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**The role of social media
in the illegal online trade of medicines**
An evaluation of situational crime prevention measures

PhD Programme in International Studies, XXX cycle

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Abstract

In recent years, social media websites have been used by offenders to advertise illegally traded medicines (ITMs) directly to customers on a large scale. Recently, new situational crime prevention (SCP) measures aimed at identifying, blocking and removing contents linked to ITMs have been implemented by most of the social media platforms. This seems to be a promising path to follow in the fight against this criminal market: however, their ability in reaching their goal is still unknown.

The aim of this dissertation is to evaluate the impact of those measures on the illegal online trade of medicines in social media websites. In more detail, systematic keyword searches were performed on the three major social media (i.e. Twitter, Facebook, and Instagram) in order to identify contents linked to ITMs: results were then analysed and compared to the situation existing before the implementation of the measures with reference to six qualitative indicators. These indicators are a) extent of the social media usage in the illegal online trade of medicines, b) ease of finding ITMs, c) visibility over time of ITMs-related contents, d) language of posts concerning ITMs, and e) types of posts concerning ITMs.

Research results have provided evidence supporting the hypothesis of the limited impact of the measures, since they are spotting, blocking and removing only some illegal contents. At the same time, the features of the advertisements for ITMs on social networking websites are only partially different if compared to those existing before the implementation of the SCP interventions. Seemingly this is not linked to a lack of effectiveness *tout court*, but to an asymmetrical implementation of the measures. For this reason, a possible, legally binding, obligation for social media platforms to implement them more widely is suggested.

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Introduction

Research significance

The illegal trade of medicines is a very dangerous, illegal market that has acquired in the last two decades an international dimension (Di Nicola et al., 2015a). Even if it is impossible to quantify its size precisely, it is estimated to be, globally, a business of at least \$75 billion a year (Jackson, 2009; World Health Organisation, 2012). Solely within Europe, this illegal market has grown 90% in the last decade, with business amounting to more than €10 billion a year (Wajsman et al., 2016). The illegal distribution of dangerous medicines varies a lot depending on the area of the world taken into consideration. In underdeveloped/developing countries, illegal products enter easily into the legal supply chain: for this reason, it is possible to find dangerous pharmaceuticals everywhere, even in 'brick and mortar' pharmacies. On the contrary,

in western countries the legal supply chain is essentially safe because of effective control policies set by national authorities (Bate, 2012). However, some cases of infiltration occur, mainly due to the vulnerabilities of the so-called 'parallel trade' (Hall and Antonopoulos, 2016; Bryan A Liang, 2006; Muckenfuß, 2017). This term refers to a (legal) practice in which traders make profits by exploiting price differentials among states, i.e. by purchasing pharmaceutical products in countries in which they are cheaper, and re-exporting them in other countries at a higher price (Hall and Antonopoulos, 2016).¹ Parallel-trade operations present complex processes (importing, re-importing, re-packaging/re-labelling, and re-selling), steps (with the involvement of several traders and intermediaries), and routes of transport in numerous countries which generates difficulties for national authorities, and opportunities for offenders to infiltrate the legal supply chain with illicit products (Muckenfuß, 2017). For instance, in some cases during the transportation processes genuine pharmaceuticals have been substituted or bulked-out with other dangerous medicines (Hall and Antonopoulos, 2016).² Even if worrisome, in western countries the

¹ Parallel-trade has to be considered a legal business practice in virtue of EU free-movement of goods principle, as also recognised by the European Court of Justice in 1976 (Hall and Antonopoulos, 2016; IRACM, 2013). Today, parallel-trade is very common and lucrative: the price of a medicine may vary by 20% to 50% from one member state to another, and parallel-traders are able to earn a margin of at least 10-15% (IRACM, 2013). In this system, medicines are traded outside the distribution network of the manufacturers, and against their interests (Hall and Antonopoulos, 2016).

² For further information, please see, among others: Hall and Antonopoulos, 2016; IRACM, 2013; Bryan A Liang, 2006. Beside the vulnerabilities exploited by offenders to infiltrate the legal distribution chain with illicit medicines, parallel-trade presents other relevant issues. Above all, it is creating shortages in supply within member states in which medicines costs less, since it is more convenient for traders to re-export pharmaceuticals to other states at a higher-price: for instance, patients in Greece and Italy have limited access to certain pharmaceuticals since they are usually re-exported, via the parallel-trade, to Germany and the United Kingdom (Glynn, 2009; Hall and Antonopoulos, 2016; Morgan, 2008; Socialfarma, 2018).

presence of illicit medicines in the legal distribution chain has to be considered marginal, and dangerous products reach consumers mainly via alternative channels, especially online. The European Union is particularly threatened by this phenomenon (Mackey and Liang, 2011), and it is estimated that the illegal online trade of medicines is increasing by 15% each year (Euractiv, 2013)

In the last few years, several criminological studies have been carried out on this issue as highlight the functioning of this illegal online market (among others, Antonopoulos and Hall, 2016; Di Nicola et al., 2015a; Hall et al., 2017; Hall and Antonopoulos, 2016; Koenraadt and van de Ven, 2018). Scholars have focused their attention predominately on the most widespread virtual channel used by criminal entrepreneurs to distribute their dangerous products to customers, i.e. illegal online pharmacies, that are e-commerce websites selling their products to clients via shipping companies or postal services. The number of illegal online pharmacies active on the Web is impressive, especially if compared to websites operating legally. Indeed, it is estimated that from 40.000 to 50.000 online retailers are active on the Internet, and 93-96% of them operate illegally (Catizone, 2017; Isles, 2017; LegitScript, 2016; Mackey and Nayyar, 2016).

However, illegal online pharmacies are not the only virtual channel used by offenders in the distribution of illegal products. Among them, a particular reference should be made to social media websites, i.e. interactive and web-based technologies and platforms where members can create and share information and contents of different types – such as texts, photos, videos, hyperlinks, etc. – communicate among each other, discuss, and generally interact with each other (Kietzmann et al., 2011). The potential of social media has not only been exploited by legitimate operators in conducting their businesses, but also by criminal entrepreneurs. In this context, while

many authors suggested that offenders are now using social media platforms to advertise and to trade medicines illegally (just for example, (Bachhuber and Merchant, 2017; Di Nicola et al., 2015a; Hall et al., 2017; Katsuki et al., 2015; Lee et al., 2017; Liang and Mackey, 2012a; Mackey and Kalyanam, 2017; Richards and Hudson, 2016) very few scientific contributions have deeply analysed this issue, especially from a criminological perspective.

Despite this, it is clear that social media websites today represent an emerging threat in relation to the illegal online trade of medicines. For instance, in 2012, in an international operation coordinated by Interpol, a massive number of spam emails and social networking messages linked to illegal online pharmacies were removed, and from 2014 to 2015 Interpol shut-down more than 23,000 illegal advertisements of medicines from the Internet and social media platforms (Frangež and Slak, 2016). The MHRA, medicines regulatory authority of the United Kingdom, targeted illegal content on social media websites – including over 18,000 YouTube videos – advertising the illegal online trade of medicinal products, including analgesics, medicines for erectile dysfunction, and antianxiety and antidepressant pharmaceuticals (Richards and Hudson, 2016).

In this context, as frequently outlined by researchers (for instance, Trottier, 2015, 2012; Yar, 2018), the capabilities and resources of law enforcement agencies and other institutions are usually not enough to cope with the scale and complexity of the online environment, determining a significant deficit in contrasting offenders exploiting the opportunities provided by new technologies with the use of the traditional public strategies. For an effective counter action against the illegal online trade of medicines in social media websites other public and private actors should be involved, and situational crime prevention (SCP) interventions seem to be a promising path to

follow. SCP transfers the responsibility for crime control and prevention from police to other stakeholders, which is considered more effective in reducing crime in the long run (Shariati and Guerette, 2017). Since crime, according to the SCP's theoretical foundations, mainly originates from opportunities that arise from the environment, the commission of a specific crime can be prevented by controlling – and, in some cases, manipulating – a situational environment to eliminate the opportunities.

Several SCP measures have been elaborated and implemented in the last few years in order to fight against the illegal online trade of medicines. These interventions have only rarely been assessed using a sound evaluation methodology by criminologists, and their impact on the criminal market is still questionable. Furthermore, all the traditional SCP measures present some critical aspects, and none of them are tailored to social media. However, recently new SCP systems aimed at identifying, blocking and removing contents linked to the illegal online trade of medicines has been implemented by most of the social media platforms. This seems to be a very promising path towards an effective fight against the criminal market under analysis since aimed at avoiding all possible connections between buyers and sellers. However, their ability in reaching their goal is still questionable, especially because very little information on this topic is usually disclosed by the providers (Snyder, 2017). For this reason, further criminological research is needed in order to understand whether the above-mentioned counterstrategies implemented are not only theoretically promising, but also practically functioning.

The objective of this dissertation is to fill this gap. In more detail, the question of the present research is the following: *to what extent have SCP measures introduced by social media websites impacted on the illegal online trade of medicines in such platforms?*

Structure of the dissertation

In order to reach its aim, the dissertation is structured as follows.

Chapter 1 provides a general introduction to the illegal trade of medicines, highlighting the extent and features of the criminal market, the definitions used in the research, as well as the role of the Internet and new technologies both in the demand and in the supply side. The Chapter then focuses on social media, reviewing the existing literature on this field and highlighting six qualitative themes describing the role of social media in the online trade of ITMs before the implementation of the SCP measures. Such themes have then been transformed into six qualitative indicators to be used in the evaluation (see Chapter 3).

Chapter 2 is focused on situational crime prevention. After some preliminary remarks on its main features, all the SCP measures elaborated and implemented to fight against the illegal online trade of medicines are presented, illustrating also their critical aspects, especially with reference to social media websites. After that, the Chapter focuses on the SCP measure introduced by social media platforms aimed at identifying, blocking and removing contents related to the illegal online trade of medicines. The Chapter concludes by highlighting the need for an impact assessment of the interventions.

Chapter 3 illustrates both the objective and the methodology of the research. Concerning the latter, possible evaluation research designs are reviewed, highlighting their strengths and weaknesses, and analysing which one is the more suitable for the purposes of the present research - i.e. a natural experiment with one group(s) post-test only design, using a non-equivalent qualitative pre-test. Then, strategies for data

gathering and analysis are presented. In more detail, the methodology used consisted of systematic keyword searches on the three major social media platforms - i.e. Twitter, Facebook, and Instagram - after the implementation of the SCP measures in order to identify and analyse contents linked to the illegal online trade of medicines. The keyword list comprises 76 terms of two different types: 36 names of prescription medicines – both generic and branded names – known to be frequently traded in illegal virtual channels, and 8 general terms in 5 languages - i.e. 40 keywords overall - referring to disease or condition and the medicines that are intended to treat them, or their therapeutic category. In order to assess the impact of the SCP interventions, data was analysed ‘vertically’ (i.e. by social media and by therapeutic category), and ‘horizontally’ (i.e. across social media and therapeutic category). Results were compared to the situation existing before the implementation of the measures by using six qualitative indicators. These were identified due to the analysis of the existing literature and personal previous research activities carried out in the context of European projects (see Chapter 1).

Chapter 4 is divided into two main parts, following the data analysis scheme adopted in this dissertation. First, a ‘vertical analysis’ has been conducted, i.e. by social media (Facebook, Twitter, and Instagram), and by therapeutic category - i.e. medicines for erectile dysfunctions, medicines to lose weight, medicines to enhance muscles, medicines to kill pain, psychoactive medicines (psychopharmaceuticals), medicines to sleep, antibiotics, medicines to quit smoking, and others. This systematically shows (with reference to the six qualitative themes used as indicators in the evaluation) the current role of a specific social media in the illegal online trade of a certain medicinal category. After that, a horizontal analysis has been conducted in which the same six

indicators have been used to compare the situation before and after the implementation of the SCP measures. This assesses the overall impact of those interventions and highlights possible differences among social media and therapeutic category.

Finally, some *conclusive remarks* are provided and new directions for *further research* are suggested.

Chapter 1

The illegal online trade of medicines: the roles of the Internet and social media websites

This Chapter aims to provide a general introduction on the illegal trade of medicines, highlighting the extent and features of the criminal market, the definitions used in the research, as well as the role of the Internet and new technologies both in the demand and in the supply side. Finally, a focus is given to social media websites, highlighting what is known about their role in this illegal market.

1.1 The illegal trade of medicines

1.1.1 Extent of the problem

The illegal production and distribution of medicines is not new phenomenon. In the nineteenth century, in the United Kingdom, it was already considered an alarming issue, pushing the government towards the adoption of several acts concerning the adulteration of pharmaceutical products, such as the Food, Drink and Drug Acts in 1872 and 1875, and the Poisons and Pharmacy Act in 1908 (Hall and Antonopoulos, 2016). In the same period, in the United States, Hopkins Adams published a series of articles entitled 'The Great American Fraud' writing about cases of false claims concerning medicinal products under patent protection (Dobson, 2013).

However, in the last two decades, the problem acquired an international dimension and rapidly expanded all over the world (Di Nicola et al., 2015a). Even if it is impossible to quantify the size of the illegal medicine trade precisely, it is estimated to be, globally, a business of at least \$75 billion a year (Jackson, 2009; World Health Organisation, 2012). Solely within Europe, this illegal market has grown 90% in the last decade, with business amounting to more than €10 billion a year (Wajsman et al., 2016).

According to the World Health Organisation, 10 per cent of the medicines all over the world are falsified. However, it is difficult to estimate the real extent of the problem because of the very high dark figure and it is also very hard to know how much is undetected (IMPACT, 2008): the problem is likely to be underestimated and the available data represents only the tip of the iceberg (Dégardin et al., 2014; IMPACT, 2008). In addition, it is not easy to calculate the number of victims and estimates range from 100,000 to 700,000 deaths per year (Alghannam et al., 2014; Harris et al., 2009). Sometimes, figures are even more worrisome: for instance, the International Policy

Network argued that 700,000 malaria and tuberculosis deaths each year are attributable to ineffective medicines that are produced and traded illegally, without respecting the international good standard of medicines manufacturing and management (Harris, 2011).

The illicit distribution of dangerous medicines is undermining revenues of legitimate producers and is eroding public confidence both in genuine pharmaceuticals and in the healthcare systems in general (Ratanawijitrasin and Phanouvong, 2014). The consequences linked to the illegal trade of medicines are not only economic since the issue is not linked to the infringement of intellectual property rights solely but has increasingly detrimental impacts on public health. Indeed, there is a high probability that pharmaceutical products that are produced and/or traded illegally can be extremely harmful, and potentially lethal. Furthermore, the consumption of POMs - i.e. medicines which can only be purchased by patients with a prescription from a healthcare professional - without a valid prescription health problems such as addiction, dangerous side effects or the worsening of medical conditions may be caused (Di Nicola et al., 2015a; Finlayson, 1995; Lankenau et al., 2012; Twombly and Holtz, 2008).

The link between the illegal online trade of medicines and transnational criminal networks is widely acknowledged by scholars (Attaran et al., 2011; Satchwell, G, 2004), law enforcement agencies (Europol, 2015; Interpol, 2015) and other relevant stakeholders (Farmaki et al., 2012; JDSU, 2010; Przyswa, 2014). Moreover, researchers have also shown that terrorist organisations are using this business to fund their activities (Bale, 2005; Bengoechea, 2015; Finlay, B. D., 2011; Letkiewicz and Górski, 2010; Seiter, 2009). Experts have highlighted that the pharmaceutical sector is vulnerable to domestic and international terrorism, and have also linked the

counterfeit trade to funding terrorist activities (GlobalOptions, 2003). For instance, in the late 1990s, members of the Irish Republican Army – better known with the acronym IRA – established a laboratory in the United States to manufacture counterfeit doses of an anti-parasite veterinary medicine: more than 700,000 livestock were produced and profits sent to bank accounts in Ireland to fund the activity of the organisation (UNIFAB, 2016). Again, in 2016 the US Joint Terrorism Taskforce led by the FBI arrested 19 individuals involved in the illegal trade of sexual-dysfunction medicines: the network operated in a transnational dimension – Lebanon, Canada, China, Brazil, Paraguay and the United states – and part of the high profits earned from the operation, around 500,000 US dollars per month, were used to finance Hezbollah (UNIFAB, 2016). Additionally, Al-Qaeda and the Islamic State used the illegal trade of pharmaceuticals to fund their terrorist activities (Gomez, 2017).

Why are criminal and terrorist networks interested in such a dangerous illegal market? The reason is that it generates very high profits: for instance, for every 1 euro invested, the trafficking in heroin would bring a return of 20 euros, while the trade of falsified medicines between 200 and 450 euros (Sanofi, 2017). At the same time, this criminal activity is very difficult to investigate and to tackle, so it is low-risk if compared with other similar illegal activities (Di Nicola et al., 2015a; Liu and Lundin, 2016).

Even if it is a pervasive and global problem – a real ‘worldwide pandemic’ according to Wertheimer and Santella (2005: 619) – its extent varies depending on the area of the world taken into consideration, and the situation has been described in terms of a North-South division (Cahoy, 2008). In developing countries, falsified medicinal products are a dramatic problem for healthcare: it has been estimated that in certain African, Asian, and Latin American countries at least 30 per cent of medicines consumed are of a low quality since they have been produced and/or traded illegally

(IMPACT, 2008; Interpol, 2015; Newton et al., 2008; Yankus, W., 2006). The situation is even more serious for certain therapeutic categories, such as antimalarials in Southeast Asia, where the percentage of substandard medicines is estimated to be about 40 percent, causing major problems in malaria control (Dondorp et al., 2004): in Nigeria, the figure raises to 64% (Blackstone et al., 2014). Also, when the estimates are more optimistic, figures remain extremely worrisome: empirical analysis made on medicines in 17 developing and mid-income countries showed that 15 percent of medicines were of a low quality (Bate et al., 2011). On the contrary, in developed countries less than 1 per cent of medicines are likely to be illicitly produced and/or traded (IMPACT, 2008).

These medicines are usually manufactured in India and China and then sold in the rest of the world (Gautam et al., 2009; Pincock, 2003), but ‘pockets of local production’ exist also in other poorly regulated countries, even within the European Union (Bate, 2012).

1.1.2 Definitions used in this research

Before moving forward, it is necessary to focus on the different terminology that has been used by academia, law enforcement agencies, public and private institutions, and other stakeholders to describe this illegal market and to clarify the scope of the illegal trade investigated in this research. This analysis is necessary since defining the ‘illegal trade of medicine’ is not an easy task and there is not a general agreement on the labels to be used, creating confusion among scholars and problems in mutual recognition and investigative collaborations (Isles, 2017).

Most of the definitions currently used are based on the characteristics of the medicine. The trade of medicines is considered illegal as far as it concerns a

pharmaceutical product with features relating to these characteristics. One of the first and still one of the most widespread labels used following this path is 'counterfeit medicines'. According to the International Medical Products-Anti Counterfeiting Taskforce (also known with the acronym IMPACT), the term counterfeit medical product refers to

a product with a false representation (i), of its identity (ii), and/or source (iii). This applies to the product, its container or other packaging or labelling information. Counterfeiting can apply to both branded and generic products. Counterfeits may include products with correct ingredients/components (iv), with wrong ingredients/components, without active ingredients, with incorrect amounts of active ingredients, or with fake packaging (IMPACT, 2008).

However, as pointed out by the WHO, there 'is currently no universally agreed definition of what used to be widely known as counterfeit medicine' (World Health Organisation, 2014). Furthermore, this definition presents an important gap since it does not comprehend a category of medicinal products largely available in illegal sources, that are unlicensed, i.e. medicines that are not authorised by the National Medicine Regulatory Authority in the state in which they are traded or used. A typical example of this is Kamagra, a branded medicine containing sildenafil citrate legally produced and distributed in India to cure erectile dysfunctions, that is not licensed to be marketed in the European Union. Kamagra products sold in the illegal distribution chain, do not usually have false representation of their identity and/or source, contain correct information on the label, the correct ingredients and dosages, and it is contained in packages that are not forged. At the same time, is one of the most popular products sold in Europe in illegal sources (Hall and Antonopoulos, 2016). This does

not mean that we may have also a counterfeit version of Kamagra, but this can be considered as one of the possible options. Another example is 2,4 dinitrophenol (DNP), an effective but dangerous slimming substance. In 1933, the Stanford University discovered that the consumption of DNP led to significant weight loss and subsequently started to be used as an active ingredient in medicines. Unfortunately, it soon emerged that DNP assumption was linked to significant side effects, including death. For this reason, the Food and Drug Administration decided in 1938 to label this substance as extremely dangerous and not for human consumption: all medicines containing DNP were consequently banned (Grundlingh et al., 2011). Despite this, today 2,4-Dinitrophenol is still traded illegally as a weight loss medicine, especially among body-builder's communities: however, following the definition of WHO, DNP cannot be considered as a 'counterfeit medicine'.

Furthermore, in the case of medicines the use of the label 'counterfeit' may create confusion. Indeed, this adjective in other domains refers to products that have been produced and/or traded violating intellectual property rights (IPRs) (Chaudhrya et al., 2005; Staake et al., 2009; Zimmerman and Chaudhry, 2009), but the problem of the illegal trade of medicines is not solely linked to trademark protection and, at the same time, medicines that are traded illegally by offenders do not always violate IPRs of legitimate owners.

The WHO have made an incredible effort in the last thirty years in order to draft a shared and comprehensive definition, but with no success. The international organisation opted for an umbrella solution, covering different possible hypothesis of dangerous medicines, known with the acronym SSFFC, i.e. Substandard, Spurious, Falsely labelled, Falsified, and Counterfeit medicines. This definition has been used by WHO for a long time, but it has presented some problems. First of all, it was not clear

that the correct meaning of the various labels contained in the definition and such categories were not mutually exclusive. For instance, while SSFFC medicines are always substandard, a substandard medicine may not be counterfeit, falsified, falsely labelled or spurious (Isles, 2017). Secondly, the definition provided by WHO also included the term “counterfeit”, thus creating possible misunderstanding with IPRs violations as illustrated above. Recently, the same WHO acknowledged both these problems and a working group of the organisation convened in November 2016 and suggested to drop the term “counterfeit” and to reach a more precise and simple definition (World Health Organisation, 2016a). This process ended on May 2017 at the 17th World Assembly when the WHO set a new tripartite classification of medicinal products, i.e. ‘substandard’, ‘unregistered/unlicensed’, and ‘falsified’. According to the new definition, a substandard medicine – also called ‘out of specification’ – is a pharmaceutical product that does not meet the quality standards, their specifications, or both. An unregistered or unlicensed medicine is a product that has not undergone evaluation and/or approval by the National or Regional Regulatory Authority (NRRA) of the market in which they are traded or used. Finally, a falsified medicine is a product that deliberately and fraudulently misrepresents its identity, composition and/or source (World Health Organisation, 2017).

The European Union adopted a first EU common definition in the Directive 62/2011, deciding to adopt the term ‘falsified medicinal product’ and underling the differences between the traditional meaning of counterfeiting. According to Article 1 of the Directive, a falsified medicine is:

any medicinal product with a false representation of: (a) its identity, including its packaging and labelling, its name or its composition as regards any of the ingredients including excipients and the strength of those ingredients;

(b) its source, including its manufacturer, its country of manufacturing, its country of origin or its marketing authorisation holder; or (c) its history, including the records and documents relating to the distribution channels used (Article 1, Directive 2011/62/EU).

In order to better clarify that the terminology refers to dangerous medicines and not to IPRs violations, the same Article 1 underlines that the definition ‘does not include unintentional quality defects and is without prejudice to infringements of intellectual property rights’.

Article 1 of the Directive is an important step forward since, for the first time, there is a common and shared definition applicable at the EU level. At the same time, the path followed by the European Union seems to present the same weakness of the terminology above when analysed since it does not cover all the possible dangerous medicines that can be traded illegally. For example, stolen medicines – i.e. legally manufactured products that are stolen by offenders usually during the transportation phase to be then resold illegally – are not *per se* covered by this definition. This will happen in cases where, for instance, they are reintroduced into the legal supply chain with false documentation and/or when the expiration date on the packaging is changed.

In general, to provide a comprehensive and exhaustive definition of ‘illicit medicine’ is a very complex task and every definition runs the risk of excluding, from the scope of the analysis, some dangerous medicine. Most pharmaceuticals present risks when assumed without a control by a healthcare professional, especially in the case of prescription only medicines, such as side effects, morbidity, pharmaceutical resistance, therapeutic failure, and toxicity (Amin et al., 2005; Cockburn et al., 2005; Mackey and Liang, 2011; Wertheimer and Norris, 2009), and this just because they are traded illegally, even when genuine. Moreover, it is almost impossible to

understand whether a medicine is counterfeit, falsified, substandard, or of another category without long and expensive investigations activities and/or checks by specialised laboratories (Siva, 2010). Finally, medicines that are distributed in illegal channels, can be dangerous because of an incorrect storage or transportation, independent from the characteristics of the medicine itself.

According to Park (2009), it is not 'obvious that a specific definition [...] is a necessary tool to effectively combat the public health problem of unsafe medicine'. This is probably an overly strong position. Indeed, there is the need to clearly identify the various types of dangerous medicines in order to create a common understanding on the different problems linked to the illegal trade of medicines and to implement effective countermeasures and legislations at both the national and the international level (Clift, 2010; Newton et al., 2011).

Nonetheless, when exploring the availability of medicines in illicit online distribution channels, such definition problems can be ignored, and it is better to adopt a perspective that is not linked to the characteristics of the medicines itself but on the dangers connected to the illegality of the trade. For all these reasons, in the present research, it was decided to opt for a definition that does not depend on the characteristics of the products traded but that relies on the supply chain. In more detail, the term 'illegal trade of medicines' refers to every type of medicine sold outside the legal distribution chain. At the same time, the term 'illegally traded and/or produced medicines' – hereinafter also referred to with the acronym ITMs – refers to every kind of medicine that has been illicitly produced and/or distributed outside, even partially, the legal and controlled distribution chain.

1.1.3 Why are ITMs dangerous?

Medicines that are produced and/or traded illegally are very dangerous for public health for different reasons (Di Nicola et al., 2015b; Valvo and Manna, 2002). First of all, they may contain different dosages of active substances³ in respect to what is declared, i.e. higher dosage, lower dosage, or absence. Even if this situation is always dangerous, the concrete risk varies depending on the therapeutic category of the product. For instance, research has shown that in developing countries the presence of antibiotics with less active principle is creating resistant bacteria, and the development of travels and people movement may facilitate the spread of medicine-resistant malaria worldwide (Almuzaini et al., 2013; Delepierre et al., 2012; Kelesidis et al., 2007; Prazuck et al., 2002). At the same time, the risks connected to erectile dysfunction medicines containing more active principles than the recommended quantity may lead to heart failures, overdose, and other serious health threats (Borrelli, 2016; Chiang et al., 2017). ITMs often contain low-cost active ingredients whose quality does not meet the minimum safety standards: medicines of this type may contain synthetic impurities, potentially toxic degradation products, or residual solvents present in quantities exceeding those permitted (Valvo and Manna, 2002). Active substances can also differ from those declared in the packaging and/or by the seller:

³ According to the definition provided by Article 1 of EU Directive 62/2011, an active substance is 'any substance or mixture of substances intended to be used in the manufacture of a medicinal product and that, when used in its production, becomes an active ingredient of that product intended to exert a pharmacological, immunological or metabolic action with a view to restoring, correcting or modifying physiological functions or to make a medical diagnosis'. Even if not technical from a medical perspective, in this dissertation, the terms 'active substance', 'active principle' and 'active ingredients' are used interchangeably to indicate the part of the medicine aimed at creating therapeutic effects.

in this case, customers may experience unexpected side effects because of personal intolerances or reactions with other medicines assumed in the same period.

Furthermore, ITMs may have dangerous excipients.⁴ Usually, for economic reasons, illegal producers use low quality materials. They may be toxic, as happened in Haiti where many children died as a result of taking a paracetamol-based formula containing ethylene glycol in place of propylene glycol (Valvo and Manna, 2002). Laboratory analysis have found ITMs containing, for instance, bacteria-laced water, toxic paints, floor wax, coloured dye, powdered cement, boric acid, and antifreeze (Bryan A. Liang, 2006). Excipients may also interact with the active principle influencing its bioavailability – i.e. it may influence the speed and extent of active principle absorption by the human body. In the latter case, wrong excipients may lead to a delayed or incomplete therapeutic response, or to the manifestation of toxic effects due to an immediate and simultaneous absorption of active substance contained in formulations that were instead intended for a gradual and protracted action in time (Valvo and Manna, 2002).

Even in the case ITMs are produced with the correct ingredients in the right dosage, they are very likely to be dangerous since are not produced, stored and distributed following the good manufacturing practices imposed to legal pharmaceutical industries. Furthermore, they circumvent all checks and controls on the quality of the products carried out by the competent authorities. First, ITMs may be dangerous because of the packaging used, since it is very important for the quality, efficacy and safety of use of the medicine: an unsuitable container may deteriorate or contaminate the

⁴ According to the definition provided by Article 1 of EU Directive 62/2011, an excipient is 'any constituent of a medicinal product other than the active substance and the packaging material'. Excipients are, for instance, colorants, flavours, protective films, and other additives.

pharmaceutical and make it dangerous for the patient, especially for the products that need to be strictly conserved in a sterile way. Second, medicines must be conserved and transported following certain conditions that are set during stability studies that are carried out before receiving the market authorisation. To preserve its quality, the medicinal product must be properly stored during all phases of its life – production, distribution and use – while ITMs are usually stored and transported without following such conservation rules. The danger that can derive from a bad conservation depends on the specific medicine and it is greater the more the product is sensitive to environmental conditions, such as light, temperature and humidity (Valvo and Manna, 2002).

Finally, ITMs may be expired licit products in which new labels with new expiration dates are displayed. In this case, having the medicine exceeded its validity period, it may no longer meet the indispensable requirements for quality, safety and efficacy.

1.2 The illegal online trade of medicines

1.2.1 The role of the internet in the illegal trade of medicines

E-commerce within the European Union is rising year by year. According to data processed by Eurostat, the 48% of EU citizens in 2016 purchasing online goods or services for private purposes, compared to the 28% of the total in 2009 (EUROSTAT, 2017). In some member states, the 2016 share overcome the half of the population, such as in Denmark (71%), Germany (64%), Malta (69%), Poland and the United Kingdom (63%). In Italy, from 2015 to 2016 the number of e-commerce users has more than doubled (from 18% to 41%). Online commerce offers advantages for customers, ranging from lower costs and fewer geographical limitations to higher possibilities of choice for the desired items and faster operational procedures. On the other hand,

however, the Internet can be also exploited as a 'superhighway' for offenders, since the e-commerce system presents profitable criminal opportunities in offering illegal products directly to buyers reducing the risks connected to physical transactions (EAASM, 2008; Newman, 2013). This is true also for medicinal products.

Without the Internet and new technologies, the illegal online trade of medicines would never have expanded to what it is today, especially in developed countries. As illustrated above, the distribution of ITMs varies a lot depending on the area of the world taken into consideration. In underdeveloped/developing countries ITMs enter easily in the legal supply chain: for this reason, it is possible to find dangerous pharmaceuticals everywhere, even in 'brick and mortar' pharmacies. On the contrary, in western countries the Internet is basically the only way in which ITMs are distributed, since the legal supply chain is essentially safe because of effective control policies set by national authorities (Bate, 2012). In the European Union, even if some cases of ITMs infiltration happened (Attaran et al., 2011), the prevalence of ITMs in the legal supply chain is estimated to be only 0.005% (European Commission, 2015a).

Internet usage and difficulties linked to controlling virtual distribution channels enables offenders to sell potentially dangerous products on a large scale. Despite the obvious benefits of having the possibility of purchasing medicines at a distance, there are a number of problems connected to this type of product if purchased via illegal web channels (Jain et al., 2016). For instance, clients' purchases are not controlled by healthcare professionals, i.e. buyers escape the dual control that traditionally is carried out by doctors and pharmacists and are exposed to the risk of taking inappropriate medicines, or medicines that could interact with other pharmaceuticals that are already being assumed (Arruñada, 2004; Ghodse, 2010). This is also because consumers buying medicines online usually have insufficient access to information and advice

when making their orders and, consequently, they are not in the position to make informed decisions (Bessell, 2003; Orizio et al., 2009).

The most relevant issue connected with the e-commerce of pharmaceutical products is the massive presence of dangerous and substandard medicines in illegal supply channels: according to the World Health Organisation they represent 50% of the medicines traded online and this share is increasing year by year, especially in Europe (World Health Organisation, 2016b). In 2013, the value of the market had increased 90 per cent since 2005, with an estimated turnover of more than 200 billion euros (Di Nicola et al., 2015a).

In this context, the European Union is particularly threatened by the ITMs market on the Web (Mackey and Liang, 2011): it is estimated that the illegal online trade of medicines is increasing by 15% per year (Euractiv, 2013). The worsening of this situation in the European Union seems to be partially linked to some vulnerabilities of the existing legal framework. As stated above, the number of Europeans searching for any type of product online is booming but till recently the – legal – online trade of medicinal products was not possible in all EU countries. Indeed, starting from the 90s, EU member states approached the emerging phenomena of the pharmaceutical e-commerce in several different ways. Domestic legislative provisions existing before 2014 can be clustered into three major groups:

- total permission: i.e. member states in which it was allowed to sell and to buy at a distance; both prescription-only medicines (POMs) and over the counter pharmaceuticals (OTCs);
- partial permission: i.e. member states in which it was allowed to sell and to buy at a distance only OTCs;

- total prohibition. i.e. member states in which it was forbidden to sell and to buy at a distance both POMs and OTCs. This group can be further divided into two sub-groups:
 - explicit prohibition: i.e. member states that introduced a dedicated legal provision that explicitly prohibits the online trade in medicines;
 - implicit prohibition: i.e. member states in which the prohibition of pharmaceutical e-commerce was drawn from the interpretation of the legal system regulating the distribution of medicines to the public, even if no specific legislations on this topic were adopted.

Tab. 1 – Domestic legislation concerning the online trade of medicines within EU Member States.
Date: 31.12.2013

Permission		Prohibition	
Total permission (POMs and OTCs)	Partial permission (Only OTCs)	Explicit prohibition	Implicit prohibition
Denmark	Belgium	Austria	Cyprus
Finland	Bulgaria	Estonia	Greece
Germany	France	Luxembourg	Italy
The Netherlands	Ireland		Lithuania
United Kingdom	Latvia		Malta
Sweden	Poland		Romania
	Czech Republic		Slovenia
	Slovakia		Croatia
	Spain		
	Hungary		
	Portugal		

Source: elaboration of the author

The presence of different provisions within the European Union led to a puzzled legal framework, especially considering the principals of the internal market and of the free movement of goods. Legislative asymmetries create gaps and loopholes that offenders are able to exploit. Often, they created illegal websites selling POMs without prescription mislead customers by claiming that such activity was legal because they were selling from a member state abroad, where this was allowed. This situation created criminal opportunities also, because citizens in the countries in which the online trade of medicines was completely illegal did not have any legitimate and secure web channels to purchase pharmaceuticals. Generally, the presence of any type of legislative prohibition in the supply of products gives to offenders the opportunity to intercept the whole demand. Just to give an example, from 1920 to 1933 in the United States the production, importation, and sale of alcoholic beverages was considered unlawful: this legislation did not reduce substantially the demand of alcohol in the USA but opened the illegal market, ensuring a profitable activity for organised crime (Woodiwiss, 2015). This vulnerability was enhanced by the presence of implicit prohibitions: indeed, in some member states the sale at distance of medicinal products was not regulated at all (e.g. in Italy) creating more confusion among customers.

The need for more harmonized legislations has emerged at EU level for the first time in the so-called 'DocMorris case'.⁵ To summarize, the principle which flows from

⁵ 0800 DocMorris N.V. is a joint-stock pharmacy established in the Netherlands that, according to the Dutch law, in the late 90s started to sell medicines – both OTCs and POMs – over the Internet through a dedicated website. The pharmacy was located in Landgraaf, a Dutch city sited in the South of the country, close to the German border. Exploiting its geographical position, from June 2000 DocMorris started to offer for sale OTC and POM also to end users in Germany, a State in which the online trade in medicines was forbidden. DocMorris considered a given medicinal product to be sold only with a valid prescription if that medicine is a POM according to the Dutch law, or to the law of the State in which the

the ECJ judgment is the following: a domestic prohibition on the sale of medicinal products by mail order can be justified only so far as it concerns medicines which have not been authorized, or medicines marketable only under a prescription. Since the judgment of the ECJ is legally binding for domestic judges, after the DocMorris case the situation within the European Union was even more complex than before. Indeed, some Member States maintained absolute prohibitions even if national judges were under the obligation to disregard that provision as for OTC because it was contrary to the EU law. At the same time, several member states decided to change their

consumer is a resident: in such cases a medicine could be sold only by sending to the pharmacy the original prescription.

In a few months this new market rapidly increased and three out of four of the DocMorris's clients were German citizens. The Apothekerverband decided to bring the case in front of a German court, claiming that the pharmacy, DocMorris, was infringing the domestic provisions foreseen both by the German Law of Medicines (the Arzneimittelgesetz, AMG) and by the German Law of Advertising of Medicines (the Heilmittelwerbegesetz, HWG). In particular, Article 43 of the AMG clearly stated that 'medicinal products [...] shall be sold only within pharmacies and not by mail-order'. The judge, acknowledging the potential conflict between the German prohibition and the European principle of the free movement of goods, decided to send the case in front of the European Court of Justice using the preliminary ruling procedure.

According to the ECJ judgment, a preliminary distinction is needed. Indeed, in relation to pharmaceuticals which have not been authorized in the country of destination, a prohibition laid down by domestic provision is compliant with EU law. On the contrary, the reasoning sharply changes in relations to medicines which have been authorized. In this case, a domestic prohibition could be legal only if this is necessary for the effective protection of the health and life of people, as prescribed by Article 30 TEC (now Article 36 TFUE).

According to the ECJ, in so far as the prohibition concerns OTC medicines it shall be considered a measure equivalent to quantitative limitations to the free movement of goods, as stated by Article 28 of the EC Treaty (today Article 34 TFUE): in this case there is no room for the application of the exemption foreseen by Article 30 TEC. On this point, the judges clearly stated that 'a national prohibition on the sale of medicinal products by mail order is contrary to the community law where it applies to non-prescription medicine which have been authorized for sale' (European Commission, 2003) on the market of the member state of destination. On the contrary, in so far as the domestic prohibition regards prescription only medicines it can be justified because of the possible harmful consequences deriving from the assumption of this kind of pharmaceuticals in case of misuse, abuse, or incorrect supply.

regulations because of the DocMorris Judgment: as an example, in 2003 Germany decided to change the provisions of the German Law of Medicines (AMG) allowing the online trade of both OTC and POM.

The result was a complex puzzle and there was an urgent need for the harmonization of the domestic legislations on this topic; this judgment can be considered one of the biggest pushing factors towards the creation of the new European Directive. In May 2011 the European Council and the European Parliament adopted a new directive (Directive 2011/62/EU) with the aim of protecting the legal distribution chain from the infiltration of falsified medicinal products in the supply chain. The new European act amended Directive 2001/83/EC as to create 'a Community-wide code on medicines for human use aimed at preventing the introduction of falsified medicinal products into the chain of legal procurement'. Title VII A of the Directive foresees a set of measures to be applied by Member States in order to harmonize domestic legislation on the sale at a distance of medicinal products in order to tackle the illegal trade of medicines over the Internet.

Without prejudice to national legislation prohibiting the offer for sale at a distance of prescription medicinal products to the public by means of information society services, Member States shall ensure that medicinal products are offered for sale at a distance to the public by means of information society services [...]. (Article 85c, EU Directive 62/2011)

Thus, some member states that prohibited the sale at a distance of medicinal products must allow at least the sale of over-the-counter medicines. At the same time, the Directive left the issue of the sale at a distance of prescription medicines to be settled by member states, confirming the reasoning of the European Court of Justice during the DocMorris case. According to the Directive, only individuals entitled to supply

medicines under domestic law may sell medicinal products at a distance: member states still have the capability to decide which entities are allowed to sell medicines, even online.

The deadline for the transposition was one year after the specification provided by the Commission concerning the adoption of the new common logo for legally operating online pharmacies/retailers. Since the implementation act has been published in July 2014, the deadline was the 1st of July 2015. An analysis of domestic regulations into force within Member States after the expiration of the transposition period has shown that all the European countries complied with the Directive dispositions, or that the legislative procedure in order to amend the domestic legislation was started.

As a direct consequence of the Directive, today in all member states it is possible to sell and to buy OTCs. Furthermore, in 21 member states it is possible – or it will be possible in the near future – to only sell OTCs, while in the other 7 it is possible to also sell POMs. None of the states where the online trade of medicines was completely illegal before the entry into force of the Directive decided to allow also the sale at a distance of POMs, with the only exception of Estonia.

Tab. 2 - Domestic legislation concerning the online trade of medicines within EU Member States.
Date: 31.12.2015

Total permission (POMs and OTCs)	Partial permission (Only OTCs)	
Denmark	Belgium	Austria
Finland	Bulgaria	Estonia
Germany	France	Luxembourg
The Netherlands	Ireland	Cyprus
United Kingdom	Latvia	Greece
Sweden	Poland	Italy
Estonia	Czech Republic	Lithuania
	Slovakia	Malta
	Spain	Romania
	Hungary	Slovenia
	Portugal	Croatia

Source: elaboration of the author

Today, all European consumers have the opportunity to purchase medicines legally. However, this current situation is still presenting opportunity for offenders to boost the illegal online trade. Results of a web survey (Di Nicola et al., 2015a) have shown that the majority of people within the EU either do not know anything about the legislation applicable in their country (30% of the respondents), or possess wrongful information (43%). As a consequence, they can be easily tricked by the misleading information about the legislation displayed in illegal online pharmacies. At the same time, in most of the member states it is still prohibited to sell POMs at a distance, and it is likely that offenders will continue to create illegal websites to intercept this demand.

To conclude, the combination of consumer propulsion to buy products online, an EU legal framework which is still not fully harmonised and scarce literacy on health

risks associated with buying from illegal sources will likely worsen the situation in Europe, boosting the illegal online trade medicines.

1.2.2 Most popular ITMs online

As highlighted in Di Nicola et al. (2015a), to understand what are the medicines most traded illegally it is crucial to make a distinction between underdeveloped/developing and developed countries. In the former, the most popular ITMs are those with the higher economic value and relevance of use, that are life-saving medicines to treat chronic and serious disease. On the contrary, in developed countries, the most popular ITMs are those higher in demand, especially when customers do not want or cannot purchase them by using the legal supply chain because they need a valid prescription from a healthcare professional that customers do not want or cannot obtain. At the same time these are also the ITMs most present online since pharmaceutical products are usually purchased on the Internet by western customers.

