UNIVERSITY OF LJUBLJANA
SCHOOL OF ECONOMICS AND BUSINESS

MASTER'S THESIS

THE DIRECT ECONOMIC AND SOCIAL IMPACT OF POTENTIAL MARIJUANA LEGALIZATION IN SLOVENIA AND POLICY RECOMMENDATIONS.

Ljubljana, March 2021 KIRILL RUNOV

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The undersigned Kirill Runov, a student at the University of Ljubljana, School of Economics and Business, (hereafter: SEB LU), author of this written final work of studies with the title The direct economic and social impact of potential marijuana legalization in Slovenia and policy recommendations., prepared under supervision of professor Dušan Mramor, PhD

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sl. – Slovene
lat. – Latin
i.e. – (sl. To je); That is
e.g. – (sl. Na primer); For example
CAD – (sl. Kanadski dolar); Canadian dollar
CCS – (sl. Vprašalnik o konoplji v Kanadi); Canadian Cannabis Survey
CSIRS – (sl. Konoplja v Sloveniji in njena regulacija); Cannabis in Slovenia and Its Regulation survey
EMCDDA – (sl. Evropski center za nadzor nad drogami in zasvojenostjo z drogami); European Monitoring Centre for Drugs and Drug Addiction
EU – (sl. Evropska unija); European Union
GDP – (sl. Bruto domači proizvod); Gross domestic product
IRCCA – (sl. Inštitut za regulacijo in nadzor konoplje); Institute for the Regulation and Control of Cannabis
MNZ – (sl. Ministrstvo za notranje zadeve); Ministry of Interior
NIJZ – (sl. Nacionalni inštitut za javno zdravje); National Institute of Public Health
ŠOU – (sl. Študentska Organizacija Univerze v Ljubljani); Student Organisation University of Ljubljana
SURS – (sl. Statistični urad Republike Slovenije); Statistical Office of the Republic of Slovenia
UK – (sl. Združeno kraljevstvo); United Kingdom
US – (sl. Združene države); United States
USD – (sl. Ameriški dolar); United States Dollar

INTRODUCTION

The motivation behind this master's thesis is driven by the current relevance of the subject matter caused by foreign countries' efforts, the implementation of new regulations, the emergence of new markets, and the lack of comprehensive academic research into this area within the Slovenian context.

Cannabis is one of the oldest cultivated and versatile plants. Nowadays, it is also known as marijuana, "pot", "weed", and other street names used for the species containing a psychoactive substance known as delta-9-tetrahydrocannabinol (hereafter: THC). Because of this substance, cannabis and its cultivation are legally prohibited in most states around the world. The cannabis ban policy is generally expressed in the legal prosecution of individuals who possess it, backed by negative public opinion on the substance and individuals associated with it. Marijuana is currently the most commonly used illicit drug worldwide, with annual cannabis use reported by 2.5 per cent of the world population in 2010 (World Health Organization, 2010).

Nevertheless, within the last decade, both attitudes and regulations have gone through a change. After the first mass wave of decriminalisation of illegal drugs, a new wave of marijuana consumption liberalising policies is taking off, particularly in the United States of America (USA), Uruguay, and Canada. Several European states have also liberalised cannabis laws in various legislative ways (Hughes, Stevens, Hulme & Cassidy, 2019).

"Legalising drugs would simultaneously reduce the amount of crime and raise the quality of law enforcement. Can you conceive of any other measure that would accomplish so much to promote law and order? In drugs, as in other areas, persuasion and example are likely to be far more effective than the use of force to shape others in our image" (Friedman, 1972). The pro-legalisation movement's primary thesis is that prohibition does not give optimal results, and governments that pursue a prohibitive policy cannot regulate or benefit from it economically, as they do in the case of other intoxicants such as tobacco and alcohol. According to Dills, Goffard and Miron (2017), supporters of marijuana cite reduction of crime, increased public revenues from taxes, stimulation of the economy, lower expenditure on criminal justice enforcement, and improved public safety as benefits of marijuana legalisation. The first hypothesis thus suggests that a high economic potential is associated with non-medical cannabis liberalising policy.

The following thesis paper attempts to make an estimate for the market with illicit cannabis in Slovenia, as well as to forecast hypothetical legal market estimate. While existence of black market is not beneficial for economic development, use of cannabis is associated with certain health risks, which are particularly disadvantageous for the public health and society. Therefore, the goal and purpose of this thesis is to quantify selected positive and negative impacts of the hypothetical non-medical cannabis liberalisation policy in Slovenia. Moreover, the thesis provides with an extensive overview of such policies abroad and a

comments on certain specifics of each liberalisation case with a focus on economic and social impacts of policies introduced.

H1: Marijuana liberalisation has a beneficial impact on the state's economy.

Nevertheless, use cannabis can lead to clinically significant impairments and distress, as there are specific side effects related to consumption, especially disordered ones. Individual deviations within drug use patterns can lead to the multiplication of adverse effects (Van Gerpen, Vik & Soundy, 2015). Relaxing prohibition policies could lead to an uncontrollable increase in drug use among the population, particularly the young. The second hypothesis states that cannabis use liberalisation causes various social risks for the country, particularly public health and safety risks.

H2: Marijuana liberalisation brings social risks related to public safety and health.

