and a coder can also feedback data on what has been printed if required.

FLEXIBILITY

Coding systems are inherently flexible by the nature of the wide range of industries that they have to operate in. They are also regularly used in conjunction with other technology such as vision systems for code validation or verification purposes, or for the aggregation process. Coding systems also allow for a choice of machine readable code (MRC's) such as Data Matrix to be printed enabling aggregation & simple authentication processes.

EASE-OF-USE

To maintain operational efficiency within a manufacturing environment, coding systems are designed to be 'operator friendly'. The systems may be complex but their use must be made simple for all the operators involved in the production and distribution processes: large companies as well as SME's.

GLOBAL STANDARDS

Coding system suppliers work with many global standards bodies such as ISO and most importantly for data carrier symbologies GS1. Clearly defined standards are necessary to allow systems interoperability, which allows different technology providers to develop their own TT&A solutions.

COST EFFECTIVENESS

The cost of the systems should take into account the value of the products they "protect" and the industry specific objectives in tracking and tracing. In general the increased cost of the product due to extended authentication and supply chain control should be a small percentage of the value of the product and may vary among the several industry sectors.

Initial investments should also be viable for every company and operator in a given industry and market sector in order not to discriminate from one company to the other due to lack of investment capabilities when the TT&A application is made compulsory by governmental directives and regulations.

Experience from a wide range of industries shows that successful deployment of track and trace systems depends on seamless interoperability among disparate information technology systems and internationally-recognised technical standards that establish clear rules for capturing and sharing data. Interoperability is a critical requirement in tracking and tracing as legitimate trade is globalised. Systems of different economic operators and authorities involved along the legitimate supply chain should be able "to speak to each other" i.e. exchange data, irrespective of national borders (as genuine products are legitimately traded across countries).

There is no 'silver bullet' solution to tackle the problem of illicit trade. The answer lies in collaboration between different industries, trade mark owners, supply chain operators, technology providers, governments and international organizations.Sharing knowledge and expertise from different areas will create the opportunity to tackle the growing problem of illicit trade that has potentially serious consequences on all stakeholders including consumers. Key priorities to be tackled by policy makers include:

- Clear definition of most significant public policy objectives for applying TT&A for regulated products and most impacted sectors.

- Identification of standard methodologies for applying TT&A in the production-supply chain processes, although these may be product-specific.

- Define standard technologies only for basic elements of the TT&A process.

- Apply defined standards uniformly to the products to be tracked, traced and authenticated.

- Allow producers and supply chain operators to select the most appropriate technologies to fulfill TT&A standards, that best fit their respective industrial environments.

- Clearly identify the property of data to be collected in standard TT&A databases and leave the responsibility of that data management to the owners, while requiring relevant transmission in external TT&A databases.

- Allow outsourcing of the TT&A applications to "certified" third parties.

- Promote competition and foster innovation through the establishment of an accreditation/certification mechanism for systems deemed compliant with the regulatory requirements in terms of provided data and technical standards, irrespective of the technology providers.

- Put in place and overall technological architecture, enabling the interoperability across different technological platforms, geographies and industry sectors.

- Safeguard the integrity of tracking and tracing systems to ensure transparency of operation of manufacturers and to ensure adequate outside controls and audit by third parties appointed by relevant authorities.

- Ensure the public and end users are aware of and can participate (where appropriate) in either the process to authenticate or the ability to check that a particular product has been authenticated.

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