The most popular medicines purchased online illegally are the so-called 'lifestyle medicines'. These are products consumed voluntarily by individuals that may not have serious diseases or illnesses. Examples are medicines to treat erectile dysfunction or other sexually related problems, for weight loss, for birth control or smoking cessation, or anabolic steroids. Some authors also call these kind of medicines 'Performance and Image Enhancer Drugs', or PIEDs (for instance, Basaria, 2018; Brennan et al., 2017; Catalani et al., 2018; Corazza et al., 2014; Mooney et al., 2017; Piacentino et al., 2017; van de Ven and Koenraadt, 2017).

Moreover, in recent years there was an increase in the online illegal trade of analgesics, painkillers and psychotropic substances – for instance stimulants, antidepressants and benzodiazepines – that can also be misused fostering customer's

addiction (Forman, 2006; Forman and Block, 2006; Ghodse, 2010; Raine et al., 2009; Sugiura, 2018).

Life-saving medicines and pharmaceuticals to treat serious diseases are not traded illegally only in underdeveloped/developing countries. Indeed, the demand for such products in illegal sources has increased also in western countries (Hall et al., 2015) and consequently offenders are starting, more and more, to offer such pharmaceuticals online.

1.2.3 The demand side of ITMs online

Research carried out during the European Project Fakecare⁶ (Di Nicola et al., 2015a) allowed to gain in-depth knowledge on who are at-risk customers, their characteristics, their decision-making process, and determinant risk factors.

First of all, results show that the online trade in medicines is a widespread phenomenon in the EU. A web survey showed that the 16.1% of the respondents purchased medicines online at least once in their life, even if it is not possible to determine whether from legal or illegal sources. When asked if they knew other people

⁶ From December 2012 to December 2015, I have been part of the European Project 'www.fakecare.com - Developing expertise against the online trade of fake medicines by producing and disseminating knowledge, counterstrategies and tools across the EU' (also known as 'Fakecare'). The project, co-financed by the EU Commission under the program ISEC 2011, has been coordinated by the eCrime research group of the Department 'Faculty of Law' of the University of Trento and carried out in partnership with Tesside University (UK), the Italian Medicines Agency (IT), RiSSC (IT), and with the contribution of Interpol (FR), IRACM (FR), and Legitscript (US). Furthermore, I have been part also of the European projects 'FAKESHARE – Sharing Intelligence and Science about Fake Medicines and Illegal Websites', and 'FAKESHARE II - Sharing intelligence and science at EU level about pharmacrime and its promotion through web and social networks' (both co-financed by the EU Commission under programs ISEC 2012, and coordinated by the Italian Medicines Agency - AIFA). Any possible overlapping of this dissertation with the final outcomes of the projects might be due to my contribution in them.

who had done so, the percentage doubled (32.6%). Probably, the first result is underestimated since surveys concerning sensitive information, even if anonymous, are affected by social desirability bias: respondents tend to answer questions about how they use the Web in a manner that they deem socially acceptable (Eysenbach, 2008). For this reason, the second results (32.6%) should be considered closer to the real quantity of people within the EU purchasing medicines via virtual means. At the same time, these results may indicate that a number of individuals purchase from illegal sources, but they do not want to declare it. Two out of five buyers purchased pharmaceuticals online more than twice in the last two years. Virtual channels used to purchase medicines online are retrieved usually by Internet search engines (69.2% of the buyers), followed by consultation of online forums/chat rooms (14.6%).

The quantitative data supported the hypothesis that people aged under 55 are the most likely to buy online medicinal products or to know someone who does so: this means that the likelihood of purchasing pharmaceuticals on the web is particularly high among the young. Furthermore, they are the most exposed to the risk of buying from illegal and uncontrolled virtual channels since they are 'are close to the age of onset of many drugs of abuse' (Holloway and Bennett, 2012).

As shown in the previous Section, medicines may be very dangerous if purchased in online illegal sources. So, what pushes people to purchase medicines from illicit virtual channels? The motivations are usually the following:

- no prescription: most of the individuals purchases pharmaceutical from illegal sources because they do not want or cannot receive a prescription from a doctor, because they are too embarrassed – e.g. erectile dysfunction or weight-loss medicines – or because they want to use the medicines for something other

than their intended purpose - e.g. doping or recreational use – (Di Nicola et al., 2015b).

- avoiding shame: individuals are too embarrassed to buy the product in person and prefer to receive medicines at home in relative anonymity (Orizio et al., 2011).
- low prices: customers are attracted by favourable prices and special discounts or trial packs offered by illegal sources. However, the presence of lower cost in illicit online distribution channels is only a perception since research have identified higher prices, especially for certain kind of products (Bachhuber and Cunningham, 2013; Mackey and Nayyar, 2016; Orizio et al., 2010).

Furthermore, there exists some determining factors that push customers to purchase online from illegal sources. First of all, peer pressure and social acceptability. Indeed, lifestyle pharmaceuticals are by far the most popular medicines sought by clients online (Di Nicola et al., 2015b; Hall et al., 2017; Hall and Antonopoulos, 2016; Koczwara and Dressman, 2017; Koenraad and van de Ven, 2018). This indicates a strong social determinant: social criteria in terms of social acceptability and peer-pressure seems to play an important role in the formation of risk groups. For instance, social determinants may push males to begin using steroids in order to improve their physical appearance, especially younger ones.

Second, self-medication and self-diagnosis. The growing presence of digital health and the increased access to data that pushes internet users to retrieve information on health problems online and to use such information to decide which medicines and what kind of pharmaceutical product is the most suitable for their situation (Attaran et al., 2012; Lin and Hsieh, 2006). Even if responsible self-medication can be used to prevent and treat symptoms and healthcare problems that do not need

medical consultation or oversight, a part of these individuals then decides to proceed further and to directly purchase medicines online, even in websites where the prescription is not required. For instance, studies carried out by Pew in the United States highlighted that 72% of adults have searched for health information online, and that the 35% also use the Internet to self-diagnose (Liang and Mackey, 2009). Furthermore, a research found a correlation between the growth in internet access and speed and abuse of prescription medicines in the United States (Jena et al., 2011). It must be finally noted that self-medication and self-diagnosis may lead to harmful consequences, such as antibiotic resistance (Mainous et al., 2009). In Di Nicola, Andrea et al. (2015, see also Hall and Antonopoulos, 2016) four main at-risk virtual environments have been identified:

- forums about weight-loss supplements and medicines. most of these forums offered general information on which products should be used and whether they were available. In few of them, discussions about dangerous medicines were closely moderated and posts advertising medicines to be purchased from illegal sources removed or adjusted. The overwhelming majority of the individuals engaged in such groups are females.
- communities with bodybuilders or people wanting to enhance their physical and sport performance. These forums contain discussions mainly on androgenic, anabolic steroids, but also on erectile dysfunction medicines that are used to cope with side effects connected with the abuse of steroids. Participants use technical terms and seem very familiar with products, side-effects, dosages, and consumption cycles.
- forums on sexual performance and sex-related problems. In some forums women share their partners' problems. Users share opinions and information

on psychological needs, advice on the pharmaceutical products best for a specific problem, and recommendations of websites in which to purchase those products.

- forums on serious diseases, such as diabetes, hepatitis, or cancer. These groups are less common, and they share information about treatments, natural substances, etc., with recommended virtual channels on which to purchase products.

Third, self-rationalisation. The results of virtual ethnography carried out during project Fakecare highlighted a self-rationalisation phenomenon, i.e. a self-made justification for acting in a certain (negative) manner. In order to justify a specific action, this process usually looked for the weakest perceived link in the environment external to the decision-making process. For instance, the supposed lack of integrity of public authorities was used as an external justification for the use of a banned substance like sibutramine (Di Nicola et al., 2015a). Sugiura (2018) illustrated how the purchase of medicines online from illegal sources is perceived by users as a case of 'respectable deviance', encouraging techniques of neutralization (Sykes and Matza, 1957) and particular self-representations (Goffman, 1959).

Fourth, lack of awareness. Internet users seems to underestimate, on average, the risks linked to purchases of medicinal products from illegal sources (Di Nicola et al., 2015b; Liu and Lundin, 2016; Patel, 2017): for these reasons, several attempts to raise customers awareness have been made (Alwon et al., 2015; Chambliss et al., 2012; Chaudhry and Stumpf, 2013; Crawford, 2003; Fittler et al., 2013; Hertig et al., 2017; Kelesidis et al., 2007; Liang et al., 2013). Moreover, this situation is complicated by the presence of posts in social media and online forums containing misleading or

incorrect information about the dangers associated with consuming pharmaceuticals bought on these channels (Di Nicola et al., 2015a).

1.2.4 The supply side of ITMs online

Actors

In the European Union, there are no evidences of the involvement of classical criminal organisations in the illegal online trade of medicines and this is confirmed also by Interpol, according to which, in Europe there are no cases concerning traditional organised criminal groups operating in this market (Interpol, 2014). However, this does not mean that the illegal business is run by unorganised actors. On the contrary, the concept of an organised criminal group – or organised crime – has changed in the last few years because of the Internet and new technologies: illegal online activities exhibit a decline of traditional hierarchical criminal groups and the expansion of more fluid, flexible and informal criminal networks (Europol, 2015). For instance, actors involved in cybercrime usually do not correspond to the definition of organised criminal groups set by the United Nations Convention against Transnational Organised Crime, better known with the term ‘Palermo Convention’ (Broadhurst et al., 2014).

The illegal online trade of medicines is a complex and transnational criminal activity run by a number of different individuals and groups. Hall and Antonopoulos (2016b) provided a comprehensive classification of all the actors involved. One of the most important is represented by the producers, i.e. individuals and organised criminal groups involved in the production of ITPs that usually sell products to illegal wholesalers and/or other organisations and are not involved in the final distribution. Producers are usually based in Asia – especially in China and India (see, among others, Dégardin et al., 2014; Fernandez et al., 2015; Khan and Ghilzai, 2007; Lewis,

2009) – and their skills range from amateurs to professionals. During the production phase, a key role is represented by chemical engineers that are involved in the chemical processing of the substances, creating the active principles and the other chemical components used to manufacture the medicines. Such individuals' expertise ranges from skilled chemists with expertise in the pharma industry to non-professionals who follow instructions and recipes from others. Furthermore, the manufacturing of ITMs requires a large number of other actors, such as equipment producers and installers – who are involved in the preparation of all the necessary tools needed to produce medicines – non-specialised workers – involved in low-skilled labours during the production and distribution of ITMs, e.g. warehouse workers – packaging producers – dedicated to the production of the primary and secondary packaging of the medicinal products, in some cases also experts in forging branded medicine packages and security systems (Dégardin et al., 2018). Several actors are also involved in the transportation and storage of medicines, in the importation of bulk quantities of ITMs and/or active principles and other ingredients to resell to final customers or to other individuals and groups in the illegal supply chain, in the creating and managing the contacts among individuals and groups involved in the illegal trade, and in the distribution of the products to retail sellers or directly to the final users.

All these actors are organised in different ways, depending on the scale of the single operation (Przyśwa, 2014). Generally, as pointed out by Di Nicola et al. (2015a), it is possible identify two different type of actors:

- fluid, flexible, informal, sophisticated and well-organised transnational networks running large-scale operations;

- national-based small groups of offenders running small-scale operations. Usually these groups are involved just in the final distribution of ITMs – or in the production of small quantities.

Networks of the first type, are usually very difficult to track and target by law enforcement authorities because of the flexible and informal nature of their crime structure, and for the transnational nature of the organisation (Interpol, 2014). As regards to small-scale operations, offenders often see opportunities to sell ITMs online through their day-to-day business activities. They exploit the opportunities provided by the Internet to profile potential clients or to reach specific social groups as to enhance the effectiveness of their business, also by using marketing and social engineering tactics (Lavorogna, 2015a).

Distribution channels

Several virtual channels are used to advertise and to market ITMs online. The most widespread are illegal online pharmacies, i.e. websites that sells their products to clients via shipping companies or postal services. The number of illegal online pharmacies active on the Web is impressive, especially if compared to websites operating legally. Indeed, it is estimated that from 40.000 to 50.000 online retailers are active on the Internet, and 93-96% of them operate illegally (Catizone, 2017; Isles, 2017; LegitScript, 2016; Mackey and Nayyar, 2016).

Before proceeding further, it is necessary to clarify what the term ‘illegal online pharmacy’ means in this research. Legal online pharmacies are websites that operate respecting the legal framework of the country where they are established. The concept of ‘legality’ has to be considered in a relative sense: indeed, the inherent transnational nature of the Internet entails that an online legal pharmacy could be accessed by

customers from a country where the sale from that source is considered illegal. In this case, however, this does not mean that the website should be considered 'illegal'. At the same time, some websites sell medicines only in appearance: they are in fact 'traps' for potential buyers aimed at identity crimes – i.e. identity theft and identity fraud. When customers pay for the product with a credit card, the offender holds the payment without delivering the medicines, or even steals credit card details and other sensitive information (please see, among others, Abbasi et al., 2012a; Blackstone et al., 2014; Moore et al., 2009; Spamhaus Project, 2018; Tcherni et al., 2016). Also, in this case it is better not to talk about 'illegal online pharmacies' but 'fake online pharmacies'. On the contrary, 'illegal online pharmacies' are websites that sell medicines to buyers without respecting the legal framework of the country in which they are established and/or the legal framework of the place where medicines are delivered, i.e. they should be considered illegal *tout court*. These kind of websites are also labelled by some authors and institutions 'rogue online pharmacies' (for instance, Cole, 2009; CSIP, 2016; Ivanitskaya et al., 2010; Monteith and Glenn, 2018; PharmacyChecker, 2015; Venhuis et al., 2014).

It can be very difficult to determine whether or not an online pharmacy is legitimate. Nevertheless, there are some features that allow us to spot websites operating illegally (Di Nicola et al., 2015b). First of all, illegal online pharmacies never require valid prescriptions for POMs. Sometimes, in illegal online websites selling medicines, the prescription is substituted by an online medical questionnaire to be filled out by clients before completing the order. However, such questionnaires are put in place by illegal traders only to obtain clients trust and to ease consumer apprehension rather than actually assessing their medical conditions (Fung et al., 2004; Maxwell and Webb, 2008; Orizio et al., 2011, 2009). Illegal online pharmacies not only offer POMs

without prescription but also display such products on their home page in order to attract potential customers.

Second, illegal online pharmacies present low prices, huge discounts, and promotions of trials in relation to POMs. Although products in illegal online pharmacies are not always cheaper than those sold in the legal distribution chain, other types of discounts or trial promotions are often present (Orizio et al., 2010).

Third, illegal online pharmacies often use – fake – testimonials and customer reviews which state positive opinions about the site and the products sold to enhance potential customers' trust. The customer reviews are often automatically translated, a further indicator that they are probably false (Di Nicola et al., 2015a). Testimonials are important both to show the benefits of purchasing online, and the good service and delivery, and to counteract the possible concerns that clients may have about buying medicines online without a prescription. Most illegal online pharmacies stress an anonymity warranty referring to delivery, and promise discreet packaging, trying to reassure people who resort to online pharmacies to treat problems for which they feel ashamed. Typically, illegal websites advertise their products in order to enhance consumers' peripheral reflection by highlighting positive aspects of the online trade, and hiding the nature and risks of the actual products they sell (Orizio et al., 2010).

Furthermore, illegal online pharmacies often do not display a physical address of the pharmacy or retailer running the website. However, the presence of indications of a physical location cannot be considered a relevant indicator with which to identify an illegal website, since illegal online pharmacies sometimes display a fake physical address (Di Nicola et al., 2015a). Finally, the text of the website usually contains misspellings and grammatical errors, especially in languages other than English: this indicator highlights the use of automatic translation systems (Hall et al., 2015).

Often, illegal online pharmacies are promoted to customers by using spam emails. Symantec reported that in 2014 1 out of 10 of all spam emails in the world are linked to illegally operating websites offering – or pretending to offer – medicinal products (Symantec, 2015). Furthermore, according to the Spamhaus Project update in 2018, Canadian Pharmacy is the first among the world's 10 worst spammers and describes it as 'a long time running pharmacy spam operation'. They send tens of millions of spam emails per day using botnet techniques. Probably based in Eastern Europe, Ukraine/Russia. Host spammed web sites on botnets and on bulletproof Chinese web hosting' (Spamhaus Project, 2018). The current volume of unwanted email messages demonstrates an increasingly active collaboration between spammers and hackers (Di Nicola et al., 2015a).

Illegal online pharmacies are not the only virtual channel used by offenders to sell ITMs to customers. Online marketplaces are often used – violating the terms and conditions of those websites – not only to sell medicinal products to final users, but also chemicals, materials, or equipment to be used for pharmaceutical manufacturing activities. Advertised on these websites are large quantities of active principles under their generic name: for instance, project Fakecare⁷ found web pages in online marketplaces selling Zopiclone in large quantities and in a powdered form. Furthermore, also for sale on the websites were the equipment needed to press pills (Di Nicola et al., 2015a). In many cases, online marketplaces are used just as a first point of contact between the seller and the buyer: further physical or virtual meetings are then arranged for the transfer of the products and payment. For instance, in an online marketplace in Bulgaria, a woman posted an advertisement regarding a sibutramine-based product, that is a banned active principle aimed at losing weight.

⁷ See footnote no. 6, page 39.

Despite this, the seller had displayed her name, telephone number, and physical location (Di Nicola et al., 2015a).

Another virtual distribution channel used for ITMs is the so called dark web, that is the part of the Internet that cannot be accessed by using conventional search engines and traditional web browsers but only by their own query interfaces and results (Noor et al., 2011). One of the most popular systems to access the dark web is The Onion Router, better known with its acronym TOR. Designed for online anonymity, TOR offers layered encryption: the network is designed to pass IP addresses and carry out web transactions through numerous relays, using random and anonymous URLs in order to conceal the location of the users (Hall and Antonopoulos, 2016; McCoy et al., 2008). Payments are usually made in digital and encrypted currencies, such as the Bitcoin (Reid and Harrigan, 2013), and data and messages are protected by strict encryption and decryption tools. Hence, the dark web is a virtual environment in which buyers and sellers can communicate and make transactions covered by the anonymity guaranteed by the system. Even if TOR, and the dark web, are still not common among the majority of internet users, it is increasingly used to market illegal substances, including medicines (Aldridge and Décary-Hétu, 2014; Al-Imam, 2017; Christin, 2013; Dolliver, 2015).

Finally, social media websites represent an emerging key issue in the illegal distribution of medicines: this topic will be analysed in-depth in the next Section.

1.3 The role of social media in the illegal online trade of medicines

1.3.1 The emerging role of social media in legal and illegal markets

Social media – also known as social networking websites – are interactive and web-based technologies and platforms thanks to which members can create and share information and contents of different types – such as texts, photos, videos, hyperlinks, etc. – communicate among each other, discuss, and generally interact with each other (Kietzmann et al., 2011).

They are not a new phenomenon, even if the first primordial examples were just generalized online communities such as Theglobe.com (1994), Geocities (1994) and Tripod.com (1995): these communities were aimed to bring people together and encourage users to communicate among each other by using chat rooms and to share personal information and ideas. For this reason, this social media websites provided users with personal webpages – with free or inexpensive web space – and a user friendly content creator (Abhyankar, 2011). After some years, personal profiles became a central feature of social networking sites, allowing users to create lists of fiends, even if unknown in the real life, and search for other users with the same interests: in the late 90s the social media websites Sixdegrees already allowed users to create their own profile, to have a list of friend and to add friends-of-friends to the list (Boyd and Ellison, 2007).

However, from that date, social media has rapidly exploded and the number of networking websites, platforms and mobile applications is difficult to account. They may vary a lot in terms of scope and functionalities. For instance, some are generic and dedicated to general masses – such as Facebook – while other are devised for specific scopes – such as LinkedIn for professional networks – or to share a specific type of content – such as YouTube and Dailymotion for videos and Flickr for pictures.

It may also vary concerning the geographical location of the users targeted since some of them are global – such as Facebook, Instagram or Twitter – while others are mainly devised for users located in specific countries or areas – such as VK for Russia and WeChat for Asia. The number of active users of social media has rapidly grown in a few years: from 0.97 billion in 2009 to 2.46 in 2017, and it is estimated that in 2021 they will be more than 3 billion (eMarketer, 2017). Moreover, it is estimated that 4 out of 5 active Internet users in the world visit regularly social media websites (Nielsen, 2012). It can be stated that social media represents today one of the most frequently lived environments, even if virtual, in which people around the world spend more and more time to interact with each other on a daily basis.

The importance of social media websites has been rapidly recognised and exploited by the business sector. Examples are many. Social media play a crucial role in the field of marketing strategies (Fong and Burton, 2008; Kumar et al., 2016; Schultz and Peltier, 2013), understanding consumers' behaviours (Chang et al., 2015; Relling et al., 2016), managing relations with clients (Trainor et al., 2014), managing the brand (Asmussen et al., 2013), innovation strategies (Gebauer et al., 2013), and employee recruitment (Sivertzen et al., 2013). For instance, customers have become increasingly empowered to influence brands and industries, while the business sector has the opportunity to provide immediate feedbacks and to profile customer preferences in order to tailor their strategies and to obtain insights for new products and service development. Consistently, private industries are investing more and more to advertise their products in such virtual social spaces. For instance, Pepsi has recently waived the TV advertisement during the Super Bowl after 20 consecutive years in order to reallocate those resources – millions of dollars – into social media. At the same time, 25% of the total budget of Ford for marketing strategies is dedicated for digital

technology and social media (Qualman, 2011). In a recent survey (Buffer, 2018) conducted by around 1,700 marketers from businesses of all sizes, the 96% of respondents declared that they are using Facebook in their business, followed by Twitter (89%), LinkedIn and Instagram (70%).

The potential of social media has not only been exploited by legitimate business operators, but also by criminal entrepreneurs. Criminal actors have always exploited new technologies to facilitate their activities, but the spreading of fast Internet connections and wireless devices – such as smartphones – has exponentially increased this capability (Choo, 2008). However, even to date we do not have a clear picture on to what extent organised criminal groups have incorporated new technologies into their criminal activities (Nix et al., 2016) and sometimes it is not easy to distinguish between stereotypes and the reality (Lavorgna, 2015a), it is clear that social networking websites play an important role both in the organisational and internal aspects of individuals, groups and networks and in the organisation of criminal activities. In recent years, researchers investigated both these aspects.

Concerning the former, it is possible to cite as examples the studies on the drug trafficking organisations and gangs by King et al. (2007), Decker and Pyrooz (2011), Wormer and Bunker (2010), Nix et al. (2016), Décary-Hetu and Morselli (2011; Morselli and Décary-Hétu, 2013; Morselli, 2010), Patton et al. (2017), Sela-Shayovits (2012).⁸

Many examples can be provided also concerning the second aspect, i.e. the use of social media websites in the organisation of criminal activities. For instance, recent studies analysed in detail the role of social networking platforms in the

⁸ King et al. (2007) reported that 45% of gang members use the Internet and Decker and Pyrooz (2011) found that 82% of gang members in America have access to the Internet, and 71% use social media platforms such as Facebook or MySpace. Nix and colleagues (2016) conducted research on the use of social media by alleged members of Mexican cartels and affiliated drug organisations.

Authors spotted and analysed the connections between and among 75 alleged members: research results indicate that cartel members actively use Facebook to plan and organise their activities, as well as to communicate in real-time.

Wormer and Bunker (2010) analysed Surenos affiliates – one of the Mexican drug cartels – and street gangs – such as MS-13 and 18th street – highlighting that in such cases social media websites are used to advertise their power and danger – for instance, posting photos of gun-toting members flashing gang signs – more than to recruit new members.

In two studies Décary-Hetu and Morselli (2011; Morselli and Décary-Hétu, 2013) assessed that gang members are largely active on social media websites. Again, Morselli studied ‘cyberbanging’ – the practice of threatening, via the Internet, members of rival gangs – concluding that social networking sites taken into account during the research (i.e. Facebook, MySpace and Twitter) are a virtual environment in which individuals sharing gang values can congregate and legitimate their beliefs (Morselli, 2010).

Patton and colleagues (2017) analysed more than 8.5 million tweets by members of gang based in Detroit related to gang violence, crime and substance abuse and found that social media is used to communicate, argue online with gang rivals, and display and discuss firearms, drugs and alcohol.

Results of in-depth interviews conducted by Sela-Shayovits on a sample of 30 members of an Israeli criminal group, revealed that the Internet and social media websites play a key role in the socialization of members, particularly relating to their computer skills: more skilled members train the ones less proficient improving the cyber skills of the organisation.

facilitation of people smuggling (Di Nicola et al., 2017)⁹ and human trafficking activities (Andrews et al., 2016; Di Nicola et al., 2017; Fraser, 2016).¹⁰

⁹ From November 2014 to March 2017, I have been part of the European Project 'www.surfandsound.eu - Improving and sharing knowledge on the Internet role in the human trafficking process (also known as 'Surf and Sound'). The project, co-financed by the EU Commission under the program ISEC 2013, has been coordinated by the eCrime research group of the Department 'Faculty of Law' of the University of Trento and carried out in partnership with Tesside University (UK), and the Center for Study of Democracy (BG). Results of the projects highlighted how these posts are easily accessible and are intended to recruit new clients and usually contain information on the country or the geographical area of departure and arrival, means of transportation, duration of the journey, price of service, and telephone numbers to contact by using Internet-based mobile services – such as Viber and WhatsApp – in order to receive more information and to organise the travel. Moreover, social media pages and groups managed by smugglers are very responsive: for instance, a service provided by Facebook certifies how quickly someone replies to messages sent to him/her in the private chat of the website. Smuggler pages were very often marked as 'very responsive' – i.e. replying within an hour – or even as 'extremely responsive' – i.e. responding to messages in minutes. In social media smugglers also use marketing strategies in order to enhance the effectiveness of the advertisement, such as the 'call now button' or the 'live video' option (Di Nicola et al., 2017).

¹⁰ A research carried out by Andrews et al. (2016), using human trafficking as a case study, highlighted how words and phrases used by social media users can be treated as weak signals of organised crime, giving hints on how this information can be used to alert police analysts. Furthermore, Di Nicola et al. (2017) conducted a study on two origins and two destination countries of victims within the European Union – i.e. Bulgaria and Romania, and Italy and The United Kingdom. What has become apparent is that social media websites are largely used by traffickers, especially in the recruitment of potential victims. 'eRecruitment' is considered by perpetrators as more efficient compared to traditional methods since it is more easy, fast, and cheap: it has been estimated that the total costs for business management online are very low and constitute 20-30% of the total income. One of the more important roles played by social media is the facilitation of the so-called 'lover boy' method: with this recruitment technique a trafficker simulates a romantic interest in a potential victim – usually a young girl – and seduces her with promises of marriage and an auspicious future by travelling abroad from the country of origin. Then, as the relationship develops further, the recruiter coerces the victim into sexual exploitation through prostitution. Social media dramatically facilitates this method since traffickers, after selecting a potential victim via her Facebook profiles focusing on specific characteristics – such as physical appearance, age, and vulnerability – start to lure her by sending a friend request and chatting via services provided by the social media trying to establish a – fake – romantic relationship. Social networking sites gives traffickers access to various contents that users post undermining potential risks – such as photographs, personal information, daily activities, places visited, etc. – that recruiters can

To give an example concerning illegal online trades, Hinsley et al. (2016) estimated the extent and structure of market in horticultural orchids via social media. In more detail, by analysing 150 of the orchid-themed groups on social networking sites, by recording 55,805 posts over a period of 12 weeks connected to this illegal trade, 8,9% of which contained plants for sale. The link between trafficking in wildlife and protected species has been recently analysed also in other fields, such as pet trade in Asia (Siriwat and Nijman, 2018), slow loris trade in Turkey (Kitson and Nekaris, 2017), and by using innovative techniques, such as machine learning (Di Minin et al., 2018). Other examples in the field of illegal online trade are the several, research conducted, investigations into the relation between social media websites and the drug market, including also New Psychoactive Substances (NPS) (among others, Corazza et al., 2014b; Kolliakou et al., 2016; Lange et al., 2010; Patrick et al., 2016; Walsh, 2011).

use to better identify their potential victims and to facilitate the gaining of victim's trust. Moreover, social media has also started to play a significant role in an emerging recruitment method, i.e. the so-called 'sextortion'. In this case, once traffickers have established an intimate relationship with a potential victim, they convince her to exchange personal pictures. After an accommodation period, perpetrators ask the women to send sexually-explicit pictures or videos that are used afterwards as blackmail material: if victims refuse their propositions, recruiters threaten to publish the photographs online or send them to her friends and relatives.

Considering forms of exploitation other than the sexual one, Fraser (2016) conducted an ethnographic study living among victims of human trafficking in 21 developing countries. What has emerged during the research is that most of the trafficked individuals had internet access and many actively engaged in social media, especially because of the fast and widespread growth of both Internet availability and low-cost access in the countries of origins of the victims. In such a context, thanks to social media, perpetrators now have the opportunity to engage with potential victims even if they are geographically distant, exploiting also embedded auto translations applications in order to overcome language barriers. Furthermore, social networking sites allowed buyers and sellers to communicate among each other in an effective way. At the same time, they have given the opportunity for 'micro-brokers' to enter the market, who are even more hard to detect if compared to traditional perpetrators.

To conclude, social media are largely used by offenders both to organise themselves or to carry out organisational activities, and to organise, to perpetrate and to facilitate criminal activities. Hence, it should be considered as an emerging virtual environment in which to conduct criminological research. This is the case also in the illegal online trade of medicines.

1.3.2 Illegal online trade of medicines and social media: state of the art

Social media websites represent an emerging threat in relation to illegal online trade of medicines. The President of International Narcotics Control Board, Hamid Ghodse, stated that 'illegal Internet pharmacies have started to use social media to get customers for their websites, which can put large, and especially young, audiences at risk of dangerous products' (UN Information Service, 2012). In 2012, in an international operation coordinated by Interpol, a massive number of spam emails and social networking messages linked to illegal online pharmacies were removed, and from 2014 to 2015 Interpol shut-down more than 23,000 advertisements of ITMs and they were removed from the Internet and social media platforms (Frangež and Slak, 2016). More recently, a joint investigation carried out by the Intellectual Property Crime Coordinated Coalition (IPC3) of Europol, the Italian *Guardia di Finanza* and other law enforcement authorities from different member states, lead to a seizure of more than 20,000 packages of ITMs and other counterfeit and dangerous items (Europol, 2018). The MHRA, medicines regulatory authority of the United Kingdom, targeted illegal content on social media websites – including over 18,000 YouTube videos – advertising ITMs, including analgesics, medicines for erectile dysfunction, and antianxiety and antidepressant pharmaceuticals (Richards and Hudson, 2016).

Nonetheless, research addressing the relation between the illegal online trade of medicines and social media websites is relatively scarce, especially if compared to the amount of scientific contributions produced in recent years concerning illegal online pharmacies or other issues related to ITMs. Indeed, while many authors suggested that offenders are now using social media websites to advertise and to trade medicines illegally – especially as a marketing strategy to target young people – (just for example, Bachhuber and Merchant, 2017; Hall et al., 2017; Lee et al., 2017; Liang and Mackey, 2012a; Richards and Hudson, 2016) very few scientific contributions have deeply analysed this issue.

Di Nicola and colleagues (2015a) have explored all the possible virtual distribution channels of ITMs in the European Union by using virtual ethnography in the period 2013-2015, including social media – see also Hall and Antonopoulos (2016) for a focus on the UK market. Results highlighted that several social networking sites contain posts, pages, and profiles dedicated to the illegal online trade of medicines. Sometimes, providers of ITMs are active in more than one social media at the same time. For example, on Facebook the connections between sellers and buyers are established via friends' lists, dedicated groups, or linked to subcultures in which prescription medicine use is prevalent and normalised – such as bodybuilders. Individuals post products available directly on their profile or in a group page, providing also a picture of the product, their name and the information on how to contact the seller for further information. In order to establish, assure and circulate the legitimacy of the seller and the quality of medicines sold, a crucial role is played by virtual 'word of mouth', especially because users are concerned about becoming victims of 'scams' and being defrauded (Hall and Antonopoulos, 2016). In some cases, social media represents a 'shop window' to advertise products, while transactions and payments

are completed via illegal online pharmacies – in this case the link of the websites is usually displayed in the social media post – or between the buyer and the seller via email. The ease to advertise and market ITMs via social media has also led small-scale amateur sellers to enter the market. To provide an example on how social media is increasingly used to promote ITMs online, researchers created a fake Bulgarian Facebook profile to search the availability of prescription steroids: 150 pages were liked and followed, many of them explicitly offering and/or advertising potentially falsified medicinal products, such as anabolic steroids and slimming supplements, including Lida, Lipovon and Meizitang. In just one month, the profile befriended 54 people, mostly interested in steroids, and concerned with weight-loss, fitness and body-building issues. Additionally, research highlighted that several Facebook profiles and pages were associated with a web-shop offering the aforementioned products, especially in the case of anabolic steroids, with images and publicly shared information about the product. Prices are also publicly available.

Mackey and Liang (2013) conducted a research in order to assess the accessibility of creating illicit social media content to advertise the online sale of POMs without prescription and evaluated its potential global reach. To reach this aim, they created a fake advertisement linked to a unique URL – that actually redirected users to a site error page – and posted it on four social media platforms, i.e. Facebook, Twitter, Google+, and Myspace. Surprisingly, even if those posts were deliberately advertising medicines illegally, they remained active for the entire length of the research – i.e. 10 months, with the only exception of Google+ that removed the advertisements approximately 4 weeks after they were posted. The linked web pages, in the same period, was visited by almost 3,000 unique users, coming from high-

income and middle-income countries, and emerging markets. What is more, results demonstrated how easy is to advertise ITMs using social media.

The same authors, in another study focusing on prescription contraceptives (Liang et al., 2012), found that such medicines were largely available for sale without requiring a prescription in the four social networking websites analysed, i.e. Facebook, Twitter, SlideShare and Flickr. Moreover, it emerged that YouTube contained videos with instructions on how to use invasive contraceptive devices. In another research (Liang and Mackey, 2012b), they also found that social media posts advertising the trade in vaccines were most of the time associated to illegal online pharmacies. Again, other research activities by Mackay and other colleagues demonstrate the potential of social media data – Twitter, in particular – to detect the advertisement and sale of ITMs. At the same time, the large number of tweets collected and analysed in such studies confirmed that social networking sites are largely used in the illegal online trade of medicines (Katsuki et al., 2015; Mackey et al., 2018, 2017a, 2017b; Mackey and Kalyanam, 2017).

Recently, in the last ‘Progress Report for State and Federal Regulators’ (September 2018) the US National Association of Boards of Pharmacy (NABP) acknowledged that many social media posts promote the illegal sale of prescription medicines (NABP, 2018a). Findings of a research conducted by the association revealed that posts advertising POMs were easily accessible on the main social media platforms, such as Instagram, Facebook, Twitter and Pinterest: most of them did not sell medicines directly but included links or web addresses leading to illegal online pharmacies or other illicit virtual distribution channels. As underlined in the report, this situation is critical since social media platforms are increasingly used by Internet users to gather information on medicines, cures and other health-related purposes, thus

playing a crucial role in their decision-making process. Indeed, a recent survey found that 46.6% of respondents declared that they started to consume medicines promoted on posts after information they retrieved from social media websites, without consulting a healthcare professional first (Iftikhar and Abaalkhail, 2017).

1.3.3 What is known about the role of social media

This Chapter illustrated why the illegal online trade of medicine is a worrisome phenomenon, that is increasingly threatening public and private health, especially because it has reached a global scale. In western countries, since the legal supply chain is well controlled and secure, ITMs reach final users via illegal distribution channels, especially the Internet. In this context, social media websites represent an emerging and alarming issue, since they give to offenders a difficult to monitor platform in which to advertise and to sell their products at low costs, reaching a large number of potential buyers.

This topic has not been extensively studied by scholars, but from the personal research carried out in the context of European projects (Fakecare, Fakeshare, and Fakeshare II),¹¹ and by cross-analysing results of the existing studies on this issue illustrated in the previous Section, it emerges that:

- i. social media is largely used by criminal entrepreneurs to advertise and to sell ITMs online.
- ii. advertisements of ITMs on social networking websites are easily accessible by using, as keywords, the names of the medicines.

¹¹ See footnote no. 6, page 39.

- iii. advertisements of ITMs on social media are available in a large number of languages, i.e. targeting potential clients all over the world, especially in western countries, including the European Union.
- iv. the ITMs most advertised and sold via social media platforms are lifestyle products, such as anabolic steroids and erectile dysfunction medicines.
- v. posts concerning ITMs on social media platforms are usually of two types: a) posts and pages with information and pictures of the products are displayed together with contact details of the supplier to be used to receive more information and to complete the transfer; b) post and pages linking to external websites, usually illegal online pharmacies.
- vi. advertisements of ITMs were not removed by the social media platform and remained active for a long time once published.

The literature produced is very limited, especially when compared to the large number of studies analysing illegal online pharmacies, and what has been published presents two important limitations (e.g. studies have focused mainly on Facebook and Twitter, while Instagram has not been investigated). Even so, these six themes could be used to define the qualitative features of the illegal online trade of medicines on social media websites.¹² However, currently the situation is changing as these platforms have adopted countermeasures aimed at blocking posts concerning the illegal online trade of medicines. Such interventions, that until now have been overlooked by criminologists, will be presented in the next Chapter.

¹² As illustrated in Chapter 3, these themes have been transformed into the six qualitative indicators used to evaluate the impact of the SCP measures introduced by social media platforms.

Chapter 2

Situational crime prevention measures in the illegal online trade of medicines

As illustrated in the previous Chapter, in recent years, social media websites have played an important and emerging role in the illegal online trade of medicines. However, specific countermeasures have been recently adopted by social media platforms aimed at identifying, blocking and removing contents related to the illegal online trade of medicines. The aim of this Chapter is to illustrate the theoretical framework of such interventions, their features, and the need for an impact assessment.

2.1 Situational crime prevention (SCP)

2.1.1 SCP and its theoretical framework

The most common conception of crime prevention is that it is the attempt to prevent a criminal behaviour before its execution, by intervening directly on individuals or communities, or after the actual crime has been committed, through the usual measures of crime repression such as police interventions and sanctions (Welsh and Farrington, 2012). Situational Crime Prevention (hereinafter referred to with the acronym SCP) is a crime prevention strategy that differs from the others as it focuses its crime-prevention efforts on the environment, such as settings or places, where a specific crime takes place (Welsh and Farrington, 2012). So, 'proceeding from an analysis of the circumstances giving rise to specific kinds of crime' SCP 'introduces discrete managerial and environmental change to reduce the opportunity for those crimes to occur. Thus it is focused on the settings of the crime, rather than upon those committing criminal acts' (Clarke, 1997:2). SCP transfers the responsibility for crime control and prevention from police to other private and public entities, which are considered more effective in reducing crime in the long run (Shariati and Guerette, 2017). Since crime, according to the SCP's theoretical foundations, mainly originates from opportunities that arise from the environment, the commission of a specific crime can be prevented by controlling – and, in some cases, manipulating – a situational environment to eliminate the opportunities.

SCP's basic idea of 'opportunity reduction' (Clarke, 1995) is not completely new, since there are several examples, going back thousands of years, of similar approaches to crime. The ancient Romans, for instance, used to build walls and other engineering installations to protect buildings, houses and other structures (Freilich and Newman, 2017). They just altered the urban environment in a way that created

obstacles for criminal opportunities: in this specific case the construction of a wall prevented external attacks. Even Aristotle, in his work on ethics and rhetoric, noticed a link between opportunity and theft. He goes even further: when outlining people's motives for wrongdoing, he considers the role of the targets (e.g., as victims, precipitators) in the activities in question anticipating the modern Routine Activity Approach, which is one of SCP's theoretical foundations (Freilich and Newman, 2017; Prus, 2015; Shariati and Guerette, 2017).

Apart from the historical theoretical background that might have represented a breeding ground for the development of SCP, its three primary modern theoretical foundations are Rational Choice perspective, Routine Activity approach and Crime Pattern theory. The *Rational Choice* perspective, proposed by Clarke and Cornish in 1985, borrows some concepts from the economic theories of crime. Its main idea is that offenders' behaviour is based on a rational decision process and that it is the result of an assessment of costs and benefits that may arise from the given act (Clarke, 1995). If risks and efforts – i.e. the 'costs' – of a crime outweigh its potential benefits and rewards, it is less likely for the crime to occur (Shariati and Guerette, 2017). Since, according to this theory, potential offenders base their decision to commit a crime on a preventive evaluation of the suitability of the surrounding situational environment – in terms of costs and benefits – for carrying out crime acts, the most effective and efficient way to prevent a crime is to manipulate the corresponding situational environment in a way that makes the commission of the crime riskier, more 'expensive' and less desirable for the potential offender. Another implication is that the rational decision processes may vary between different offences: every specific kind of crime has its own risks and benefits and thus implicates, as said before, a different decision process. Hence, the suggestion of SCP to tailor the crime-preventing measures on

each specific kind of crime (Clarke, 1995). Poyner and Webb, for instance, showed that burglaries committed for cash and jewellery are characterized by different patterns than those committed for electrical goods. The first are usually carried out by offenders working on foot, while the second seem to be realized with the use of a car (Clarke, 1995; Poyner and Webb, 1991). These different *modi operandi* might seem insignificant but has great implications for prevention.

The *Routine Activity* approach, proposed by Cohen and Felson in 1979 states three minimal elements that are necessary for crime to occur: a likely offender, a suitable target, and the absence of a capable guardian, often referred to as the 'crime triangle'. This theory has the merit of focusing the attention on the convergence of the three elements in space and time rather than on the development of a criminal disposition, which is also SCP's *leitmotiv* (Clarke, 1995; Shariati and Guerette, 2017; Wilson, 2018). Cohen and Felson illustrated how the increase of burglaries in the USA between the '60s and the '70s might be linked to the changed 'routine activities', due to more single-person households and the female emancipation, which increased the number of empty houses during the day (Cohen and Felson, 1979). This shows how crime occurs when the three elements mentioned above are perfectly converging and, thus, how the elimination of this three components can reduce the opportunity to offend (Shariati and Guerette, 2017). Cohen and Felson's analysis also illustrated a relationship between crime and the victims' lifestyle: differential risks of victimization are also a matter of a different level of exposure to the likely offender (Clarke, 1995). Lifestyle and Routine Activity theories have both made opportunity the central topic of SCP's research.

Crime Pattern theory studies the regularities in crime behaviours combining Rational Choice and Routine Activity theories to explain the distribution of crime across

geographic space (Brantingham et al., 2005). The crime pattern theory focuses on how a place might come to the attention of a potential offender and divides spaces into 'crime generators' and 'crime attractors' (Bernasco and Block, 2011; Eck and Weisburd, 2015). Crime generators are places that attract numerous people at the same time, including victims and potential offenders, for non-criminal purposes – e.g. shopping malls, schools, public transport stations. The main idea is that a high concentration of people increases the occasions and, so, opportunities for crime. Crime attractors refer to places where a potential offender might find the perfect convergence between attractive and weakly guarded victims or targets and, thus, places that might already have illegal activities (Bernasco and Block, 2011). This theory is very helpful to situational-prevention policies, as it helps to identify the crime-targeted areas and the most suitable preventive measures tailored on the characteristics of each area. It must be noted that this theory can also be adapted to cover virtual environments.