While states have legalised the recreational use of marijuana and removed it from the list of dangerous illicit drugs, there is no unified legalisation model, as regulations differ between jurisdictions both in terms of structure and respective outcomes. The third research hypothesis or research question of the thesis is that an optimal cannabis legalisation policy mix can be formulated.

H3: There is optimal non-medical cannabis liberalisation policy, which allows to maximise positive economic impact with given social risks.

The thesis consists of six sections. The first section presents cannabis, its characteristics, effects associated with its use, and the markets related to it. The second section examines alternative cannabis regulations worldwide, their economic and social effects, the specifics of their implementation. The third section introduces the Cannabis and Its Regulation in Slovenia Survey (hereafter: CSIRS), which was carried out to collect the data used within quantitative analysis and reached 0.5 per cent of the Slovenian population. The fourth section addresses the relevance of cannabis in Slovenia according to the survey and national data, specifically its' use as a drug or medicine. The study of survey allows to confirm presence of adverse health reactions associated with use. The Pearson Chi-Square test is used to identify the correlation between specific cannabis use patterns and adverse health effects and thus test H2. The fifth section is devoted to the examination of H1 using demand- and supply-side consumption estimates of the cannabis market in Slovenia and forecast of sales post-legalisation. The sixth section attempts to assess the potential impact of cannabis liberalisation in Slovenia, suggests policy recommendations and related expectations. We found that both H1 and H2 are supported, but H3 could not be tested because of lacking methodology and related data for the appropriate period.

1 CANNABIS CHARACTERISTICS, USE AND MARKET

The following chapter will provide an overview of the plant, its morphology, chemical content, its various application methods, how it communicates with the human endocannabinoid system, its proven health risks and therapeutic effects, and various facets related to the illicit cannabis market.

1.1 Cannabis plant presentation

Cannabis (lat. genus Cannabis) belongs to the Cannabaceae family (lat. Urticales). According to various studies, there are three subspecies of cannabis: Sativa, Indica, and Ruderalis (Cannabis, 2020). A cannabis plant can be either female, male or, more rarely, hermaphrodite, thus showing both genders' characteristics in varying proportions. While the female plant is used for cannabinoid extraction, it is isolated from male plants, decreasing the harvest quality due to pollination (Thomas & ElSohly, 2016). Within this study, we will focus mostly on Sativa, Indica and hybrid female species. The high THC level is the primary criterion and reason for legal limitations placed on cannabis in most modern legal systems. In our thesis, will general terms such as "cannabis", "non-medical cannabis", "recreational cannabis", and "marijuana" to refer to high-THC unpollinated female cannabis species. Only the leaves and top flowers of the female plant contain THC and are used for dry herb and resin production (European Monitoring Centre for Drugs and Drug Addiction, hereafter: EMCDDA, 2017).

1.2 Endocannabinoid system and use effect

The endocannabinoid system (hereafter: ECS) of the human body comprises endogenous cannabinoid receptors located in the mammalian brain and central and peripheral nervous systems. It consists of neuromodulatory lipids and their receptors. The ECS is also known as "the body's own cannabinoid system" and is involved in appetite, pain-sensation, mood, and memory (Aizpurua-Olaizola, et al., 2017). The receptor network sends and receives signals that facilitate complicated chemical reactions. Cannabinoid receptors are divided into type 1 (located in the brain, and the central nervous system) and type 2 receptors (located in the liver, the endocrine system, and muscles) (Kendall & Yudowski, 2017).

A cannabis plant can contain over 400 chemical entities, with at least 144 compounds known as cannabinoids – chemical components found on trichomes, small crystal resin glands. After administration, cannabinoids interact with receptors by mimicking endocannabinoids and causing the activation of specific cell surface receptors (Pertwee, 2008). Criteria of origin may be used for grouping cannabinoids. Endocannabinoids are naturally produced and stored in the human body, while phytocannabinoids are produced naturally and are present in plants, fruits, and species. Synthetic cannabinoids are typically synthesised in a laboratory and do not exist naturally (Červek & Červek, 2018).

The THC is the most "famous" of the cannabinoids, mostly for its psychoactive effect, as it is the cannabinoid responsible for the physical intoxicating effect, "the high". It also has a broad spectrum of therapeutic applications. Receptors that react to this cannabinoid are situated mostly in the brain, although a minority is located throughout the body (Freeman, Hindocha, Green & Bloomfield, 2019). Cannabidiol (hereafter: CBD) is the second currently most widely discussed cannabinoid present in cannabis. CBD has no psychoactive effects and is considered to have favourable effects by the vast majority of nations. Moreover, CBD administration causes countereffects which reduce the psychoactive effect of THC (Freeman, Hindocha, Green & Bloomfield, 2019).

The psychoactive effect of cannabis use depends on the profile and concentration of cannabinoids. THC is responsible for the amplitude of "recreational" effect of cannabis impairment and the severity of associated adverse side-effects. Its concentration is measured in per cent per gram and determines the potency of a drug. In recent years, both the US and the EU have sounded the alarm about the growing increase of THC in cannabis. According to Chandra, Radwan, Majumdar, Church, Freeman and ElSohly (2019), sample examinations across US states have shown that the mean concentration of THC in cannabis has nearly doubled in 2017 compared to 2008. Moreover, the mean THC to CBD content ratio has increased more than four times during the same period. Examination of hash oil samples has shown a nearly tenfold increase in mean THC concentration in samples in the same period (Chandra et al., 2019).