The features of SCP introduced so far can be condensed into three major concepts: rationality, specificity and opportunity:

- *rationality*. As illustrated above, according to the SCP theory, an offence is the result of a rational choice. Human rationality is 'bounded', this means that human behaviour is neither wholly rational nor fully irrational, but it is 'satisficing', i.e. satisfactory and sufficient (Wortley, 2017). The ideal rational decision-making process is affected by different elements like cognitive prejudices, disinformation, individual values, time pressure, emotional arousal, which make the decision process subjective and, thus, not always leading to the greatest benefit. The offender is not always a *homo economicus* – i.e. a perfect calculator of costs and benefits – but may also be subjected to unconscious

decisions, by behaving according to the way the situation – physical and social environmental setting – is perceived (Wortley, 2017). And the perception of a situation is quite a subjective factor. Nevertheless, the crucial point is that the decision-making process remains basically rational: there is a personal need and an environment perceived as offering opportunities to carry out actions that will fulfil the need. To observers, the offender's behaviour may or may not seem rational, but to the offender the behaviour is seen as a rational way to achieve a goal (Freilich and Newman, 2017).

- *specificity*. As opposed to general theories about crime, SCP adopts a crime-specific focus. Its interventions aim to reduce very specific kinds of crime, thus the focus of SCP's studies are the situations in which a single type of crime occurs. This specificity-oriented approach to crime analysis allows, firstly, to identify the situational characteristics (the opportunities) that permit the offender to perpetrate the crime successfully, and, furthermore, to highlight the feasible interventions to remove the opportunities.
- *opportunity*. This is the crucial notion of SCP. It is the cluster of opportunities provided by a situation that offers the offender incentives to commit a crime: thus, it is on the opportunities that SCP interventions have to focus (Freilich and Newman, 2017). Clarke elaborated a model of opportunity structure that represents an attempt to integrate the various theoretical approaches on which SCP is based. Under this model, three components are included: targets, victims, and facilitators (Clarke, 1997). The socio-economic structure from which opportunities arise can be divided into two categories: the physical environment, including the layout of cities, housing, transportation, virtual environments, etc., and the lifestyle and routine activities of the population,

including patterns of work, leisure, shopping and residence. The targets are function of both categories, while facilitators are mainly determined by the physical environment. Lifestyle and routine activities play a crucial role in determining the victims. The opportunity structure is, thus, the result of a complex combination of potential offenders, victims, targets and facilitators (Clarke, 1997).

The theoretical framework underlying the SCP is particularly suitable for describing the illegal online trade of medicines. Indeed, as illustrated in Chapter 1 actors involved in ITMs are rational-based and profit-driven and exploit different opportunities – such as the lack of customer awareness and the absence of an adequate control and punishment system. At the same time, this criminal market is very specific and has different peculiarities that distinguish it from other similar criminal activities: as a consequence, specific countermeasures should be taken.

Before proceeding further, it must be noted that SCP is not the only approach that could be used in reducing the illegal online trade of medicines. Indeed, several theoretical frameworks can help in understanding the phenomenon and in shaping crime prevention interventions.¹³ Among others, Alexandra Hall (2019) has recently analysed the trade in lifestyle medicines by adopting a series of contemporary critical criminological theories within a ‘zemiological’¹⁴ framework. Beside an innovative categorisation of the different harms associated with the trade in lifestyle products, the

¹³ There is not the room in this dissertation to provide a detailed analysis of the different criminological developments concerning crime prevention approaches. For further information, please see, among others: (Bjørge, 2016; LeClerc and Savona, 2017; Shaftoe, 2002; Tilley and Sidebottom, 2017).

¹⁴ *Zemiology* is an innovative perspective focusing on the different social harms inherent in capitalism, and challenging the traditional ‘criminological’ boundaries dividing licit-illicit activities and actors and conformity-deviancy (Boukli and Kotzé, 2018; Hall, 2019; Hillyard and Tombs, 2017; Tombs, 2018).

study presents a deep reasoning behind the demand in this market. Even if critical criminological perspectives challenge the very foundation of traditional studies, results seem to be compatible with a SCP framework. According to Hall, the 'causes' of the demand in lifestyle medicines rely on the late-capitalist processes of production and accumulation, calling for long term crime prevention strategies that would require deep and multi-layered societal changes. On the other hand, the existence of a strong demand represents an 'opportunity' that profit-oriented offenders can exploit. Again, SCP appears to be very promising in tailoring effective countermeasures (at least in the short-medium term) to prevent the illegal online trade of medicines, without neglecting the possibility of more structured interventions with a long-term view.

2.1.2 SCP measures for crime reduction

As outlined in the previous Section, the main features of SCP are a) the implementation of opportunity-reducing measures, b) directed at very specific kinds of crime, c) involving the concrete manipulation of the environment where the crime is committed with the aim to d) make the crime riskier and more difficult to perpetrate and e) less rewarding and excusable (Clarke, 1997). Different situational prevention techniques were developed and their classification is constantly being refined. Currently, the SCP framework includes 25 techniques to reduce crime opportunities encompassed by the following five general intervention strategies: increase the effort, increase the risk, reduce the rewards, reduce provocation, remove excuses. Each heading includes 5 more specific opportunity-reducing techniques, as illustrated in the table below.

Tab. 3 – SCP techniques

Increase the effort	Increase the risks	Reduce rewards	Reduce provocations	Remove excuses
1. Target harden [e.g. steering column locks, tamper-proof packaging]	6. Extend guardianship [e.g. routine precautions, neighbourhood watch]	11. Conceal targets [e.g. off-street parking, unmarked bullion trucks]	16. Reduce frustrations and stress [e.g. efficient queues, expanded seating]	21. Set rules [e.g. rental agreements, harassment codes]
2. Control access [e.g. access badges, baggage screenings]	7. Assist natural surveillance [e.g. improved street lighting, support whistle-blowers]	12. Remove targets [e.g. removable car radio, women's refuges]	17. Avoid disputes [e.g. separate access for rivals soccer fans, reduced crowding in pubs]	22. Post instructions [e.g. 'no parking', 'private property']
3. Screen exits [e.g. ticket needed for exit, merchandise tags]	8. Reduce anonymity [e.g. display of taxi drivers IDs, school uniforms]	13. Identify property [e.g. cattle branding, property marking]	18. Reduce emotional arousal [e.g. controls on violent contents, prohibit radical slurs]	23. Alert conscience [e.g. roadside speed display, customs declarations]
4. Deflect offenders [e.g. street closures, bathrooms for women]	9. Utilise place mangers [CCTV for double-deck, reward vigilance]	14. Disrupt markets [Monitor pawn shops controls, controls on classified ads.]	19. Neutralise peer pressure [e.g. 'idiots drink and drive, 'it is ok to say no']	24. Assist compliance [e.g. easy library check out, public lavatories, litter bins]
5. Control tools/weapons [e.g. 'smart guns', restrict paint sales to juveniles]	10. Strengthen formal surveillance [e.g. red light cameras, burglar alarms, security guards].	15. Deny benefits [Ink merchandise, graffiti cleaning, speed humps]	20. Discourage imitation [rapid repair of vandalism, censor details of modus operandi]	25. Control drugs and alcohol [e.g. breathalysers in pubs, alcohol-free events].

Source: POP Center¹⁵

The choice of which technique to implement depends on the specific crime that needs tackling, as well as on the specific environment in which it takes place. It also depends

¹⁵ The updated list of SCP techniques is available at <http://www.popcenter.org/25techniques>, last accessed on: 24/02/2018.

on the convenience of the intervention for the local community, after balancing public safety, individual rights, community concerns and other factors.

2.1.3 Evaluation of SCP measures

A criticism to SCP practices regards, the possible ineffectiveness of its measures: it has been argued that situational prevention may help mitigate, but not eliminate the problem. Clarke replied that 'none of the failures of SCP interventions call into question the basic validity of the concept, but they suggest that matters may be more complex than those implementing measures sometimes appreciate' (Clarke, 1997:27). In other words, the measures must be tailored on the specific cases and settings, taking into consideration the motives and the methods of the offender, the characteristics of the targets and the victims etc. and this is a result of several trials that might also be unsuccessful at first. At the same time, SCP measures are usually very costly, both from a monetary and a social point of view. As an example, it is possible to cite CCTV systems: these interventions usually require huge public investments both for their implementation and their maintenance and, at the same time, they may erode privacy and liberties of individuals (Welsh and Farrington, 2009).

For both these reasons, the effectiveness – and also the efficacy – of SCP measures need to be evaluated as to understand whether they might be justified in light of the reduction of crime it may generate.

In general, evaluation studies carried out in the last four decades prove that situational prevention initiatives have a great impact on reducing the harms of a crime. Both individual case studies and general reviews of evaluation research demonstrate the effectiveness of SCP techniques in reducing crime rates. For example, Guerrette and Bowers (2009) came to the conclusion that 75% of the interventions analysed were

successful and led to a substantial decrease of crime rates, 12% were unsuccessful, 6% showed mixed findings and 8% were inconclusive. Eck and Guerrette (2012) carried out another research by grouping the 149 analysed evaluation studies by place types and found out that 60% of interventions in all place types had been successful showing the highest effectiveness rates in recreational settings. In another assessment they used a different classification method and analysed the situational interventions by types organised in a hierarchical order based on how frequently they were implemented. It was found that 79% of all 149 studies included in the review involved only the same 7 situational prevention techniques out of 25 and that two of them – CCTV and lighting – had been the lowest in efficacy. This result can be explained by the tendency to use off the shelf situational techniques rather than those tailored to the specific problem at hand (Shariati and Guerette, 2017). Again, a meta-analysis of 41 case studies on the effectiveness of CCTV (Welsh and Farrington, 2009) showed that this kind of measure had produced modest but significant results in reducing crime rates related to specific place and crime types. The UK, for instance, experienced a more significant reduction in crime than the USA and the installation of CCTV in parking lots was found to be the most effective: car crimes in parking lots represented the most responsive crime type to CCTV. The same methodology was used to examine the effects of street lighting interventions reported in 13 evaluation studies. The review showed a general effectiveness for this kind of preventive measure through a reduction in crime rates, not only at night but in the daytime as well (Welsh and Farrington, 2008).

Such results provide two major conclusions: a) SCP measures, considered as whole, are very promising in crime reduction but, b) the level of effectiveness – or ineffectiveness – of SCP measures depends on the single measure adopted in a specific context. Hence, the evaluation of SCP interventions is always essential.

2.2 SCP measures in the illegal online trade of medicines

2.2.1 Traditional SCP measures in the illegal online trade of medicines

Several SCP measures have been developed, especially in the last two decades, in order to fight against the illegal trade of medicines, online and offline. By analysing the existing literature, it is possible to cluster these solutions into four main groups depending on what they are focused on, i.e. measures targeting the product (a), the distribution chain (b), retailers/final distributors (c), customers (d), and legislations (e).

2.2.1.1 Measures targeting the product

This group comprises a set of measures targeting the medicinal product itself or the packaging. In general, the aim of these measures is to provide a way to distinguish between items that are produced by legitimate manufacturers – thus genuine and secure – and medicines that are produced illegally by criminal entrepreneurs. Several measures of this type have been implemented and/or offered by public and private entities: in a survey conducted by Stumpf and Chaudhry (2010) it emerged that such solutions are considered to be the most valuable in the fight against counterfeit products by executives.

They range from basic and simple to new and sophisticated authentication measures. It is possible to divide such SCP interventions into two categories: overt and covert technologies (Lima et al., 2018). The first group concerns solutions that are visible to the naked eye and authenticated by human inspections, such as watermarks, holograms, and colour-shifting ink. They are usually easy to be used by the controllers – even for the final user – and not so expensive to implement by the private industries; but, at the same time, they may require training and be easily forged by offenders (Kwok et al., 2010; Li, 2013; Wilson et al., 2016). The second group

concerns solutions that require special devices for the authentication of the product. They are usually difficult to circumvent by criminal entrepreneurs but more expensive and difficult to use by the controllers – most of the time products' checks are not possible for final customers since special devices are required (Chaudhry et al., 2009; Kwok et al., 2010; Li, 2013; Wilson et al., 2016).

To provide examples of the more sophisticated solutions, smartphones may be used as a device for data gathering – codes, images, etc. – that are then processed in real time by Internet or cloud-based services providing users with feedback on the authenticity of the product under analysis (Mackey and Nayyar, 2017). This is the case for Mobile Product Authentication (MPA), where SMS, image capture, and code scanning are used to validate the genuineness of medicine by a validation process involving information hosted in secure servers or cloud technologies (ur Rehman et al., 2011). One of the most innovative SCP measures targeting pharmaceutical products is a proof-of-concept regarding a mobile software application able to identify ITMs via image capture by using chromatography analysis (Yu et al., 2016b, 2016a). Mobile-based solutions for the identification of ITMs have been recently adopted, for instance, by the Nigerian Ministry of Health and in India (Bansal et al., 2013; Kounteya, 2011; NAFDAC, 2013).

2.2.1.2 Measures targeting the distribution chain

This groups comprises a set of measures targeting the distribution of medicinal products through the whole procedure, i.e. from the manufacturer to the final retailer. The aim of these measures – generally referred to as track-and-tracing systems – is to provide tools to monitor the history of the pharmaceutical during the supply chain, thus ensuring that the products delivered to customers are genuine and safe, avoiding

the infiltration of ITMs (Coustasse et al., 2010; Lima et al., 2018). Such systems are very important in the guaranteeing of the product flow to the final user (DiMase et al., 2016), allowing also fast inspections (Urciuoli, 2010), providing real time information (Enyinda and Tolliver, 2009), and increasing controls in reverse logistics (Kumar et al., 2009).

The several existing track-and-tracing systems are based on different technologies. The firsts solutions used were based on barcodes affixed to the medicines' packaging: however, they manifested several limits because they are very easy to forge by criminal actors and have a very limited data storage capacity (Coustasse et al., 2010; Hemalatha and Rao, 2015; Ting et al., 2010). An emerging and more promising technology used to overcome these problems is Radio Frequencies Identification – usually referred to with the acronym RFID (Ehrenhuber et al., 2015; Rajesh and Ravi, 2015). RFID-based solutions consist of the application of tags in the products packaging containing electronically stored information that can be controlled by reader-devices by exploiting electromagnetic fields (Lima et al., 2018). It must be noted that this new technology seems to be very promising and is to be used as a basis in the creation of new generation track-and-tracing systems, i.e. blockchain. This is a 'secure distributed digital ledger – i.e. simultaneously shared across multiple users/locations and not stored in a single location) made up of "blocks" of continued transaction information' (Lima et al., 2018: 25-26). Born as the base technology in cryptocurrencies, blockchain presents several functionalities that can be used for track-and-tracing solutions: however, to date, there are not fully operational solutions in the field of the online distribution of medicines that is based on blockchain.

In the European Union, Directive 62/2011 (Directive 2011/62/EU of the European Parliament and of the Council of 8 June 2011 amending Directive 2001/83/EC)

introduced safety features to be applied by all member states to prevent the entry into the legal supply chain of ITMs. As highlighted by the EU Commission in the ‘whereas’ of the delegated regulation act implementing those measures, the need for EU-wide system of authentication and track-and-tracing was necessary since different national mechanisms may limit the circulation of medicines within the EU and increase costs for all players involved in the supply chain (European Commission, 2016). The safety features to be applied consist of two elements placed on the packaging of a medicinal product:

- a unique identifier, i.e. a unique sequence carried by a two-dimensional barcode allowing the identification and authentication of the individual pack on which it is printed.
- an anti-tampering device allowing the verification of whether the packaging of the medicinal product has been tampered with.

According to this system, the identification and the authentication of medicinal products is guaranteed by an end-to-end verification of all medicinal products, supplemented by the verification given by wholesalers of certain medicinal products at higher risk of falsification. Indeed, the verification scheme is different according to the specific medicinal product taken into consideration. While the authenticity and integrity of the safety features at the beginning of the supply chain should be verified for all medicines at the time the medicinal product is supplied to the public, medicinal products at higher risk of falsification should be additionally verified by wholesalers throughout the supply chain. This decision was taken in order to balance two different aspects, i.e. the need for an effective track-and-tracing system in order to avoid infiltrations of ITMs in the legal supply chain, and the necessity to avoid over complicated and inefficient

verification schemes increasing the overall costs of the medicines supply within the EU.

The EU Directive 62/2011, stated that the safety features should allow the verification of each supplied pack of the medicinal products, regardless of how they are supplied, including through sales at a distance – i.e. even to medicines that are supplied by legally operating online pharmacies/retailers. However, since the supply of medicinal products to the public – online and offline – is still mostly regulated at national level, the final distribution to patients at a distance may be organised differently within member states. For this reason, the decision is left to each single state to exempt specific institutions or persons authorised or entitled to supply medicinal products to the public from the obligation of verification of the safety features, in order to accommodate the particular characteristics of the supply chain in their territory and ensure that the impact of the verification measures on those parties is proportionate. For this reason, the verification scheme may not operate in cases where medicines are supplied online to the public. Moreover, not all the medicinal products have to display those safety features. Indeed, they should be applied on the packages of the following products:

- prescription only medicines. However, there are exemptions applying to those medicines that have a low risk of being produced and/or traded illegally. These medicines are included in the list set out in Annex I of Commission Delegated Regulation (EU) 2016/161.
- over the counter medicines with a high risk of being falsified and/or traded illegally. These products are included in the list set out in Annex II of Commission Delegated Regulation (EU) 2016/161.

- medicines that are judged to be at risk of falsification by a national competent authority. The scope of the unique identifier or the anti-tampering device is in this case extended within member states, and the authority must promptly notify their decision to the EU.

2.2.1.3 Measures targeting retailers/final distributors

This groups comprises a set of measures aimed at ensuring the legality of the supplier of medicines to the final user. This way, if the legal distribution chain is controlled and secure – especially in cases where effective track-and-tracing systems are in place – products delivered to the customers should be considered genuine and safe. These measures are particularly important in the case of the online trade of medicines. Indeed, as explained in Section 1.2.4, the vast majority of websites supplying medicines are illegal and it is not always simple, especially for the general public, to distinguish between licit and illicit virtual distribution channels.

Probably the most widespread measure is the use of logos and seals to certify legally operating online retailers, i.e. websites and/or other virtual distribution channels that have obtained a license or are registered under the requirements set by the state regulation in which they are operating. Such systems usually consist of images, links or other objects and have the purpose to provide customers with a tool to easily understand virtual channels to trust, and to distinguish them from illicit suppliers (Haruna, 2012; Mackey and Nayyar, 2017).

One of the first measures implemented in this category is the Verified Internet Pharmacy Practice Sites Seals (VIPPS), created by the National Association Boards of Pharmacy (NABP) in 1999 in the United States (Haruna, 2012; Mackey and Nayyar, 2017). The seal is provided to online pharmacies under request – and with the payment

of a fee – via a rigorous application process, involving also regular inspections and audits. The VIPPS logo is applicable to 8 districts, i.e. the 50 United States, the District of Columbia, Guam, Puerto Rico, the Virgin Islands, 8 Canadian provinces, and New Zealand. Online pharmacies participating in the program, shall comply with the set of security criteria established by the NABP, including patient rights to privacy, authentication and security of prescription online medicines purchases, adherence to quality assurance policies, and provision of meaningful consultation – even if virtual – between clients and pharmacists. The verification scheme is quite simple: the VIPPS logo is displayed in the webpages of participating online pharmacies and, by clicking on it, customers are linked to the website of the program in order to verify whether the virtual channel they are visiting is actually present in the list of operators maintained by the NABP (Haruna, 2012).

In the European Union, some member states introduced provision adopting verification schemes and certification logos as a guarantee of authenticity of legally operating online pharmacies and other virtual retailers. However, till recently such provisions were introduced only by few of them and both the logos and the verifications schemes were very different state by state. To overcome this problem, Article 85 quarter (3) of European Directive 2011/62 introduced an EU common logo for legally-operating online pharmacies/retailers to use as a guarantee of authenticity of the supplier. According to the same Article, the Commission had to adopt implementing acts regarding the design of the logo as well as the technical, electronic and cryptographic requirements for verification of the authenticity of the seal. On 24 June 2014 the Commission adopted the new common logo through the Implementing Regulation 699/2014.⁴² Thereafter, Member States had one year to ensure that the provisions on the common logo were applied: as of 1st of July 2015, all legally

operating online pharmacies/retailers in the European Union should display the logo. The verification scheme is very simple and similar to one adopted by the NABP: the seal must be clearly displayed on every page of the online pharmacy/retailer's website, and it must be recognisable throughout the Union, while enabling identification of the member state where the website is established. The EU common logo links to the website of the national competent authority responsible for maintaining a list of legally-operating online pharmacies/retailers registered or authorized in the country. By clicking on the logo, customers are directed to the national list and, once there, they must check whether the online pharmacy/retailer is listed in order to complete the verification process (European Commission, 2015b). The information transiting between the websites authorized or entitled to supply medicinal products at a distance to the public and the websites hosting the national lists must be secured by appropriate means.¹⁶

Logos and seals are not the only measures that have been developed to certify legally operating virtual distributors. Another category is composed by private website verification services that uses large databases containing information about online virtual channels – usually online pharmacies only. These systems give customers the possibility to check the legitimacy of an online website supplying medicines by querying its URL (Mackey and Nayyar, 2017). Another approach that recently emerged is to exploit top level domain names as an instrument to guarantee legally operating online retailers. Furthermore, in 2011 the Internet Corporation for Assigned Names and Numbers (ICANN) created a large number of generic top level domain names (gTLD), also for websites associated with health services, such as *.health* and *.doctor*. One of these new gTLD is *.pharmacy* with the US NABP as registry operator: the aim of this

¹⁶ For further information on the EU common logo, please see: European Commission (2014a, 2014b).

domain is to become a name space to host legal online pharmacies. Hence, the customers have the possibility to check the security of an online operator selling medicines just by simply checking the URL address of the pharmacy.

Till now, solutions presented in this Section have the final goal to provide customers with reliable tools to verify whether a website selling pharmaceutical products is legitimate or not. However, final users are not the only players that should be supported in the identification of legitimate virtual distributors. Law enforcement authorities, for instance, in their activities against the illegal online trade of medicines need to continuously monitor the Web in order to spot illegal operators and proceed with consequent actions. In doing so, given the number of operating websites, they should be equipped with tools enabling the automatic evaluation of suspicious online websites. The manual verification process of suspicious sites could be assisted by a data mining algorithm able to extract implicit information concerning the website – such as texts, images, internal and external links – and to assign a score automatically to a website under analysis. Based on this reasoning, the first operative example was FAST – the Fakecare Alert System Tool –, a system developed during the European Project Fakecare. FAST algorithm relies on the analysis of the textual web content and of the outgoing web links. Then, by the combination of these two analyses, the tool can calculate a risk index, i.e. a normalised score given in percentage (0% - 100%) estimating the probability that the processed website is illegitimate. Researchers involved in the project set a threshold at 50%: if a website receives a score higher or equal to this risk index it is considered as illegitimate by the tool. FAST has been implemented as a distributed web application following the client-server model. Each component has a modular architecture based on the SOA (Service Oriented Architecture) paradigm. The tool is made up of two main components: a front-end –

web application – and a back-end – several modules with a key role in the decision-making process of the system. FAST has been used in real operative scenarios, i.e. the international police operations against the illegal trade of medicines PANGEA, coordinated by Interpol, demonstrating a very good overall accuracy (Di Nicola et al., 2015a). Other examples of automatic software for the identification of illegal online pharmacies are PharmaGuard, proof-of-concept based on the combination of a web crawler and supervised machine learning algorithms (Corona et al., 2015), and another system developed to find websites selling counterfeit products – not only ITMs – based on an adaptive learning algorithm called recursive trust labelling (RTL) (Abbasi et al., 2012b; Fadlallah et al., 2016).

2.2.1.4 Measures targeting clients

This group comprises of a set of measures aimed at raising the awareness of the public on the dangers connected with the assumption of medicines purchased from online illegal distribution channels. Indeed, as illustrated in Section 1.2.3, customers generally underestimate the risks linked to ITMs, do not have correct information on the legislation concerning the online trade of medicines, and may be pushed to purchase products from illegitimate sources for several factors, such as peer pressure and social acceptability, self-medication and self-diagnosis, self-rationalisation, the willingness to buy medicines without prescription – e.g. to avoid shame –, and to save money because of the perception of lower prices applied in illicit distribution channels. All these factors should be balanced by effective awareness raising campaigns.

As in the case of counterfeit products, also in the case of ITMs purchased online such measures should be aimed at modifying customers' behaviour and reducing the demand in illegitimate items (Cesareo and Stöttinger, 2015; Lima et al., 2018),

including fighting the perception that illicit products are as good as the genuine (Lima et al., 2018) and explaining the impacts of consuming them (Chaudhry et al., 2009; Fernandes, 2013; Meraviglia, 2015), combatting 'anti-big business' sentiment (Lima et al., 2018), contrasting the idea that it is a victimless crime (Meraviglia, 2015), explaining implications for states and societies (Cesareo and Stöttinger, 2015), and reinforcing the value of genuine products by emphasizing purchase experiences from legitimate sources (Wilcock and Boys, 2014). Awareness raising campaigns should also be aimed at providing customers with information on how to identify genuine products (Chaudhry and Stumpf, 2013; Hoecht and Trott, 2014) and legitimate distributors (Cesareo and Stöttinger, 2015; Di Nicola et al., 2015b).

Several measures and programmes targeting customers have emerged in the last years (Isles, 2017), such as one carried out by the Alliance for Safe Online Pharmacy EU targeting Italian customers via an intensive Google AdWords campaign, an interactive story targeting youngsters (8-15 years old) coordinated by the European Directorate of Medicines & Healthcare, the campaigns carried out by 'Fight the Fakes' and the Institute of Research Against Counterfeit Medicines, and the guidelines 'Trick or Treat(ment)' developed during the EU Project Fakecare. The latter provides Internet users with both the knowledge acquired during research activities and helpful advice drawn from the project's results aimed at mitigating the risks linked to the online purchase of medicinal products from illegitimate sources. Furthermore, the guidelines include illustrative boxes with concrete examples of research results, as well as in depth explanations of key concepts (Di Nicola et al., 2015b).

Finally, it must be noted that EU Directive 62/2011 contains an obligation for member states to set up a website providing, among other things, information on the national legislation applicable to the online sale of medicines, including information on

the fact that there may be differences between member states regarding classification of medicinal products and the conditions for their supply. The website must also contain information about the risks related to medicinal products supplied illegally and about the purpose of the EU common logo for legally operating online pharmacies/retailers, as well as the list of persons and entities entitled to sell medicines online in the member state.

2.2.1.5 Measures targeting legislations

This group comprises a set of measures aimed at removing gaps and loopholes present in the legal framework. Indeed, it may happen that a legal provision accidentally creates opportunities that can be exploited by criminal entrepreneurs: for instance, the presence of a criminal offence that can be interpreted in different ways may obstruct investigations and prosecutions, giving offenders incentives to commit such crime. In the case of the illegal online trade of medicines, offenders exploit the opportunity derived by the absence of adequate and tailored sanctions: indeed, as illustrated in Chapter 1, this criminal market generates high profits while the risks are very low, especially if compared to criminal provision in other similar activities. At the international level, the MediCrime convention of the Council of Europe represents an important attempt to introduce adequate and tailored substantial and procedural criminal laws at the national level. At the same time, its correct implementation in several states across the world would represent a crucial framework of cooperation at the international level (Bate and Attaran, 2010; Negri, 2016; Venhuis et al., 2014). Another example is Article 118a introduced in the EU Directive 83/2001 by the EU Directive 62/2011, that obliged member states to introduce in their legal framework adequate penalties to prevent the entry of falsified medicinal products in their health

system: strict rules should ensure that medicines are safe and that the trade in medicines is rigorously controlled (Stroetmann et al., 2017).

It may also happen that unintended criminal opportunities are created not by the law itself, but by gaps and loopholes stemming from legislative asymmetries. For example, the European Project 'AMOC – Assessing Measures Against Organised Crime'¹⁷ has shown how existing discrepancies between domestic provisions aimed at countering organised crime within the European Union are generating criminal opportunities by undermining an effective transnational judicial cooperation (Di Nicola et al., 2014). To analyse vulnerabilities involuntarily generated from the legal framework is essential in order to better understand criminal opportunities exploited by offenders as to improve the legislation reducing such opportunities and, as a consequence, making criminal activities riskier and more difficult. As illustrated in Chapter 1, till recently the legislation concerning the legal distribution of medicines via the Internet were very different among EU member states and this situation created opportunities for offenders, especially leveraging on the lack of knowledge of customers on the applicable regulation. EU Directive 62/2011 introduced a measure to harmonise legislative provision regarding the sale at a distance of medicinal products in EU member states (Di Nicola et al., 2015a).

¹⁷ From March 2013 to February 2015, I have been part of the European Project AMOC. Objectives were (a) to assess the impact of the Framework Decision 2008/841/JHA and other relevant European and domestic legislation on the fight against organised crime through a comparative legal analysis, and (b) to provide a comparative analysis of investigative tools and other measures used at the national and EU level for the purpose of fighting organised crime. The project has been carried out by RAND Europe (UK) in cooperation with the University of Trento (IT) and the CSD (BG).

2.2.2 Problems and lacks with traditional SCP measures

As illustrated in Section 2.1.3, the assessment of SCP measures is crucial for the evaluation of the effectiveness – and efficacy – of the interventions. An ineffective SCP measure is not only useless but also dangerous since it may give a false sense of assurance among law enforcement, customers and stakeholders in general. Furthermore, all the SCP interventions are very costly and require huge efforts for their implementation: for instance, the introduction of track-and-tracing systems will impact on private and public controlling procedures, as well as on the manufacturing procedures of pharmaceutical industries, thus augmenting the costs of the supply of medicines. Even in countries in which such systems have already been implemented, it is not clear as to the effectiveness of the systems, nor the actual ability of the private sector to deploy these technologies (Mackey and Nayyar, 2017). SCP measures should be justified in order to demonstrate their efficacy in protecting patients, mitigating risks associated with ITMs, and fighting offenders involved in this criminal market. However, to date there is a lack of criminological research aimed at assessing these measures. Despite the possible advantages they may have, many of these solutions are still at a primordial stage, and there are ongoing questions regarding their utility and cost-effectiveness (Mackey and Nayyar, 2017).

Even when not assessed by using a sound evaluation methodology by criminologists, several SCP measures introduced in the previous Section present critical aspects that may raise questions about their actual effectiveness in effectively contrasting the illegal online trade of medicines. To start with, offenders have demonstrated their ability in forging solutions targeting the products that are easily usable by final users – such as holograms, antitampering packaging, and watermarks. When measures are more sophisticated and secure – e.g. RFID or NFC based

solutions – they are not user friendly. In general with these type of technologies, a trade-off between usability and security always exists (Di Nicola and Baratto, 2017). Finally, in the case of sale at a distance they are fully operational only in case they are used by final users in checking whether the medicine they are assuming is legitimate or not i: but customers may not be trained and aware in doing so.

Second, measures targeting the distribution chain are usually costly and difficult to implement, since they require a joint effort of different actors and the adoption of standard protocols for communications: logistical costs will increase and such systems will determine a valuable impact on internal procedures, changing process of shipping and handling. At the same time, legitimate producers may not have incentives in the adoptions of track-and-tracing technologies since they will protect the legal supply chain from the infiltration of ITMs but, at the same time, the major problems are connected to illegal online trade that will be completely uncovered by these solutions, thus undermining the cost-effectiveness of the systems (Hohenstein et al., 2015; Jacso, 2005; Jameson et al., 2009). Furthermore, the distribution chain of medicines is very complex and it is composed of multiple layers and actors, such as manufacturers, packagers and re-packagers, retailers, sale representatives, pharmacies, hospitals, private clinics and doctors (Liu and Lundin, 2016). Empirical studies on the vulnerabilities of the legal supply chain are still lacking, thus is not clear as to the actual opportunities exploited by legal entrepreneurs in infiltrating the legal market (Stumpf and Chaudhry, 2010), and consequently what the most effective countermeasures to implement are.

Third, concerning the measures targeting the final retailers/distributors, logos and seals to certify the authenticity of a website are extremely vulnerable to fraudsters. Indeed, in the past similar verification schemes implemented in other sectors – e.g.

other types of e-commerce – have been forged. These vulnerabilities were acknowledged also by some relevant stakeholders and national competent authorities when responding to the concept paper during the public consultation before the issue of implementing the act by the Commission.¹⁸ The results of a vulnerability assessment

¹⁸ Excerpts of the responses to public consultations concerning the possible vulnerabilities of the logo are reported below. All the documents are available on the webpage of the European Commission: https://ec.europa.eu/health/human-use/falsified_medicines/developments/2013-02_common_logo_pc_it (accessed on December 2015).

National Association of Pharmacies – ANF (PT): *‘However, we also believe that the adoption of a logo can be counterproductive since it can introduce a false sense of security among citizens. Logos and a national list of legally-operating online pharmacies/ retailers with reciprocal links can be easily falsified and, instead of improving safety, these may facilitate the dissemination of illegal internet pharmacies’.*

Alliance for Safe Online Pharmacy EU – ASOP (UK) & European Alliance for Access to Safe Medicines (UK): *‘Similar national logos have, in the past, been forged’.*

Consejo General de Colegios Oficiales de Farmacéuticos de España (ES) : *[...] the presence of the logotype alone is not sufficient and that the patient/consumer [...]. On the other hand, taking into account that an URL may be redirected or modified in such a way that the false URL may pass unnoticed by the average user [...].*

European Federation of Pharmaceutical Industries and Associations – EFPIA: *‘However we are concerned that if the system is not set up with care there is a strong likelihood that illegal operators will be able to copy the logo, place it on illegal pharmacy websites and link it to fake authentication pages. This could mislead patients into believing that they are purchasing from an authorised online pharmacy’.* *“[...] the simple presence of the logo on a webpage will not be sufficient to ensure that the online pharmacy/retailer is authorised, as the logo may have been copied. Equally, clicking on the logo on a page will not provide a guarantee of authenticity as the page to which the logo links could also be fake”*

Federació d'Associacions de Farmàcies de Catalunya – FEFAC (ES): *‘It is easy to fake webpages, also a second, pseudo-“official” webpage that approves the first fraudulent webpage. [...]. You may face situations such as this: a person visits a fraudulent pharmacy webpage with copied logo. The person then clicks on the logo to make sure the website is legit, and is taken to another fake webpage that “approves” the pharmacy page. There may be an additional risk that clicking on a fake logo activates computer viruses (on top of selling bogus drugs)’.*

General Pharmaceutical Council (UK): *‘At the GPhC we already have a web-based searchable register of pharmacies that are registered with us. [...] We have however encountered incidents where owners of registered pharmacies have just copied our logo onto their website instead of first applying*

that I conducted during project Fakecare has shown that both the EU logo and the verification scheme can be counterfeited in a few minutes, with basic computer skills, and spending only the money necessary to purchase a fraudulent domain to upload the copied version of the websites hosting the national lists (Di Nicola et al., 2015a). Moreover, the verification scheme introduced by the European Union has not always been well implemented by online pharmacies/retailers: an analysis of a large number of European legally-operating suppliers has shown several problems, among which: the logo is not displayed at all; the image of the logo contains some errors – e.g. it is smaller or different –, the link does not work, or the logo is linked to pages other than

to us for approval to display the logo. [...] To circumvent the reciprocal hyperlink embedded in the logo, owners have simply hyperlinked other information beneath the copied logo, (such as their pharmacy's unique registration number), directly to their pharmacy's entry on the web-based register instead'. 'In summary we support the desire to provide greater assurance to the public when purchasing medicinal products over the internet but remain concerned that the EU logo could give false assurance as it appears possible to copy the logo onto websites that have not been approved by the relevant national competent authority'.

National Association of Boards Pharmacy – NABP (US): *'One stakeholder who runs a similar, voluntary scheme, reports to us that there have been occasional examples where the logo they have adopted appears to have been illegitimately copied by non-registered pharmacies, despite their considerable efforts.*

The Netherlands: *'The Netherlands are of the opinion that a common logo will also not be a solid instrument to determine right from wrong. The selling of falsified medicinal products is highly profitable. Falsifiers will sooner or later be able to copy the common logo. And we certainly don't want to refer people to illegal websites/suppliers and make them think that they are legitimate ones. On the other hand: offering them no tool at all is also not a favourable option'.*

Pharmaceutical Group of European Union, Groupement Pharmaceutique de l'Union Européenne – PGEU, GPUE: *'PGEU has consistently argued that the use of a Common Logo to identify legally authorised sellers of medicines is potentially counterproductive. For example, there can be no assurance that both the Logo and the national list of legally operating pharmacies and retailers can be excluded from risk of falsification'*

Pharmacy Forum (UK): *'[...] the Forum has some reservations with regards to the common logo for internet pharmacies and the potential for the logo to be copied. Such logos are easily counterfeited, and may provide a false sense of security for patients'*

the national register of legally-operating online pharmacies/retailers – e.g. a web page with the text of the EU Directive. Furthermore, several illegal online pharmacies use fraudulent logos of legal online pharmacies, genuine stamps of approval of national watchdogs, or fake a similar one, and this situation may create confusion among customers. The presence of vulnerable verification schemes is one of the more relevant criminal opportunities since it gives to customers a false sense of assurance.

Also, other SCP measures targeting the retailers and final distributors present some critical aspects. For instance, websites providing online verification services for online pharmacies may not be reputable. At the same time, they require constant monitoring and updating activities since new websites selling medicines become active nearly on a daily basis and already checked online pharmacies may become noncompliant with the requirements once they are inserted in the ‘white list’ (Khan et al., 2012; Lima et al., 2018; Linnenluecke, 2017). Concerning the *.pharmacy* project, it must be noted that it is just in a very preliminary phase and many customers may not be aware of the new gTLDs. At the same time, it is not clear whether legitimate operators will use it: even if this project will be used by some legal online suppliers, others will maintain traditional top-level domain names (Lima et al., 2018).

One example of evaluation of measures targeting online websites supplying medicines may be given by taking the software FAST into consideration. Indeed, the tool was tested on a real investigative scenario, i.e. the enforcement actions organised at Interpol headquarters in Lyon, France, within the context of Operation PANGEA. A sample test dataset containing 4,368 suspicious websites was processed using the FAST: all the websites were illegal, and the tool automatically recognised as illegitimate 4,168 of them. Afterwards, another sample composed by 118 known to be legitimate websites were processed: 118 of them were correctly classified by the software. As a

general result, FAST has demonstrated an overall accuracy higher than 95%. On conclusion of the operation PANGEA, more than 11,800 illegal websites were shut down, including those spotted by FAST (Di Nicola et al., 2015a). Even if promising, software like FAST need to be constantly trained and reshaped in order to be fully operational. For these reasons, resources are needed: in the future, a public-private partnership in this field may overcome this problem.

Taking into account SCP measures targeting customers and their behaviours, they may take time in order to produce effects on the general public. At the same time, campaigns aimed at training individuals on how to recognise illegitimate products may be difficult to implement and have limited effect. The disparities on the success of implementation may also explain why the perceived effects of these type of measures in different countries varies a lot (Stumpf and Chaudhry, 2010). Also measures targeting the legislation may require a long period in order to produce consistent outcomes. However, neither the EU Directive 62/2011 nor the MediCrime convention seems to have, till now, achieved their aims by filling the existing gaps among different national provisions (Bate and Attaran, 2010; Di Nicola et al., 2015a).

All the measures examined in the previous Section have as a final goal to protect the legal distribution chain from the infiltration of ITMs and/or to protect customers wanting to acquire genuine and secure medicinal products online from acquiring ITMs. On one hand, none of the SCP measures may achieve this aim if singularly considered for the critical points explained above. On the other hand, a combination of different measures may solve singular vulnerabilities, thus being an effective solution. However, while in the literature consumers of ITMs are usually cited as 'victims' (Liu and Lundin, 2016), as illustrated in Chapter 1 most of the buyers of ITMs online are aware that they are purchasing products from illegitimate sources and they are active participants in

circumventing the regulatory systems and the measures set by both public and private actors to certificate the legitimacy of medicines acquired on the Internet. Behaving this way, they are fostering the illegal online supply chain and situational crime prevention measures should be aimed at protecting them from dangerous ITMs even if they are aware clients of this illicit system (Haruna, 2012). Thus a virtual grey market is in place, that is completely separate from the legal supply chain and situational crime prevention measures should also take this into consideration (Kesselheim et al., 2016; Tim K Mackey and Liang, 2013; Mackey and Nayyar, 2017; Orizio et al., 2010).

Finally, all the measures introduced in the previous Sections are scarcely applicable in the case of social media. The only exception is represented by awareness raising campaigns, even if they may not produce effective outcomes in a short period. Since, as explained in Chapter 1, social networking websites are the new forefront in the fight against the online trade of medicines, further criminological research is needed to identify and to evaluate possible SCP measures targeting this very specific virtual environment. This will be the focus of the following Sections.

2.3 SCP measures tailored on social media

2.3.1 Identifying possible SCP measures in the case of social media

As illustrated in the previous Paragraph, it has not yet been proven to what extent traditional SCP measures, in the context of the illegal online trade of medicines, are effective – and efficient – in fighting offenders involved in this criminal activity. At the same time, none of the traditional measures seem to be directly applicable in the case of ITMs advertised and/or directly traded in social media websites. Hence, criminological research is needed in order to obtain insights on possible effective

measures to be adopted in this context. The so-called 'crime script analysis' (CSA) seems to be a suitable method to achieve this task.

CSA is a technique in which it is possible to divide the crime commission process into the consequential steps and actions – that are separate but related – undertaken in order to prepare and commit a certain criminal offence, as well as all the subsequent actions that are strictly related to the crime under analysis (Cornish, 1994; Di Nicola et al., 2015a; Lavorgna, 2015b; Leontiadis and Hutchings, 2015). The focus is on the criminal activity rather than on the offenders and their motivations. Since criminal markets such as the illegal online trade of medicines are a process rather than a single event, CSA allows to better identify the opportunity exploited by offenders and, consequently, to understand how to implement measures to eliminate or to mitigate such opportunities.

There are some studies that have recently adopted a crime script approach to illustrate the commission process in the case of the online trade of ITMs. First of all, Di Nicola (2015) by analysing investigative and judicial cases, crime news records, and results from in-depth interviews, divided the illegal online trade of medicines in 5 steps:

- a) *manufacturing*. ITMs are usually imported from China, India, Pakistan, Thailand, and other Asian countries, as well as from Western Europe. Although most of the time products are shipped from abroad, there are some cases in which medicines were produced within the EU, especially in the case of anabolic steroids. Chemical components and technical equipment to manufacture medicines are obtained by criminal entrepreneurs in different methods, such as legal or illegal purchases, even online.
- b) *acquisition of medicinal products and/or other equipment*. ITMs are usually acquired by unlawful distributors on the Internet or offline thanks to the agency

of intermediaries and then re-sold illegally online and offline. In some low-scale operations, products are also acquired from legal pharmacies using forged prescriptions and fake IDs. ITMs may also be obtained by stealing them in the legal distribution chain and then re-introducing them to consumers via online pharmacies. As explained in Section 1.1.3, those medicines are very dangerous even if genuine and produced by legal manufacturers, because of the improper storage and transportation, or the modification of the expiry date by offenders.

c) *transportation*. Since medicines are usually obtained by criminal entrepreneurs from abroad, the transnational transportation of ITMs is a common practice. In doing so, offenders try to circumvent applicable legislations and checks and controls by national authorities and in some cases are facilitated by the presence of source countries with weak export laws and/or controls. ITMs are usually smuggled by mail, but in some cases also by other means, such as private cars or courier companies. Moreover, the smuggling of ITMs may take complex forms: a packet of pills may pass through one or more intermediaries, such as brokers, trading houses and agents, before reaching the destination. Intermediaries may also be involved in repackaging, re-labelling and mixing: such activities may facilitate not only the illegal supply, but also the introduction of ITMs into the legal distribution chain (see, for instance, ABC, 2013; Sears and Greenwood, 2011).

d) *detection avoidance tactics* (see also Hall et al., 2015; Hall and Antonopoulos, 2016). Offenders involved in the illegal online trade of medicines are usually aware of the investigative procedures and countermeasures used by law enforcement agencies and other relevant agencies. For this reason, they use tactics to avoid these efforts, such as the use of affiliate and sub-affiliate

networks to 'muddy the waters'¹⁹, the purchase of domain name for their websites from registrars not cooperating with enforcement actions, the use of identification measures to identify when law enforcement authorities and national/international regulatory agencies are visiting their websites²⁰ or to avoid WHOIS checks²¹, hide money transactions²², and avoid the provision of any personal information and details on delivery items accompanying ITM shipments (such as delivery notes, invoices, etc.).

- e) *money laundering*. In some cases, offenders set up offshore banking facilities to launder money. Research results suggests that offenders who rationally

¹⁹ Affiliate networks may be established by criminals who are responsible for a number of websites (often have very similar if not identical templates) selling ITMs and/or by the use of 'affiliates', in case larger criminal networks running illegal online pharmacies pay commercial entities commissions to surf the web and post links to their distribution virtual channels on various online sites (Di Nicola et al., 2015a; Hall and Antonopoulos, 2016).

²⁰ Criminal entrepreneurs try to identify law enforcement and health regulatory agents visiting their websites pretending to be customers by checking the details of visitors, such as the frequency of visits and the debit/credit card used for purchases. Then, criminals block 'suspicious' visitors or re-directed them to other websites (Di Nicola et al., 2015a; Hall and Antonopoulos, 2016).

²¹ WHOIS is a free internet service that can be used to gather information regarding the Internet infrastructure utilised by offenders, such as the company acting as the 'registrar', the registrant of the domain name – i.e. the company or individual who has bought the domain name –, the registration date, the IP address, the company address. However, it must be noted that, to date, most of the functionalities provided by WHOIS services provider are not anymore possible because of the entry into force of the EU GDPR (ICANN, 2018).

²² The links among illegal activities and payments are usually concealed by re-routing payments between offenders through intermediaries. Criminals largely avoid the use of traditional bank payments preferring money transfer services – e.g. Western Union – since they are extremely easy to conduct, and difficult to track by the law enforcement – for smaller transactions no identification is required. Moreover, illegal entrepreneurs establish multiple banking relationships in numerous ways. They have been known to ask family members, friends and/or acquaintances to lend their accounts for a number of transactions, or they have rented the accounts of others for a short time (Di Nicola et al., 2015a; Hall and Antonopoulos, 2016).

weigh up the expected costs and benefits of breaking the rules, thus highlighting the highly rational schemes behind this criminal activity.

These results provide probably the first attempt to script the crime commission process of the illegal online trade of medicines. However, this analysis is not tailored on social media websites since the scope of the analysis was broader. At the same time, it was aimed at understanding the *modi operandi* used by criminal entrepreneurs in the online trade of falsified medicines within the European Union and not to provide useful information to develop effective situational crime prevention measures. For these reasons, such crime script analysis cannot be used for the purposes of the present research.

Another study in which the crime script approach was used to spot criminal opportunities exploited by offenders in the illegal online trade of medicines has been carried out by Lavorgna (2015). Data was gathered from online newspapers, judicial databases and 12 semi-structured interviews with key stakeholders such as prosecutors, police officers and other experts. The main stages identified in the study were the followings:

- a) preparatory activities;
- b) *production*;
- c) *intermediate passages (transit networks - local retailers)*;
- d) *distribution of ITMs to clients*;
- e) *activities that are directly consequential or subsequent*.

This analysis has been used by Lavorgna the five main criminal opportunities provided by the Internet in facilitating the crime commission process in the illegal online trade of medicines:

- *communicative opportunities*, i.e. the facilitation of communications among sellers and potential buyers.
- *managerial opportunities*, i.e. the facilitation of the management of the distribution of medicines to the clients.
- *organisational and relational opportunities*, i.e. the facilitation or the organisation of actors involved in the illegal online trade of medicines, the communication among different criminal networks and with clients.
- *promotional, marketing, persuasive and loyalty-building opportunities*, i.e. the facilitation of the advertisement of illegal distribution virtual channels – or even directly of ITMs –, and of all the activities aimed at convincing, keeping and reassuring clients.
- *informational and targeting opportunities*, i.e. the facilitation of the clients-profiling activities by offenders in order to tailor marketing strategies.

This study provides important insights into the Internet-related opportunities exploited by criminal actors, on the *modi operandi*, and in upcoming trends. However, the role of social media websites was not analysed. At the same time, as directly highlighted by the author, the aim of the research was to describe in-depth the current situation and not to identify possible situational crime prevention measures (Lavorigna, 2015b).

On the contrary, a useful research for this purpose is the one carried out by Leontiadis and Hutchings (2015). In their study, they focused on two specific processes concerning the criminal activity, i.e. the search-redirection attack²³, and the operation

²³ The ‘search-redirection attack’ is a method to advertise illegal online pharmacies often used by criminal entrepreneurs, with which illegitimate sellers compromise high-ranking websites and dynamically redirect Internet traffic to different illegal online pharmacies based upon the particular search terms issued by the consumer. For a detailed explanation of the functioning of this scheme: (Leontiadis et al., 2011).

of illegal online pharmacies. Concerning the latter, based on previous studies they split the commission process into seven steps, that can also be adapted for the case of the online trade of medicines via social media websites:

- a) *identifying the supplier/s*. The first step consists of an organisational step carried out by criminal entrepreneurs involved in the online supply of medicines, i.e. to establish a connection with medicine manufacturers. Indeed, as explained in Section 1.2.4 of this dissertation, only rarely offenders involved in the production of ITMs are also directly linked to the distribution to the final users.
- b) *selecting products for sale*. Once a connection with product manufacturers is established, offenders need to decide which medicines they will trade in illegal virtual channels.
- c) *defining marketing and prices strategies*. The third step is to develop the sale strategies to be used. It comprises decisions on pricing of the products, discounts for big purchases, the offer of trial packs, etc.
- d) *developing the virtual distribution channel*. Then, criminal entrepreneurs involved in the online trade of medicines need to create the virtual distribution channel to be used in order to advertise and to market ITMs to the public. In case of an illegal online pharmacy, only two components are essential: a web hosting provider or a web server, and a domain name. They can both be purchased easily and cheaply online by using one of the numerous private companies providing such services. It must be noted that even registrars – i.e. the providers of the domain name – have the legal authority to stop the service in case the website is conducting criminal activities, the ones hosting illegal online pharmacies usually ignore requests for takedowns, making counteractions more difficult. In the case of social media websites, offenders

should choose the platforms, register an account, and create posts and other contents to advertise illegal online pharmacies links and/or directly ITMs they offer.

- e) *receiving web traffic*. This is probably the most important stage of the whole process. Indeed, once the infrastructure to sell ITMs online is established, criminal entrepreneurs need to find the way to attract potential customers on their websites and/or social media pages. In the case of online pharmacies, one of the most used are the search-redirection attacks. In case of social media websites, they need to create content with keywords and/or hashtags that are capable to attract the highest number of potential clients.
- f) *receiving payments*. Offenders need to develop the payment infrastructure that customers will use to pay for the products they purchase online. This is not a difficult task, since they just need to create a bank account – usually in states that do not cooperate in transnational financial investigations – and to accept payments via credit card or wire transfer. At the same time, this is just one of the possibilities since there are a number of alternative – and safe from the point of view of offenders – payments methods that can be used, such as Money Gram or Western Union (Di Nicola et al., 2015a).
- g) *delivering ITMs*. The last phase in the illegal online trade of medicines is the final shipment of products to the customer. Usually, shipments are not made by the seller – i.e. the criminal actor running the illegal online pharmacy or managing the social media account – but products are delivered directly by the producers. Hence, the sellers act as intermediaries, thus acquiring orders from clients and then sending order details to the manufacturers for the production and shipment of the merchandise.

As said, the CSA analysis provided by Leontiadis and Hutchings is very useful in identifying possible SCP measures to fight against the illegal online trade of medicines. From a criminological perspective it is clear that phase 'e' (i.e. receiving web traffic) is the most critical of the entire crime commission process and, as a consequence, tackling this step is probably the most effective way in tackling the advertisement and the trade of ITMs on social media platforms. Indeed, if offenders are not able to convey a sufficient number of potential buyers on their posts, all the previous phases – i.e. identifying the supplier/s, selecting products to sale, defining marketing and prices strategies, and developing the virtual distribution channel – would become useless and they will have no incentive to invest in this activity. At the same time, by avoiding virtual meetings between buyers and sellers all the subsequent phases will simply not occur, since there will be no ITMs to pay for and to deliver. To conclude, a SCP measure will be effective so far as it is aimed at avoiding the connections between buyers and sellers. In this sense, a measure recently introduced by several social media websites seems to be promising: the next Section will focus on it.

2.3.2 A promising SCP measure implemented by social media websites

The governance of social media concerning crime-related issues is a multi-layered and dynamic rule-making process in which both private and public actors operate. In the first instance, decisions on what is allowed or not online is left to national, international and supranational laws, treaties and other public regulations: by using those instruments, institutional, public bodies may decide to impose legally-sanctioned provisions connected to certain users' behaviours or Internet content (Yar, 2018). Secondly, but not less importantly, regulations are also foreseen by companies running social media websites. Indeed, all of them provide terms and conditions that individuals

are obliged to subscribe once they want to create an account (Yar, 2018). Some of these 'private norms' concern prohibitions regarding illegal contents and/or behaviours. For instance, under the 'community standards' set by Facebook it is forbidden to public post concerning violence, nudity, pornography, bullying activities as well as to use the social media platform to procure and/or sale illicit goods and sexual services (Facebook, 2018). The 'terms of service' of Twitter prohibit a set of behaviours such as the sharing of private information without owner consent, IP violations in general, and the distribution of spam and malicious software (Twitter, 2018). Similar provisions are also provided by the other social media platforms, such as Instagram (Instagram, 2018). It must be noted that prohibitions provided by social media rules do not cover illegal contents and behaviours only, but also those considered inappropriate or unwelcome by the users: at the same time other actors – such as NGOs, private companies, and pressure groups – may play a key role in the decisions of social media owners to ban certain activities in their platforms (Yar, 2018).

Even if law enforcement is more and more involved in social media websites by monitoring, gathering intelligence information, and prosecuting illegal activities carried out in those virtual environments (Lageson, 2018; Schneider and Altheide, 2016; Trottier, 2015, 2012), the capacity, capabilities and resources of public agencies seems to be still too scarce to effectively address and tackle criminal activities on the Internet. At the same time, social media websites may apply measures to more effectively enforce obligations provided both by the public bodies and by their internal rules (Yar, 2018). Additionally, social media platforms have implemented actions to identify, report, remove and report prohibited contents and behaviours. For instance, Facebook has around 7,500 employees dedicated to the assessment and the removal of contents breaching community standard rules, and to the expulsion of the users

implicated from the platform. This activity is not only run by human analysts. Indeed, social media platforms are developing and deploying more and more sophisticated systems based on machine learning for the automatic identification of illicit posts, that are constantly trained and updated to increase their patrolling effectiveness.

This is the case also of the illegal online trade of medicines. Indeed, most of social media have recently taken steps to prevent contents linked to ITMs from appearing on their platforms (NABP, 2018a). Often, these decisions were taken because of external inputs: the cases of Facebook and Instagram are two examples. In November 2017, Mark Zuckerberg, CEO of Facebook, stated that learning that his social media platform was used to advertise and to trade illicitly prescription only medicines was his 'biggest surprise' (Constine, 2018). However, no measures were adopted after this statement, but the situation completely changed after a few months. In April 2018, during a US Congress hearing Representative David McKinley attacked Zuckerberg on this issue stating that 'your platform is still being used to circumvent the law and allow people to buy highly addictive drugs without a prescription [...] With all due respect, Facebook is actually enabling an illegal activity, and in so doing, you are hurting people. Would you agree with this statement?'. In that occasion, Zuckerberg admitted that 'there are a number of areas of content that we need to do a better job policing on our service' and Facebook rapidly adopted measures to stop retouring posts concerning the illegal online trade of medicines on its internal search bar, and to find and remove those contents from the platform (Constine, 2018).

External pressures seem to have also played a crucial role on the decision of Instagram to adopt those counteractions. In recent years, Instagram has been accused by the media of being a facilitator in the illegal trade of medicines, especially of POMs misused by the youngster for recreational purposes. For instance, a reportage made

by BBC in 2013 revealed that social media platforms were a place to easily buy illegal drugs, including prescription medicines. By using the right hashtags, it was possible to find lot of entries with pictures and instructions on how to acquire. The enquiry suggested that this situation was alarming since, thanks to social media, customers have the possibility to see the pictures of the drug they will buy and be more attracted thanks to this marketing strategy (BBC, 2013). In the same year, Vice magazine published another reportage disclosing an underground prescription only medicines distribution network on Instagram (Sundermann et al., 2013). In more detail, the journalists' investigation concerned a cough syrup made up by two strong active ingredients: codeine and promethazine. In this case, medicines are not sold because of their curative effects but because this syrup is used in underground cultures mixed with Sprite and a Jolly Rancher to create psychoactive cocktail²⁴. These media investigations were followed by others in the following years, such as the ones published in 2018 by WIRED (Tiku, 2018) and The Washington Post (Dwoskin, 2018). After all these reportages, Instagram has taken in steps to alter its algorithms and search system to stop contents and profiles linked to the online trade of medicines (Carbon, 2018).

To conclude, independent of the reasons leading to their adoption, these actions undertaken by the main social media websites seems to be a very promising SCP measure to effectively fight the illegal online trade of medicines. Indeed, they are aimed at avoiding the contacts between demand and offer of ITMs on the platforms, targeting exactly the step of the commission process identified in the previous paragraph – i.e. the receiving of web traffic. This way, they are promising in both protecting customers

²⁴ This cocktail is called with several names in subcultures' jargon – especially in the hip-hop, rap, and trap environments –, such as 'lean', 'oil', 'mud', 'Texas tea', 'dirty Sprite', 'drank' or 'sizzurp'.

wanting to purchase legal products online, and in stopping the 'grey market' of ITMs populated by aware buyers of pharmaceuticals from illegal web channels.

2.3.3 The need for an assessment

Even if SCP measures adopted by social media websites described in the previous Paragraph seem to be promising, their ability in reaching their goal is still questionable. Indeed, in general very little is known about the effectiveness of social media platform blocking techniques especially because very little information is usually published by the providers (Snyder, 2017). Figures provided by social media on the takedown activities are very limited and incomplete since they cover just a few illegal activities. For instance, Facebook published in its bi-annual 'Transparency Report' the number of contents removed concerning IPR violations only; similarly, Twitter discloses every six months just general data related to the removal requests received and acted upon, and none of the social media websites provide numbers on the accounts that have been suspended or disabled because of violating terms and conditions. This situation may raise questions about the capability of SCP measures adopted by social networking sites to remove illegal contents hosted in their platforms (Yar, 2018).

For this reason, further criminological research is needed in order to understand whether the above-mentioned counterstrategies implemented in social media are not only theoretically promising, but also practically functioning. As explained in the next Chapter, the research presented in this dissertation is aimed at filling this existing gap.

Chapter 3

Research objective and methodology

This Chapter illustrates the objective of the research, i.e. to evaluate the SCP measures introduced by social media websites (presented in the previous Chapter) and its methodology. Concerning the latter, Section 3.2.1 presents an overview of the existing evaluation research designs, while Section 3.2.1 analyses the specific existing conditions in the under analysis as to establish the most appropriate – and feasible – evaluation strategy. The Chapters concludes with the presentation of the adopted methodology, and the limitations of the study.

3.1 Research objective

As explained in the previous Chapter, SCP measures recently introduced by social media websites seem to be promising in fighting the illegal online trade of medicines. In addition, the entry into force of systems aimed at spotting, blocking and removing contents linked to ITMs should be considered an encouraging SCP intervention since it matches several SCP techniques.²⁵ In more detail, at least:

- *target hardening* (SCP technique no. 1). In this case, the target should be considered the virtual channel used to advertise and to sell ITMs – i.e. the social media platform – rather than the product under trade. The measures may determine a reduction in the online trade of medicines since efforts of criminal entrepreneurs in promoting those products to the general public are increased.
- *deflecting offenders and removing targets* (SCP techniques no. 4 and 12). Interventions are supposed to separate buyers from clients. In case the matching between demand and supply of ITMs would become impossible, there would be not reasons for offenders to use this virtual channel to advertise and to trade medicines illegally.
- *extending guardianships* (SCP technique no. 6). These measures are aimed at extending the guardianship on the illegal online trade of medicines by involving private actors in monitoring and countering activities, i.e. companies running the social media platforms.
- *disrupt markets* (SCP technique no. 14). If posts linked to ITMs are removed, the illegal online trade of medicines on social media platforms would be consequently disrupted.

²⁵ For further information, please see Section 2.1.2 of this dissertation.

- *deny benefits* (SCP technique no. 15). In case interventions are effective, offenders will not have the incentive to use social media to promote and trade ITMs online since efforts in producing marketing strategies in those platforms would not produce any benefits.
- *discourage imitation* (SCP technique no. 20). Social media represents an easy, cheap and secure way to commercialise ITMs online. For this reason, as illustrated in Chapter 1, several sellers have entered the illicit market. However, in case systems introduced by social media platforms are effective in spotting and removing contents associated to the illegal online trade of medicines, other actors will be discouraged in starting the illicit activities.

The possible impacts of the SCP interventions put in place by social media platforms can be clustered in the following hypothesis:

- *strong impact*. SCP measures are effective and all contents concerning all ITMs are spotted and removed from social media platforms: i.e. the connection between sellers and consumers is then completely blocked. The opportunity exploited by offenders is removed; thus, social media would no longer represent a virtual channel to sell and to buy ITMs.
- *limited impact (some medicines)*. SCP measures are not fully effective and only some contents concerning ITMs are spotted and removed from social media platforms: i.e., the connection between sellers and consumers is then not completely blocked. The opportunity exploited by offenders is only reduced/mitigated; social media still represents a virtual channel to sell and to buy ITMs, even if to a lower extent.
- *limited impact (some social media)*. SCP measures are effective and all contents concerning all ITMs are spotted and removed from some social media

platforms but not in other: i.e. the connection between sellers and consumers is then completely blocked in some websites, while they are still possible on other platforms. The opportunity exploited by offenders is only reduced/mitigated; social media still represents a virtual channel to sell and to buy ITMs, even if to a lower extent.

- *no impact*. SCP measures are not effective and contents concerning ITMs are not spotted and removed from social media platforms: i.e. the connection between sellers and consumers is not prevented. The opportunity exploited by offenders is still in place; social media still represents a virtual channel to sell and to buy ITMs, to the same extent.

Consistently, the research question of the present research is the following: to *what extent have SCP measures introduced by social media websites impacted on the illegal online trade of medicines in such platforms?*

3.2 Research methodology

3.2.1 Overview of the evaluation research designs

As illustrated in the previous Chapter, one of the most important implications – and advantages – of implementing SCP measures is the possibility to evaluate their effectiveness, or more in general their impact on the criminal activities they are intended to reduce. In doing so, the decision on the research design to adopt should not be considered as trivial. Hence, before deciding the research methodology to be used in the assessment, it is crucial to have a clear idea on the different possible research designs that can be used in the evaluation of SCP measures. Two are the methodologies that should be considered as preferable, i.e. the meta-analysis and the experiments.

Meta-analysis are systematic reviews that uses rigorous methods for the identification, analysis and results comparison of prior studies carried out in the evaluation of a specific crime reduction and/or prevention measure. As stated by Johnson and colleagues (2000:35), meta-analysis 'essentially takes an epidemiological look at the methodology and results sections of a specific population of studies to reach a research-based consensus on a given study topic'.²⁶ Unfortunately, this method is not easily applicable in evaluating the impact of SCP on crimes. First of all, it can only be applied in several previous researches focused on the assessment of a given measure. Second, these researches shall not only be existing, but also be based on sound and comparable methodologies.

Concerning the experimental research design, Shadish and colleagues (2001:12) define an experiment as 'a study in which an intervention is deliberately introduced to observe its effects': they are techniques to test hypotheses about the effects of variation of an independent variable on a dependent variable (Fagan, 1990). The gold standards of this type of studies is constituted by randomised experiments (Mitchell, 2015), i.e. a set of research in which the investigators have the full control on both the independent variable and the experimental situation. Key features of the experimental studies are manipulation and control (Messer, 2016). Manipulation

²⁶ Studies using meta-analysis are based on extensive searches for previous evaluation research on databases concerning a certain crime prevention measure, and specific criteria for the inclusion or the exclusion of previous studies are set in order to define which ones to include in the analysis. Once defined, key features of the previous research are extracted, coded and compared (for further information, Petticrew and Roberts, 2012; Welsh and Farrington, 2006). In the field of SCP, thanks to meta-analysis, researchers can obtain useful information on the effectiveness of a measure generally considered, and not just on a specific intervention on a specific context. Moreover, these studies can go beyond by illustrating specific conditions and contexts under which a SCP measure may have an impact on crime. For an example, please see the study on CCTV by Welsh and Farrington (2009).

means that the researcher is able to expose subjects assigned to the treatment group of the intervention under analysis – i.e. they can ‘manipulate’ one of the variables – while control refers to the fact that the investigator is able to set procedure by which participants have the same probability to be assigned to a treatment or to a control condition.

Very common in the field of epidemiology (Messer, 2016), randomised experiments are often difficult to use in the field of SCP, especially because of the many ethical, legal, and practical issues that would face researchers (Farrington and Welsh, 2005; Kopak, 2015). However, there exists several research designs that differ – with different degrees – from the pure experimental randomised method, that are generally grouped under the label quasi-experiments. They are methods used to study the impact of some *stimuli* on social phenomena – as crime and deviance – in cases in which it is impossible to control all existing variables, and can be considered as highly functional and feasible alternatives to pure experiments in the study of complex behaviours (Kopak, 2015).

All quasi-experiments lack of a pure randomisation process and some other methods of assignment are used (Kopak, 2015; Mitchell, 2015), i.e. there is ‘manipulation’ but not ‘control’ by the researcher. Most of the SCP evaluation studies carried out in the last decades used a quasi-experimental model of evaluation (Shariati and Guerette, 2017). Even if this way is more difficult to establish the non-spuriousness of results and possible selection bias should be taken into consideration (Mitchell,

2015), when quasi-experiments differ only in this aspect they can be considered as very close to the experimental design.²⁷

This is the case of the so-called 'non-equivalent control group design'. In this case, research subjects are exposed to an intervention and then the impact of the measure (independent variable) is evaluated by comparing the situation before and after the intervention (dependent variable). Then, such research design also encompasses measurements on the variation of the dependent variable in a 'control group' – i.e. that did not receive the treatment – similar but not equal to the first one, and the comparison of the results (Pawson and Tilley, 1994).

Other quasi-experimental research designs present higher degrees of difference with the pure randomised experiment model. A first group is composed by methodologies in which a 'control group' is lacking. This approach is particularly used when there exists ethical concerns in intentionally excluding a group from the intervention (Kopak, 2015; Weisburd, 2010). Depending on the number and on the type of analysis carried out, it is possible to identify 5 possible single-group quasi-experimental methods (Kopak, 2015):

- one-group post-test only design, i.e. measurements on the dependent variable took place at a one point in time after the intervention.
- one group post-test only design with multiple post-tests, i.e. measurements on the dependent variable took place more than one time after the intervention.
- one group pre/post-test design, i.e. measurements on the dependent variable took place once before and once after the intervention.

²⁷ A famous example of studies using a non-equivalent control group is the research conducted by Painter and Farrington (1999) to evaluate the impact of improved street lighting on crime in the city of Stoke-on-Trent (UK).

- one group pre/post-test design with multiple post-tests, i.e. measurements on the dependent variable took place once before and more than one time after the intervention.
- one group pre/post-test design using non-equivalent dependent variables, i.e. measurements took place once before and once after the intervention but with a focus on different variables.

A second group of the other quasi-experimental methods is composed by studies with a comparison group, even if measurements on the dependent variables are carried out only after the intervention. This type of research design is useful to assess measures on which the researcher does not control and are not expected and/or that have been introduced before the study started (Kopak, 2015). Variations of these methods are post-test only design with non-equivalent groups, and the use of an independent sample as a pre-test comparison.

Another set of quasi-experimental methods is grouped under the label 'time series design'. In these cases, several measurements on the same variable are carried out at consecutive points of time (Kopak, 2015). These methodologies can be used in examining changes over a dependent variable – e.g. crime rates, crime perceptions, etc. – after the implementation of a certain treatment – e.g. a SCP measure.²⁸

Other quasi-experimental designs have been widely used in criminology to evaluate the impact of different types of interventions on crime, i.e. 'natural

²⁸ The most widespread method of this category is known as 'interrupted time series method', according to which a series of observations are made and broken-up by the introduction of the measure. By evaluating a SCP intervention in this way, the impact is assessed by comparing measurements referring to a period antecedent to the introduction of the measure, and to a subsequent period. One example is the study carried out by Steinbach and colleagues (2015) aimed at assessing the effect of reduced street lighting on road casualties and crime.

experiments'. This term refers to a set of methodologies that assess the modification of the dependent variable by exploiting exogenous variations in the independent variable arising from natural or social factors (Mitchell, 2015). In such research designs, both of the key features of the pure experiments are lacking, i.e. 'manipulation': then, they are useful in the conduction of studies in which the researcher has not had the possibility to manipulate the independent variable and, consistently, also to randomly assign research subjects in a control and in a treatment group. However, natural experiments can be seen as a way to approximate randomised experiments or other quasi-experiment designs (Alexandrie, 2017; McKenna and Morrison, 2012).²⁹

Finally, it must be noted that most of evaluation research aimed at assessing the impact of interventions to fight against and prevent crime focuses on quantitative data. For instance, statistical analysis on the prevalence and/or incidence of crime rates are used to understand whether a SCP intervention was effective in reducing the crime – or crimes – in which it is focused on. However, quantitative research should not be considered as the only path towards how to conduct evaluations in this field. Qualitative research can be used, for instance, to uncover the 'subjective realities' of an intervention by examining how it affects different groups and individuals (CJEF, 2015; University of Leicester, 2010). This way, while quantitative methods look for 'a single objective reality', qualitative ones acknowledge that individuals may experience an intervention differently and the multiple realities need to be documented (Clarke and

²⁹ For instance, natural experimental designs has been used to evaluate if stadiums generate or attract crime in the surrounding areas during football matches (Kurland et al., 2014), to evaluate the impact on crime of surveillance cameras (Alexandrie, 2017), or to evaluate the impact of courts' guidelines on gender disparities in sentencing (Johnson and Stewart, 2016).

Dawson, 1999). Qualitative analysis can be used to supplement quantitative evaluation studies (e.g. Padgett et al., 2006), or to evaluate directly the outcome of an intervention in case quantitative data is hard to retrieve (Kelly, 2008).

To conclude, in evaluation studies it is crucial to select the research design – either quantitative, qualitative, or both– that appears to be the most appropriate – considering all the circumstances of the specific case and characteristics of the specific intervention under analysis – in order to achieve the evaluation purpose. This will be the focus of the next Section.

3.2.2 Evaluation research design used in this research

Once all the possible research designs that can be used to evaluate the impact on crime since the SCP interventions have been reviewed, the specific existing conditions in the case of the measures introduced by social media in the fight against the illegal online trade of medicines need to be considered as to establish the most appropriate – and feasible – evaluation strategy to use. These are:

- a) the lack of previous evaluation studies. As explained in Chapter 2, criminological research aimed at assessing measures introduced by social media in spotting and blocking contents linked to ITMs have never been carried out. For this reason, the meta-analysis approach cannot be used.
- b) the lack of a possible ‘manipulation’ over the independent variable – and, consequently, of a ‘control’ over the random assignment of research subjects: SCP interventions under analysis have been introduced and managed by social media websites and researchers do not have the possibility to manipulate them. For this reason, they can be considered as an ‘exogenous variation’ that might

have an impact on the illegal online trade of medicines. Thus, evaluation studies on this field may present the features of a natural experiment;

- c) the lack of a possible 'control group'. As illustrated in the previous Paragraph, the use of natural experimental designs does not exclude, in principle, the imitation of traditional experiments or quasi-experiments features, including the identification of a possible 'control group'. In the case analysed in the present research this would be feasible only in two cases: a) the existence of several social media platforms very similar to each other with different levels of implementation of the measure under analysis – i.e. some of them introduced the SCP intervention while others not –, or b) the measures implemented target some medicines while others not. However, neither of the two options is applicable in the case under analysis. First of all, all social media platforms present very peculiar features and are very different to each other, as illustrated in Chapter 1. Hence, while evaluating the existing differences in the use of the platforms by offenders in the illegal online trade of medicines can provide useful information for a better understanding of the role of social media, they cannot be used as 'control groups' against each other. Furthermore, the concrete SCP measures introduced to spot and remove contents linked to ITMs differ depending on the specific social networking site. It is not known whether those measures cover all the possible medicines traded or just some of them. For all these reasons, in the case under analysis, it is not possible to use a 'control group'.
- d) the lack of quantitative measurements before the intervention. As already underlined, usually evaluation research in the field of SCP is based on quantitative and statistical analysis. For instance, figures on crime rates are

compared before and after an intervention to observe possible variations. However, in the case under analysis quantitative analysis seems to be unfeasible. Quantitative studies on the presence of social contents carried out prior to the implementation of the SCP measures are not available. When existing, they focus only on one social media platform – usually Twitter – and/or only on specific categories of medicines.³⁰ In these cases, as illustrated in the previous Paragraph, researchers may use research designs to quantitatively measure the extent of the problem existing before the implementation of the intervention also after the exogenous modification of the independent variable took place, e.g. by using methods such as the interrupted time series. However, in the case under analysis, the use of these research strategies may lead to contradictory results. Indeed, the SCP measures under analysis are aimed at spotting and removing targeted social media contents independently on the date they were posted, i.e. also retroactively. This means that, in case SCP interventions were effective, the use of research design as the interrupted time series method may lead to the (contradictory) result that the quantitative presence of posts linked to ITMs remains stable before and after the cut-off point, i.e. the measures introduced by social media websites have no impact on the illegal online trade of medicines.

- e) the existence of qualitative analysis before the implementation of the measures. As illustrated in Chapter 1, even if the scientific production considering the role of social media in the illegal online trade of medicine is relatively scarce, from both the existing literature and the personal research activities carried out by the writer in this field it is possible to retrieve a detailed

³⁰ For further information and examples, please see Section 1.3.3 of this dissertation.

qualitative description on the situation prior to the introduction of the block-and-remove measures targeting ITMs. This would represent a useful information to be used as a – qualitative – pre-test in assessing the impact of the SCP measures introduced by social media platforms.

In light of all these considerations, the research design adopted in the present research can be considered as a natural experiment with one group(s) post-test only design, using a non-equivalent qualitative pre-test. It may also be conceived as a qualitative and non-equivalent time series design. The evaluation methodology used is described in the next Paragraph.

3.2.3 Methodology

This Section illustrates all the steps that have been followed in evaluating the impact of SCP measures introduced by social media websites by using the research design illustrated in the previous Paragraph.

The first step consisted of the identification of the social media platform to analyse. The choice was based on their characteristics and on the most recent global rankings of social media usage. According to global statistics, the world usage of internet increased from 1 billion users in 2005 to 3,5 billion users in 2017, due to easier access to computers, the modernization of some underdeveloped countries, the increased use of smartphones and the decrease of the related costs (ITU, 2017). In January 2018, more than a half (4 billion) of the world's population has internet access. One of the most popular online activities is, of course, social networking. Indeed, more than 77% (3,1 billion) of the global internet users has a profile on a social media platform: this shows an increase of more than 13% compared to last year (2017) (WAS, 2018). As far as the 2018 global social media ranking is concerned, the first 15 social

networks of the list were considered (WAS, 2018). Facebook remains undoubtedly the world most popular social network, sitting currently at more than 2 billion users – i.e. one third of the global social media users –, followed by YouTube, WhatsApp, Facebook Messenger and WeChat, which weren't considered suitable to our research, since the first is more a video-sharing platform than a traditional social media and the others are instant messaging platforms. The sixth most popular social network is Instagram with 1 billion monthly active accounts, that is also the social media most in growth, especially amongst young people. It is followed by a list of platforms used only in China, i.e. QQ (instant messaging system), QZone, Tik Tok (a new Chinese social networking platform to create short-form mobile videos), and Sino Weibo (micro-blogging website). The following most used social media are Twitter, Reddit (social news aggregation and discussion website), LinkedIn (social networking site designed specifically for the business community), and Baidu Tieba (a Chinese communication platform). The choice has been made to include the three social media most used in western countries that are not focused in one geographical area of the world only, not considering video-sharing and instant-messaging platform. As a consequence, the social media analysed in this research were: Facebook, Instagram and Twitter. All these social media websites introduced SCP systems to spot and block contents linked to ITMs, as illustrated in the previous chapter, and for this reason they were considered as suitable research subjects for the evaluation.

Data gathering was based on systematic keyword searches in the three chosen social media platforms after the implementation of the SCP measure. The list was composed by using 76 keywords of two different types. First of all, it included 36 names of prescription medicines – both generic and branded names – known to be frequently traded in illegal virtual channels. Products were selected within the therapeutic

categories most traded online.³¹ They were: 'Viagra', 'Cialis', 'Levitra', 'Kamagra' (medicines for erectile dysfunction), 'Xenical', 'Orlistat', 'Dinitrophenol' (medicines to lose weight), 'Anadrol', 'Durabolin', 'Nandrolone', 'Dianabol' (products to enhance body-building performances), 'Oxycodone', 'Percocet', 'OxyContin', 'Vicodin' (pain killers), 'Ritalin', 'Xanax', 'Valium', 'Tavor', 'Adderall', 'Prozac' (psychoactive medicines), 'Ambien', 'Zolpidem', 'Lunesta' (sleeping pharmaceutical products), 'Doxycycline', 'Zithromax', 'MacroBid', 'Trimethoprim' (antibiotics), 'Wellbutrin', 'Zyban', 'Nicotinell' (medicines to quit smoking), 'Sovaldi', 'Harvoni', 'Clomid', 'Disulfiram', and 'Nolvadex' (others).³² A second set of keywords regarding not the specific name of the medicines but terms referring to the disease or condition they are intended to treat or their 'pharmaceutical family', i.e. 'erectile problems', 'weight loss', 'steroids', 'pain killers', 'psychopharmaceuticals', 'sleeping pills', 'antibiotics', and 'quit smoking'. These 8 keywords were searched at first in English, since this is not only the language most spoken in North America and part of Europe, but it can also be considered as a 'universal idiom' of Western countries. Then, searches were performed after translating those terms into the other 4 languages most spoken in the European Union, i.e. German, French, Italian, and Spanish – widely spoken also in South American countries. Overall, this second set was then composed of 40 keywords.

³¹ For further information, please see Section 1.2.2 of the present dissertation.

³² The last 5 keywords included a list of different medicines mainly used to treat serious diseases. Indeed, even if the most traded ITMs in Western countries are 'lifestyle' medicines, there is an increase in demand also of other types of pharmaceuticals, also lifesaving, as illustrated in Section 1.2.2. More in detail, the category 'others' included: a) expensive medicines to treat Hepatitis C (Sovaldi and Harvoni); b) a medicine to treat infertility in women (Clomid); c) a medicine to treat breast cancer (Nolvadex); d) a medicine to treat alcoholism (Disulfiram).

Social media were accessed via browser – i.e. no mobile versions of the platforms were used – and the research queries were carried out by using a laptop and therefore that version. For the purpose of the research, dedicated profiles were created in the three social media analysed. Manual research has been considered as the most appropriate procedure to follow in the keyword search for two reasons. First of all, even if automatic search tools are available, social media platforms have recently introduced some limitations and blocks undermining the effectiveness of such systems. The Twitter APIs are not meant to be an exhaustive source of contents since not all tweets are indexed or made available via the search interfaces: for instance, typically tweets older than 2 weeks will not be returned. At the same time, both Facebook and Instagram introduced several limitations in their APIs. For instance, Facebook imports work for posts in public ‘pages’ only – and one research query is necessary for each public page under analysis – and Instagram APIs do not allow for the automatic collection of useful information, such as the number of comments.³³ The second reason relies on the fact that manual searches resemble the normal behaviour of a person searching for pharmaceutical products on social media platforms, thus providing more useful information in understanding the concrete impact of spot-and-remove systems on the illegal online trade of medicines.

The identification of a ‘cut-off point’ (i.e. the day in which the interventions under analysis have been implemented) is not trivial. Indeed, social media platforms did not disclose detailed information on this point, and the introduction of such interventions should be considered as a process rather than a ‘switch-on’ in a precise time frame.

³³ To have a complete and updated picture of the APIs blocks and limitations provided by social media platform it is possible to consult the dedicated explanatory boxes in the website of the Netlytic online service, available at the website: netlytic.org.

The only information on this point are retrievable from both reports, such as the one delivered by the US National Association of Board of Pharmacy (NABP, 2018b), and media news (Carbon, 2018; Constine, 2018). By analysing those sources, is it possible to assume that the three social media platforms taken into account introduced an operative version of these SCP systems during the spring-summer 2018. Accordingly, in the present research the measures were considered to be operative from the 15th of August 2018, and data were gathered during the period 15th of August 2018 – 30th of September 2018.

Since the three social media platforms taken into account are different both in term of type of contents and internal research bars/tools, different procedures have been followed in gathering and coding data. In the case of Twitter, the procedure was as follows:

- log-in to the social media by using the credentials of the profile specifically created for the research purposes.
- search for the keywords – i.e. 76 different manual searches, one for each keyword (searched only once) – by using the ‘advanced research’ tool provided by the platform.
- analysis of the first 10 results displayed in each of the following result categories: ‘popular’ tweets, ‘recent’ tweets, ‘profiles’, ‘photos’, ‘videos’.³⁴
- identification of the posts/photos/links dedicated to the (illegal) advertisement of ITMs, and gathering of relevant information, i.e.:
 - for ‘popular’ and ‘recent’ tweets: URL address, language, name of the posting profile, date of the tweet, number of comments, number of

³⁴ It must be noted that the keyword search for some keywords led to less than 10 results for some of the categories, or to no results.

retweets, number of likes, full text of the tweet, presence/absence of a web link pointing outside the social media – and, in case of presence, functioning/not functioning and type of the link. Furthermore, also information on the posting profile were collected, i.e.: number of tweets posted by the profile, number of followers, and total number of likes. Finally, general comments from the researcher were associated to each analysed tweet.

- for 'profiles': URL address, language, geo-localisation – if present –, date of subscription, number of followers, number of followings, total number of likes, text of the personal presentation, presence/absence of a web link pointing outside the social media – and, in case of presence, and, in case of presence, functioning/not functioning and type of the link. Finally, general comments from the researcher were associated to each analysed profile.
- for 'photos': URL address, language of texts accompanying the photo, name of the posting profile, date, number of comments, number of retweets, number of likes, full text accompanying the photo, presence/absence of a web link pointing outside the social media – and, in case of presence, functioning/not functioning and type of the link. Furthermore, also information on the posting profile was collected – the same collected in case of 'popular' and 'recent' tweets. Finally, general comments from the researcher were associated for each analysed picture.
- for 'videos': URL address, and general comments by the researcher.

In the case of Facebook, the procedure was as follows:

- log-in to the social media by using the credentials of the profile specifically created for the research purposes.
- search for the keywords – i.e. 76 different manual searches, one for each keyword (searched only once) – by using the search bar of the platform.
- analysis of the first 10 results displayed in each of the following result categories: ‘posts’, ‘profiles’, ‘photos’, ‘videos’, ‘pages’, and ‘groups’.³⁵
- identification of the posts/photos/links dedicated to the (illegal) advertisement of ITMs, and gathering of relevant information, i.e.:
 - for ‘posts’: URL address, language, name of the posting profile/page, date of the post, number of comments, number of shares, number of likes, full text of the post, presence/absence of a web link pointing outside the social media – and, in case of presence, functioning/not functioning and type of the link. Furthermore, also information on the posting profile was collected, i.e.: type of the poster – i.e. profile or page – and number of friends, for profiles, and likes, for pages. Finally, general comments from the researcher were associated to each analysed post.
 - for ‘profiles’: URL address, language, date of subscription, number of friends, number of followings, total number of likes, text of the personal presentation, presence/absence of a web link pointing outside the social

³⁵ It must be noted that the keyword search for some keywords led to less than 10 results for some of the categories, or to no results. In the first phase of the research also the result category ‘marketplace’ was included. However, results retrieved were always 0. The reason is that the ‘marketplace’ results on Facebook is intended to find advertisements of items privately sold by users within a range of, at most, 100 kilometres from the location of the device used for the search query. Because of this, this category was excluded from the analysis.

media – and, in case of presence, functioning/not functioning and type of the link. Finally, general comments from the researcher were associated to each analysed profile.

- for 'photos': URL address, language of texts accompanying the photo, name of the posting profile, date, number of comments, number of shares, number of likes, full text accompanying the photo, presence/absence of a web link pointing outside the social media – and, in case of presence, functioning/not functioning and type of the link. Furthermore, also information on the posting profile was collected – the same collected in case of 'posts'. Finally, general comments from the researcher were associated for each analysed picture.
- for 'videos': URL address, and general comments by the researcher.
- for 'pages' and 'groups': URL address, language, name of the page/group, date of creation, number of likes/members, page description text, presence/absence of a web link pointing outside the social media – and, in case of presence, functioning/not functioning and type of the link, general comments from the researcher.

In the case of Instagram, the procedure was as follows:

- log-in to the social media by using the credentials of the profile specifically created for the research purposes.
- search for the keywords – i.e. 76 different manual searches, one for each keyword (searched only once) – by using the search bar of the platform.
- analysis of the first 10 results displayed in the categories 'recent', and 'popular' posts.