1.3 Medical application of cannabis and cannabinoids

The cannabis plant has a vast spectrum of application, as strains differ by peak yield, growth specifics, and the plant's chemical content. Generally, cannabis can be divided into three groups, with the main difference being in the methods and motivation behind the application. Besides recreational cannabis, there are low-THC hemp sorts, mostly used for industrial purposes, medical cannabis, and cannabinoid products.

For medical purposes, cannabis products are most commonly inhaled through combustion or vaporisation, as well as administered orally (Bridgeman & Abazia, 2017). Female flowers and upper leaves of cannabis plants contain valuable cannabinoids and terpenes. This is the so-called "medical marijuana", the use of which may be prescribed to ease symptoms or treat various health conditions. Lists vary among jurisdictions and may include cancer, glaucoma, human immunodeficiency virus or acquired immunodeficiency syndrome, hepatitis, amyotrophic lateral sclerosis, seizure disorders, anxiety disorders, insomnia, weight loss, Crohn's disease, arthritis, Parkinson's disease, and multiple sclerosis (Van Gerpen, Vik & Soundy, 2015; Bridgeman & Abazia, 2017; Sansone & Sansone, 2014; Wall Liu, Hasin, Blanco & Olfson, 2019). In Slovenia, cannabis is successfully used in epilepsy treatment, particularly of children, resulting in a full cure or significant symptom suppression (Neubauer, Perkovič-Benedik & Osredkar, 2019). A detailed list of research conducted by

influential overseas institutions on cannabinoid application in medicine is provided in Appendix 2.

The primary argument against the prescription of black market products that favours the prescription of pharmacy drugs based on synthetic cannabinoids is the predictability of the chemical content. Cannabinoids' and terpenes' profile within the material varies drastically, depending on strains and growing conditions (Červek & Červek, 2018). There is evidence that, given the higher chemical profile predictability, synthetically synthesised cannabinoids may be less clinically effective than phytocannabinoids (Pristavec Đogić, 2019).

1.4 Health risks associated with cannabis use

Marijuana use is associated with a broad spectrum of possible adverse health-related effects, starting with the risk of developing an addiction. According to the Centre for Disease Control and Prevention (2018), every tenth user of marijuana develops an addiction. For users under 18, the risks are higher, as every sixth user is likely to become addicted. It also affects the brain and can negatively affect the individual's learning ability, attention, memory, decision-making, coordination, emotions, and reaction time (Lopez-Quintero et al., 2011; Hall & Degenhardt, 2009). Studies have also demonstrated that the systematic use of cannabis may negatively affect adolescents' intellects, as early marijuana consumption can hinder brain development processes. Those effects can be long-lasting or even permanent (Van Gerpen, Vik & Soundy, 2015; Filbey et al., 2014).

Since combustion or smoking marijuana presents the most popular consumption method, there are cumulative risks for breathing paths and lung health. Marijuana smoke contains tars – toxins and irritants harmful to lung tissues and small blood vessels, especially if smoked together with tobacco. However, these symptoms usually improve in case of quitting (Tashkin, 2013). The research by Huang, Zhang, Tashkin, Feng, Straif and Hashibe (2016) attempts to aggregate data obtained by healthcare institutions within the last several decades and identify a link between marijuana use and cancer. The findings show an increased risk of oropharyngeal cancer, decreased risk of oral – particularly tongue – cancer, no association with neck and head cancer, and no association with lung cancer. There is some evidence of cannabis consumption impacting the user's heartbeat. In turn, this might increase risks for the cardiovascular system and increase the risk of stroke and heart diseases (Sidney, 2002).

There is an extensive ongoing debate on whether marijuana consumption can lead to psychotic and anxiety disorders, depression, and schizophrenia. Statistical data shows a correlation between individuals suffering from these diseases and marijuana use (Van Gerpen, Vik & Soundy, 2015; Volkow et al., 2016). The evidence collected by Leyton (2019) suggests that there is a vital link between adolescent cannabis use and incidences of psychosis, but that it is small or non-existent in cases of adult use. Establishing cannabis use as a causal element for psychotic disorders is challenging. The association appears to reflect overlapping genetics and the average cannabis initiation age preceding the onset of

psychosis. Di Forti et al. (2019) conclude that higher potency and frequency of use significantly increase the odds for incidences of psychosis. The study by Chan, Burkhardt and Flyr (2017) focuses on the characteristics of "butane hash oil", which is an extremely potent cannabis extract and its use on individuals. Participants who reported lifelong depression and substantial side effects were also more likely to have reported the use of butane hash oil rather than cannabis.

Recent research has shown that marijuana consumption is related to decreased testosterone production among men and the consequent reduction of libido, erectile dysfunction, and infertility (Alvarez, 2015). Another potential threat of marijuana use, according to the study, is testicular cancer. However, the study did not find strong dose-response relationships and could not confirm the causal link because of the need for further research and isolation of impactful factors (Huang, Zhang, Tashkin, Feng, Straif & Hashibe, 2016).

The Government of Canada (2019a) divides the risks of cannabis into short-term and long-term perspective groups. As for the short-term negative side-effects, the use of THC-potent cannabis can make it harder to learn, remember, concentrate, and make decisions. It may affect an individual's mental health and cause euphoria, panic, and anxiety. Among the long-term risks (associated with several months or years of use), are lung injuries if combustion methods are used, mental health effects, addiction, and use disorders. The use of potent products with THC levels higher than 20 per cent (resin, hash oil, wax and distillates) further increases the risk of mental health issues. However, stopping or reducing cannabis use can improve mental health.