- analysis of the 2 'suggested related searches' provided by the search bar of the social media platform.
- identification of the posts dedicated to the (illegal) advertisement of ITMs, and gathering of relevant information, i.e.: URL address, language, name of the posting profile, date of the post, number of comments, number of likes, full text accompanying the photo, presence/absence of a web link pointing outside the social media – and, in case of presence, functioning/not functioning and type of the link. Furthermore, also information on the posting profile were collected, i.e. URL address, total number of posts, follower, and following, and full text of the profile description. Finally, general comments from the researcher were associated to each analysed post.

Finally, it must be noted that when investigating social media contents, concerns about ethics and privacy should be considered. The data gathered and the following analysis regarded public available contents only: it must be assumed that users are aware that the information they post on social media can be accessed by anyone (Hall and Antonopoulos, 2016). Even if in the research methodology used in this research no major issues arose, in social sciences precautions should always be taken as to ensure a high level of privacy and ethics.³⁶ First of all, the research did not include any active behaviour and/or interaction with other users. This means that no 'friend requests' were sent to anyone on either Facebook or Instagram, no profiles were followed on Twitter, no active actions were undertaken in order to gain entry into private groups or likes awarded to pages on Facebook. Attempts of interactions undertaken by other profiles – such as the receptions of invitations to enter groups, friends request, or private

³⁶ Several attentions have been given to possible ethical issues in research activities investigating social media. For instance, please see (Social Data Science Lab, 2018; Williams et al., 2017).

messages – were ignored. Secondly, no sensitive information was collected during the research. In the case of personal data (such as the name of the users' profiles) they were coded in the database used during the analysis. Name of private users' profiles were never disclosed in the presentation of the results and blurred in the screenshots used as examples. Finally, full quotes of posts or profile pictures have never been reported as to avoid the possible traceability of the user, with the exception of 'fake' accounts with no personal information and clearly created with the sole purpose of trading illicit products.

Data gathered³⁷ was qualitatively analysed in order to understand if and to what extent social media websites are used in the illegal online trade of medicines. According to the research design adopted in this dissertation, a set of qualitative indicators was necessary. As illustrated in Section 1.3.3, due to both the analysis of the existing literature and personal research carried out in the context of European projects, it has been possible to identify six qualitative themes describing the role of social media in the online trade of ITMs before the implementation of the SCP measures. Such themes have then been transformed into six qualitative indicators to be used in the evaluation, i.e.:

- i. *Extent of the social media usage in the illegal online trade of medicines.* Before the implementation of the measures, social media was largely used in the illegal online trade of medicines, and several posts concerning ITMs were active. The evaluation was aimed at understanding whether SCP interventions had an impact on the availability of ITMs in the three social media analysed. On this point, a clarification is necessary. While in the evaluation on the 'extent' of a given phenomenon, quantitative approaches may appear as the only possible

³⁷ For further information on the number of contents retrieved and analysed, please see the Annex.

path to follow. In this case 'qualitative measurements' were necessary, mainly for two reasons. First, quantitative studies on the presence of social media contents carried out before the implementation of the SCP measures were not available: this means that it was not possible to compare *ex ante* and *ex post* data. Second, in the specific case under analysis, pure quantitative measurements on the number of ITMs related contents are not able to capture the actual 'availability' of a medicinal product in each social media platform. In other words, it is not the 'quantity' of the contents that imply the availability of products for potential clients, whereas their 'quality'. For instance, in a given social media there might be several posts illegally advertising medicines for trade linked to non-operating external websites, 'groups' with no members, or profiles that have not been active for a long time. Even if pure numeric analysis can be used to have a preliminary idea on the amount of posts/groups/pages/profiles related to ITMs, the features of each content have been critically evaluated in a qualitative way by an expert on this topic. Data analysis in this dissertation followed this path.

- ii. *Ease of finding ITMs on social media.* Before the implementation of the SCP measures, to find social media posts advertising ITMs on social networking websites it was enough to search the name of the medicinal product and/or of a given therapeutic category. The evaluation was aimed at understanding whether SCP interventions had an impact on the ease of finding ITMs related content by using the abovementioned keywords.
- iii. *Visibility over time of ITMs-related contents on social media.* Before the implementation of the SCP measures, social media posts about ITMs remained active for a long time once published. To assess the impact of the SCP

measures on this point, a dedicated analysis on research data has been conducted. It consisted of assessing, one week after they were first analysed, the functioning of the URL addresses relating to recently published content on each platform, i.e. 'recent' tweets, 'recent' Instagram posts, and Facebook posts published one week (at the most) before they were found during the research.³⁸

- iv. *Types of ITMs advertised and sold in social media.* Before the implementation of the SCP measures, ITMs most present in social media were lifestyle medicines. The evaluation was aimed at understanding whether these products are still the most offered illegally in social media platforms.
- v. *Language of posts in social media concerning ITMs.* Before the implementation of the SCP measures, social media posts concerning ITMs were available in many languages. The evaluation was aimed at understanding whether ITMs related contents are still available in a large number of languages, especially the ones spoken in western countries.
- vi. *Types of social media posts concerning ITMs.* Before the implementation of the SCP measures, present in social media were both: a) post and pages with information and pictures of the products, contact numbers and other details to complete the order, b) post and pages linking to illegal online pharmacies. The evaluation was aimed at understanding whether these two types of marketing strategies are still used by offenders.

Data analysis followed two different paths. First, a 'vertical analysis' (i.e. by social media and by therapeutic category) has been conducted. This allows systematic understanding (with reference to the six qualitative themes used as indicators in the evaluation) of the availability and features of ITMs related contents in each social

³⁸ On Facebook does not exist a specific searching category grouping 'recent' posts.

media for each medicinal category. After that, a horizontal analysis has been conducted in which the same six indicators have been used to compare the situation existing before and after the implementation of the SCP measures, as to assess the impact of those interventions, highlighting also possible differences among social media and therapeutic category. Results of the analysis are presented following the same scheme in the next Chapter.

3.3.5 Research limitations

Like every research, this study also ineludibly presents some limitations. The first one is linked to object of the evaluation. Indeed, this research is aimed at assessing not a single SCP measure but different, similar interventions implemented in different ways by each social media platform; and Facebook, Twitter, and Instagram did not disclose detailed information on how those measures work. However, independently from the specific and technical features of the system implemented, what is crucial for the present research is the final goal of the measure, i.e. spotting and removing contents related to ITMs. Despite this, some inconvenience in the evaluation persists: a) it is unknown whether the systems are targeting all the possible ITMs or only a subset, i.e. the presence of some medicines may be due to this and not to the lack of effectiveness of the systems; b) the timing of the implementation of the intervention need to be approximated since the actual timing of the entry into force of the measures is unknown.

A second limitation is linked to the research design used in this research. Indeed, all quasi-experiments – especially the ones without control groups – may suffer with problems in the causal validity of the findings (Mitchell, 2015). In the case under examination, the study may be theoretically affected by the presence of external events

beside the intervention under examination that might cause changes in the dependent variable under examination. To avoid this problem, this possibility should be accurately taken into account by the investigator when analysing research findings. However, in the case under analysis, no other possible intervening variables seem to have had an impact on the presence of ITMs on social media: thus, possible variations should be linked to the SCP measures under analysis. Furthermore, another limitation linked to the research design is that (as previously illustrated in Section 2.3.2) the situation existing before the implementation of the measures can only be reconstructed by cross-analysing the results of personal research activities and of the scientific production on the role of social media in the illegal online trade of medicine. However, methodologies used in the studies analysed were different from each other, and from the one used in this dissertation.

A third limitation is linked to the data gathering procedure. Keyword searches are always affected by the contradictory weaknesses of both finding few related results (under-inclusion), and finding unrelated results (overinclusion) (Jacoby, 2009). However, this limitation has been strongly mitigated by taking into account several keywords including both general terms and specific names of pharmaceutical products – i.e. to avoid under-inclusion – and by analysing each retrieved search result as to evaluate its pertinence – i.e. to avoid overinclusion. Furthermore, results can be affected by the very limited period in which the data was collected.

The last limitation of the present research is linked to the concept of ‘displacement’, that is not taken into account in the adopted methodology. According to the traditional criminological theory, situational elements just determine the time and the place of delinquency. Thus, altering environmental and situational variables to reduce opportunities only causes offenders to shift their behaviour to other places,

targets or time: the major type of displacement is spatial displacement, but also temporal, target, tactical, offense or offender displacement may occur (Clarke, 1997; Guerette and Bowers, 2009).³⁹ In the case under analysis, it may be argued that a reduction in the presence of ITMs in the considered social media might be accompanied by an increase in other platforms. However, this possible criticism should not be worrisome. Indeed, the social media analysed in the present research are the three most widespread in western countries and a reduction on the presence of ITMs in Facebook, Instagram and Twitter will reduce the overall online trade of medicines, even in the case of a possible displacement effect in other minor platforms.

³⁹ Many examples of displacement were reported in the past and reported by Clark in his 'Situational Crime Prevention - Successful Case Studies' (Clarke, 1997). For instance, an effective crime-reducing intervention in a New York City precinct in the early '70s was followed by an increase of the same kind of crime in the surrounding districts. In 1984 another research found that the decrease of burglary in a British public housing estate after SCP interventions was followed by an increase of burglary in adjacent areas. But as Clarke himself claims, according to the rational choice perspective that informs situational prevention, displacement is no longer an inevitable side-effect, but an element of contingency. Once eliminating opportunities to commit a crime, it appears clearly that the offender will move to alternative crimes that serve the same purpose, if the offender is really motivated and inventive. So, displacement can be predicted. But even if displacement occurs, it can, in fact, provide some benefits: offenders may shift to other less offensive crimes, or the increase of offenses in another area might be less than the decrease experienced by the treated area (so called 'benign displacement'). Moreover, by assessing the effectiveness of some interventions, Guerette and Bowers (2009) found that displacement (mostly 'benign') occurred only in 26% of observations, while the opposite of displacement, diffusion of benefits, occurred in 27% of the observations. Diffusion of benefits is, as written before, the reverse of displacement. It was noticed that in many cases of implementation of situational prevention techniques, the preventive measures led, not to an increase of crime in adjacent areas, but, on the contrary, to a reduction of crime rates in these areas, which were not directly addressed by the measures (Clarke, 1997).

Chapter 4

Research results

As explained in Chapter 3, data analysis followed different paths. The following pages contain, at first (Section 4.1) results of the ‘vertical analysis’. This means that the results presented are divided by social media (i.e. Twitter, Facebook, and Instagram) and by therapeutic category (i.e. medicine for erectile dysfunctions, medicine to lose weight, medicines to enhance muscles, medicines to kill pain, psychoactive medicines or psychopharmaceuticals, medicines to sleep, antibiotics, medicines to quit smoking, others). Each paragraph contains both a detailed description of all the data retrieved by using the research methodology illustrated in Chapter 3, and a summary of the results with reference to the qualitative themes used as indicators in the evaluation.

This includes: a) extent of the social media usage in the illegal online trade of medicines, b) ease of finding ITMs on social media, c) visibility over time of ITMs-related contents on social media, d) language of posts in social media concerning ITMs, and e) types of social media posts concerning ITMs.⁴⁰ The vertical analysis allows systematic understanding of availability and features of ITMs related content in each social media for each medicinal category.

Then, Section 4.2 presents results of the horizontal analysis in which the six qualitative indicators have been used to compare the situation existing before and after the implementation of the SCP measures, and so to assess the impact of the SCP interventions, highlighting also possible differences among social media and therapeutic category. Finally, Section 4.3 presents the overall impact assessment, i.e. the answer to the research question.

4.1 Vertical analysis

4.1.1 Twitter

4.1.1.1 Medicines for erectile dysfunctions

Results retrieved by searching for the general term ‘erectile problems’ (in English) were numerous both in categories of ‘popular’ and ‘recent’ tweets. In the first group, four of the first ten results were considered to be potentially associated to the online trade of ITMs. All of them were in English and advertised links of active websites selling – claimed to be – natural products. They were considered as suspicious since there have been in the past several instances of ITMs to treat erectile dysfunction containing

⁴⁰ The indicator ‘types of ITMs advertised and sold in social media’ has not been used in the vertical analysis since, as said, results are divided by therapeutic category. The summary of the results is not present when very few or no results have been retrieved.

synthetic APIs advertised online under the fake label 'natural products' (Gaudio et al., 2016; Mullaicharam, 2011). However, it was not possible to ascertain the real nature of the products sold since control purchases and laboratory tests would be needed. The profiles posting these tweets were very active and popular among users: for instance, one of these published more than 30,500 tweets in less than two months – i.e. around one tweet per hour – and was followed by 1,450 profiles, and another profile received more than 1,000 total likes in its tweets. In the case of 'recent' tweets, seven out of ten of the analysed results presented the same characteristics of the 'popular' ones, and they were all posted by one profile. At the same time, the keyword search did not produce any relevant results for the categories 'profiles', 'photos', and 'videos'.

Results were different in cases where the terms were searched for in other languages. The research in Italian and Spanish did not produce any relevant results in the categories 'popular' and 'recent' tweets and did not produce any results at all in the others. By using the keyword in French, just one tweet – displayed both as 'popular' and 'recent' – has been considered as suspicious since redirecting to a website selling claimed to be 'natural products' to treat erectile dysfunctions. In any case, neither the tweet nor the associated profile was popular among users, since the tweet received only one like (no comments and no retweets) and the profile had just 1 follower.

On the contrary, more relevant results were found when searching for the keyword in German. Indeed, in the category 'popular' two of the ten tweets were with no doubt associated to the online trade of ITMs. The first, was posted by a profile active since March 2018, that declared to be located in Germany, publishing several posts – more than once a day – advertising not only erectile dysfunction products – such as Cialis, Levitra, Kamagra, and Viagra – but also other pharmaceuticals, such as

sleeping pills. All the tweets displayed a link redirecting the user to an operating illegal online pharmacy. It must be noted that the page was considered as quite popular among users since although it had just 6 followers, its tweets received 179 total likes. The other 'popular' tweet was published by a very active profile, active since October 2011 (declared to be located in Germany). Tweets link to a 'Dutch' online pharmacy which sells a large number of pharmaceutical products without prescription: a check confirmed that this pharmacy was not present in the list of legally operating online pharmacies of the Dutch competent Authority. The profile was very active (135,000 total tweets) and very popular (2,767 followers and 723 total likes).

Keyword searches in German also produced three relevant tweets among the 'recent' ones, all posted by the two abovementioned pages. Furthermore, results associated to the illegal online trade of medicines were retrieved also in the categories 'profiles' (1) and 'photos' (4). In the first case, the profile has been considered as suspicious since it presented a link in the page description redirecting users to a website selling medicines for erectile dysfunctions. However, the profile seemed to be inactive, not very popular (5 followers) and the external link was not functioning. In the case of 'photos', two out of four were posted by one of the two very active profiles already described and presented pictures of a package of Alprostadil, and the link of an active illegal online pharmacy (see Fig. 1). In another case, the picture portrayed a sexual activity and the associated description promoted the online trade of erectile dysfunction medicines, but the associated link was not active. In the last case, the tweet advertised Viagra and the link redirected users to an active illegal online pharmacy focused on the trade of this medicine only.

Fig. 1 – Example of a result associated to the illegal online trade of medicines. Twitter. Category 'photos'. Keyword (German): *erektionsprobleme*



Source: author's research results on Twitter

Results retrieved by searching for medicine names usually traded in illegal virtual channels produced different results depending on the specific name. In the case of 'Viagra', no 'popular' relevant tweets have been identified. On the contrary, four of the ten of the 'recent' tweets were directly associated to the illegal online trade of medicines. One of these was in Thai and published by a profile active since May 2018 and was quite popular among users (371 followers) that advertise the trade of medicinal products for erectile dysfunction without prescription. It did not display any external link: to receive further information, users were asked to contact the profile by private messaging systems. The other 3 results were in English, as well as the associated profiles. Two of them advertised suspicious natural supplements for erectile dysfunction and 'penis enlargement'. The third seemed to be, at a first sight, an informative tweet linking to a page with an explanation of the differences between

'Viagra' and 'Cialis': however, the tweet contained a link for further information to a website that, besides the explanation, contained links to illegal online pharmacies to purchase those products without a prescription.

Also in the category 'profiles' the keyword search provided several relevant results, i.e. four out of ten:

- a profile in English active since May 2014 followed by 339 users that published 0 tweets but displayed the following description: 'Looking for Viagra? Order the leading erection pill online for a guaranteed long hard erection at [web link] [...]. The link directed to an active illegal online pharmacy that promoted several medicines for erectile dysfunction.
- a profile in Indonesian active since September 2017 followed by 358 users that published tweets for only three months. Almost all the tweets contained a picture of the product, a website link (not active in the period of the research), and a telephone number to be contacted by using WhatsApp for further information (see Fig. 2).
- a profile in English active since June 2009 very active (4,869 total tweets) and popular (852 followers) but inactive since 2010. Tweets displayed a web link that was not active during research activities.
- a profile in Turkish active since April 2018 with 454 followers and 241 total likes. The tweets (69 in total) usually displayed a picture of a Viagra package – or, less frequently, other medicines for erectile dysfunctions – with a telephone number to contact via WhatsApp for further information. The description of the profile also contained a direct link to send WhatsApp messages by using the desktop version of the messaging system (see Fig. 3).

Fig. 2 – Example of a result associated to the illegal online trade of medicines. Twitter. Category 'profiles' (tweet published by one of the relevant profiles). Keyword: Viagra



Source: author's research results on Twitter

Fig. 3 – Example of a result associated to the illegal online trade of medicines. Twitter. Category 'profiles' (tweet published by one of the relevant profiles). Keyword (German): *erektionsprobleme*



Source: author's research results on Twitter

Keyword searches with the term 'Viagra' provided also two (out of ten) relevant results associated to the illegal online trade of erectile dysfunction medicines in the category 'photos': both of them were associated to tweets in English containing links directing users to active illegal online pharmacies. In particular, one of these pictures was posted by a profile which was very active (286 tweets in the last month) and popular (342 followers and 1,934 total likes). On the contrary, no relevant results were found in the category 'videos'.

Concerning the keyword 'Levitra', the half of the results analysed in the category 'popular tweets' (five out of ten) advertised the illegal online trade of medicines in different languages. One was in Italian, even if the linked profile posted tweets prevalently in English concerning several products (slimming pills, products for body building, etc.) and displaying a web link to an illegal online pharmacy that was not functioning during the research. Another tweet was in English and promoted the online trade of Viagra, Cialis and Levitra: the linked profile displayed a URL address on the profile picture directing users to an active illegal online pharmacy. The other three were in Turkish and posted by profiles advertising several products for erectile dysfunctions. None of them displayed a web link: to receive further information it was required to write private messages, by using telephone numbers (via WhatsApp) posted in the tweets.

Results from searches performed using the keyword 'Levitra' provided relevant results in the categories 'recent' tweets. One of these was in Korean (106 followers, 2,831 total likes) and linked to a profile advertising Kamagra – with roughly one tweet per day – and linking to an active illegal online pharmacy. The other two were in English. Both of them were linked to profiles claiming to be 'pharmaceutical experts' and providing information on several medicines (not only for erectile dysfunctions) and

displayed links to up and running illegal online pharmacies. None of these two profiles were very popular (only 16 and 18 followers).

Several results have also been found in the category 'profiles': six out of ten were directly linked to the trade of ITMs, one in German, two in Japanese and four in English. However, all these profiles were dated (created from 2010 and 2015) and not active anymore during research activities. They all displayed a web link to purchase the medicines advertised in the profile, even if four out six of these were not functioning. Four out of ten results in the category 'photos' were considered relevant for the purposes of the research since advertising the illegal trade of erectile dysfunction medicines. Three of them were in Turkish (400 followers on average), advertising several products and with numbers to be contacted via WhatsApp to obtain further information, and one in English (463 followers), providing a link for an active illegal online pharmacy (supposed to be) located in the United States and selling several products, including abortive pills. No results were retrieved in the category 'video'.

Fewer results linked to the illegal online trade of medicines were found by using the keyword 'Cialis'. Just one recent post in Korean promoting the link of an active illegal online pharmacy, one Turkish profile with a functioning URL address and a telephone number for WhatsApp contacts, and two photos, one in Turkish and one in English. The latter was very popular since retweeted 802 times and had 50 likes: it was posted by a profile declaring to be located in the United States (204 followers) that promoted discounts up to 70% and a link of an active illegal online pharmacy selling several products.

On the contrary, several results were found by using the keyword Kamagra. In more detail, all the firsts ten results of all the analysed categories (apart from 'video') were directly linked to the illegal online trade of medicines. However, only one of the

'photo', 'popular' and 'recent' tweets was in English while all the others were in Thai and Korean. Almost all – the only exception was the one in English – did not display links to illegal online pharmacies but numbers to be used for further communications through WhatsApp, Line or Talk. Some of these were linked to profiles advertising not only ITMs but also other sex-related products, such as sex toys. Results were different in the category 'profiles': seven out of ten were in English (the others three were in Spanish, German, and Dutch). However, almost all of them were not active during research activities and few tweets were visible. All but two displayed a link to an illegal online pharmacy but they were all not functioning.

To conclude, results concerning erectile dysfunction medicines on Twitter can be summarised as follows:

- *Extent of Twitter usage in the illegal online trade of erectile dysfunction medicines.* Several contents explicitly promoting the illegal trade of erectile dysfunction medicines and suspicious natural products were present on Twitter.
- *Ease in finding ITMs (erectile dysfunction) on Twitter.* Contents related to ITMs were easily retrievable by searching for the brand names 'Viagra', 'Levitra', 'Kamagra', and (to a lesser extent), 'Cialis'. The general term 'erectile problems' in Spanish, French and Italian did not provide results; on the contrary, when searched in English provided several results related to the online trade of suspicious natural products.
- *Visibility over time of ITMs-related contents (erectile dysfunction) on Twitter.* Relevant tweets found in the category 'recent' posts were usually still active when searched after one week.

- *Language of post on Twitter concerning ITMs (erectile dysfunction).* Tweets promoting ITMs (or suspicious natural products) were written in several languages (e.g. English, Italian, German, Spanish, Thai, Turkish).
- *Types of Twitter posts concerning ITMs (erectile dysfunction).* Almost all the tweets linked to ITMs displayed images of different types, mainly pictures of the products, of sexual-related behaviours, or of women in explicit poses. Texts of the relevant tweets and/or of the profiles associated to the trade of ITMs were different from each other: sometimes they used marketing phrases (e.g. underlining low prices), while other times they included just a brief description on the products effects or only the name of the product advertised. Tweets published in English (and in other western languages) in almost all the cases displayed a functioning direct link to an active illegal online pharmacy. On the contrary, tweets published in other languages (such as Thai and Turkish) in almost all the cases displayed telephone numbers to be contacted for further information by using online messaging systems (such as WhatsApp, Line or Talk).

4.1.1.2 Medicines to lose weight

Research results concerning the general term 'weight loss' in English and in French did not produce any relevant results clearly linked to ITMs: contents found related to the promotion of 'suspicious' natural dietary supplements and to users' experiences in losing weight. While translated in German, the search on Twitter produced only one suspicious profile advertising generically the sale of '*diapille*', i.e. pills for weight loss. However, the profile was inactive since 2009 and the linked URL displayed in the description of the page and in the tweets was not functioning during the research.

The keyword search in Spanish revealed a set of 'recent' tweets (seven out of ten of the firsts ten results) published by two profiles connected to in South America, one in Chile and one in Colombia. They both trade products to treat a large number of problems, such as sexual-related dysfunctions and obesity. However, by analysing the online shops connected, they seemed to sell natural products, even if suspicious. Three profiles were also found located in South America: however, they were all dated – since created in 2011, 2013 and 2014) and no longer active during the research. The number of followers was non-conspicuous (88, 35, and 21) and the external links displayed in the tweets, and in the page descriptions, were not functioning during the research.

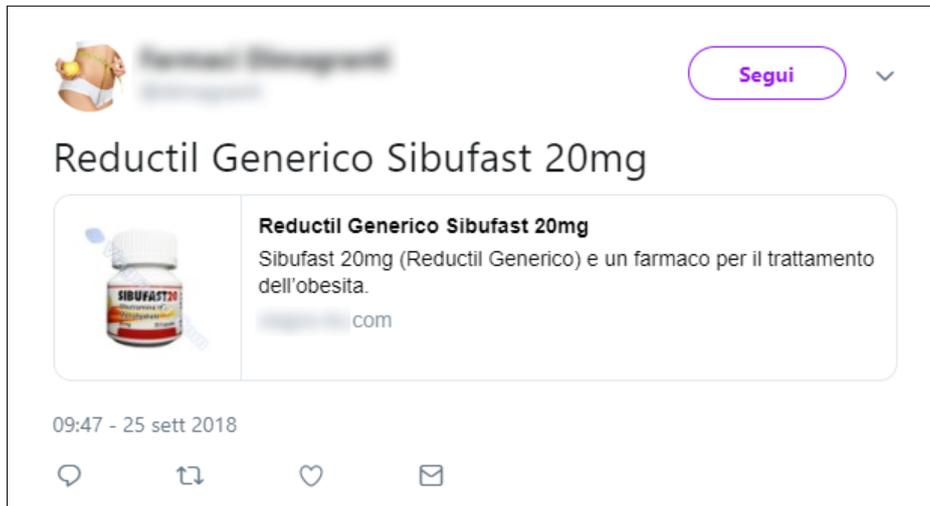
On the contrary, searching activities in Italian led to two very active profiles certainly involved in the illegal trade of medicines, linked also to the 6 results in the category 'popular' tweets found and to the 5 relevant tweets found in the category 'recent':

- one profile active since September 2018 and promoting the online trade of medicines for weight loss without asking for a prescription. The description of the page, located in Italy, clearly stated (in Italian): 'Weight loss pills without prescription online at the lowest price. Fast shipping in Italy by courier post and friendly customer service'.⁴¹ The page published on average one tweet a day promoting different types of products (for an example, see Fig. 4). Both the tweets and the page description display a functioning link for an operating illegal online pharmacy in Italian named 'Viagra4U' selling both pharmaceuticals to lose weight and medicines for erectile dysfunctions. The number of page followers is not available, but the fact that linked tweets are easily retrievable in

⁴¹ Original text in Italian: '*Pillole di perdita di peso senza ricetta online al prezzo più basso. Trasporto veloce in Italia da posta corriere e amichevole servizio clienti*'.

the search categories 'recent' and 'popular' makes the access to these advertisements very easy for Italian Twitter users.

Fig. 4 – Example of a result associated to the illegal online trade of medicines. Twitter. Category 'profiles' (tweet published by a relevant profile). Keyword (Italian): *dimagranti*



Source: author's research results on Twitter

- one profile active since September 2017 and promoting ITMs for weight loss only (see Fig. 5). The description of the page is linked to an operating illegal online pharmacy in Italian selling Reductil, Phentermine, Acomplia, and Xenical, while the tweets usually link to another illegal online pharmacy, also in this case operating and in Italian. The only difference relies on the fact that the latter sells different types of pharmaceuticals, i.e. not only to lose weight, but also for sexual-related problems, pain killers, blood pressure, psychoactive substances, and hepatitis C. Also, in this case, tweets on the profile are easily retrievable in the search categories 'recent' and 'popular', making related contents easily accessible for Italian users.

Fig. 5 – Example of a result associated to the illegal online trade of medicines. Twitter. Category 'profiles'. Keyword (Italian): *dimagranti*



Source: author's research results on Twitter

Concerning the keyword search for 'Dinitrophenol' (or DNP), Twitter searches never produced relevant results. On the contrary, searches for 'Orlistat' and 'Xenical' produced a large amount of contents linked to the illegal online trade of medicines. Concerning the first, seven out of ten of the analysed 'popular' tweets advertised the trade of the products, five in English and one in Spanish, and one in Brazilian-Portuguese. Three of these tweets were particularly relevant since published by very popular profiles with a large number of users:

- one in English: the tweet was published in October 2017 and presented an image of a package of Xenical (Fig. 6). The external web link was not

functioning. The profile that posted the tweet, active since March 2009, claimed to be a pharmacy located in Essex (UK), and in the description declares to sell products for erectile dysfunctions, weight loss, cystitis, and malaria. It was followed by 1,917 users, posted more than 39,000 tweets, and received 630 total tweets likes.

- another one in English: the tweet was published in September 2018 and displayed only the following text: '#Orlistat [...] blocks some of the fats that you eat by preventing your body from absorbing the fats. [web link]'. In this case the web link was functioning and directed users to an illegal online pharmacy selling a large number of products for several therapeutic categories. The profile that posted the tweet had been active since May 2017, claiming to be a pharmacy located in the United States, and in the description declared to sell 'generic prescription medications that are composed of the very same active ingredients found in their brand name counterpart drugs'. It was followed by 3,633 users, posted around 1,700 tweets, but received 7 total tweets likes only.
- one was in Brazilian-Portuguese: the tweet was published in January 2018 and displayed a web link accompanied by the following text: '#Orlistat or #Xenical has been shown to be effective in eliminating fat consumption. Each capsule of Orlistat contains the dose of 120mg of the active principle responsible for eliminating the excess of fat consumed'. The web link was functioning and directed users to an operating Brazil-based website selling products both to lose weight and to enhance sport performances. The profile had been active since July 2011 and was followed by 8,719 users, posted around 11,600 tweets, but received 7 total tweets likes only.

Fig. 6 – Example of a result associated to the illegal online trade of medicines. Twitter. Category ‘popular’ tweets. Keyword: Orlistat



Source: author's research results on Twitter

Concerning the ‘recent’ tweets retrieved by searching for ‘Orlistat’, five out ten were connected to the illegal online trade of prescription weight loss medicines. All of them presented web links to illegal online pharmacies and they were all functioning. Also, a keyword search for ‘Xenical’ produced several results certainly linked to the illegal online trade of medicines. Six out of ten of the analysed ‘popular’ tweets advertised sales of Xenical or other slimming pills (for one example, see Fig. 7). In all the cases, tweets advertised web links to illegal online pharmacies, all up and running during the research. At the same time, all the 10 analysed ‘recent’ tweets were connected to ITMs. In this case, it must be noted that four out of six of the ‘popular’ tweets and all the ‘recent’ tweets were in Japanese and posted by the same profile, active since April

2017. Research also produced three relevant profiles: however, they were all inactive during the research.

Fig. 7 – Example of a result associated to the illegal online trade of medicines. Twitter. Category ‘popular’ tweets. Keyword: Xenical



Source: author's research results on Twitter

To conclude, results concerning weight-loss medicines on Twitter can be summarised as follows:

- *Extent of Twitter usage in the illegal online trade of weight-loss medicines.* Several contents explicitly promoting the illegal trade of weight-loss medicines and suspicious natural products were available on Twitter.
- *Ease in finding ITMs (weight-loss medicines) on Twitter.* It was quite easy to find relevant posts on Twitter. Indeed, keyword searches for the general term ‘weight loss’ in English, German, French and Spanish produced several results linked to advertisements of suspicious natural products. Searching for the same

term in Italian revealed the presence of very active profiles advertising the illegal online trade of prescription medicines. At the same time, keywords 'Xenical' and 'Orlistat' produced several results linked to ITMs. The only exception is the keyword 'Dinitrophenol' that did not produce relevant results.

- *Visibility over time of ITMs-related contents (weight-loss medicines) on Twitter.* Relevant tweets found in the category 'recent' posts were all still active when searched after one week.
- *Language of post on Twitter concerning ITMs (weight-loss medicines).* Tweets promoting ITMs (or suspicious natural products) were written in several languages (e.g. English, Italian, Spanish, Brazilian-Portuguese, Japanese, etc.).
- *Types of Twitter posts concerning ITMs (weight-loss medicines).* Almost all of the relevant tweets advertised web URLs of active illegal online pharmacies and displayed pictures of the product and/or of individuals before and after the treatment (providing evidence on the effectiveness of the substance).

4.1.1.3 Medicines to enhance muscles

Twitter searches containing the term 'steroids' led to numerous 'popular' posts certainly linked to the illegal online trade of medicines, i.e. six out of the first ten results. They were very similar to each other. Tweets were in English and accompanied by a picture – either of the product under sale, or to individuals in healthy shapes/with big muscles – and displayed links directing to an operating illegal pharmacy selling steroids. In some cases, linked Twitter profiles also presented an email address and/or telephone numbers to be contacted via WhatsApp. Relevant results with the same characteristics have also been found in the category 'recent' tweets, 'profiles', and 'photos'. Several

relevant results were also retrieved by searching for the term 'steroids' in the other languages.

Research activities in Spanish led to advertisements of ITMs in all the categories but videos. For instance, half of the analysed profiles were directly linked to the online trade of anabolic steroids without a prescription and very popular among Twitter users (two of these had respectively 607 and 3,404 followers). Those profiles mainly targeted potential buyers from South America: the only exception consisted of one selling ITMs in the United States (declaring to be located in Florida). It claimed to sell 'natural steroids': an analysis of the linked webpage highlighted the presence of several products for trade that seemed to be natural supplements named very similar to the actual anabolic steroids medicines, e.g. 'Anadroll' and not 'Anadrol'. All the profiles had been active for many years however some of them were inactive during the research. Despite this, they all displayed phone numbers to be used for WhatsApp contacts and, when present, external web links to illegal web shops were all functioning. In one case, the profile also directed users to a linked Instagram page.

Relevant results were also found with the keyword search in Italian. For instance, a profile located in the United States operating since 2013 with 372 followers, published several tweets in English targeting Italian customers advertising several types of prescription steroids (Fig. 8): the linked website was operating during the research and led to an illegal online pharmacy selling both products for enhanced muscles and for burning fat. Very similar results have also been found by using the French and German version of the keyword (for an example of the latter, see Fig. 9).

Fig. 8 – Example of a result associated to the illegal online trade of medicines. Twitter. Category ‘popular’ tweets. Keyword (Italian): *steroidi*



Source: author's research results on Twitter

Fig. 9 – Example of a result associated to the illegal online trade of medicines. Twitter. Category ‘popular’ tweets. Keyword (German): *steroide*



Source: author's research results on Twitter

Several instances of tweets and profiles linked to the online trade of ITMs have also been found by searching for the specific names 'Durabolin', 'Dianabol', 'Nadrolone', and 'Anadrol'. They were almost all in English with the same sale patterns; displayed either on the tweet or in the linked profile a URL to an illegal online pharmacy (almost all functioning during the research), and/or a WhatsApp number, and/or an email address.

To conclude, results concerning medicines to enhance muscles on Twitter can be summarised as follows:

- *Extent of Twitter usage in the illegal online trade of medicines to enhance muscles.* Several contents explicitly promoting the illegal trade of steroids and suspicious natural products to enhance muscles has been found: those products revealed to be largely available on Twitter.
- *Ease in finding ITMs (medicines to enhance muscles) on Twitter.* It was easy to find relevant posts on Twitter, by searching for both the general term 'steroids' (in all the languages analysed), and the names of specific medicines.
- *Visibility over time of ITMs-related contents (medicines to enhance muscles) on Twitter.* More than 2/3 of the relevant tweets found in the category 'recent' posts were still active when searched after one week.
- *Language of post on Twitter concerning ITMs (medicines to enhance muscles).* Tweets promoting ITMs (or suspicious natural products) were usually written in English. However, some contents were available also in other languages (e.g. Italian, Spanish, German, etc.).
- *Types of Twitter posts concerning ITMs (medicines to enhance muscles).* Relevant tweets displayed a web link to illegal online pharmacies, and/or other contact details of the seller (such as WhatsApp numbers and email addresses).

4.1.1.4 Medicines to kill pain

Research results concerning the keyword 'pain killers' did not produce relevant results, or any results at all, either in English or when translated into Italian, and French. Searches performed by using the German term '*schmermittel*' led to some relevant results all linked to a very popular profile (around 5,300 followers) active since August 2017 presenting the following description 'EU Prescription Free | buy medicines without prescription from us [web link]'⁴² (Fig. 10). It declared to be located in Berlin (Germany) and frequently posted tweets advertising a large number of different prescription medicines: both the description of the profile and the tweet displayed a functioning web link directing to an illegal online pharmacy in German. Also the keyword research in Spanish led to a relevant result, i.e. two separate profiles almost identical but with slightly different names: they were both created in January 2018 and had no followers, did not display any tweets, presented the same picture of a green cross as a profile photo, their names seemed to advertise medicines to lose weight, and the same URL address in the profile description. The link directed to an operative illegal online pharmacy selling different products, such as medicines for sexual-related problems, pain killers, blood pressure, psychoactive substances, and hepatitis C. It must be noted that another identical profile was found with keyword searches about medicines for weight loss (see Fig. 5).

⁴² Original text in German: '*EU Rezeptfrei | kaufen Sie Medikamente ohne Rezept bei uns unter [web link]*'.

Fig. 10 – Example of a result associated to the illegal online trade of medicines. Twitter. Category 'profiles'. Keyword (German): *schmermittel*



Source: author's research results on Twitter

Very few results were also retrieved by searching for specific medicine names. In more detail, searches for 'OxyContin' led only to a suspicious profile with 12 followers active since July 2017: however, the profile was private and to see tweets a 'following' request should be sent. Some results have also been found by searching for 'Oxycodone' (Fig. 11): they were all tweets linked to a profile (with 10 followers only) declaring to be located in Berlin (Germany) and presenting the following description (in English): 'Pain and Sleeping pills for sale Sleeping tablets for sale WhatsApp number +44 [UK telephone number] we stock best pain [email address]'. On the contrary, searches for 'Percocet' and 'Vicodin' never led to relevant results.

Fig. 11 – Example of a result associated to the illegal online trade of medicines. Twitter. Category ‘recent’ tweets. Keyword: Oxycodone



Source: author's research results on Twitter

To conclude, results concerning medicines to kill pain on Twitter can be summarised as follows:

- *Extent of Twitter usage in the illegal online trade of medicines to kill pain.* Very few contents promoting the illegal trade of painkillers were available on Twitter.
- *Ease in finding ITMs (medicines to kill pain) on Twitter.* It is not very easy to find the illicit promotion of painkillers on Twitter. Only some keywords produced (very few) results associated to the illegal online trade ITMs (i.e. 'OxyContin', 'Oxycodone', and the general name of the therapeutic category in German and Spanish).

- *Visibility over time of ITMs-related contents (medicines to kill pain) on Twitter.* Almost all of the relevant tweets found in the category 'recent' posts were still active when searched after one week.
- *Language of post on Twitter concerning ITMs (medicines to kill pain).* The few tweets retrieved were in English, German, or Spanish.
- *Types of Twitter posts concerning ITMs (medicines to kill pain).* All relevant tweets displayed a web link to illegal online pharmacies selling different types of products (with one exception displaying a telephone number and an email address for further contact).

4.1.1.5 Psychoactive medicines (psychopharmaceuticals)

Research results concerning the keyword 'psychopharmaceuticals' did not produce relevant results, or any results at all, neither in English nor when translated into Italian, German, Spanish and French. All results were about informative contents, mainly linked to the risks associated with the abuse of this products. Concerning the keywords for specific medicine names, searches for 'Adderall' produced no results, while for 'Ritalin', 'Tavor', 'Prozac' and 'Valium' only irrelevant results.

On the contrary, research on Twitter concerning the term 'Xanax' produced limited but relevant results. Indeed, a very popular profile (19,100 total followers) very active since September 2015 (2,015 total tweets) directly linked to the online trade of psychoactive substances has been identified. The user named itself in the description the 'GOODFATHERXANAX' and posted several tweets advertising both Xanax and a syrup containing promethazine and codeine: the latter is a cough syrup that is used in some subcultures as a drug called 'lean' when mixed with sprite. It must be noted that posts advertising Xanax never mentioned the name of medicines within the texts of the

tweet and, at the same time, pictures published never contained packaging with the name of the pharmaceutical but just the pills. For this reason, these tweets probably escaped the SCP monitoring systems of Twitter. The description of the profile presented a link to 'Postmates', a logistics company active in the United States composed by a network of private carriers who deliver goods by bike at a local level. Shipments are based on-demand by using a dedicated mobile application. In synthesis, it provides general shipment services that can be compared to the ones existing for the delivery of foods – such as 'Deliveroo', 'Foodracers', and 'Foodora' – or for the transportation of persons – such as 'Uber'. For this reason, it is possible to assume that the purchases of Xanax are delivered to the buyer by using this system (see Fig. 12).

The profile description presented also some hashtags, apparently with no sense, i.e. #G3722, #R039, #GG249, and #S903. On the contrary, they refer to the codes impressed in the pills of Xanax and other Psychopharmaceuticals. Further searches by using these hashtags revealed an underground of tweets and profiles based in the United States selling those products or simply (much more frequently) talking about the assumption and the misuse of psychoactive medicines for recreational purposes. Furthermore, by analysing results retrieved by using those keywords, several other hashtags and slang names were identified, all linked to the online trade of psychopharmaceuticals, such as 'Yellow School Buses' for R093 Xanax – that actually is a long yellow pill. As a result, it is possible to state that despite contents with both the general term 'psychopharmaceuticals' and the specific brand names of psychoactive medicines being spotted and removed by Twitter, a large amount of alternative and jargon names and hashtags have been developed by both users and sellers trying to avoid monitoring activities run by the social media. At the same time,

the number of identified profiles and posts that were considered as undoubtedly connected to the illegal sales of psychoactive products were very few and at a local level. Most of the analysed tweets were pictures and texts about the experiences connected to the assumption of those medicines.

Fig. 12 – Example of a result associated to the illegal online trade of medicines. Twitter. Category 'profiles' (tweet published by a relevant profile). Keyword: *Xanax*



Source: author's research results on Twitter

To conclude, results concerning psychoactive medicines on Twitter can be summarised as follows:

- *Extent of Twitter usage in the illegal online trade of psychoactive medicines.*
Almost no contents related to the illegal trade of psychopharmaceuticals were available on Twitter. The only exception was a very active profile selling Xanax

and other psychoactive medicines at a local level in the United States. Further analysis uncovered some (very limited) similar posts and profiles.

- *Ease in finding ITMs (psychoactive medicines) on Twitter.* Research results concerning psychoactive substances on Twitter did not produce relevant results, or any results at all, by using either the general term psychopharmaceuticals or the specific names of medicines. Even if there are several jargon hashtags for Xanax used in subcultures in order to avoid monitoring activities by Twitter, it is very hard to find contents promoting ITMs.
- *Visibility over time of ITMs-related contents (psychoactive medicines) on Twitter.* N.A. (no 'recent' tweets found).
- *Language of post on Twitter concerning ITMs (psychoactive medicines).* The few tweets retrieved were in English (and promoting deliveries in the US).
- *Types of Twitter posts concerning ITMs (psychoactive medicines).* The only relevant profile analysed asked for private messages to receive more information and to complete orders.

4.1.1.6 Medicines to sleep

Keyword searches concerning the generic term 'sleeping pills' in Spanish and Italian produced some suspicious results. Indeed, while the Spanish term "*somniferos*" produced one result linked to suspicious natural remedies to insomnia, the Italian version of the keyword revealed some contents related to an apparently personal profile that promoted the purchase of natural supplements through an external website. The profile seemed suspicious because it published tweets in many languages (also French, German, Spanish and Dutch), and despite the high number of tweets (1100) and followers (1290), it had one 'like' only.