1.5 Illicit cannabis market

The data on trade and production of illicit drugs remains limited and is not easily accessible to the broad public. Nevertheless, we need to understand certain aspects of the existing illegal cannabis business before considering its possible alternatives.

1.5.1 Cultivation

European domestically-grown cannabis comes from both indoor facilities and outdoor plantations. The size of cultivation sites varies considerably, from one to thousands of plants at once. Yields and potency of crop vary too due to applying specific techniques, mainly when growing cannabis indoors. Cannabis production seems to have experienced a sharp rise worldwide in the last several decades. The availability of the internet and, consequently, of advanced knowledge and technology could be a factor that significantly impacted these developments. In European countries, particularly in Slovenia, so-called specialist "grow shops" exist and usually sell the equipment and other know-how needed for cultivation (European Monitoring Centre for Drugs and Drug Addiction & Europol, 2019).

Cannabis allows for cultivation outdoors on wide arrange of soils, as a single crop or interspersed with other crops. Outdoor cultivation usually allows for one crop a year, although, there are unverified reports of up to three crops a year in some countries. Indoor cultivation requires water and electricity; such cultivation allows for six and more harvests per year. The type and strain of cannabis grown, cultivation methods, plant density, water supply (irrigated or rain-fed crops), soil acidity, alkalinity, and climatic conditions affect plants' yield and chemical content. According to the EMCDDA), most European cannabis today is grown indoors (EMCDDA, 2012). The cannabis plant is a short-day plant that flowers at a precise date in late summer. This day is determined naturally through the length of a daylight period, in which the plant recognises the appropriate day for flowering. For a relatively short period after blooming, the plant's potency is at its peak, making it perfect for harvest. When growing indoors, artificial illumination allows setting the desired day length and the harvesting day faster by providing more daylight. Costs of growing outside are insignificant compared to indoor plantation maintenance due to the costs of artificial illumination and other equipment required for indoor growing, including the irrigation needs of a site (EMCDDA, 2012).

Marijuana growers vary widely in demographics, technical knowledge, intent, skills, and production scale. The typology and profiles of growers also differ significantly. Cultivation can be a hobby; it can also be used to make a profit, serve one’s recreational and therapeutical needs or done out of scientific interest. One of the popular reasons is that black market cannabis is often tainted with pesticides and fertilisers or chemically induced. Cultivation can be seen as a means of avoiding criminal elements, saving money, and enjoying gardening (EMCDDA, 2012). Growers can have purely commercial motives or grow cannabis to supply themselves, their friends, and family. They can be motivated by both financial and non-financial drivers. Growers can be independent, part of an organised criminal group, or “communal growers” who grow cannabis for their friends and other customers to bring them “spiritual”, “social” and “intrinsic” benefits. Growing can be a sign of political activism or a means of satisfying medical needs (Potter, Bouchard & Decorte, 2013).

1.5.2 Processing and product types

When the plant is ready for harvest, it is typically cut at or near the stem base and dried, while the rest of the plant, including the root, is disposed of. Drying is the most crucial part in order to avoid the danger of bacteria and fungi. Plants that dry too quickly inevitably lose its cannabinoid and terpene content. The harvested plant typically contains approximately 80 per cent of moisture, which has to be reduced to approximately 15 per cent before final packaging. Only the floral part of a plant is used and separated from stem and leaves, which are usually disposed of. Sieving equipment available on the market is used to extract glandular trichomes to produce cannabis derivative products (EMCDDA, 2012).

The hashish resin is produced from female plants' trichomes by thrashing and sieving dried flowers and leaves of sun-dried cannabis. Trichome powder is compressed into a resin, containing leaves and their fragments. Cannabis flowers can also be placed into a tumbler that is powered manually or with a motor. During the rotation of the tumbler, trichomes dislodge from a plant and powder can be collected for further compression into a final substance that is characterised by high purity (EMCDDA, 2012). The hashish resin can be further distilled with ethanol or butane to obtain cannabis extracts, also known as hashish oil, which has the highest concentration of cannabinoids. This product is frequently used for medical purposes. However, it can also be used non-medically with care, as there is much evidence on the possibility of poisoning with such oil (Thomas & Pollard, 2016). Hashish oil is also used to produce tinctures used for vaping in electronic cigarettes and vaping devices (Etter, 2015). Cannabis extracts, especially butter, can be used to cook cannabinoid-infused edible products and drinks (Gottlieb, 1993).

1.5.3 Distribution

Cannabis distribution represents a complex supply chain with linkages ranging from so-called "social distributors" to large scale suppliers and ones responsible for logistic processes between wholesale growers, traffickers, and retail dealers. Dynamics within supply chain result from complex interactions. For example, research has concluded that "... upper-level dealers purposely cultivating perception of trust and friendship with other dealers to achieve a higher profit, suggesting the use of social bonding as a strategy in higher levels of the distribution chain ...". Cannabis use itself and market contain a social element as "… use of cannabis is largely a social and communal activity, with the drug often shared among the using group … the majority of cannabis transactions occur within social groups and networks, and therefore may not be dominated by "professional" networks of sellers" (EMCDDA, 2012).