Research concerning the French term '*somnifères*' led to a suspicious result, i.e. a profile that did not directly refer to the sale of sleeping pills. However, on one hand the tweets mainly focused on informative contents about insomnia and sleeping pills (especially Zopiclone), on the other hand, some tweets openly advertised the illegal online trade of Zopiclone and Diazepam. In addition, in the profile's description a link to a website with a suspicious URL address was displayed. The link was not functioning and, moreover, the twitter profile seemed to be inactive since 2015.

On the contrary, searching activities in German and English led to two very active pages undoubtedly involved in the trade of ITMs. The German keyword '*schlafmittel*' produced four identical results in the category 'photos' all tracing back to the same German profile. The four tweets (Fig. 13) promoted Zopiclone for sale and used hashtags like #Schlaftabletten (sleeping pills), #Schlafstörungen (sleep disorders), #Zopiclon, #Lorazepam, #Zolpidem, #STADA (the name of a very famous German pharmaceutical company) and other promotional hashtags such as '#kaufen #ohne #rezept', which means 'to buy without prescription'. All the relevant contents found were published by the same profile, displaying a link to a functioning illegal online pharmacy in its description.

Fig. 13 – Example of a result associated to the illegal online trade of medicines. Twitter. Category 'photos'. Keyword (in German): *schlafmittel*



Source: author's research results on Twitter

Through the English term “sleeping pills” it was possible to identify two relevant profiles certainly related to the illegal trade of medicines. One was based in the United States and openly advertised sleeping pills, pain killers and anti-anxiety medicines. In the profile’s description there was an email address and a phone number to contact the seller, and a set of hashtags. One of them, i.e. *#percocetmollypercocet*, was linked to a number of tweets selling medicines for recreational purposes. However, this profile was banned a few days after the research. Also, the second relevant profile was undoubtedly related to the illicit trade of medicines. In the description the seller stated that the aim of the profile was to ‘bridge the gap between demand and supply of sleeping tablets and deliver the best quality sleeping tablets to the doorstep of the consumers’. Furthermore, the description presented a link to a functioning illegal online

pharmacy selling several sleeping pills without prescription (such as Zopiclone, Ambien, Valium, Tramadol).

Concerning the keywords 'Ambien', 'Lunesta' and 'Zolpidem', searches on Twitter only produced irrelevant results. To conclude, results concerning medicines to sleep on Twitter can be summarised as follows:

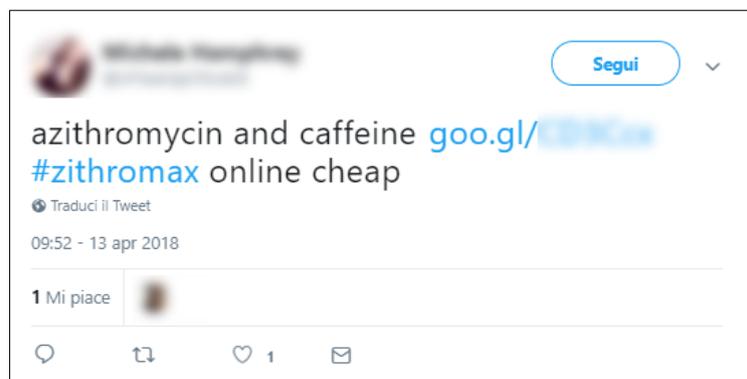
- *Extent of Twitter usage in the illegal online trade of medicines to sleep.* Few but very relevant contents related to ITMs or to suspicious natural products were available on Twitter.
- *Ease in finding ITMs (medicines to sleep) on Twitter.* Relevant contents were easily accessible by using the general term 'sleeping pills' (especially when used in English and in German). No relevant tweets have been found by using the name of specific medicines.
- *Visibility over time of ITMs-related contents (medicines to sleep) on Twitter.* The few relevant tweets found in the category 'recent' posts were all still active when searched after one week.
- *Language of post on Twitter concerning ITMs (medicines to sleep).* Relevant contents were predominantly in English and in German (in case of 'suspicious' natural products also in Italian, Spanish, French and Dutch).
- *Types of Twitter posts concerning ITMs (medicines to sleep).* Almost all the relevant tweets displayed a web link to illegal online pharmacies, with only one exception of a US based seller displaying a telephone number and an email address.

4.1.1.7 Antibiotics

Research results concerning the keyword ‘antibiotics’ did not produce relevant results, or any results at all, either in English or when translated in Italian, French, German, and Spanish. Most of the tweets consisted in news or in awareness raising campaigns about the dangers connected to antibiotics misuse and resistance. Very limited and not-so relevant results have also been found for the words ‘Doxycycline’ – three profiles, all in English and located in the United States, inactive since 2012 and displaying non-functioning links to illegal online shops – and ‘MacroBid’ – two dated tweets (2011 and 2012) linked to profiles advertising several medicines with non-functioning links to (illegal) online pharmacies.

The only exceptions were keyword searches for ‘Zithromax’ and ‘Trimethoprim’. Indeed, Twitter searches revealed the presence of some posts (for Zithromax: 2 ‘popular’ tweets, 1 ‘recent’ tweet, and 1 photo; For Trimethoprim: 3 ‘popular’ tweets, and 2 photo) advertising these medicines and with functioning links to illegal online pharmacies. It must be underlined that in half of the cases tweets were posted by very popular (fake) profiles of young women linked to dating websites and they all linked to the same illegal online website (for one example Fig. 14).

Fig. 14 – Example of a result associated to the illegal online trade of medicines. Twitter. Category ‘popular’ tweets. Keyword: *Zithromax*



Source: author's research results on Twitter

To conclude, results concerning antibiotics on Twitter can be summarised as follows:

- *Extent of Twitter usage in the illegal online trade of antibiotics.* Almost no relevant contents related to the illegal online trade of antibiotics were available on Twitter.
- *Ease in finding ITMs (medicines to sleep) on Twitter.* The few relevant results have been found by searching for the keyword 'Zithromax' and 'Trimethoprim'.
- *Visibility over time of ITMs-related contents (medicines to sleep) on Twitter.* The only 'recent' posts analysed were removed from Twitter in a few days.
- *Language of post on Twitter concerning ITMs (medicines to sleep).* The few contents found were always in English.
- *Types of Twitter posts concerning ITMs (medicines to sleep).* All the relevant tweets displayed a web link to illegal online pharmacies.

4.1.1.8 Medicines to quit smoking

The search with the general keyword 'quit smoking' did not produce relevant results or any results at all, neither in English nor in any other of the four languages. Related contents were mainly promotional and motivational posts with the aim of helping people stop smoking. On the other hand, some results have been found by conducting the research using the names of specific medicinal products, even if not all connected to the illicit online trade of medicines.

In the case of 'Nicotinell', the keyword research led to three suspicious findings. However, after an accurate analysis, it has emerged that they were related to an online training platform for pharmacists and to two legally operating online pharmacies (one in Ireland and one in Spain). The keyword 'Wellbutrin' led to two results, both belonging to the category 'profiles', i.e. one inactive since 2017 and advertising Wellbutrin and

antidepressants with a non-functioning link to an online pharmacy, and one inactive since 2009 presenting the same features.

On the contrary, a relevant result arose from the research using the specific term 'Zyban': a tweet (Fig. 15) promoting this product and a link to an illegal online pharmacy. The very active profile that published this tweet came up many times during the research, since it was posting several tweets a day concerning several prescription medicines, such as for erectile dysfunctions and weight loss.

Fig. 15 – Example of a result associated to the illegal online trade of medicines. Twitter. Category 'popular' posts. Keyword: *Zyban*



Source: author's research results on Twitter

To conclude, results concerning medicines to quit smoking on Twitter can be summarised as follows:

- *Extent of Twitter usage in the illegal online trade of antibiotics.* Almost no relevant contents related to the illegal online trade of medicines to quit smoking were available on Twitter.
- *Ease in finding ITMs (medicines to sleep) on Twitter.* The only relevant result has been found by searching for the keyword 'Zyban'.
- *Visibility over time of ITMs-related contents (medicines to sleep) on Twitter.* The only 'recent' posts analysed was promptly removed from Twitter.
- *Language of post on Twitter concerning ITMs (medicines to sleep).* Contents were all in English.
- *Types of Twitter posts concerning ITMs (medicines to sleep).* The only tweet found displayed a web link to an illegal online pharmacy selling different types of medicines.

4.1.1.9 Others

Twitter searches for the keyword 'Clomid' led to several relevant results. To start with, four of the 'popular' tweets analysed were certainly connected to the illegal online trade of medicines. Two of them were published by two very popular profiles of (fake) young girls (1,271 and 1,974 followers respectively) and displayed functioning links to illegal online pharmacies. The other two posts, were published by a profile selling products to enhance sport performances, presenting an email address for further contacts with potential buyers in its description, and a WhatsApp number in the watermarks of the pictures (Fig. 16). In all the cases, Clomid was advertised as a product to enhance muscles. Indeed, despite these medicines being intended to treat infertility in women

who do not ovulate, it is also used by bodybuilders in order to avoid the side effects of steroids abuse. Among the ten results analysed in the category 'profiles', four were undoubtedly intended for the advertisements of illegal online pharmacies supplying the product. Even if they were all dated and inactive months before, in one case the link was still functioning. It must be noted that in all these cases the medicine was advertised for their proper use, i.e. to treat infertility. Four relevant results were retrieved also in the category 'photos' in half of the cases the medicine was advertised to treat infertility, while in other two as an anti-oestrogen substance to be used in order to counter the side effects of steroids. All the results retrieved for Clomid were in English, but one in Italian.

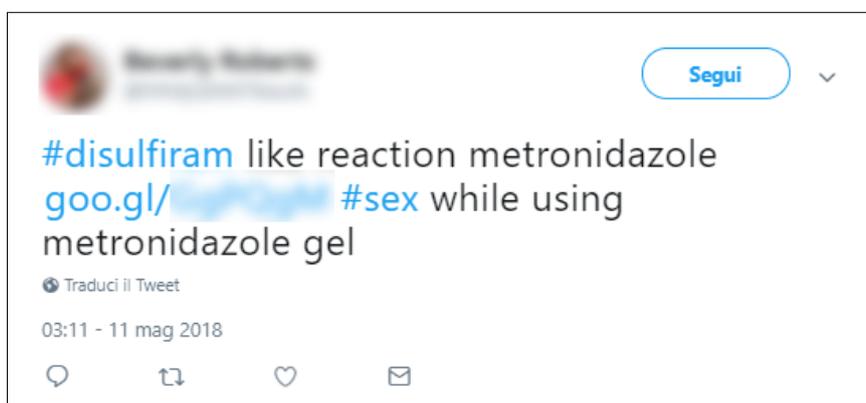
Fig. 16 – Example of a result associated to the illegal online trade of medicines. Twitter. Category 'popular' tweets (profile that published the tweet). Keyword: *Clomid*



Source: author's research results on Twitter

Keyword searches for the term 'Disulfiram' led to four findings associated to the illegal online trade of medicines, two among the 'popular' tweets, and two among the 'photos'. The formers were both advertisements in English of active illegal online pharmacies and published by very popular fake profiles of young women (around 1,500 followers each), presenting in their profile descriptions links also to a dating website. In these cases, the medicine was advertised as a substance to allow sex performances while assuming metronidazole, a strong antibiotic used to treat several problems, such trichomonas infections (Fig. 17). On the other hand, the two results in the category 'photo' (one in English and one in German) advertised the medicine for its proper use, i.e. to treat alcoholism. Also, in this case, profiles were linked to active illegal online pharmacies.

Fig. 17 – Example of a result associated to the illegal online trade of medicines. Twitter. Category 'popular' tweets. Keyword: *Disulfiram*



Source: author's research results on Twitter

Also, the search for 'Nolvadex' led to several Twitter contents linked to the illegal online trade of prescription medicines. To start with, half of the analysed photos were clearly advertising the illegal sale of this product. In one case, the profile that published the tweet was very popular (2,766 followers). In another case, the tweet displayed a

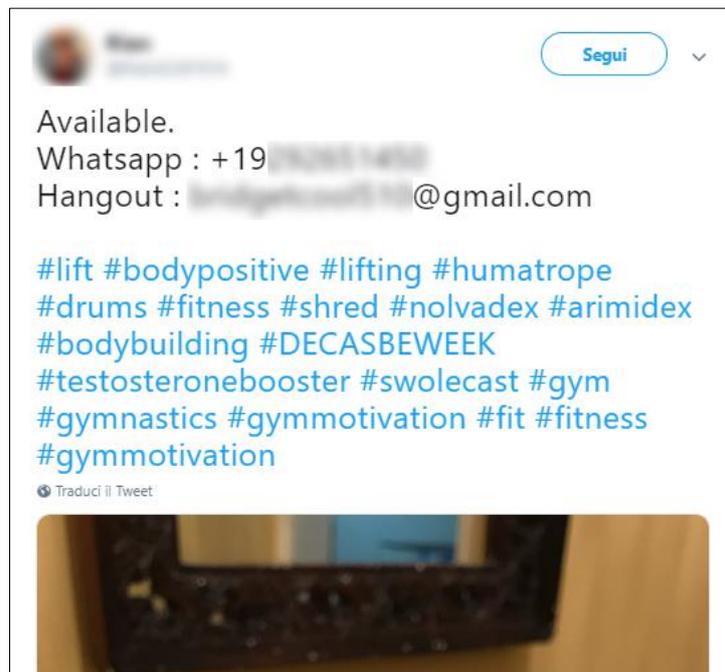
number to be contacted via WhatsApp and an email address (Fig. 18), while all the other presented functioning web links to illegal online pharmacies (Fig. 19). In most of the tweets, the medicine was presented not for its intended purposes – i.e. to treat breast cancer – but as a substance to counterbalance a very common side effect connected to the abuse of steroids among bodybuilders, i.e. the accumulation of oestrogens by the body. Also, six out of ten of the ‘profiles’ analysed advertised ITMs and links to illegal online pharmacies.

Fig. 18 – Example of a result associated to the illegal online trade of medicines. Twitter. Category ‘photos’ tweets. Keyword: *Disulfiram*



Source: author's research results on Twitter

Fig. 19 – Example of a result associated to the illegal online trade of medicines. Twitter. Category 'photos' tweets. Keyword: *Disulfiram*



Source: author's research results on Twitter

To conclude, results concerning other medicines (i.e. products of therapeutic categories different from the ones previously analysed) on Twitter can be summarised as follows:

- *Extent of Twitter usage in the illegal online trade of other medicines.* Clomid, Disfluram, and Nolvadex are largely available on Twitter. They were all advertised either for their proper use (i.e. Clomid to treat infertility, Disfluram to treat alcoholism, and Nolvadex to treat cancer), or for other associated effects (i.e. Clomid and Nolvadex to counter the side effects of steroids, and Disfluram to have sex while assuming metronidazole). At the same time, no illegal advertisements concerning Sovaldi and Havroni were found.
- *Ease in finding ITMs (other medicines) on Twitter.* Contents related to ITMs are easily accessible by searching for the name of the medicine.

- *Visibility over time of ITMs-related contents (other medicines) on Twitter.* All 'recent' posts analysed were still active after one week.
- *Language of post on Twitter concerning ITMs (other medicines).* Tweets were (almost) always in English.
- *Types of Twitter posts concerning ITMs (other medicines).* Relevant tweets displayed either a link to illegal online pharmacies, or details to contact the seller (e.g. telephone numbers, email addresses, hangout contacts). In some cases, popular fake profiles of women with several followers which linked to dating websites were also used to advertise the illegal online trade of medicines.

4.1.2 Facebook

4.1.2.1 Medicines for erectile dysfunctions

By searching for the general term 'erectile problems' (in English) only two results were displayed in the category 'post', with very similar features, i.e.:

- in English and advertising natural products. They were considered suspicious since possibly related to the marketing strategy of concealing ITMs under the fake label 'herbal supplements' (Gaudio et al., 2016; Mullaicharam, 2011).
- the posts included a telephone number to be called to receive more information.
- the posts did not include any external web link.
- they were both posted by private profiles – i.e. not pages.

The only difference was the first post was specifically dedicated to sexual-related problems only ('all men that have erectile problems call me [telephone number]'), while the second referred to different types of dysfunctions ('BP, Diabetes, Kidney failure, Stroke, Fibroids, Tumours, spinal injuries, brain damage, Obesity, Eye challenges, Arthritis, Cancers, Prostate disorders, infertility, Erectile problems, premature ejaculation, Period pain etc [telephone number]'). However, from a detailed analysis of both the posts and the linked profiles, it can be stated that they seemed to actually promote natural and alternative cures and were not related to the illegal online trade of medicines. Some results were retrieved in the category 'photo' – four out of ten of the first ten results were about the online trade of herbal supplements to treat sexual-related problems, presenting telephone number details – and 'videos' – eight out of ten.

On the contrary, one of the analysed Facebook pages was certainly linked to the ITMs. It promoted medicines for erectile dysfunction only – Viagra, Cialis, and Levitra – also displaying prices of the available products (Fig. 20). The page was quite

popular (183 likes) but inactive since February 2017 and the external web link displayed in the description of the page was not functioning during research activities.

Fig. 20 – Example of a result associated to the illegal online trade of medicines. Facebook. Category 'pages'. Keyword: erectile problems

The screenshot shows a Facebook page for an illegal online trade of medicines. The page header includes a circular profile picture of a doctor writing, a banner with images of couples and pills for Viagra, Cialis, and Levitra, and a call to action "REACH US: +1- (DIRECT LINE)". The page has 183 likes and 184 followers. A post from February 27, 2017, lists prices for Viagra, Cialis, and Levitra, and promotes "bigfun jelly".

Page Header:

- Home
- Post
- Foto
- Informazioni
- Community
- Informazioni e inserzioni
- Crea una Pagina

Banner:

- VIAGRA sildenafil citrate
- CIALIS tadalafil
- LEVITRA vardenafil
- REACH US: +1- (DIRECT LINE)
- Buttons: Mi piace, Segui, Condividi, Chiama ora, Invia un messaggio

Post:

27 febbraio 2017 ·

Reach us @1- for best quality medications at reasonable price.....

Today's Bestsellers:

- Viagra Price= \$0.98
- Cialis Price= \$0.99
- Viagra Professional Price= \$2.63
- Cialis Professional Price \$3.56
- Levitra Price- \$ 1.48

Product Image:

- Sildenafil Citrate Jelly
- bigfun jelly
- Mint Cool Flavour
- 1 Sachet of 5 gm

Community:

- Invita i tuoi amici a mettere "Mi piace" a questa Pagina
- Piace a 183 persone
- Follower: 184

Informazioni:

- Invia un messaggio
- www.pharmacyonlinez.com
- Prodotti farmaceutici
- Suggerisci modifiche

Pagine correlate:

- Mi piace
- Mi piace
- Mi piace

Footer:

- Italiano · English (US) · Română · Español · Português (Brasil)
- Informazioni sui dati di Insights della Pagina
- Privacy · Condizioni · Pubblicità · Soe gli tu!
- Cookie · Altro
- Facebook © 2018

Source: author's research results on Facebook

Three other results, in the category 'pages', were only considered suspicious since promoting herbal supplements to treat sexual related problems. At the same time, no relevant results were found in the categories 'profiles' and 'groups'. Few relevant results were retrieved by searching 'erectile problems' in other languages. In more detail, contents certainly linked to the illegal online trade of medicines were:

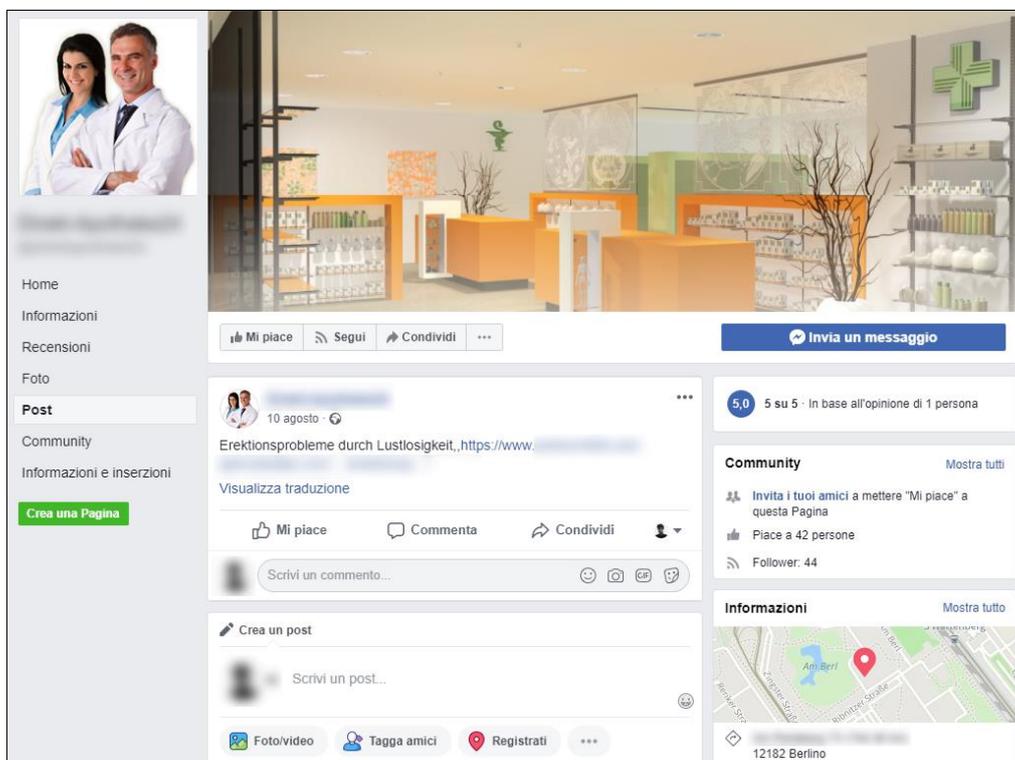
- one post retrieved in the category 'photos' (keyword in Spanish) published by a profile of a person in a C2C marketing page. It displayed a picture of a Cialis package and information on the price and on the location of the seller (i.e. Torrèon, in Mexico). For further information, private messages were needed.
- one page in English (keyword in French) promoting Levitra from the Philippines (Fig. 21). The link displayed on the page description pointed to a legally operating general e-commerce website selling a large number of items of very different types (clothes, watches, jewellery, ICT devices, etc.). It must be noted that all the specific links concerning Levitra were not available during the research, probably because they were removed by the website.
- one page (keyword in German) advertising an active illegal operating online pharmacy (Fig. 22).

Fig. 21 – Example of a result associated to the illegal online trade of medicines. Facebook. Category 'pages'. Keyword (in French): *problèmes érectiles*



Source: author's research results on Facebook

Fig. 22 – Example of a result associated to the illegal online trade of medicines. Facebook. Category 'pages'. Keyword (in German): *erektionsprobleme*



Source: author's research results on Facebook

Keyword searches in Italian, German, French and Spanish did not produce other relevant results or did not produce any results at all.

The keyword 'Levitra' did not produce relevant results as for 'posts', only one inactive profile in the linked category. However, several results have been retrieved in the categories 'pages' and 'groups'. Concerning the first, nine out of ten of the pages were clearly linked to the illegal online trade of erectile dysfunction medicines. One of these were in Turkish published two posts containing pictures of Levitra pills and packages: however, neither web links nor telephone numbers were displayed, and the page seemed to be inactive since April 2012. All the others were in English and very similar to each other: they provided information on product prices – including discounts and special offers – and promoted links to illegal operating online pharmacies. However, half of this group has been inactive for some years and the web links were functioning in only three cases. It must be underlined that some of these inactive pages were very popular among Facebook users: for instance, one had more than 1,000 likes, while another around 400. Also, in the category 'groups' the keyword search performed by using the keyword 'Levitra' produced many relevant results (eight out of ten) in different languages: English (3), Russian (2), Italian (2), and Turkish (1). However, almost all were inactive and/or with no members, only half of them presented web links to external illegal online pharmacies and only one of these was functioning. Research results highlighted also the presence of two videos (out of the first ten results) used to advertise illegal online pharmacies: in both cases, the videos were not available for streaming, but the linked profiles presented functioning web links directing to illegal shops.

Very few relevant results were found also by using 'Cialis' as a keyword. Indeed, no results at all were produced by the keyword search in the categories 'posts',

'photos', 'pages', and 'groups'. Only one result was retrieved in the category 'profiles', but it was included only because the name was considered suspicious 'Generic Cialis': however, no information was available, such as posts, number of friends, locations, profile pictures, descriptions, etc. At the same time, some videos were found (three in Turkish and one in Arab). One of these was composed by a series of images of medicines for erectile dysfunctions (such as Viagra, Cialis and Kamagra) and published by a page of a Turkish sex shop. The other three seemed to be unrelated to the illegal online trade of medicines.

At the same time, the keyword 'Viagra' did not produce any results in the categories 'posts', 'photos', 'pages', and 'groups', while no relevant results in the category 'video'. In contrast, the keyword search for 'Kamagra' led to a large amount of results, certainly linked to the illegal online trade of medicines. To start with, all the first ten results among 'posts' were about this ITM and written in several languages: English (3), Italian (2), Serb-Croatian (2), French (1), Macedonian (1), and Albanian (1). Almost all these posts presented pictures of the medicines and information on the products – such as effects, dosage, delivery information, price, etc. To complete the transfer, in most of the cases the post and/or the linked profile displayed external web links, that were all functioning and directing to operating illegal online pharmacies. In other cases, the sellers should be contacted by using the private messaging service provided by the platform. Several relevant results with the same features have also been found in the other search categories, i.e. 'photos', 'pages', and 'groups'. Concerning the latter, even if they were composed by a limited number of members, groups were open thus allowing every user, even if not a member, to see the information within. On the contrary, very few relevant profiles were retrieved and none of these seemed to be active.

To conclude, results concerning erectile dysfunction medicines on Facebook can be summarised as follows:

- *Extent of Facebook usage in the illegal online trade of erectile dysfunction medicines.* Few relevant contents related to the illegal trade of erectile dysfunction medicines were available on Facebook. Even if some profiles, pages and groups clearly linked to the illegal online trade of medicines, they were almost always inactive or linking to illegal external websites which were no longer online. The only exception concerned Kamagra (largely available in posts, pages, and groups), and some suspicious natural products.
- *Ease in finding ITMs (erectile dysfunction) on Facebook.* Contents related to ITMs (even if rarely relevant) were easily retrievable by searching for the analysed keywords (with the exception of the keyword Viagra, often leading to no results). Specifically, all the relevant contents related to Kamagra were easily accessible by searching for the name of the medicine.
- *Visibility over time of ITMs-related contents (erectile dysfunction) on Facebook.* All recent posts (all related to Kamagra) were still active when searched after one week.
- *Language of post on Facebook concerning ITMs (erectile dysfunction).* Contents related to ITMs are available in numerous languages, such as English, German, Italian, Serb-Croatian, French, Macedonian, and Albanian.
- *Types of Facebook posts concerning ITMs (erectile dysfunction).* Three types of marketing strategies related to ITMs have been identified: a) promotion of links to illegal online pharmacies, b) promotion of telephone numbers or other contact details of the seller (e.g. messaging systems), and c) posts on C2C marketing pages (targeting customers from South-America).

4.1.2.2 Medicines to lose weight

Research results concerning the general term 'weight loss' in all the languages analysed in the present research revealed a large number of posts, profiles, photos, pages and groups advertising natural products, sometimes more than suspicious. For instance, by using the keyword search '*produits minceur*' (French) a post was found advertising a supposed-to-be 100% natural supplement to lose weight. The post linked to a website in which the features of the products were described, presenting also another link to complete the purchase. These URLs directed to illegal online pharmacies selling that product and also a large number of other ITMs in several therapeutic categories.

Several relevant results have been found by searching for medicinal products names. In the case of 'Orlistat', for instance, for out of ten of the results retrieved in the category 'posts' were connected to the online trade of slimming prescription pills. One was in Spanish (Fig. 23) and one in Portuguese and all linked to online shipments in South America: they all displayed, either on the posts or in the linked page/profile, telephone numbers to be contacted via WhatsApp to complete the transfer. Another one was in English and linked to an operating illegal online website selling Orlistat and Xenical. Another four results retrieved in the category 'posts' were connected to suspicious natural diet supplements. Research results in the other categories always revealed some relevant results, demonstrating the high availability of prescription medicines traded illegally through Facebook.

Fig. 23 – Example of a result associated to the illegal online trade of medicines. Facebook. Category 'posts'. Keyword: Orlistat

 7 agosto · 

DIECAPS ORLISTAT 120MG X 30 CÁPSULAS

Orlistat produce una pérdida de peso mediante la inhibición de la absorción de nutrientes. En las lipasas gástrica y pancreática, se forma un enlace covalente entre uno de los residuos de serina de la enzima y la pared del intestino lo que impide que la lipasa hidrolize los triglicéridos de la dieta en ácidos grasos y mono glicéridos. De esta manera se reduce la absorción de grasas. Como consecuencia, la ingesta calórica se reduce, el balance energético se vuelve negativo y se produce una pérdida de peso. Con las dosis recomendadas de 120 mg de orlistat 3 veces al día, la absorción de grasas se reduce en un 30%.

COMPONENTES
Orlistat 120mg

BENEFICIOS

- o Absorción de las grasas
- o Nivel la Insulina
- o Ayuda a bajar el colesterol malo
- o Evacua las Grasas

FORMA DE USO USO SUGERIDO:
Diecaps capsulas por 120mg debe consumirse una cápsula una hora antes, durante, o hasta una hora después de cada comida principal. – Si se omite una de las comidas se puede omitir la dosis de Orlistat. – Si la comida no incluye grasas en la misma se puede omitir la dosis de Orlistat

ADVERTENCIA Y RECOMENDACIONES
Embarazo y lactancia. – Pacientes con síndrome de malabsorción crónica. – Colestasis (cualquier afección que altera el flujo de la bilis). - Hipersensibilidad al orlistat.

[Visualizza traduzione](#)



Source: author's research results on Facebook

Also in the search activities for the term 'Xenical' results were similar. Indeed, six out of ten of the analysed posts were illegal advertisements of the medicine (Fig. 24). They were all in English and, in all but one of the cases, presented mobile numbers to be contacted via telephone or online messaging systems to receive more information or to complete the transfer: in the other case, the URL displayed in the post directed to an active illegal online pharmacy. Results linked to ITMs trade were found also in the categories 'photos' (eight out of ten), videos (six out of ten), and pages (three out of ten).

Fig. 24 – Example of a result associated to the illegal online trade of medicines. Facebook. Category 'posts'. Keyword: Orlistat



Source: author's research results on Facebook

Searches for the name 'Dinitrophenol' (or DNP) produced fewer but relevant results, especially in posts, profiles and pages linked to body building activities. To conclude, results concerning medicines to lose weight on Facebook can be summarised as follows:

- *Extent of Facebook usage in the illegal online trade of medicines to lose weight.* Products for weight-loss (both ITMs and suspicious natural products) were largely available on Facebook.
- *Ease in finding ITMs (medicines to lose weight) on Facebook.* Relevant contents were easily retrievable by searching for the analysed keywords.
- *Visibility over time of ITMs-related contents (medicines to lose weight) on Facebook.* Around 2/3 of the posts had been removed by the social media within a few days.
- *Language of post on Facebook concerning ITMs (medicines to lose weight).* Contents related to ITMs are available in numerous languages, such as English, Spanish, and Portuguese.
- *Types of Facebook posts concerning ITMs (medicines to lose weight).* Facebook contents illegally promoting weight-loss substances displayed either URLs of illegal online pharmacies or other contact details (in some cases, both).

4.1.2.3 Medicines to enhance muscles

Facebook searches concerning the term 'steroids' led to very few results linked to the illegal online trade of medicines, i.e. two profiles and one video. Both of the profiles were created in 2016 and were inactive during the research. Furthermore, one of these had only two friends and no other information – such as posts, web links, telephone numbers, etc. – was available while the other linked to an external website not linked

to ITMs – even if the domain contained the words ‘steroids4u’. The video portrayed a very young man – with a high probability around 10/14 years old – with a lot of muscles while training assisted by a brawny trainer: the description of the video consisted in a URL address linking to an operating illegal online pharmacy selling several products for muscle enhancement and burn fat. No other relevant results were presents in the other categories.

Few results were found also in the categories ‘profiles’ and ‘photos’ by using the French keyword *stéroïdes*. Only two profiles, but with very few friends (17 and 39) and both inactive since 2010. Two instances were retrieved also in the category ‘photos’ but they linked to profiles inactive since 2017, targeting potential buyers form South America: furthermore, no links or other contact details were present. Much more relevant results have been discovered among Facebook pages since five out of ten of those analysed were clearly aimed at selling prescription steroids. Even if two of them were inactive since one year, the other three were operative and posted several images of medicines for sale (Fig. 25). In all the cases, no URLs were displayed but in order to receive more information and/or to finalise the purchase personal messages via Facebook or WhatsApp were needed.

Some relevant results have also been found with the Spanish translation of the Keyword. In more detail, three ‘profiles’ were openly devised for the illegal online trade of steroids, all targeting South-American customers. None displayed any external URLs, only email addresses and telephone numbers. In one case, the sellers regularly posted a price list containing all the products available (Fig. 26): moreover, the page was quite popular since it had more than 450 friends. The analysis of the results retrieved in the category ‘photos’ disclosed a very peculiar illegal trade pattern. All the five relevant findings were advertisements of anabolic steroids posted in South-Central

American based C2C marketing pages (for example, Fig. 27). They were posted by profiles of apparently normal individuals, posting on their pages and portraying pictures of their everyday life. This result seems to disclose the presence in South-Central America of people making up their wages by selling limited quantities of ITMs. The research also led to some relevant results in the categories ‘pages’ – i.e. a page with 55 likes selling steroids and displaying a number for WhatsApp contacts – and ‘groups’ – i.e. four groups, even if with very limited number of users: also in this case, they all targeted South and Central American potential buyers.

Fig. 25 – Example of a result associated to the illegal online trade of medicines. Facebook. Category ‘profiles’ (tweet published by one of the relevant profiles). Keyword (in French): *stéroïdes*



Source: author's research results on Facebook

Fig. 26 – Example of a result associated to the illegal online trade of medicines. Facebook. Category 'profiles' (post published by one of the relevant profiles). Keyword (in Spanish): *esteroides*

TESTOSTERONA ENANTATO multi-10 ampollas de 1ML/250mg..70€
 (también ampollas sueltas a 10€/unidad
 TESTOSTERONA PROPIONATO multi-10 ampollas de 1ML/100mg..65€
 (también ampollas sueltas a 9,50€/unidad
 TESTOSTERONA CIPIONATO multi-10 ampollas de 1ML/200mg..70€
 (también ampollas sueltas a 10€/unidad
 TESTEX PROLONGATUM 2ML/250MG..... 14€
 PRIMOBOLAN BAYER 1ML/100MG..... 14€
 SUSTANON multiTESTO- 10 ampollas de 1ML/250mg..... 75€ (también
 ampollas sueltas a 10€/unidad
 DECA NANDROLONA multi 10 AMPOLLAS 1ml 200mg.....75€ (también
 ampollas sueltas a 12€/unidad)
 DECA NORMA 2ml / 200mg..... 14€
 BOLDENONA CAJA MULTI-10 AMPOLLAS 250MG X 1ML...80€
 PRIMOBOLAN multi 10 ampollas de 1ml / 100 mg.....95€ (ampollas
 sueltas a 11€/unidad)
 MASTERON multi-10 ampollas 1ml/100mg.....75€
 WINSTROL CAJA MULTI-10 AMPOLLAS 50MG X 1ML.....70€
 WINSTROL DESMA CAJA TRES AMPOLLAS 3ML X 50MG...20€
 WINSTROL ORAL.....caja 96 comp x 10mg..... 65€
 WINSTROL ORAL (COOPER)caja 50 comp x 10mg..... 40€
 WINSTROL ORAL STROMBAFORT (balkan) 10mg/120 comp.....75€
 TREMBOLONA ACETATO MULTI-10 AMPOLLAS 10ML/100MG...90€
 TREMBOLONA ENANTATO MULTI-10AMPOLLAS 10ML/100MG...90€
 TREMBOLONA PARABOLAN 10ML/76,5MG.....115€
 DIANABOL.....96 comp x 10mg..... 65€
 DIANABOL.....COOPER.....50 comp x 10mg..... 40€
 DIANABOL BALKAN... 10MG/120 COMP.....75€
 ANADROL.....50 COMP. X 50MG.....65€
 OXANDROLONA.....10mg x 96 comp.....80€
 PARABOLAN.....10ML/76MG X 1ML.....70€

Source: author's research results on Facebook

Fig. 27 – Example of a result associated to the illegal online trade of medicines. Facebook. Category 'photos'. Keyword (in Spanish): *esteroides*



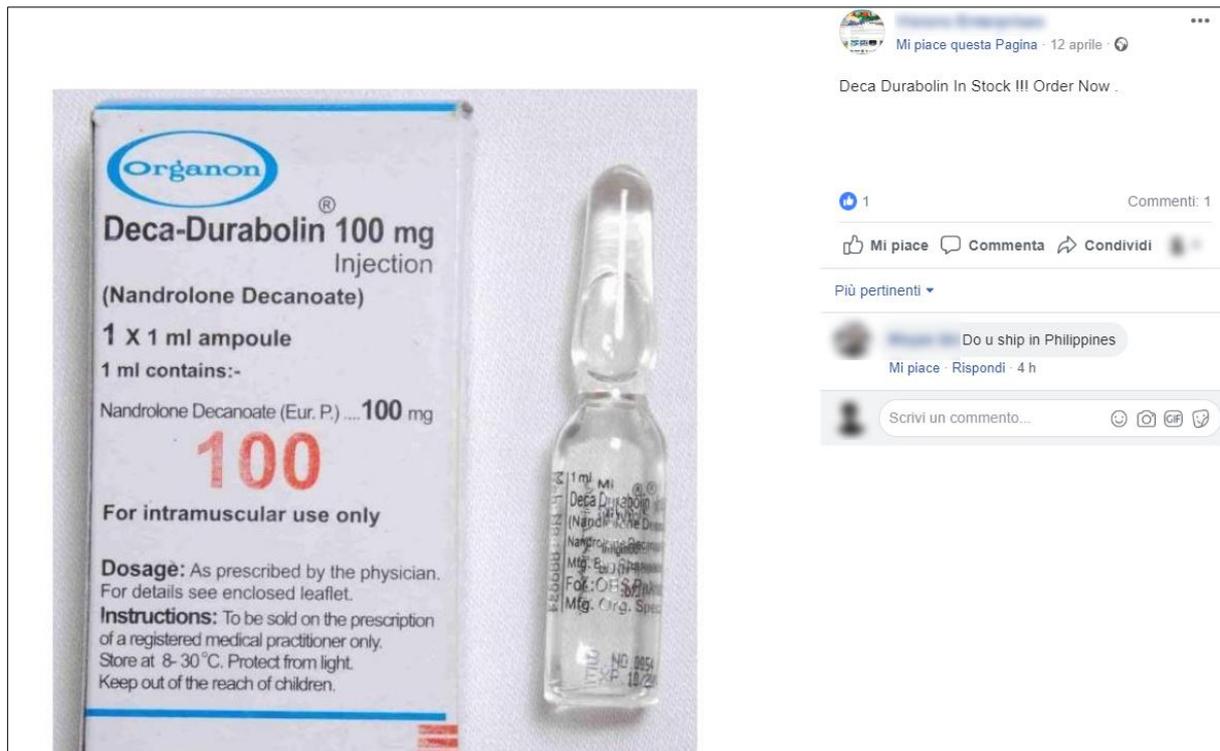
Source: author's research results on Facebook

The keyword in Italian led to relevant results retrieved in the category 'pages'. Indeed, almost all the results seemed to be directly linked to the illegal online trade of medicines or were at least suspicious since promoting natural products but containing the term 'steroidi' on the page name. Only one page displayed a link to an – up and running – illegal online pharmacy in Italy, while all the others did not display any other contact details and private messages are needed to receive further information. It must be noted that several of these groups had very limited members – around 10/15: the more liked were not in Italian but in Serb-Croatian and targeting clients from the Balkans.

Fewer results were retrieved by using the German version of the keyword. The most relevant has been a Facebook page promoting steroids for sale without a prescription with possible deliveries in the EU and the US. Payments are asked in Bitcoins and further contact to receive information and/or to complete the transfer shall be made via a given Telegram contact.

Some results have also been found by searching for specific product names. To start with, four out of ten of the posts analysed for the keyword 'Durabolin' concerned advertisements of this product for sale. One of these, was connected to a profile in English with around 200 friends posting several images and texts concerning several ITMs, including steroids and medicines for erectile dysfunctions: further contacts with the potential clients are arranged via private messages. Personal 'virtual' meetings with the buyers were required also in two of the other posts. The only exception was an advertisement from a Vietnamese based Facebook page that presented a link to an operating illegal online pharmacy. However, also in this case a telephone number was displayed in every image published by the page as to allow customers to directly contact the buyer. However, the high availability of these products for sale on Facebook has been highlighted by results in the category 'photos'. Indeed, all the ten analysed search findings clearly advertised steroids for sale (for an example, see Fig. 5). In all these posts and in the linked profiles, no external URLs were displayed (but in one case), thus a potential buyer had to take personal contacts with the purchasers via the internal messaging service provided by the social media or using email addresses and/or telephone numbers displayed in the post or in the profile. Relevant results have also been found in the categories 'videos', while fewer findings were retrieved among 'pages' and 'groups'. Several similar results have also been found for the keywords 'Nandrolone' (Fig-28) and 'Anadrol', while with the term 'Dianabol' retrieved less findings.

Fig. 28 – Example of a result associated to the illegal online trade of medicines. Facebook. Category 'posts'. Keyword: Nandrolone



Source: author's research results on Facebook

To conclude, results concerning medicines to enhance muscles on Facebook can be summarised as follows:

- *Extent of Facebook usage in the illegal online trade of medicines to enhance muscles.* Steroids were largely available on Facebook.
- *Ease in finding ITMs (medicines to enhance muscles) on Facebook.* Relevant contents were easily retrievable by searching for all the analysed keywords.
- *Visibility over time of ITMs-related contents (medicines to enhance muscles) on Facebook.* All posts analysed were not removed within one week.
- *Language of post on Facebook concerning ITMs (medicines to enhance muscles).* Contents related to ITMs were available in numerous languages, even if predominately in English.

- *Types of Facebook posts concerning ITMs (medicines to enhance muscles).* In almost all cases, advertisements of steroids on Facebook do not display external URLs directing to illegal online pharmacies, but contacts between the buyers and the sellers are made via private messages by using the internal system provided by the social media, online messaging services such as WhatsApp and Telegram, or email. In some cases, contents were posted on C2C marketing pages (targeting customers from South America).

4.1.2.4 Medicines to kill pain

Research results concerning the keyword 'pain killers' did not produce any relevant results, or any results at all, when searched in Italian, German and French. On the contrary, one relevant photo has been retrieved with the English keyword, even if posted more than one year ago (i.e. August 2017). It portrayed a pill of Percocet and displayed on the text a telephone number and a 'Wickr Me' contact (a private messaging system) to be used for ordering prescriptions pain killers (Fig. 29). The linked profile was not very active since it published posts quite rarely: the last one was a picture advertising Xanax in January 2018.