1.5.4 Price of illicit cannabis

At user-level, cannabis can be sold either in grams or at a fixed price per package, where the volume and chemical profile of the content is frequently unknown. The price of a kilogram of cannabis resin and dried cannabis in Europe may vary from €500 to €10,000 and €800 to €9,000 per kilogram, respectively. Markups added throughout the supply chain for resin and cannabis may reach 550 and 900 per cent, respectively (EMCDDA, 2012).

2 CANNABIS REGULATION AROUND THE WORLD

2.1 Cannabis regulation regimes and international legal acts

As the thesis attempts to analyse the social and economic consequences of cannabis liberalisation policies, it is essential to identify general distinctions in policies and underlying international regulatory acts.

In 1925, the League of Nations Second Opium Convention, which initially aimed to control opium trade, was extended to include cannabis. Cannabis was referred to as "Indian hemp" covered by fruiting tops (flowers) of female cannabis plants, rich in "pharmaceutically strong active resin". The Convention banned the export of cannabis and its resin to countries that prohibited its usage and trafficking (EMCDDA, 2017; League of Nations, 1925). The United Nations (1961) Single Convention on Narcotic Drugs classified narcotic drugs into four schedules based on the danger and risk of future dependence associated with use. The United Nations (1971) Convention on Psychotropic Substances rearranged the schedules. Both UN conventions included cannabis in Schedules I and IV, meaning high risk and minimal medical potential of the substance (Pain, 2015; United Nations, 1961; United Nations, 1971). The United Nations (1988) Convention against Illicit Narcotic Drugs and Psychotropic Substances specified the creation of a criminal offence mechanism for possession, cultivation, and purchasing for the sole purpose of personal consumption. The Convention's drug schedules affect punishment procedures for drug possession and trade-related legal misbehaviours (EMCDDA, 2017).

As a result, complete deregulation of cannabis is rarely seen nowadays, and prohibition or ultra-prohibition (the most limited and strict policy) is the most common practice globally. Such policies restrict possession, trade, advertising, and cultivation. Sanctions and severity vary among jurisdictions as the two are not defined in the treaties (EMCDDA, 2017). In addition to prohibitive cannabis policies, several legalisation approaches which allow for cannabis possession, cultivation and legal trade are employed today in Uruguay, Canada, and several US states. Several European states employ six further de facto and de jure decriminalisation approaches and depenalisation policies as an alternative to either prohibition or legalisation. Policies of this sort liberalise cannabis possession, trade, and cultivation through changes in guidelines instead of changes in the law that would contradict international agreements.

The graph depicted in Figure 1 represents different regulations and their relationship to social and health harms. It also partially represents the logic behind the path towards cannabis liberalisation. The following chapters present a review of individual states' legislative efforts for cannabis liberalisation policies, related outcomes, and characteristics.

Figure 1: A spectrum of (policy) options

Source: The Government of Canada (2016).

2.2 Netherlands

While Uruguay and Canada are pioneers of drug legalisation policy, the Netherlands is the pioneer of drug use tolerance and liberalisation. The liberalisation started in 1976 as a response to the social problems of drug abuse. Prosecution for marijuana offences stemming from the 1953 amendment to the Opium Act faced significant public resistance and was followed by a call for a reconsideration of prosecution policies. The excessive use of force by Amsterdam police in response to student riots in 1966 made law enforcement highly sensitive to public opinion. It led to more relaxed attitudes towards social issues such as drug use and policies de-emphasising arrests for marijuana possession. Social attitudes towards marijuana use and its legalisation had changed in the postwar period, and there was a growing acceptance of drug use. These pre-conditions created an environment suitable for the social experiment of "gedoogbeleid", also known as the "Dutch model", to be carried out in the Netherlands, starting in 1976 (Centre for Public Impact, 2016).

The primary objective of gedoogbeleid is to safeguard the health of users, the people around them, and society as a whole. The further aim of the policy is to tackle drug-related crime and maintain public order. At the same time, priority is given to vulnerable groups and the youth (Centre for Public Impact, 2016).

The Netherlands' government web page summarises its "toleration policy regarding soft drugs and coffee shops". It states that soft drugs are less damaging to health compared to hard drugs. The Netherlands has a policy of toleration regarding soft drugs, which means that the sale of soft drugs in coffee shops is a criminal offence, but that the Public Prosecution Service does not prosecute coffee shops for it. Neither does it prosecute members of the public for possession of small quantities of soft drugs." A "small quantity" is defined as a

maximum of five cannabis plants or five grams of dried cannabis or hash resin. The sale of cannabis in coffee shops is tolerated, provided that coffee shops stick to "toleration criteria", according to which coffee shops should not cause any nuisance, sell hard drugs, sell cannabis to minors, advertise drugs, and sell quantities of over five grams in a single transaction. Municipalities are free to determine whether to allow coffee shops within their boundaries and impose possible additional rules (Government of the Netherlands, no date). The cultivation of cannabis plants is illegal, although, in cases where no more than five plants are grown for personal consumption, the police are not expected to prosecute (Government of the Netherlands, no date).

Existing regulation allows for smaller amounts of retail-like cannabis transactions; however, it still prohibits the cultivation, processing, storage, transportation, and transactions of over five grams. Therefore, coffee shops in the Netherlands are forced to rely on illicit market supply or so-called "safe houses", often connected to criminal networks. Law enforcement closes down between five to six thousand of these safe houses annually (DutchAmsterdam, 2014). Dutch taxation of coffee shops illustrates a paradox: while profits of coffee shops are subject to taxes, precise amounts of tax cannot be calculated since tax authorities have no data regarding the inventories purchased from illegal sources (DutchAmsterdam, 2014).

In 1995 the Dutch government published a report, which noted three negative implications to be addressed: the nuisance caused by drug users, an increasing trend of organised crime, and the effect of Dutch model on other countries, particularly those that share a border with the Netherlands, i.e. the drug tourist effect (Centre for Public Impact, 2016; Dolin, 2001). The modern direction of Dutch cannabis policy is towards the termination of the so-called "open-door" approach. Coffee shops will have to become smaller and concentrate more on the local market. The policy also aims to make Dutch coffee shops less attractive to drug users abroad (Government of the Netherlands, no date). In an attempt to control the nuisance and organised crime, government measures have caused intended, or unintended reductions in the number of coffee shops. Across Dutch municipalities, the number of operating coffee shops between 1995 and 2016 has decreased by two to three times (Decorte, Lenton & Wilkins, 2020). A new toleration rule was introduced in 2013 to combat drug-related crime and nuisance. Only residents with municipal registration are permitted to officially buy cannabis and visit coffee shops (Government of the Netherlands, no date).

Table 1 presents the data on the prevalence of drug use among residents within the 15-64 and 15-24 age groups, used for cross-country comparison with a selected peer-group of European states that report to the EMCDDA and the arithmetic means of the estimates. The data is presented in the form of an index with the Netherlands' 2016 prevalence figures used as base values.

Table 1: Past 12-month and 30-day cannabis use prevalence across European states within the 15-24 and 15-64 age groups, index (Netherlands 2016 = 100)

Age group	**15-64**		**15-24**	
Country and survey year	**Cannabis use prevalence type**			
	12 months	**30 days**	**12 months**	**30 days**
Austria (2015)	76	49	91	83
Belgium (2013)	55	51	83	65
Bulgaria (2016)	50	49	66	87
Croatia (2015)	**94**	**98**	**99**	**133**
Cyprus (2016)	26	24	42	21
Czech Republic (2016)	**113**	**108**	**124**	**109**
Denmark (2017)	76	57	130	85
Estonia (n.a.)	71	27	-	58
Finland (2014)	81	49	74	58
France (2016)	**132**	**-**	**140**	**-**
Germany (2015)	73	61	107	102
Greece (2015)	33	25	15	16
Hungary (2015)	18	14	46	25
Ireland (2015)	92	86	77	100
Italy (2017)	**125**	**110**	**104**	**127**
Latvia (2015)	50	31	86	57
Lithuania (2016)	32	22	50	27
Luxembourg (2014)	58	43	-	-
Malta (2013)	11	8	16	-
Netherlands (2019)	85	94	-	-
Norway (2016)	46	33	75	50
Poland (2014)	55	41	81	27
Portugal (2016)	61	84	42	50
Romania (2016)	38	27	28	20
Slovakia (2015)	51	41	90	68
Slovenia (2018)	70	59	95	87
Spain (2015)	**113**	**143**	**113**	**162**
Sweden (2016)	40	22	47	23
United Kingdom (2016)	79	63	99	83
Mean	**64**	**53**	**76**	**68**

Adapted from Statistics Netherlands (2020); EMCDDA (2019); ATTAD (2018, Appendix 4).

According to the presented data, the prevalence of cannabis use in the Netherlands is substantially higher than the other countries' mean cannabis prevalence rate. Past 30-day cannabis use prevalence among youth in the Netherlands is higher than in all the other countries, except for the Czech Republic, Spain, Italy, Germany, Ireland, and Croatia. Similarly, the 30-day cannabis use prevalence among the general population is higher in the Netherlands than in the other countries presented in the table, except Spain, Italy and the

Czech Republic. Croatia's score is somewhat comparable. Past 12-month prevalence among adolescents in the Netherlands is lower than in Austria, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Ireland, Italy, Slovenia, Spain, and the UK. Finland and Latvia show somewhat close estimates. As among the general population, only Czech Republic, France, Italy, and Spain show higher cannabis use prevalence than that of the Netherlands, while Croatia and Ireland's estimates are somewhat close to the Dutch ones. The Slovenian prevalence rates are also above the calculated means of the selected peer group.

Table 2 presents the policy review summary, including the acknowledged positive and negative characteristics and problematic aspects and other characteristics. Overall, the Dutch cannabis regulation policy represents a middle approach between legalisation and prohibition. It brings economic benefits such as additional taxes collected from retail sales, employment within the cannabis sector, and related economic activities. The cannabis economy cannot be precisely measured, although the available estimates show a strong economic potential expressed in aggregate economic value and coffee shop turnover. However, since today's policy does not allow for legal supply and accounting within the cannabis sector, most cannabis-related economic activities, including the supply of cannabis, are underreported, because of the "back door" problem. Also, cannabis transactions may not contain sales tax or excise duties rates because of their illicit status. The change in cannabis regulation has led to increased drug use prevalence, which modestly decreased later.