Fig. 29 – Example of a result associated to the illegal online trade of medicines. Facebook. Category 'photos'. Keyword: pain killers



Source: author's research results on Facebook

Relevant results have been found in the category 'photos' by using the Spanish keyword since four out of the ten analysed were about the illegal online trade of medicines. All advertisements were very similar among each other since they were all posted by 'normal' profiles in C2C Facebook marketing pages targeting South-Central Americans (for an example, Fig. 30). As in the case of steroids, these results disclosed the presence of people making up their wages by selling ITMs at a local level via virtual channels. It must be noted that research activities also found another two suspicious profiles, but they have both been inactive since 2016 and contained no relevant contents.

Fig. 30 – Example of a result associated to the illegal online trade of medicines. Facebook. Category 'photos'. Keyword (in Spanish): *analgésicos*



Source: author's research results on Facebook

Furthermore, most of the time keyword searches for OxyContin, OxyCodone, Percocet and Vicodin did not produce any results. To conclude, results concerning medicines to kill pain on Facebook can be summarised as follows:

- *Extent of Facebook usage in the illegal online trade of medicines to kill pain.* Very few contents related to the illegal online trade of painkillers were available on Facebook.
- *Ease in finding ITMs (medicines to kill pain) on Facebook.* The few relevant contents have been retrieved by using the general term 'painkillers' in Spanish and in English. Searches for specific pain killer names did not produce any results.
- *Visibility over time of ITMs-related contents (medicines to kill pain) on Facebook.* N.A. (no recent posts found).

- *Language of post on Facebook concerning ITMs (medicines to kill pain).* Analysed contents related to ITMs were available in Spanish (only one case in English).
- *Types of Facebook posts concerning ITMs (medicines to kill pain).* External URLs directing to illegal online pharmacies have never been found. In one case further contact between the buyer and seller was available via an online messaging application. While in the other cases contents were posted on C2C marketing pages (targeting customers from South America).

4.1.2.5 Psychoactive medicines (psychopharmaceuticals)

Research results concerning psychoactive substances on Facebook did not produce relevant results, or any results at all, by using either the general term psychopharmaceuticals (in English, Italian, German, Spanish and French) or the specific names of medicines (i.e. 'Adderall', 'Xanax', 'Prozac', 'Valium', and 'Ritalin').

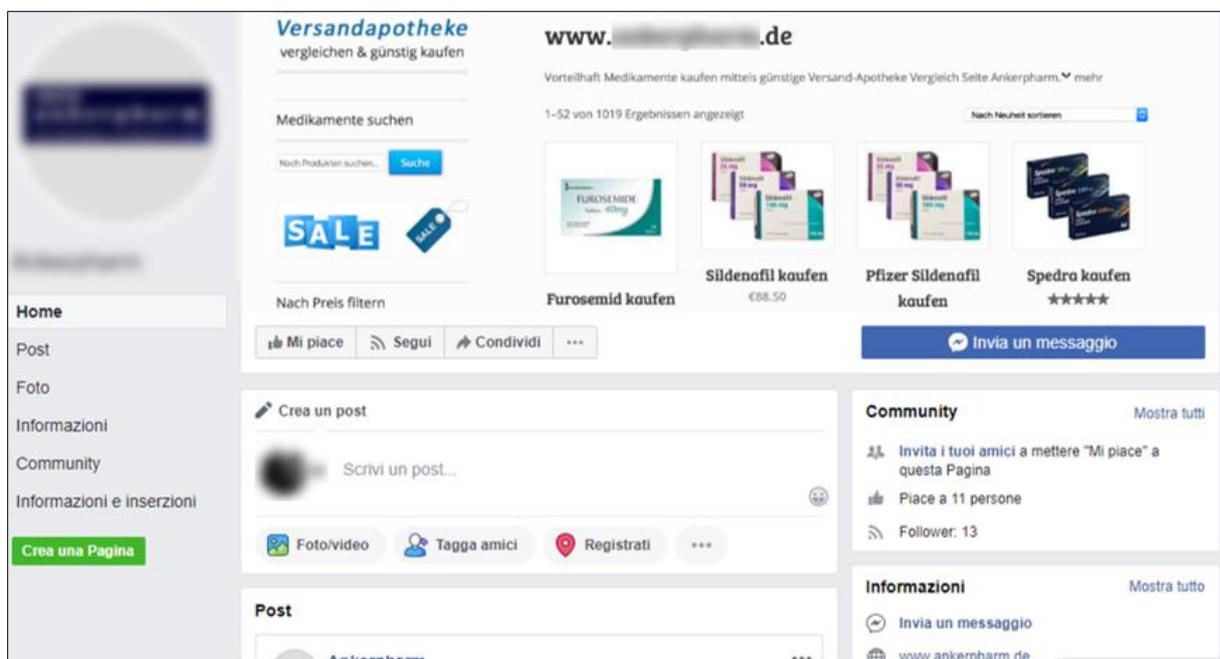
4.1.2.6 Medicines to sleep

Keyword searches on Facebook concerning the generic term 'sleeping pills' in Italian and Spanish did not produce any relevant results or any results at all. On the contrary, some of them has been found by using the same keyword translated in German, English and French.

The search with the German name '*schlafmittel*' led to a Facebook page (Fig. 31) promoting a website containing a search tool that compares the prices of pharmaceuticals (not only sleeping pills) sold in different illegal online pharmacies, identifying the one that sells the searched product at the lowest price and without prescription – i.e. a service similar to 'Skyscanner' for flights, or 'Booking.com' for

hotels. Nevertheless, the posts published by the page did not have anything to do with the linked website, as they seemed to be simple comments written by a ‘Swiss mother and pharmacist’, who has a blog aimed at informing people of the daily life of a pharmacist and of medical and pharmaceutical issues. There are no apparent links between the blog and the ITMs web service illustrated above. Said that, it is possible that the Facebook page used the contents as to appear more professional and trustworthy in the eyes of customers.

Fig. 31 – Example of a result associated to the illegal online trade of medicines. Facebook. Category ‘pages’. Keyword (in German): *schlafmittel*



Source: author's research results on Facebook

Research concerning the French term '*somnifères*' produced only one relevant result, i.e. a page with a cover image promoting pharmaceutical products against anxiety, depression and insomnia without prescription and publishing several posts advertising different ITMs, also with components and prices lists (Fig. 32). Furthermore, a

functioning link to an online pharmacy selling several products was displayed in the information as well as at the bottom of the promotional posts.

Fig. 32 – Example of a result associated to the illegal online trade of medicines. Facebook. Category 'posts'. Keyword (in Spanish): *somníferos*



Source: author's research results on Facebook

The English term 'sleeping pills' produced some results, in some cases only suspicious – such as photos and videos advertising products for human consumption with strange names – while other cases were clearly linked to the illegal online trade of medicine. For instance, one page was called 'Cheap Sleeping Pills' and published a high number of posts not aimed at 'providing advice' to overcome insomnia and other sleeping disorders: some of them posts promoted the use of specific medicines such as Zolpidem or Zopiclone. The page description presented a link to an illegal online pharmacy selling medicines like Zopiclone, Zolpidem, Diazepam, Alprazolam and Tramadol without prescription. Keyword searches lead to also another similar page,

promoting sleeping pills, pain killers and weight-loss medicines at low prices: however, it must be noted that both pages were banned by Facebook during the research.

As far as the specific name searches are concerned, 'Ambien' and 'Lunesta' did not produce relevant results or any results at all. Whereas, the keyword 'Zolpidem' produced two results among 'videos'. They both provided information about the characteristics and the use of Zolpidem (sleeping pill) and Pain-O-Soma (pain killer) and presented in the description was a link to an illegal online pharmacy where it was possible to buy the products. The videos were quite dated (2015) and the website link was not available anymore. The last promotional post regarding the sale of medicines published by the related Facebook page 'Modafinil' dates back to 2016, from that moment onwards the page has changed its function and now promotes electronics and SKY cards.

To conclude, results concerning medicines to sleep on Facebook can be summarised as follows:

- *Extent of Facebook usage in the illegal online trade of medicines to sleep.* Very few contents related to the illegal online trade of sleeping medicines were available on Facebook.
- *Ease in finding ITMs (medicines to sleep) on Facebook.* The few relevant contents have been retrieved by using the general term 'sleeping pills' in German, French, and English. Searches for other keywords did not produce relevant results or any results at all.
- *Visibility over time of ITMs-related contents (medicines to sleep) on Facebook.* More than 1/2 of the relevant results were removed by Facebook within one week.

- *Language of post on Facebook concerning ITMs (medicines to sleep).* Analysed contents related to ITMs were available in English, German, and French.
- *Types of Facebook posts concerning ITMs (medicines to sleep).* All contents related to the illegal online trade of sleeping pills displayed external URLs directing the user to illegal online pharmacies.

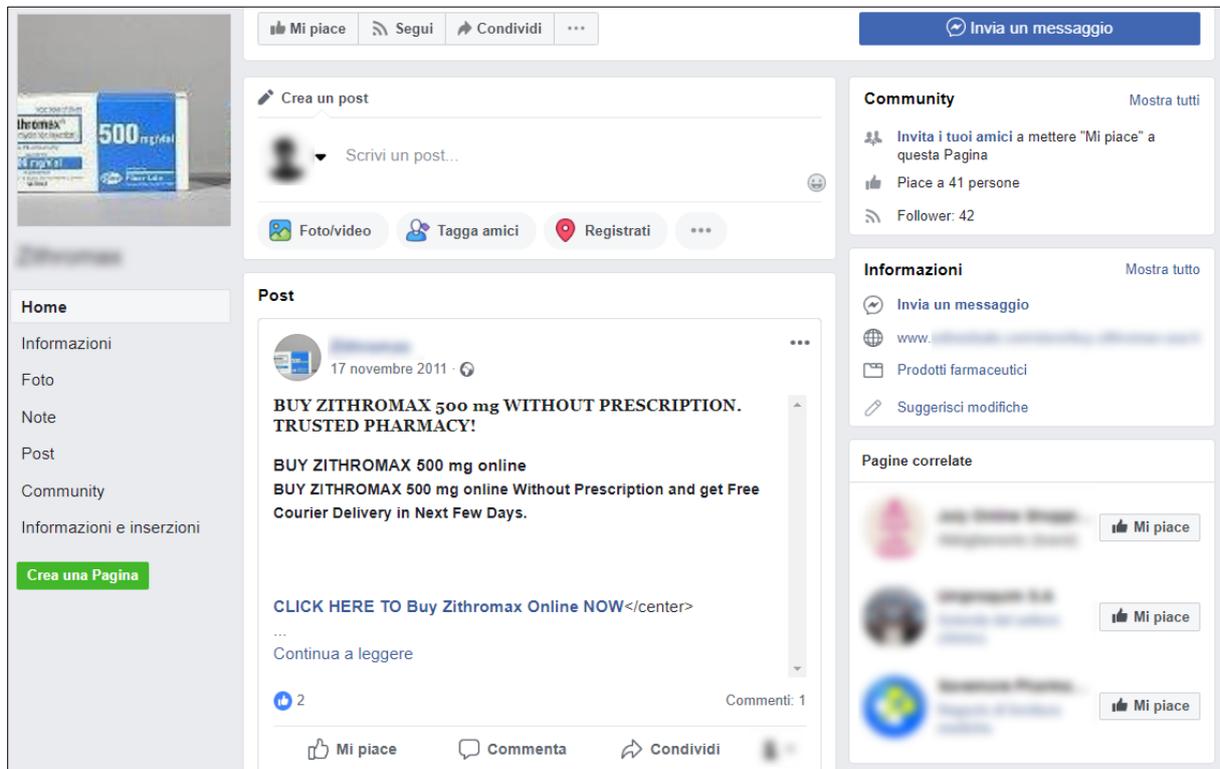
4.1.2.7 Antibiotics

Research results concerning antibiotics on Facebook did not produce any relevant results, by using the Italian and the German version of the keyword. At the same time, very limited results have been found by using terms in English – one suspicious page, with one like, only displaying very limited contents, i.e. some pictures of antibiotics packages, a telephone number and an email address – in Spanish – one post advertising several medicines on a C2C marketing Bolivian page –, and in French – one page in English with 127 likes advertising natural products to treat candida.

Few results have been found also by searching by the specific names Doxycycline, MacroBid, and Zithromax. In more detail, the term Doxycycline led only to a post advertising the medicine in a C2C marketing Vietnamese page, while MacroBid led to one post in a page publishing several posts per hour advertising ITMs but in a very limited number of days, linking to different threads in a Web forum – named as the page – displaying links to illegal online pharmacies. By analysing both the Facebook page and the Web forum they seemed to have nothing to do with the illegal online trade of medicines: thus, it is likely that they were both targeted by a hacking activity. At the same time, the keyword Zithromax led to three groups (two in English and one in Italian) advertising the product for sale (Fig. 33). Even if they had been inactive for years, the URLs contained in the posts and/or in the pages'

descriptions, in two cases, were still functioning. On the contrary, searches for Trimethoprim led to no relevant results.

Fig. 33 – Example of a result associated to the illegal online trade of medicines. Facebook. Category 'pages'. Keyword: Zithromax



Source: author's research results on Facebook

To conclude, results concerning antibiotics on Facebook can be summarised as follows:

- *Extent of Facebook usage in the illegal online trade of antibiotics.* Very few relevant contents related to the illegal online trade of antibiotics were available on Facebook.
- *Ease in finding ITMs (antibiotics) on Facebook.* The few relevant contents have been retrieved by using the general term 'antibiotics' in Spanish, and English, as well as the specific names of the medicines.

- *Visibility over time of ITMs-related contents (antibiotics) on Facebook.* N.A. (no recent posts found).
- *Language of post on Facebook concerning ITMs (antibiotics).* Analysed contents related to ITMs were available in English, Spanish, French and Vietnamese.
- *Types of Facebook posts concerning ITMs (antibiotics).* Contents related to the illegal online trade of antibiotics either displayed external URLs directing the user to illegal online pharmacies or were posted on C2C marketing pages.

4.1.2.8 Medicines to quit smoking

The research activities with the general term ‘quit smoking’ did not produce relevant results clearly connected to the illegal online trade of medicines, either in English or in the other languages. However, some findings regarded suspicious natural products and remedies against the smoking addiction.

The use of the term ‘Nicotinell’ led only to three irrelevant results. First of all, to a Japanese Facebook page, which apparently belongs to an existing drug store that sells generic health and cosmetic products of different famous brands, such as *Shiseido*. Another result retrieved by using the same term concerns a French Facebook page that sells beauty and generic health products linking to a homonymous website, which only sells non-prescription products. Even if there is no EU logo for online sale of medicines, the website does not show any sign of connection to the illicit online trade of medicines. The last result concerning this keyword was another Facebook profile called ‘Nicotinell’, which published just one post claiming that Nicotinell helps stop smoking. The post does not link to any external websites nor provide any phone number or e-mail address.

The keyword ‘Wellbutrin’ produced only two relevant results. The first was a Facebook post portraying a Wellbutrin package with a phone number with an Armenian country code to contact via WhatsApp or Viber (Fig. 34). The post was published by a page that advertised several prescription medicines and links to an illegal online pharmacy in Russian.

Fig. 34 – Example of a result associated to the illegal online trade of medicines. Facebook. Category ‘pages’ (post published by one of the relevant pages). Keyword: Wellbutrin



Source: author’s research results on Facebook

The second relevant result regarded a Facebook page named ‘Wellbutrin generic’, which presented posts and photos of Wellbutrin packages, and offers a brief description of the product and a link to an inaccessible website. The page’s activities were all concentrated between July and November 2016, since then no activity has been registered. No relevant results were found under the keyword “Zyban”.

To conclude, results concerning medicines to quit smoking on Facebook can be summarised as follows:

- *Extent of Facebook usage in the illegal online trade of medicines to quit smoking.* Medicines to quit smoking revealed to be very rarely available on Facebook.
- *Ease in finding ITMs (medicines to quit smoking) on Facebook.* The few contents clearly associated to the illegal online trade of medicines have been retrieved by using the term 'Wellbutrin'. Natural products were retrieved by using the general terms 'quit smoking' in the four languages analysed.
- *Visibility over time of ITMs-related contents (medicines to quit smoking) on Facebook.* N.A. (no 'recent' tweets found).
- *Language of post on Facebook concerning ITMs (medicines to quit smoking).* Analysed contents were available in English.
- *Types of Facebook posts concerning ITMs (medicines to quit smoking).* The few relevant contents displayed a telephone number (for further contacts via Viber or WhatsApp) or links to external websites.

4.1.2.9 Others

Facebook searches for the keyword 'Clomid' led to only one profile in Spanish: even if it was clearly linked to the illegal online trade of medicines, it was inactive since 2012 and did not display any external URL or contact information. Very few results, none of them clearly linked to the illegal online trade of medicines, were retrieved in the case of 'Disfluram'. On the contrary, keyword searches for 'Nolvadex' led to several findings in different languages, such as English, Arabic, and Italian. In all the cases, posts linked to active illegal online pharmacies. On the contrary, the keyword 'Sovaldi' led only to a

page advertising a non-functioning link to an illegal online pharmacy, while 'Havroni' to no relevant results.

To conclude, results concerning other medicines (i.e. products of therapeutic categories different from the ones previously analysed) on Facebook can be summarised as follows:

- *Extent of Facebook usage in the illegal online trade of other medicines.* Nolvadex largely available on Facebook, while all the others (Clomid, Disfluram, Sovaldi, and Havroni) not.
- *Ease in finding ITMs (other medicines) on Facebook.* Contents related to the illegal online trade of Nolvadex were easy to find by searching for the name of the medicines.
- *Visibility over time of ITMs-related contents (other medicines) on Facebook.* Relevant results remained active when searched after one week.
- *Language of post on Facebook concerning ITMs (other medicines).* Analysed contents were available in several languages, such as English, Arabic, and Italian.
- *Types of Facebook posts concerning ITMs (other medicines).* All relevant contents displayed links to illegal online pharmacies.

4.1.3 Instagram

4.1.3.1 Medicines for erectile dysfunctions

Research results on Instagram retrieved by using the keyword #erectileproblems (in English) provided irrelevant results concerning the illegal online trade of medicines, both in the popular and in the recent posts. Furthermore, the platform did not suggest any other related keyword. However, even if not useful for the purposes of this research, two results should be outlined. First of all, Instagram was heavily used as a promotional tool by a legally operating online pharmacy established in the United Kingdom⁴³: it posted lot of videos and pictures advertising free consultations for individuals with erectile problems. Second, the hashtag #erectiledysfunction was use together with other keywords linked to sexual-related disorders – such as #impotence, #erection, #treatment, #viagra, #etc. – to promote a US based company that provides financial services. This is probably a marketing strategy to boost the potential number of people visiting the advertisement.

By using other languages, results were only partially different. While the keyword searches in Italian, French, and German did not produce any relevant results neither among the popular nor the recent posts (both for the principal keyword and the two suggested), one finding was discovered by using the Spanish version. Indeed, one of the popular results analysed in the first keyword suggested by Instagram advertised the trade of 'Vasil', a medicine to treat erectile dysfunction containing Sildenafil, the same API of Viagra. The post was linked to a shop based in Venezuela that displayed, in the description of the page, a link to be used to send messages by using the desktop version of WhatsApp. Furthermore, both research results in German and in Spanish

⁴³ A detailed research on the UK national database confirmed that the online pharmacy was legally operating under the UK laws and regulations.

provide some instances of suspicious natural products, even if from an analysis of both the pages and the posts they did not seem to conceal ITMs advertised under misleading labels.

The searches for both #viagra and #cialis did not produce any results. However, relevant findings have been retrieved by using the alternative keyword suggested by the search bar of Instagram. In more detail, in the case of #cialis, the first suggested hashtag was #obatkuatcialis, composed by the words '*obat kuat cialis*' that in Indonesian means 'strong medicine Cialis'. In this case, two out of ten of the popular posts and 5 out of ten of the recent ones were clearly linked to the online trade of medicines (while two of the popular posts advertised suspicious natural products). All the posts were in Indonesian and were removed from the platform some days after they were published. It must be noted that some of the profiles publishing the posts were very popular among users with thousands of followers (from 1,000 to 263,000). Most of this profiles seemed to be run by very popular girls posting very frequently posts related to their everyday life. Among these, sometimes, some posts advertising erectile dysfunctions medicines would appear: it is unknown whether that this is due to hacking activities or to a marketing strategy of the seller consenting in some forms of collaboration with individuals owning popular profiles.⁴⁴ Usually these posts present pictures of the medicines and telephone numbers to use in ordered to obtain further information on the purchase (Fig. 35).

⁴⁴ As underlined by Hall, today in our society an individual is '*compelled to become active in the reconstruction of the self and the projection of the self's image to others as it faces growing pressure to improve its performance and image to make it more competitive and successful*' (Hall, 2019: 162). This way, the use of the so-called influencers (i.e. people with a huge number of followers) in the advertisement of ITMs can be interpreted as an effective marketing strategy used by offenders to push customers to purchase lifestyle products.

Fig. 35 – Example of a result associated to the illegal online trade of medicines. Instagram. Category 'popular' posts. Keyword: #obatkuatcialis



Source: author's research results on Instagram

The second suggested hashtag was #obatcialis, meaning (in Indonesian) 'medicine Cialis', and produced similar results. In the case of #viagra, the two related hashtags were #femaleviagra and #obatkuatviagra. Also, the profiles linked to these posts were very popular with thousands of users.

The same patterns were also observed with reference to the hashtag #levitra. The only difference is that the principal keyword was not disabled by the platform but produced two results concerning suspicious natural products and one result in Russian clearly linked to the illegal online trade of medicines: however, the latter was quite dated since published in 2015. The suggested hashtags in the case of Levitra were #levitraoriginal and #levitraasli (i.e. 'genuine Levitra' in Indonesian): in this case, more than half of the first ten results, both in the category popular and recent, were linked to

the illegal online trade of medicines for erectile dysfunctions. All the posts were in Indonesian.

Results were partially different in the case of Kamagra, since relevant results were produced by using both the principal hashtags (#kamagra), and the suggested keywords (#kamagraoraljelly and #kamagrajely). However, also in this case no results have been found in any of the languages widely spoken in America or in the European Union, they were all in Indonesian, Malaysian, and Turkish. Also, in this case, posts and linked profiles did not display any links to illegal online pharmacies but instead contact details to be used through WhatsApp and other online messaging systems.

To conclude, results concerning erectile dysfunction medicines on Instagram can be summarised as follows:

- *Extent of Instagram usage in the illegal online trade of erectile dysfunction medicines.* Contents related to the illegal online trade of erectile dysfunction medicines in western languages are almost non-existent on Instagram. On the contrary, ITMs-related contents are largely available in other languages.
- *Ease in finding ITMs (erectile dysfunction) on Instagram.* Contents related the illegal trade of medicines were easy to find by searching for the name of the products. It must be noted that alternative hashtags suggested by Instagram when searching for specific medicine names produced several results linked to the illegal online trade of medicines, but always in Indonesian (and Turkish in the case of Kamagra).
- *Visibility over time of ITMs-related contents (erectile dysfunction) on Instagram.* Posts concerning the illegal online trade of medicines were usually removed by the platform a few days after they were posted.

- *Language of post on Instagram concerning ITMs (erectile dysfunction).* Contents related to the illegal online trade of medicines were available in different languages, but predominantly in Indonesian.
- *Types of Instagram posts concerning ITMs (erectile dysfunction).* Profiles posting pictures related to the illegal online trade of medicines were in some cases specifically created for the online trade of ITMs, while in other cases belonging to very popular girls with thousands of followers. In almost all the cases, posts concerning the illegal online trade of medicines did not display any link pointing to illegal online pharmacies but, in order to complete the purchase, direct contact with the seller was needed through online messaging services.

4.1.3.2 Medicines to lose weight

Research results concerning the hashtag #weightloss and the first two suggested hashtags on Instagram, in all the languages analysed, led to a large number of posts advertising the online trade of natural products. Even if some of them may be considered as suspicious, it was not possible to determine whether they conceal ITMs under a fake label or not.

Four out of ten of the popular results obtained by using the keyword #dinitrophenol were posts with pictures of the product and texts exalting its efficacy in burning fat. They were all in English, certainly linked to illegal online trade of DNP, but dated (2016-2017). One of this reported also the price of the product (Fig. 36).

Fig. 36 – Example of a result associated to the illegal online trade of medicines. Instagram. Category 'popular' posts. Keyword: #dinitrophenol



Source: author's research results on Instagram

Three out of four were posted by profiles about gym activities, highlighting how popular this dangerous product is among body builders, especially considering that one of these profiles was quite popular, with more than 500 followers. All of these displayed external web links, either in the comments, in the text of the post, or in the description of the linked profiles: two were functioning and directed to websites to purchase several ITMs for body building, such anabolic steroids. In another case DNP was advertised as a product for plant care. However, the linked profile advertised the sale of 'capsules': probably this was a strategy used by the seller trying to conceal the real nature of the product. In this post, an email address to receive more information on the purchases was displayed in the description text of the profile. Also, in the search category 'recent posts' three relevant results were found, two in Russian and one in Turkish. In the case of #dinitrophenol, no other related hashtags were suggested by Instagram.

Search results for #orlistat produced some relevant results, certainly linked to the illegal online trade of medicines. However, they were all in Turkish and Arabic. In this

case, the first suggested hashtag was #orlistatdiary. In the category 'popular' posts, four similar contents were retrieved: they were all in English and posted about positive experiences of women losing weight by using this medicine. This has been considered as a potential strategy used by sellers in order to promote their product: indeed, in one case the linked profiles displayed on the description external web links to purchase the product, even if it was not functioning during the research. On the contrary, in the category 'recent' posts, three pictures clearly advertised the online trade of prescription weight loss medicines such as Aslene (Fig. 37), Xenical and Slimox. They were all posted by a very popular Korean profile that published posts in English advertising a large number of products for cosmetics and weight loss. The description of the profile presented a WhatsApp number to be contacted for further information.

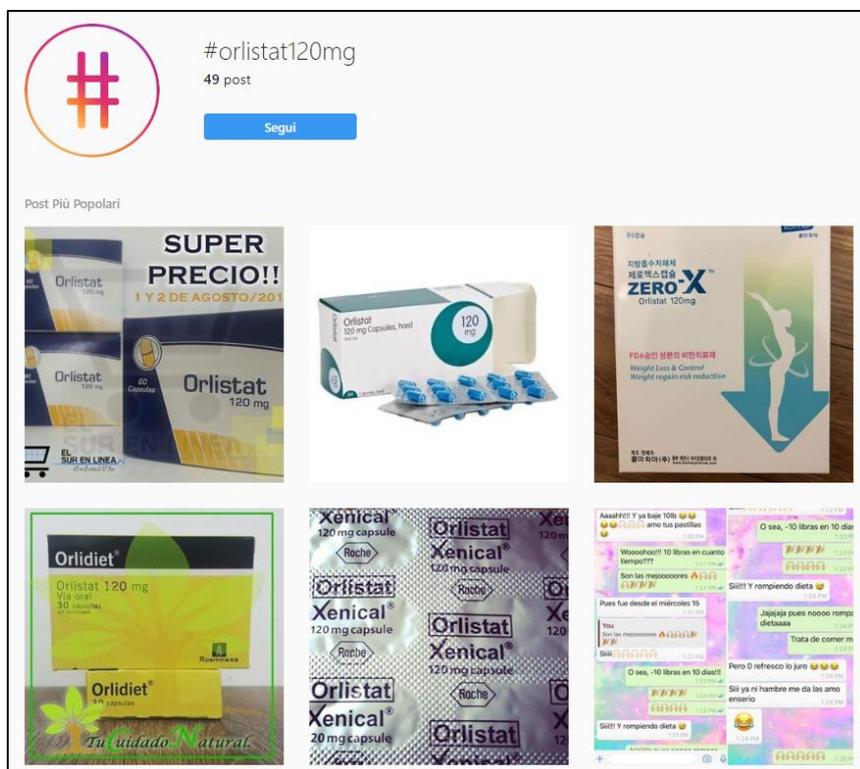
Several instances of prescription medicines were found by using the second suggested hashtag, i.e. #orlistat120mg. Indeed, all the twenty results analysed were directly linked to the illegal online trade of pharmaceuticals (Fig. 38). They were either in Spanish or in English and displayed numbers to be contacted via WhatsApp to complete the transfer. All the linked posts were quite popular, with around 100-500 followers (in one case more than 1,500). They all displayed telephone numbers to be contacted via WhatsApp, in some cases together with external web links. Very similar results have also been found in the case of the hashtag #xenical and the two related searches, i.e. #xenicalmurah and #xenical120g.

Fig. 37 – Example of a result associated to the illegal online trade of medicines. Instagram. Category 'recent' posts. Keyword: #orlistatdiary



Source: author's research results on Instagram

Fig. 38 – Results associated to the illegal online trade of medicines. Instagram. Category 'popular' posts. Keyword: #orlistat120mg



Source: author's research results on Instagram

To conclude, results concerning medicines to lose weight on Instagram can be summarised as follows:

- *Extent of Instagram usage in the illegal online trade of medicines to lose weight.* Posts concerning both ITMs to lose weight and suspicious natural products were largely available on Instagram.
- *Ease in finding ITMs (medicines to lose weight) on Instagram.* Contents related the illegal trade of medicines to lose weight were easily retrievable by using all the analysed hashtags. In more detail, keyword searches for the general hashtag #weightloss and the first two suggested keywords in all the analysed languages produced several results related to the advertisements of natural products, some of them more than suspicious. At the same time, the use of the hashtags #dinitrophenol, #orlistat, #xenical, and especially of the suggested hashtags by Instagram, led to a large number of posts advertising the illegal online trade of weight loss medicines.
- *Visibility over time of ITMs-related contents (medicines to lose weight) on Instagram.* Posts concerning the illegal online trade of medicines were usually not removed by the platform within one week.
- *Language of post on Instagram concerning ITMs (medicines to lose weight).* Most of the posts were in English (to a lesser extent in Spanish, Arab and Turkish).
- *Types of Instagram posts concerning ITMs (medicines to lose weight).* Relevant posts displayed telephone numbers to be contacted via WhatsApp for further details (sometimes together with external web links, not always functioning), and presented pictures of the product traded.

4.1.3.3 Medicines to enhance muscles

Research results concerning medicines to enhance muscles on Instagram did not produce relevant results, or any results at all, by using either the general hashtag #steroids or the two suggested related hashtags in English, French and German. The only exception is a post advertising suspicious 'natural products resembling the effects of anabolic steroids' found in the 'recent' posts connected to the keyword #onsteroids: however, there was no evidence that the profile linked to the illegal online trade of medicines.

More relevant results were found by using the first suggested alternative hashtag in Spanish, i.e. #esteroidesanabolicos. Indeed, three out of the ten among the 'popular' posts and five out of ten of the 'recent' ones were considered linked to ITMs. In particular, one post advertised (in Portuguese) a substance called 'Combo-Med' that contained nandrolone decanoate and testosterone cypionate (Fig. 39). The linked profile presented other posts containing pictures of injectable steroids for trade. For more information, private messages with the profile owner were needed. All the other posts retrieved by using the hashtag were about 'suspicious' substances for body building, even if it was not possible to determine whether they were ITMs or not. It must be noted that all those posts and profiles targeted potential buyers located in Central-South America and that profile descriptions always provide details for further contact on WhatsApp: one profile also displayed a functioning web link directing to an online shop selling several sport performance enhancer products.

Fig. 39 – Example of a result associated to the illegal online trade of medicines. Instagram. Category 'popular' posts. Keyword (in Spanish): #esteroidesanabolicos



Source: author's research results on Instagram

By using the hashtag #steroidi (Italian) several posts clearly associated to the illegal online trade of steroids were found, all connected to an Instagram profile presenting the following description: 'The prophets have arrived! Stop scammers! Here only quality products and above all at fair prices! Do not follow guys who are not interested in your health, we are here just in case! we recommend and provide our experience'.⁴⁵ This description was accompanied by a link and when clicked on it was possible to join a dedicated group chat on Telegram with 34 members. Posts on the profile contained images of the products traded, examples of shipments ready to be delivered, or excerpt of Telegram chats in which customers thanked the sellers once the products had

⁴⁵ Original text in Italian: 'I profeti sono arrivati! Basta truffatori! Qui solo prodotti di qualità e soprattutto a prezzi onesti! Non seguire tizi a cui non interessa della tua salute, noi siamo qui per ogni evenienza! Consigliamo e mettiamo a disposizione la nostra esperienza'.

reached their destination (Fig. 40). However, it must be noted that both the profile and all the related posts were removed from Instagram a few days after they were created. However, the Telegram group is still up and running.

The hashtag #durabolin led to only one result concerning a picture posted by a personal trainer talking about his experience in assuming nandrolone deconate, but no posts linked to the trade of ITMs were retrieved, also searching for the first two alternative hashtags suggested by Instagram. On the contrary, the keyword search for #nandrolone (principal keyword) #nandrolonedecanoate, and #nandrolonephenylpropionate (the two others indicated by the social media) revealed a large number of posts advertising steroids for trade without a prescription, i.e. twelve out of sixty, either in Turkish or in English. However, it must be noted that, once analysed, posted only some hours before, they were all removed by Instagram very shortly. Similar results have been found also for the keyword #dianabol.

Fig. 40 – Example of a result associated to the illegal online trade of medicines. Instagram. Category 'popular' posts. Keyword (in Italian): #steroidi



Source: author's research results on Instagram

Some relevant results have also been found by searching for #anadrol and the two suggested hashtags, i.e. #anadrole and #anadrol50. Six results retrieved with the first keyword (all in English) were connected to the illegal online trade of medicines. One was found in the category 'popular' posts: it displayed a picture of the product, a text containing information such as features, dosage and price, and the description of the linked profile containing a link to an operating illegal online pharmacy selling several anabolic steroids (Fig. 41).

Fig. 41 – Example of a result associated to the illegal online trade of medicines. Instagram. Category ‘popular’ posts. Keyword: #anadrol



Source: author's research results on Instagram

The others were found in the category ‘recent’: however, most of them were shortly removed by Instagram. They were published by two profiles, all asking for further contact via email to make arrangements on the purchases. The first suggested keyword (#anadrole) led to seventeen out of twenty results potentially connected to ITMs. They were all in Portuguese and published by a Brazilian profile linked to a website selling several suspicious natural products for body building. Also, in the case of #anadrol50, several results (eleven out of 20) were connected to advertisements of products for sale: seven of them were in English and published by a profile based in the United States selling several ‘supplements’ for body builders. However, by analysing the substances advertised on the website it was not clear whether they were ITMs or real ‘natural supplements’. The other four were in Thai and published by a profile displaying a telephone number to be contacted via the messaging service Line.

To conclude, results concerning medicines to enhance muscles on Instagram can be summarised as follows:

- *Extent of Instagram usage in the illegal online trade of medicines to enhance muscles.* Posts concerning both ITMs to enhance muscles and suspicious natural products were largely available on Instagram.
- *Ease in finding ITMs (medicines to enhance muscles) on Instagram.* It was quite easy to find contents promoting steroids or other muscle enhancement substances. Indeed, several results have been found by using the hashtag #steroids (and/or the ones suggested by Instagram) in Spanish and in Italian, and the hashtags related to specific names of substances. At the same time keyword searches for #steroids – and the firsts two keywords suggested by Instagram – in English, German, and French did not lead to relevant results.
- *Visibility over time of ITMs-related contents (medicines to enhance muscles) on Instagram.* Almost all posts clearly linked to the illegal online trade of prescription steroids are quickly removed by Instagram, including the linked profiles.
- *Language of post on Instagram concerning ITMs (medicines to enhance muscles).* Posts were written in several languages, such as in English, Italian, Spanish, Turkish, and Portuguese.
- *Types of Instagram posts concerning ITMs (medicines to lose weight).* Relevant posts displayed telephone numbers to be contacted via WhatsApp or Telegram, and (to a lesser extent) web links to external websites.

4.1.3.4 Medicines to kill pain

Research results concerning pain killers on Instagram did not produce relevant results, or any results at all, by using either the general hashtag #psychopharmaceuticals (in English, Italian, German, Spanish and French) or the specific names of medicines (i.e. OxyContin, OxyCodone, Percocet and Vicodin).

4.1.3.5 Psychoactive medicines (Psychopharmaceuticals)

Research results concerning psychoactive substances on Instagram did not produce relevant results, or any results at all, by using either the general hashtag #psychopharmaceuticals (in English, Italian, German, Spanish and French) or the specific names of medicines (i.e. 'Adderall', 'Xanax', 'Prozac', 'Valium', and 'Ritalin'). The only exception consisted in a recent post retrieved by searching for the keyword suggested alternative of #xanax, i.e. #fuckxanax. However, it was available just for a few hours and then removed from the platform.

4.1.3.6 Medicines to sleep

Almost no results concerning the illegal online trade of sleeping pills have been found on Instagram. Keyword searches concerning the generic hashtag #sleepingpills and the first two suggested hashtags on Instagram did not produce relevant results or any results at all, when the research was carried out in English, German, French and Spanish. The Italian versions of the hashtags led to some posts from a suspicious profile linked to a Polish website promoting natural supplements for several purposes, such as acne, pills against snoring, male enhancement products, thyroid-support pills, etc. However, from analysis of both the website and the profile it was not possible to clarify whether the products sold were ITMs concealed under a fake label or real natural

supplements. At the same time, searches for #ambien, #lunesta and #zolpidem, as well as the alternative keywords suggested by Instagram, did not produce relevant results or did not produce any results at all.

4.1.3.7 Antibiotics

Research results on Instagram did not produce any relevant results, or any results at all, by using either the general hashtag #antibiotics (in English, Italian, German, Spanish and French,) or the alternative hashtags suggested by the social media. Very few findings were also retrieved by searches for the names of medicines. The keyword #zithromax led only to one post advertising the pharmaceutical in Arabic, while #doxycycline to two results, both in Malaysian and published by the same profile (Fig. 42). All the other hashtags used, including #macrobid and #trimethoprim, did not reveal any posts related to the illegal online trade of medicines.

Fig. 42 – Example of a result associated to the illegal online trade of medicines. Instagram. Category 'popular' posts. Keyword: #doxycycline



Source: author's research results on Instagram

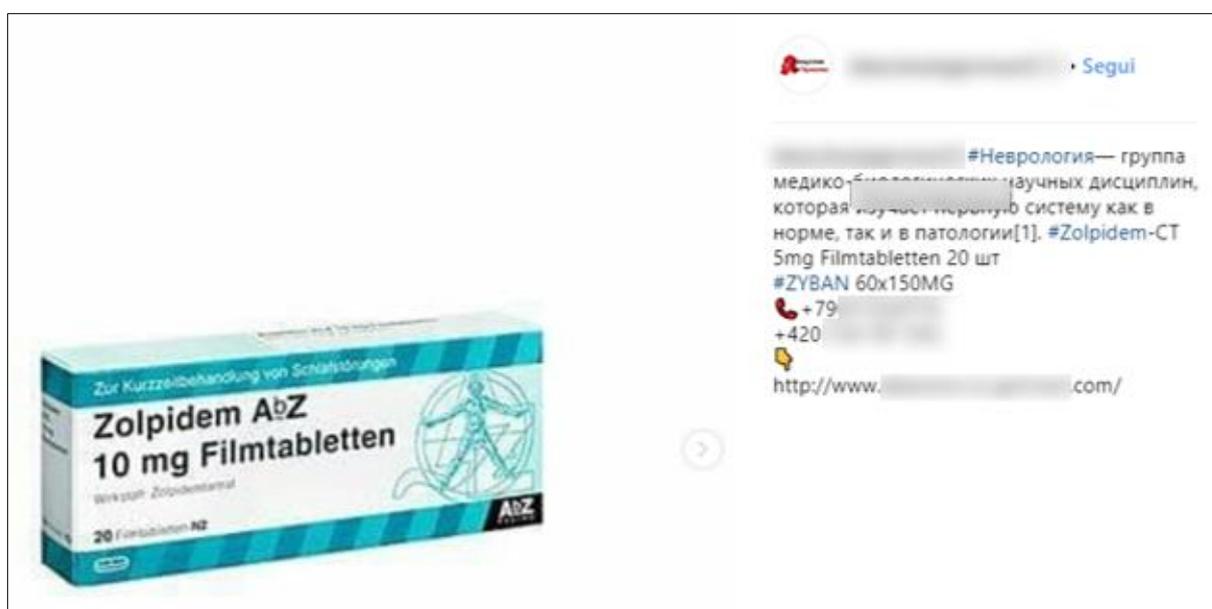
4.1.3.8 Medicines to quit smoking

The research carried out on Instagram using the general hashtag #quitsmoking, both when used in English and when translated in the other languages, did not produce relevant results or did not produce any results at all.

The medicine-focused research regarding the hashtag #nicotinell led to just one possibly relevant result, which arose by searching relevant posts under the second hashtag suggested by Instagram, i.e. #nicotinellinspires. The post I identified promotes the use of this medicine as a helpful tool for stopping smoking and invites users to buy the product on an online pharmacy. However, the connected Instagram profile advertises only over-the-counter health and beauty medicines and the displayed external link directed to a website 'under construction'. Searches for #wellbutrin and the related hashtags did not produce relevant results.

On the contrary, the hashtag #zyban led to an interesting post in Russian promoting Zolpidem and Zyban and providing both a functioning link to an illegal online pharmacy and two phone numbers (one Russian and one Czechs) for further contact (Fig. 43). The connected Instagram profile promoted both over-the-counter medicines and prescription medicines, as the related illegal online pharmacy – which, for instance, also advertised the sale of Cialis without a prescription.

Fig. 43 – Example of a result associated to the illegal online trade of medicines. Instagram. Category 'popular' posts. Keyword: #zyban



Source: author's research results on Facebook

To conclude, results concerning medicines to quit smoking on Instagram can be summarised as follows:

- *Extent of Instagram usage in the illegal online trade of medicines to quit smoking.* Posts concerning ITMs to quit smoking were almost non-existent on Instagram.
- *Ease in finding ITMs (medicines to enhance muscles) on Instagram.* It is not easy to find posts related to ITMs in this category. The only result clearly

associated to the illegal online trade of medicines was found by searching for the hashtag #zyban.

- *Visibility over time of ITMs-related contents (medicines to enhance muscles) on Instagram.* The post was removed after few days.
- *Language of post on Instagram concerning ITMs (medicines to enhance muscles).* The only relevant post was in Russian.
- *Types of Instagram posts concerning ITMs (medicines to lose weight).* The only relevant post presented a link to an illegal online pharmacy selling numerous ITMs.

4.1.3.9 Others

Research results on Instagram did not produce any relevant results for the keywords #clomid, #sovaldi, #havroni, and #disfluram, or for the suggested hashtags: furthermore, in the case of #clomid, no alternative hashtags were presented by the social media.

On the contrary, by using the hashtag #nolvadex some results were found. All the posts (or the linked profiles) presented telephone numbers for further WhatsApp contact, or direct links to the desktop version of the messaging system. All the found advertisements promoted the medicine as a way to contrast possible side effects linked to the assumption of steroids, and not for its intended use, i.e. to treat breast cancer.

4.2 Horizontal analysis

4.2.1 Extent of the social media usage in the illegal online trade of medicines

Research results highlighted that today social media still represents a virtual channel used largely by offenders to trade medicines as several posts concerning ITMs are easily accessible by potential customers.

However, some distinctions should be made. The extent of the presence of ITMs varies depending on the social media taken into consideration. Posts, profiles, and photos linked to the illegal online trade of medicines are largely available on Twitter. By searching for the name of specific medicines and/or general terms referring to the therapeutic categories, it is quite easy to find contents promoting the sale of medicines without a prescription. This is particularly true in case of erectile dysfunction products, weight loss medicines, and steroids: however, even if to a lesser extent, advertisements of ITMs have also been found in the other therapeutic categories analysed in the present research. The only exceptions are pain killers and psychopharmaceuticals: in the latter case, the only result concerned a profile selling Xanax and other products for recreational purposes at a local level in the United States.

Also, on Facebook the presence of contents advertising ITMs for sale depends on the specific therapeutic category and on the specific product. In more detail, advertisements of erectile dysfunction medicines for sale without a prescription were very rarely accessible to customers. Some keywords, such as 'Viagra' or 'Cialis', seems to be completely blocked by the social media and the use of these terms in the search bar of the platform usually led to no results at all. However, this type of pharmaceutical presents an important exception, i.e. Kamagra: indeed, this unauthorised medicinal product is largely advertised and traded through Facebook. Several contents related to ITMs are present also in the case of weight loss medicine,

steroids, and (to a lesser extent) sleeping pills. On the contrary, the illegal online trade of pain killers, antibiotics, and other pharmaceutical products seems to be very limited on the platform, while contents related to the sale of psychopharmaceuticals have been completely blocked and/or removed.

Research activities on Instagram revealed how on this platform illicit advertisements of prescription medicines are present for certain products while not for others. Indeed, Kamagra, weight loss medicines, and steroids are largely advertised by illegal sellers, while promotions of other pharmaceutical products are blocked, at least in the languages spoken in Western countries. However, it must be noted that most of the posts related to ITMs are usually removed by the platform in a few days.

Furthermore, for several therapeutic categories and in all the three social media analysed, research activities highlighted a large number of advertisements concerning 'natural products', 'herbal remedies', and 'food supplements'. Such products are purchased by a large share of customers because they are perceived as valid alternatives to traditional medicine. They are presumed to be effective, with no side effects, more accessible and less expensive and safe if compared to prescription medicines sold by the (*greedy*) pharmaceutical companies (Lavorigna and Di Ronco, 2018, 2017; Mullaicharam, 2011).

Natural products are not illegal *per se* but should be considered suspicious since they may cause serious harm to patients. Firstly, even if in some cases herbal remedies can be beneficial, some of them are fraudulent, leading to possible serious repercussions on health (Lavorigna and Di Ronco, 2018, 2017). Such an issue is also enhanced by an altered self-representation of online communities supporting complementary and/or alternative medicines (Lavorigna and Di Ronco, 2017), as well as by confusing media representations of such products which are unable to

adequately inform the general public on the distinctions among benign and fraudulent products (Lavorgna and Di Ronco, 2018).

Secondly, some studies highlighted that 'natural' products may contain strong active ingredients, hence they should be considered as ITMs commercialised under a 'fake' label (Antonopoulos and Hall, 2016; Foroughi et al., 2017; Gaudiano et al., 2016). Research results provided evidence on the use of this marketing strategy by offenders. For instance, a post was found on Facebook advertising a supposed-to-be 100% natural supplement to lose weight, linking to a website to order the item; however, the webpage was an illegal online pharmacy selling a large variety of prescription medicines.

The advertisement of ITMs under the false label of herbal remedies can be considered as a technique used by criminal entrepreneurs to avoid the control of social media platforms and to make investigations by law enforcement authorities more difficult. Natural products are not included in the same marketing regulation of medicines in most of the countries (e.g. Gaudiano et al., 2016). At the same time, test purchases, and costly and time consuming laboratory analysis are needed in order to confirm the composition of the product (e.g. Foroughi et al., 2017) . Hence, it is simply not possible to have a clear picture on the share of this issue, this should be considered as one of the major future challenges in the fight against the illegal online trade of medicines, especially on social networking sites.

4.2.2 Ease of finding ITMs on social media

Before the implementation of the SCP measures, to find social media posts advertising ITMs on social networking websites it was sufficient to search for the name of the wanted medicinal product on the search tool provided by the platform. Research results highlighted that today it varies depending both on the social media and on the therapeutic category.

As for erectile dysfunctions, searching for Viagra, Cialis, Levitra and Kamagra led to several Twitter results connected to the illegal online trade of medicines. On Facebook (and to a lesser extent on Instagram) contents related to Viagra, Cialis and are very rare (especially in the languages spoken in Europe and America). On the contrary, promotions of Kamagra are widespread in all social media and easily retrievable by searching for the medicine name. These results seem to suggest that in this case the SCP measures introduced by each platform are probably focused on the protection in Western countries of IPRs of legitimate medicines' brands owners.

Furthermore, keyword searches for the name of specific medicinal products leads to relevant results in the case of weight loss medicines and pharmaceuticals used by bodybuilders – not only steroids, but also other medicines used to counter side effects of steroids, especially on Twitter – while to fewer or no findings at all in the other cases (Tab. 4).

The research was also aimed at assessing the ease of finding ITMs related content by using more general terms – in English, Italian, Spanish, German, and French – associated to the specific therapeutic category of the medicines taken into consideration, i.e. 'erectile problems', 'weight loss', 'steroids', 'pain killers', 'psychopharmaceuticals', 'sleeping pills', 'antibiotics', and 'quit smoking'. It emerged that in this case contents clearly related to the illegal online on medicines were retrievable

with only a few keywords, the only exception being sleeping pills on Twitter and steroids on Twitter and Facebook (Tab. 4). As by using these keywords it was easy to find several promotions of suspicious herbal remedies.

4.2.3 Visibility over time of ITMs-related contents on social media

Before the implementation of SCP measures, social media posts and other contents related to ITMs remained active for a long time once published (e.g. Mackey and Liang, 2013). Results highlighted that the percentage of removed contents was different for each social media, i.e. 18% for Twitter, 25% for Facebook, and 58% for Instagram - on this platform most of the posts that were still available were in Indonesian. However, results of the analysis should be considered as no more than an exploratory test and must not be used to prove the accuracy of the SCP systems introduced by social media. It probably depends on different variables, such as language, characteristics of the post, and therapeutic category. At the same time, several Facebook pages and groups potentially linked to the illegal trade of medicines were online but inactive – i.e. presenting very little content or no content at all –, suggesting the removal of ITMs related content by the platform. The same happened in case of Twitter profiles.

Said that, it is possible only to conclude that the measures implemented by the platforms are capable of removing only a share of the contents linked to the illegal online trade of medicines, this also varies depending on the specific social media platform taken into consideration.

Tab. 4 – Amount of results associated to the illegal online trade of medicines by type of keyword used, social media, and therapeutic category. August-September 2018

Therapeutic category	Keyword	Twitter	Facebook	Instagram
Erectile dysfunctions	General terms	Few results [but some suspicious natural products]	Few results	No results
	Medicines' Names	Several results	Few results [several for Kamagra]	Several results [especially for Kamagra]
Weight loss	General terms	Few results [but several suspicious natural products]	No results [but several suspicious natural products ¹]	No results [but several suspicious natural products ¹]
	Medicines' Names	Several results	Several results	Several results
Steroids	General terms	Several results	Several results	No results [but for one Spanish alternative keyword]
	Medicines' Names	Several results	Several results	Several results
Pain killers	General terms	Few results	Few results [very limited]	No results
	Medicines' Names	Few results	No results	No results
Psychopharmaceuticals	General terms	No results	No results	No results
	Medicines' Names	No results [but one profile]	No results	No results
Sleeping pills	General terms	Several results	Few results	No results
	Medicines' Names	No results	No results	No results
Antibiotics	General terms	No results	Few results [very limited]	No results
	Medicines' Names	Few results [Zithromax only]	Few results [very limited]	Few results [very limited]
Quit smoking	General terms	No results	No results [but some suspicious natural products]	No results
	Medicines' Names	Few results [very limited]	Few results [Wellbutrin only]	No results [but one case for Zyban]
Others	General terms	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>
	Medicines' Names	Several results [no results for Havroni and Sovaldi]	No results [but several for Nolvadex]	No results [but some for Nolvadex]

Source: elaboration of the author on research results

4.2.4 Types of ITMs advertised and sold in social media

Prior to the implementation of the SCP measures, the ITMs most present in social media for sale were lifestyle medicines, and this is confirmed by the results of the research. Thus, the intervention introduced by the platforms seems not to have had an impact on this aspect of the online illegal trade of medicines. This is not surprising since, as illustrated in Section 1.2.2, the most popular ITMs are those higher in demand, especially when customers do not want or cannot purchase them by using the legal supply chain. However, this consideration is also applicable to lifesaving medicines, such as Havroni e Sovaldi, two expensive pharmaceuticals to treat Hepatitis C that are not easily purchasable by the patients, especially in certain Western countries. Indeed, several illegal online pharmacies have started, in the last three years, to sell illegal versions of these products at affordable prices. That said, it can be assumed that offenders have also started to exploit the marketing potential of social media to advertise products for Hepatitis C. However, the search for these products on social media led to ITMs related results. While on Twitter and Facebook the research activities did not lead to any relevant results, on Instagram the platform displayed the following phrase after the search: 'the most popular posts of #havroni are currently hidden because the community has reported some content that may not comply with the guidelines of the Instagram community'. Generally, ITMs most present on social media were the following:

- medicines for erectile dysfunction, especially Kamagra. Offenders are focusing on this particular product more than on others because they are exploiting an opportunity generated by vulnerabilities of the existing legislations and definitions. Indeed, Kamagra is a generic product with sildenafil citrate, a strong active ingredient also contained in the branded medicine Viagra, while legally

produced and traded in India, does not have the authorisation to be sold in other countries. However, usually this product is not sold with the misrepresentation of its 'identity', 'source', or 'history' and for this reason cannot be considered as a 'falsified' or 'counterfeit' medicines.⁴⁶ This situation highlights the limitations of the definitions currently used in the illegal trade of medicines, as explained in the first Chapter, but more importantly creates opportunities that are exploited by criminal entrepreneurs involved in this traffic. For instance, Kamagra, since 'only' unlicensed medicine, is not included in the UK Misuse of Drugs Act, thus both sellers and buyers do not run the risk of being sanctioned for the criminal provisions (Hall et al., 2017).

- medicines to enhance bodybuilders performances. This category does not only include steroids (largely advertised in illegal markets, e.g. Antonopoulos and Hall, 2016; Di Nicola et al., 2015; Hall and Antonopoulos, 2016), but also several types of medicinal products that are used to counter the effects linked to steroids use and abuse. For instance, research results showed that social media profiles devoted to the illegal online trade of medicines among the bodybuilder subculture often include illegal advertisements of pharmaceuticals to contrast the increase of oestrogens determined by the assumption of steroids, such as medicines to treat breast cancer.
- medicines to lose weight, both for cosmetic reasons and as substances to burn fat in body building activities – with a particular reference to 2,4 dinitrophenol, also known with the acronym DNP.

⁴⁶ For further information, please see Section 1.1.2 of this dissertation.

4.2.5 Language of posts in social media concerning ITMs

Before the implementation of the SCP measures, social media contents concerning ITMs were available in a large number of languages, especially the ones spoken in Western countries. Research results highlighted that the majority of social media contents related to the illegal online trade of medicines are predominantly in English, but illegal advertisements of medicines were also written, to a lesser extent, in the other languages analysed in the present research, i.e. Italian, German, Spanish –especially targeting customers from the Central-South America – and French. Furthermore, on all platforms, several ITM-related idioms were available in other languages such as Thai, Turkish, Korean, Japanese, Serbo-Croatian, Malaysian and Indonesian.⁴⁷ Hence, the SCP measures seem to have not had an impact on this specific point, with only one exception. Indeed, the hashtag searches for erectile dysfunction medicines on Instagram led to a large amount of posts in Indonesian, while not in other languages, probably suggesting that the systems implemented by the platform are currently unable to spot and remove contents related to ITMs in that language.

Even if social media contents are not always available in a language that is spoken by a potential customer, linguistic barriers should not be overestimated. Indeed, most of the posts are self-explicative without understanding the text. First of all because they often present evocative pictures of either the medicine itself or images related to the use of the product, such as sexual acts or women in explicit poses in case of erectile dysfunction products, ‘before and after’ evidences in case of weight loss medicines, or muscular individuals in case of steroids. This way, it is very easy for

⁴⁷ It must be noted that some ITMs advertisements seems to target specific ethnical groups within some Western countries. This is the case, for instance, of some illegal promotions of pharmaceuticals in Turkish that promoted shipments in Germany.

the customers from all-over the globe to easily understand the object of the advertisement. Then, in case the post (or the linked profile) is promoting a link to an illegal online pharmacy, the virtual shop is usually available in several languages because of the use of automatic translations tools - even if with some spelling and grammar mistakes (Di Nicola et al., 2015a, 2015b; Hall et al., 2015). The same services can be easily used in the case of the other systems adopted by criminal entrepreneurs to finalise the purchase, i.e. further direct contacts by using online messaging systems and email addresses. The use of auto-translation applications in the facilitation of the communication across languages and cultures has already been observed by research in other criminal markets, such as trafficking in human beings (Fraser, 2016).

4.2.6 Types of social media posts concerning ITMs

Before the implementation of the SCP measures in social media, the content related to the promotion of ITMs contained either: a) telephone numbers and/or other contact details of the seller; b) contents promoting external links to illegal online pharmacies. Research results also highlighted that after the implementation of the interventions both methods are still used by offenders to contact potential buyers and to complete the purchases.

The specific strategy used by sellers seems to depend on both the therapeutic category of product and on the platform. Indeed, on Instagram the overwhelming majority of posts promoting the trade of ITMs – and/or the linked profiles - do not display any external URLs pointing to an illegal online pharmacy but instead display email addresses, telephone numbers or links directing the user to online messaging systems. The same was also found for Facebook contents concerning medicines for quitting smoking, pain killers, steroids, and erectile dysfunctions with the only exception

of Kamagara, since in this case the promotion of URLs directing to illegal online pharmacies was the most encountered pattern. Additionally, several times on Twitter contents has presented links to external illegal shops, but most of time in combination with other contact details displayed in the description of the linked profile. However, it is possible to state that today the number of social media contents presenting contact email addresses, telephone numbers, or links directing to online messaging systems⁴⁸ is increasing and posts and profiles advertising links to external illegal online pharmacies are frequently accompanied by other information used to communicate with the buyers.

This results can be interpreted in two different ways. On one hand, it may suggest the presence of a large number of individuals acting as final retailers having neither the technical nor the organisational skills to create and manage an online e-commerce website: they exploit the opportunity provided by the social media to advertise and to trade medicines illegally in a cheap and secure way. Second, this can also be used as a strategy for more organised groups in order to minimise the potential risks linked to the shutdown of their illegal online pharmacies or the removal of the posts on social media. Indeed, social media can be used as a temporary shop window to establish an initial contact with potential buyers: then, thanks to the use of online messaging services and email addresses, communications among the buyer and seller can be ensured in case contents are banned by the platform and/or the illegal eCommerce

⁴⁸ It must be noted that details displayed by the offenders are often constituted of telephone numbers to be contacted via online messaging systems that are rarely controllable by the law enforcement, such as WhatsApp, Viber, Talk, and Telegram. This scheme has been recently observed by the criminological literature on other types of illegal advertisements on social media platforms, such as in the case of the promotion of illegal transportation services by migrant smugglers (Di Nicola et al., 2019, 2017).

websites are closed down by relevant authorities. Probably, the result highlights a combination of the two and suggests a possible tactical displacement, put in place by offenders involved in the illegal online trade of medicines, to counter the SPC measures introduced by social media platforms.

Finally, it must be noted that on Facebook in some cases advertisements of ITMs have been found on C2C marketing pages targeting possible clients in South-Central America. They were posted by profiles of apparently normal individuals: this result seems to disclose the presence in that region of people making up their wages by selling limited quantities of products.

4.3 Overall impact assessment

Overall, research results have provided evidence supporting the hypothesis of the limited impact of the SCP measures, since they are spotting and removing only some contents concerning ITMs. The connections between potential buyers and unlawful sellers are then not completely blocked, and social media still represents a virtual channel to sell and to buy ITMs. At the same time, the features of the contents still accessible on social networking websites online are only partially different with respect to those existing before the implementation of the measures: they are still easily accessible by using some simple keywords, products advertised are still predominantly lifestyle medicines, posts are still available in different languages, and the strategies used to complete the purchase and/or to retrieve further information are still through the promotion of links to illegal online pharmacies and the deployment of personal contact details of the sellers, such as telephone numbers and email addresses – even with the exceptions and considerations illustrated above.

However, these results do not seem to be linked to the ineffectiveness of the SCP measures *tout court*, but rather to the fact that they are targeting some specific therapeutic categories and/or medicinal products more than others. First of all, research results clearly demonstrated that the interventions put in place by the three social media analysed determined a complete removal of contents linked to psychoactive medicines. In this case, all the mechanisms of crime reduction illustrated in Section 3.1 are fully operative, eliminating the opportunity for offenders to establish contacts online with potential buyers and *vice versa*, and disrupting – or at least reducing to a very significant extent – the illegal online market of those medicines in social media platforms. The focus on psychopharmaceuticals can be explained by the fact that most of the social media decided to introduce the analysed SCP interventions because of political and/or media pressures regarding the use of the platforms by offenders to trade very addictive prescription medicines used by consumers for recreational purposes. At the same time, the measures seem to be very effective in finding and removing contents linked to specific branded medicines, such as Viagra. In this case, the reasons may be linked to the legitimate aim to protect the IPRs of legal owners and producers.

Thus, research results highlight the asymmetrical applications of the SCP measures by social media, and their effectiveness when correctly and fully implemented. These discrepancies, however, are creating gaps and loopholes that can be exploited by offenders and are undermining their effectiveness in countering the illegal online trade of medicines even in the cases where they are performing well. For example, on Facebook, keyword searches for Viagra are successfully blocked by the platform however by searching for 'Kamagra' customers can be directed to contents illegally advertising different types of medicines for erectile dysfunctions, including

Viagra. At the same time, illegal online pharmacies advertised in social media contents linked to ITMs, are very rarely focused on specific products and often offer several prescription medicines for sale. For instance, consumers searching for medicines to lose weight, may reach a post presenting a functioning link to an illegal website which also supplies psychoactive medicines, pain killers, branded pharmaceuticals for erectile dysfunctions or to treat Hepatitis C, undermining the overall activities in countering the illegal sales of those products.

To conclude, the limited impact of the SCP measures introduced by social media, aimed at identifying and removing contents linked to ITMs, should lead to the conclusion that those measures do not constitute a good path to follow. On the contrary, their effectiveness concerning specific therapeutic categories and a medicines' brand highlights the fact that they can be a very valid instrument in the fight against the illegal online trade of medicines in cases where they are applied more broadly and systematically.

As illustrated in Chapter 2, the governance of social media concerning the prohibitions of online content is only rarely set by the law, while most of the time left to the internal regulations of the platforms, such as in the case of ITMs. However, as stressed by Yar (2018), this approach is demonstrating some limitations because of the providers' reluctance to effectively stem the flow of illegal and harmful contents on their platforms. In their own defence, social media point out that a comprehensive and rapid removal of unwilled contents is a very complex activity, and even by using a large number of analysts and machine learning automatic algorithms it presents several challenges, especially due to the number of contents continuously uploaded by users. For instance, on Facebook alone 350 million photos are uploaded every day, that corresponds to 14.58 million per hour or 4,000 per second (Omnicores, 2018). At the

same time, as pointed out by Duarte and colleagues (2018) in frequent cases automatic content identification and blocking systems generate a significant number of 'false positives', thus blocking and removing contents legitimately published by users respecting laws and community standards. This may generate a reputational damage and further costs for the social media.

That said, in some cases contents on social media are considered by the public as dangerous to the point that it requires the intervention of national and international decision makers, justifying legal provisions obliging social networking websites to strong efforts in the monitoring of their platforms with reference to certain illegal contents. This is the case, for instance, of contents linked to child pornography or to the diffusion of terrorist organisations' propaganda (Akdeniz, 2008; Gillespie, 2018; Yar, 2018). As the illegal online trade of medicines is representing a global issue directly impacting on both private and public health and posing very serious risks to Internet users safety⁴⁹, all the basis to foresee legal provisions enforcing a more symmetric and effective application by social media of SCP measures targeting ITMs related contents hosted in their platforms. Such an intervention is needed also because, as frequently outlined by researchers (for instance, Trottier, 2015, 2012; Yar, 2018), the capabilities and resources of law enforcement agencies and other institutions are usually not enough to cope with the scale and complexity of the online environment, determining a significant deficit in contrasting offenders exploiting the opportunities provided by new technologies with the use of the traditional public strategies. Thus, the collaboration of providers with specific SCP measures on their platforms tailored to contents promoting the illegal online trade of medicines should be

⁴⁹ For further information, please see Chapter 1 of the present dissertation.

considered as the best pathway towards both an affective fight against criminal actors involved in this market, and protection of individual and public health.

Conclusion

Final remarks

Research results highlighted that social media websites still represent a virtual channel largely used by offenders to trade medicines illegally, since several posts concerning ITMs are easily accessible by potential customers. However, the extent of the problem depends on both the single platform and the specific therapeutic category. Overall, research results have provided evidence supporting the hypothesis of the limited impact of the SCP measures, since they are spotting, blocking and removing only some contents concerning ITMs. Hence, connections between potential buyers and unlawful sellers are not fully prevented. At the same time, the features of the advertisements for ITMs on social networking websites are only partially different if compared to those existing before the implementation of the measures. Indeed, they are still easily

retrievable by using some simple keywords, products advertised are still predominantly lifestyle medicines, posts are still available in different languages, and the strategies used to complete the purchase and/or to retrieve further information are still through the promotion of links to illegal online pharmacies and the deployment of the sellers personal contact details, such as telephone numbers and email addresses.

However, results suggest that the limited impact of the SCP interventions is not linked to a lack of effectiveness *tout court*, but to their asymmetrical implementation by the social networking websites. Indeed, while illegal advertisements of medicines within certain therapeutic categories are constantly and completely banned by the social media platforms, such as in the case of pain killers and psychoactive medicines, promotions of other types of products are still online and removed to a lesser extent or with less efficacy. In other words, SCP measures are monitoring some specific therapeutic categories and/or medicinal products more than others. This finding can most likely be explained by a combination of two factors. First, the focus on psychopharmaceuticals and pain killers can be explained by the fact that most of the social media websites decided to introduce the analysed SCP interventions because of political and/or media pressures regarding the use of the platforms by offenders to trade very addictive prescription medicines for recreational purposes. Second, the focus on certain famous branded medicines seems to be linked to the protection of the IPRs of legal owners and producers.

The governance of social media concerning the prohibition of certain contents and the obligations to remove them is only rarely set by the law, while most of the time left to the internal regulations of the platforms, such as in the case of the illegal online trade of medicines. This approach is demonstrating some limitations. Indeed, providers are usually reluctant to implement SCP measures aimed at spotting and removing

contents on their platform because they are costly, time consuming, challenging, and may generate reputational losses in the case of 'false positives' (Duarte et al., 2018; Yar, 2018). However, the illegal online trade of medicines is a criminal market progressively threatening both public and private health, posing very serious risks to internet users' safety. Given the proven effectiveness of SCP measures in disrupting this criminal market when fully implemented, as well as the limited capabilities and resources of traditional public enforcement agencies and institutions in acting in the virtual environments (e.g. Trottier, 2015, 2012), a legally binding obligation for social media platforms to identify, block and remove contents linked to ITMs' advertisements should be desirable - i.e., using the same pathway adopted in the case of contents linked to child pornography or to the diffusion of terrorist organisations' propaganda (Akdeniz, 2008; Gillespie, 2018; Yar, 2018).

Suggestion for further research

Research results have only hinted at certain meaningful issues and perspectives that should be investigated more thoroughly. Some perspectives for future research will be briefly suggested hereafter.

First, as frequently illustrated during the analysis of the results, available on social media websites are a large number of contents promoting 'natural products', 'herbal remedies', and 'food supplements'. Such products are very popular among customers seeking alternative treatments; they are usually perceived (often wrongfully (Lavorigna and Di Ronco, 2018, 2017)) to be as effective as the traditional medicines, while presenting no side effects and with more affordability (Mullaicharam, 2011). Even if the online trade of complementary and alternative medicines has not been extensively studied by criminologists, some studies highlighted how they can represent

a serious threat for patients' health. Indeed, in some cases herbal remedies are fraudulent (Lavorgna and Di Ronco, 2018, 2017). In other cases from the past, there has been several cases of natural products traded by criminal entrepreneurs containing strong active principles not declared on the label (Antonopoulos and Hall, 2016; Foroughi et al., 2017; Gaudiano et al., 2016). This is a strategy used by offenders as to avoid the control of social media platforms and to make investigations by law enforcement authorities more difficult, especially considering that 'herbal remedies' are usually not included in the same marketing regulations as medicines (e.g. Gaudiano et al., 2016). For this reason, it is not possible to quantify precisely the extent of the illegal online trade of medicines since test purchases and costly, time consuming laboratory analysis is needed in order to confirm the composition of the product (e.g. Foroughi et al., 2017). However, similar issues concerning the possible illegality of certain online content has been overcome by criminological research through developing risk indicators. For instance, a set of indicators has been outlined as to understand the risk for a given websites supplying medicines being illegal (e.g. Di Nicola et al., 2015b). To provide an example concerning other criminal markets, one of the methods most used in the trafficking of human beings is to recruit women online through deceptive and fraudulent job advertisements: a research conducted by Di Nicola and colleagues identified a number of indicators that are useful when detecting at-risk job offers (Di Nicola et al., 2017). Consistently, further research on this issue would be necessary in order to be used by both researchers and law enforcement authorities as to understand the risk associated with social media content promoting natural products whilst actually concealing advertisements of ITMs.

Second, as illustrated in Chapter 3, the research was limited to publicly available contents only, and did not include any active behaviour and/or interaction with other

users. However, results highlighted several social media contents displaying direct contact information of the sellers, especially telephone numbers to be contacted via online messaging systems (e.g. WhatsApp, Telegram, Viber, Line, Talk, etc.) and/or email addresses. Such information can be used for active interactions with potential sellers and to retrieve useful information in order to provide a more detailed picture on the marketing strategies used by criminal entrepreneurs - e.g. details on prices and method of payment, discounts, products available, methods and types of shipments, etc. For instance, in a research conducted by Di Nicola and colleagues exploring the role of social media websites in migrant smuggling, undercover phone calls have been made by the researchers to the smugglers, and this technique uncovered very useful information on the criminal market of illegal transportation services (Di Nicola et al., 2017). Even if undercover ethnography has been criticised by some authors because of possible ethical implications linked to a lack of any informed consent (e.g. Calvey, 2018; Spicker, 2011), as already pointed out by Miller (1995) the study of crime in some circumstances may require similar techniques as to obtain useful information that would be impossible to gain following different methods (see also ESRC, 2015).

Finally, since both the illegal online trade of medicines and social media are ever changing and dynamic, the same research design can also be used in the future investigating the same three social media analysed in the present research as to understand whether there will be modifications concerning the role of social media platforms in this illegal market. This way it will be possible to maintain an updated understanding on the phenomenon as to develop effective counter measures and preventive strategies.

Annex - Number of social media contents analysed

Tab. A1 - Number of Twitter contents related to the illegal online trade of medicines (n) or to the online trade of suspicious natural products (n*) retrieved among the first 10 results for each searching category (by therapeutic category and keyword). August - September 2018

Category	Keyword	Popular tweets	Recent tweets	Profiles	Photos	Videos	Total	Overall
Erectile dysfunctions medicines	Viagra	-	4	4	2	-	10	95
	Cialis	1	-	1	2	-	4	
	Levitra	5	3	6	4	0	18	
	Kamagra	10	10	10	10	0	40	
	Erectile problems	4*	7*	-	-	-	11*	
	Erektionsprobleme	2	3	1	4	-	10	
	Disfunción eréctil	-	-	-	-	-	-	
	Problème d'érection	1*	1*	-	-	-	2*	
	Problemi erezione	-	-	-	-	-	-	
Weight-loss medicines	Xenical	6	10	3	-	-	19	57
	Orlistat	7	5	-	-	-	12	
	Dinitrophenol	-	-	-	-	-	-	
	Weight-loss	1*	-	-	-	-	1*	
	Gewichtsverlust	-	-	1	-	-	1	
	Adelgazantes	-	7*	3*	-	-	10*	
	Produit minceur	-	0	1*	-	-	1*	
	Dimagranti	6	5	2	-	-	13	
Medicines to enhance muscles	Anadrol	9	9+1*	1	5	1	25 + 1*	146
	Durabolin	5	4	2	3	-	14	
	Dianabol	8	8 + 2*	7	8 + 1*	4	35 + 3*	
	Nandrolone	-	8	1	5	1	15	
	Steroids	6	5 + 2*	4	7	-	22 + 2*	
	Steroide	-	1	4	-	-	5	

Category	Keyword	Popular tweets	Recent tweets	Profiles	Photos	Videos	Total	Overall
	Esteroides	3	2	4 + 1*	2	-	11 + 1*	
	Stéroïdes	1	1	3	-	-	5	
	Steroidi	1	2	2	2	-	7	
Medicines to kill pain	Oxycodone	1	2	1	-	-	4	9
	Percocet	-	-	-	-	-	-	
	OxyContin	-	-	1	-	-	1	
	Vicodin	-	-	-	-	-	-	
	Painkillers	-	-	-	-	-	-	
	Schmerzmittel	-	2	1	-	-	3	
	Analgésicos	-	-	2	-	-	2	
	Antalgiques	-	-	-	-	-	-	
	Antidolorifici	-	-	-	-	-	-	
Psychopharmaceuticals	Ritalin	-	-	-	-	-	-	1
	Xanax	-	-	1	-	-	1	
	Valium	-	-	-	-	-	-	
	Tavor	-	-	-	-	-	-	
	Adderall	-	-	-	-	-	-	
	Prozac	-	-	-	-	-	-	
	Psychopharmaceuticals	-	-	-	-	-	-	
	Psychopharmaka	-	-	-	-	-	-	
	Psicofármacos	-	-	-	-	-	-	
	Psychotropes	-	-	-	-	-	-	
Psicofarmaci	-	-	-	-	-	-		
Medicines to sleep	Ambien	-	-	-	-	-	-	25
	Zolpidem	-	-	-	-	-	-	
	Lunesta	-	-	-	-	-	-	
	Sleeping pills	2	1	2	2	-	7	
	Schlafmittel	-	-	1	4	-	5	

Category	Keyword	Popular tweets	Recent tweets	Profiles	Photos	Videos	Total	Overall
	Somníferos	-	1*	-	-	-	1*	
	Somnifères	1	3	1	-	-	5	
	Sonniferi	4*	2*	1*	-	-	7*	
	Doxycycline	-	-	3	-	-	3	
	MacroBid	2	-	-	-	-	2	
Antibiotics	Trimethoprim	3	-	-	2	-	5	14
	Zithromax	2	1	-	1	-	4	
	Antibiotics	-	-	-	-	-	-	
	Antibiotika	-	-	-	-	-	-	
	Antibióticos	-	-	-	-	-	-	
	Antibiotiques	-	-	-	-	-	-	
	Antibiotici	-	-	-	-	-	-	
Medicines to quit smoking	Wellbutrin	-	-	2	-	-	2	4
	Zyban	-	1	1	-	-	2	
	Nicotinell	-	-	-	-	-	-	
	Quit smoking	-	-	-	-	-	-	
	Rauchen aufhören	-	-	-	-	-	-	
	Dejar de fumar	-	-	-	-	-	-	
	Arrêter de fumer	-	-	-	-	-	-	
Smettere di fumare	-	-	-	-	-	-		
Others	Sovaldi	-	-	-	-	-	-	32
	Harvoni	-	-	-	-	-	-	
	Clomid	4	2	4	4	-	14	
	Disulfiram	2	1	-	2	-	5	
	Nolvadex	-	2	6	5	-	13	

Source: elaboration of the author on research results

Tab. A2 - Number of Facebook contents related to the illegal online trade of medicines (n) or to the online trade of suspicious natural products (n*) retrieved among the first 10 results for each searching category (by therapeutic category and keyword). August - September 2018

Category	Keyword	Posts	Profiles	Photos	Videos	Pages	Groups	Total	Overall
Erectile dysfunctions medicines	Viagra	-	-	-	-	-	-	-	86
	Cialis	-	1	-	4	-	-	5	
	Levitra	-	-	-	2	9	8	19	
	Kamagra	10	2	9	-	10	10	41	
	Erectile problems	2*	-	4*	8*	1 + 3*	-	1 + 17*	
	Erektionsprobleme	-	-	-	-	1	-	1	
	Disfunción eréctil	-	-	1	-	-	-	1	
	Problème d'érection	-	-	-	-	1	-	1	
	Problemi erezione	-	-	-	-	-	-	-	
Weight-loss medicines	Xenical	6	-	8	6	3	-	23	99
	Orlistat	4 + 4*	2	3	2	1	2	14 + 4*	
	Dinitrophenol	2	2	-	-	3	-	7	
	Weight-loss	2	3	1	-	1	-	7	
	Gewichtsverlust	1*	1*	1*	-	1*	2*	6*	
	Adelgazantes	4*	6*	7*	1*	5*	2*	25*	
	Produit minceur	1	1	1	-	-	-	3	
	Dimagranti	4*	2*	1*	-	1*	2*	10*	
Medicines to enhance muscles	Anadrol	3	1	7	6	3	1	21	119
	Durabolin	4	2	10	9	3	2	30	
	Dianabol	2	1	3	4	1	1	12	
	Nandrolone	5	1	8	1	1	-	16	
	Steroids	-	2	-	1	-	-	3	
	Steroide	-	1	1	-	1	-	3	
	Esteroides	-	3	5	-	1	4	13	
	Stéroïdes	-	2	-	2	5	-	9	
	Steroidi	2	1	-	-	9	-	12	

Category	Keyword	Posts	Profiles	Photos	Videos	Pages	Groups	Total	Overall
Medicines to kill pain	Oxycodone	-	-	-	-	-	-	-	7
	Percocet	-	-	-	-	-	-	-	
	OxyContin	-	-	-	-	-	-	-	
	Vicodin	-	-	-	-	-	-	-	
	Painkillers	-	-	1	-	-	-	1	
	Schmerzmittel	-	-	-	-	-	-	-	
	Analgésicos	-	2	4	-	-	-	6	
	Antalgiques	-	-	-	-	-	-	-	
	Antidolorifici	-	-	-	-	-	-	-	
Psycho pharmaceuticals	Ritalin	-	-	-	-	-	-	-	0
	Xanax	-	-	-	-	-	-	-	
	Valium	-	-	-	-	-	-	-	
	Tavor	-	-	-	-	-	-	-	
	Adderall	-	-	-	-	-	-	-	
	Prozac	-	-	-	-	-	-	-	
	Psycho pharmaceuticals	-	-	-	-	-	-	-	
	Psychofarmaka	-	-	-	-	-	-	-	
	Psicofármacos	-	-	-	-	-	-	-	
	Psychotropes	-	-	-	-	-	-	-	
	Psicofarmaci	-	-	-	-	-	-	-	
Medicines to sleep	Ambien	-	-	-	-	-	-	-	11
	Zolpidem	-	-	-	2	1	-	3	
	Lunesta	-	-	-	-	-	-	-	
	Sleeping pills	-	-	2*	2*	2	-	2 + 4*	
	Schlafmittel	-	-	-	-	1	-	1	
	Somníferos	-	-	-	-	-	-	-	
	Somnifères	-	-	-	-	1	-	1	
	Sonniferi	-	-	-	-	-	-	-	
Antibiotics	Doxycycline	1	-	-	-	-	-	1	9

Category	Keyword	Posts	Profiles	Photos	Videos	Pages	Groups	Total	Overall
	MacroBid	1	-	-	-	1	-	2	
	Trimethoprim	-	-	-	-	-	-	-	
	Zithromax	-	-	-	-	-	3	3	
	Antibiotics	-	-	-	-	1	-	1	
	Antibiotika	-	-	-	-	-	-	-	
	Antibióticos	1	-	-	-	-	-	1	
	Antibiotiques	-	-	-	-	1	-	1	
	Antibiotici	-	-	-	-	-	-	-	
Medicines to quit smoking	Wellbutrin	1	-	-	-	1	-	2	10
	Zyban	-	-	-	-	-	-	-	
	Nicotinell	-	-	-	-	-	-	-	
	Quit smoking	1*	1*	-	1*	-	-	3*	
	Rauchen aufhören	-	-	-	-	1*	-	1*	
	Dejar de fumar	-	-	-	2*	-	-	2*	
	Arrêter de fumer	-	-	-	-	1*	-	1*	
	Smettere di fumare	1*	-	-	-	1*	-	1*	
Others	Sovaldi	-	-	-	-	1	-	1	12
	Harvoni	-	-	-	-	-	-	-	
	Clomid	-	1	-	-	-	-	1	
	Disulfiram	-	-	-	-	-	-	-	
	Nolvadex	2	3	3	-	2	-	10	

Source: elaboration of the author on research results

Tab. A3 - Number of Instagram contents related to the illegal online trade of medicines (n) or to the online trade of suspicious natural products (n*) retrieved among the first 10 results for each searching category (by therapeutic category and keyword). August - September 2018

Category	Keyword	Principal hashtag		1 st suggested hashtag		2 st suggested hashtag		Total	Overall
		Popular posts	Recent posts	Popular posts	Recent posts	Popular posts	Recent posts		
Erectile dysfunctions medicines	Viagra	-	-	-	1	2	2	5	98
	Cialis	-	-	2 +2*	5	2	3	12 + 2*	
	Levitra	1+ 2*	4*	7	6	6	9	29 + 6*	
	Kamagra	8	7	6	9	8	5	43	
	Erectile problems	-	-	-	-	-	-	-	
	Erektionsprobleme	-	-	-	-	-	-	-	
	Disfunción eréctil	-	-	1	-	-	-	1	
	Problème d'érection	-	-	-	-	-	-	-	
Problemi erezione	-	-	-	-	-	-	-		
Weight-loss medicines	Xenical	1	2	3	3	5	5	19	113
	Orlistat	-	2	4	3	10	10	29	
	Dinitrophenol	4	3	-	-	-	-	7	
	Weight-loss	-	3*	1*	1*	-	1*	6*	
	Gewichtsverlust	1*	3*	1*	2*	1*	1*	9*	
	Adelgazantes	5*	6*	-	-	4*	4*	19*	
	Produit minceur	2*	5*	-	1*	-	3*	11*	
Dimagranti	3*	6*	1*	3*	-	-	13*		
Medicines to enhance muscles	Anadrol	1	6	1	3 + 7*	4	7	29	87
	Durabolin	-	-	-	-	-	-	-	
	Dianabol	2	6	1	2	-	-	11	
	Nandrolone	1	6	1	3	-	1	12	
	Steroids	-	-	-	-	-	-	-	
	Steroide	-	-	-	-	-	-	-	
Esteroides	-	-	3 + 7*	5 + 5*	-	-	8 + 12*		

Category	Keyword	Principal hashtag		1 st suggested hashtag		2 st suggested hashtag		Total	Overall
		Popular posts	Recent posts	Popular posts	Recent posts	Popular posts	Recent posts		
	Stéroïdes	-	-	-	-	-	-	-	
	Steroidi	1	6	-	-	2	6	15	
Medicines to kill pain	Oxycodone	-	-	-	-	-	-	-	0
	Percocet	-	-	-	-	-	-	-	
	OxyContin	-	-	-	-	-	-	-	
	Vicodin	-	-	-	-	-	-	-	
	Painkillers	-	-	-	-	-	-	-	
	Schmerzmittel	-	-	-	-	-	-	-	
	Analgésicos	-	-	-	-	-	-	-	
	Antalgiques	-	-	-	-	-	-	-	
	Antidolorifici	-	-	-	-	-	-	-	
Psychopharmaceuticals	Ritalin	-	-	-	-	-	-	-	0
	Xanax	-	-	-	-	-	-	-	
	Valium	-	-	-	-	-	-	-	
	Tavor	-	-	-	-	-	-	-	
	Adderall	-	-	-	-	-	-	-	
	Prozac	-	-	-	-	-	-	-	
	Psychopharmaceuticals	-	-	-	-	-	-	-	
	Psychopharmaka	-	-	-	-	-	-	-	
	Psicofármacos	-	-	-	-	-	-	-	
	Psychotropes	-	-	-	-	-	-	-	
Psicofarmaci	-	-	-	-	-	-	-		
Medicines to sleep	Ambien	-	-	-	-	-	-	-	0
	Zolpidem	-	-	-	-	-	-	-	
	Lunesta	-	-	-	-	-	-	-	
	Sleeping pills	-	-	-	-	-	-	-	
	Schlafmittel	-	-	-	-	-	-	-	

Category	Keyword	Principal hashtag		1 st suggested hashtag		2 st suggested hashtag		Total	Overall
		Popular posts	Recent posts	Popular posts	Recent posts	Popular posts	Recent posts		
	Somníferos	-	-	-	-	-	-	-	
	Somnifères	-	-	-	-	-	-	-	
	Sonniferi	-	-	-	-	-	-	-	
	Doxycycline	2	-	-	-	-	-	2	
	MacroBid	-	-	-	-	-	-	-	
Antibiotics	Trimethoprim	-	-	-	-	-	-	-	3
	Zithromax	-	1	-	-	-	-	1	
	Antibiotics	-	-	-	-	-	-	-	
	Antibiotika	-	-	-	-	-	-	-	
	Antibióticos	-	-	-	-	-	-	-	
	Antibiotiques	-	-	-	-	-	-	-	
	Antibiotici	-	-	-	-	-	-	-	
Medicines to quit smoking	Wellbutrin	-	-	-	-	-	-	-	1
	Zyban	1	-	-	-	-	-	1	
	Nicotinell	-	-	-	-	-	-	-	
	Quit smoking	-	-	-	-	-	-	-	
	Rauchen aufhören	-	-	-	-	-	-	-	
	Dejar de fumar	-	-	-	-	-	-	-	
	Arrêter de fumer	-	-	-	-	-	-	-	
Smettere di fumare	-	-	-	-	-	-	-		
Others	Sovaldi	-	-	-	-	-	-	-	3
	Harvoni	-	-	-	-	-	-	-	
	Clomid	-	-	-	-	-	-	-	
	Disulfiram	-	-	-	-	-	-	-	
	Nolvadex	-	3	-	-	-	-	3	

Source: elaboration of the author on research results

Acknowledgments

The Section 'Acknowledgments' is missing in this version of the document.

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