After almost fifty years of decriminalisation, cannabis use prevalence in the Netherlands is higher than in most European states. However, against expectations, it is not the highest, and there is a list of European states with comparable prevalence rate statistics. It is worth mentioning that many states with similar or even higher cannabis use prevalence rates (Czech Republic, Germany, Belgium, Spain) employ other alternative methods of cannabis regulation, which will be discussed later in this chapter. At the same time, the Netherlands has the highest cannabis treatment admission rate than elsewhere in the EU. The availability of cannabis in the Netherlands attracts tourists and brings economic benefits; however, "drug tourism" also causes nuisance. Modern Dutch policy aims to limit sales to residents only to promote public order. The Netherlands has also become Europe's "greenhouse. It exports the vast majority of domestic cannabis across the border and supplies European criminal networks, which Dutch law enforcement agencies extensively oppose. The Dutch experience supports the drug markets separation theory, suggesting a decrease in hard drug use prevalence associated with establishing regulated soft drugs retail channels.

Table 2: Summary of the Dutch cannabis decriminalisation policy review

Beneficial effects	**Adverse impacts and other disadvantages**	**Other specifics of the policy and related conclusions**
Coffee shops have a high turnover and so even with existing regulation, these "points of interest" collect additional consumption tax with sales of food and soft drinks	Increased organised crime, as criminal elements are attempting to create illicit cannabis supply channels for Europe	The regulation is moving towards shutting down the "open door" of foreigners' access to cannabis
	Increased crime and cross-border illicit transactions with other states, particularly ones having a border due to drug tourism effect	Hope for a more effective regulatory framework is given by the pilot programme in 2021, within which some coffee shops will start using legal supply and employ bookkeeping practices
Legal cannabis creates additional workplaces, although these frequently belong to the grey sector of economy due to issues with existing regulation	Nuisance related to drug tourism, because of which modern regulation in the Netherlands does not allow foreigners to access cannabis anymore	Availability of coffee shops does not seem to encourage heavier use or to extend periods of use
Additional economic activity with regards to increased inflow of tourists, for whom the legality of cannabis serves as a factor of interest and a tourist attraction	The inability of the state to collect or even calculate additional tax, as cannabis transactions remain illicit	While most cannabis users are not using harder drugs, most hard drug users have experience with cannabis, explaining the frequent linkage between the two. As law legally distinguishes between cannabis and other drugs, the markets got separated, as individuals have less contact with street dealers
	Legal cannabis businesses are forced to use illicit supply channels, as the existing regulation does not allow for a legal option	
	Highest cannabis treatment admissions rate in Europe	
	Past 12-month and 30-day cannabis use prevalence rates in the Netherlands are higher than the majority of European states, including Slovenia and other EMCDDA-reporting European states	

Source: DutchAmsterdam (2014); Cluskey (2020); Wen, Meng, Ying & Belhassen (2020); Centre for Public Impact (2016); Government of the Netherlands (no date); MacCoun & Reuter (2001a); MacCoun (2011); Statistics Netherlands (2020); EMCDDA (2019).

2.3 Canada

The Canadian legalisation policy aims to create a strict legal framework for controlling production, distribution, sale, and cannabis possession across Canada. It has three goals: to keep cannabis away from youth, keep profits away from the pockets of criminals, and protect public health and safety by allowing adults access to legal cannabis. The Cannabis Act came into force on 17 October 2018 (The Government of Canada, 2019b).

Attitudes towards cannabis liberalisation in Canada have generally been positive throughout modern history. In 1997, the majority of Canadians agreed that "Smoking marijuana should not be a criminal offence" (Savas, 2001) and in a 2016 national poll, seven out of ten Canadians supported cannabis legalisation (Tahirali, 2016). To formulate a cannabis legislation policy, the Task Force on Cannabis Legalization and Regulation held extensive consultations with experts, patients, advocates, employers, industry, provinces, territories, municipalities, indigenous governments, representative organisations, and the public. It also conducted surveys and carried out opinion polls (The Government of Canada, 2019h). According to the Government of Canada (2019b), since 17 October 2018, it is legal to:

- possess up to thirty grams of legal cannabis, dried or equivalent to dried form in public or to share this amount with other adult users;
- buy dried or fresh cannabis and cannabis oil from a provincially-licensed retailer physically or online;
- grow from licensed seed or seedlings up to four cannabis plants per residence for personal use;
- make cannabis products, such as food and drinks, at home as long as organic solvents are not used to create concentrated products.

On 17 October 2019, the Cannabis Regulations were updated to legalise the production and sale of new three classes of cannabis products such as cannabis extracts, cannabis topicals, and edible cannabis (The Government of Canada, 2019h). Within the context of legal volume limitations, the following equivalents to cannabis products apply: one gram of dried cannabis is equal to five grams of fresh cannabis, fifteen grams of edible products, seventy grams of liquid product, a quarter of a gram of concentrates or one cannabis plant seed. Medical cannabis and medicine with cannabinoids are accessible to people who have the authorisation of their healthcare provider. The policy aims to protect the youth from cannabis by preventing sales to minors under 18. It also implemented a firmly restrictive policy that prohibits "products that are appealing to youth; packaging or labelling cannabis in a way that makes it appealing to youth; selling cannabis through self-service displays or vending machines and other promotional channels (The Government of Canada, 2019b).

Multi-level control over cannabis is regulated by the federal government and the provincial and territorial governments. The responsibilities of the federal government include setting

strict requirements for cannabis growers and manufacturers as well as industry-wide rules and standards, e.g. types of cannabis products available for sale, packaging and labelling requirements for products, standardised serving volumes and potency, prohibitions on the application of certain ingredients, good production practices, tracking requirements of cannabis from seed to final product sale to keep it out of the illegal market, and restrictions on promotional activities (The Government of Canada, 2019b). Bookkeeping regulations for manufacturing businesses and the reporting requirements are exact and demanding (The Government of Canada, 2019e).

In turn, provinces and territories are responsible for developing, maintaining, implementing, and enforcing systems for overseeing the distribution of cannabis. They have a right to add safety measures, such as (The Government of Canada, 2019b):

- increasing the minimum age, however not lowering it;
- lowering the personal possession and cultivation limits within the jurisdiction;
- creating additional rules for cannabis cultivation at home;
- restricting locations for consummation.

Another pillar of the Cannabis Act is public education, as the Government of Canada has committed close to €46 million over the next five years for cannabis public education and awareness-related activities which are to inform Canadians, particularly youth, on the health and safety risks of cannabis consumption (The Government of Canada, 2019b).

The reduction of criminal activity is one of the three main goals of the Cannabis Act. It helps keep Canadians who consume cannabis out of the criminal justice system, reducing the burdens on the courts. At the same time, law enforcement bodies are expected to have higher capacities for targeting those acting outside of the legal framework, such as organised crime and penalties, according to the severity of the offence. Taking cannabis across Canada's borders and the illegal distribution, sale or production of cannabis over the personal cultivation limit and with the application of combustible solvents are criminal offences (The Government of Canada, 2019b). Individuals who were previously sentenced for simple cannabis possession can request a record suspension online, which allows the previously convicted individual to, in a sense, start anew (The Government of Canada, 2019f).

Health Canada’s Cannabis Legalization and Regulation Branch or, as it is known today, the Controlled Substances and Cannabis Branch is the state body responsible for licensing and compliance monitoring under the Access to Cannabis for Medical Purposes Regulations. Its mandate is to conduct inspections and compliance verifications to enforce the Regulations (The Government of Canada, 2019g).

There are two main sets of regulations that support the Cannabis Act: the Cannabis Regulation and the Industrial Hemp Regulations. The Cannabis Regulation state that:

- preliminary licensing is required for the cultivation and processing of cannabis, the sale of cannabis for medical purposes, cannabis research, and analytical testing of cannabis;
- permissions are required for the import and export of cannabis for medical or scientific purposes and industrial hemp;
- license holders are subject to strict physical and personnel security requirements;
- plain and appropriate packaging is required for cannabis products;
- access to cannabis for medical purposes is provided to patients in need;
- manufacturers of drugs containing cannabis are primarily subject to the Federal Drugs Agency and its regulations, and to the requirements of the Cannabis Regulations;

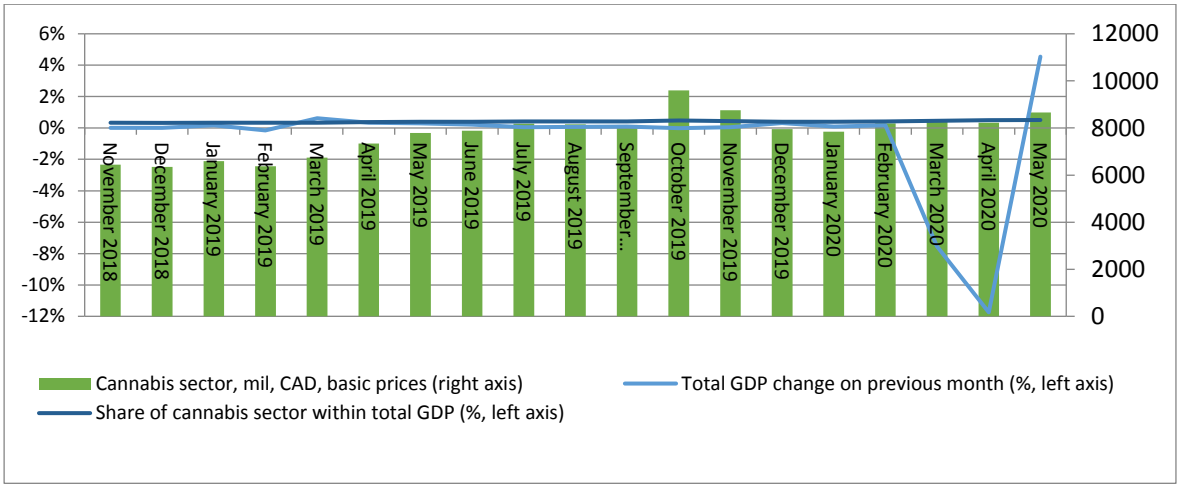
The regulation sets out strict requirements for branding, colours, and the use of logos. Cannabis products also must be labelled with mandatory health warnings, a standardised cannabis symbol, and specific-to-product information (The Government of Canada, 2018a; 2019h). Another specific characteristic of Canada's cannabis legalisation policy is the use of advanced tools to track the policy's consequences and using the data for analysis and publication. Health Canada is responsible for the majority of measurements of cannabis use estimates. Since 2017, Canada has also conducted the annual Canadian Cannabis Survey (hereafter: CCS), which examines patterns of use, the cannabis market, and its associated dynamics (The Government of Canada, 2019j).

The excise duty is calculated as $1 per gram of dried cannabis sold and $0.01 per milligram of THC sold. Consumers can confirm the legal purchase of their cannabis by verifying that there is a cannabis excise stamp on their product, which also vary between provinces and territories (The Government of Canada, 2019l). Excise duty can also be calculated as 10 per cent of the pre-tax transaction cost, which is similarly divided into 25 per cent of state revenue and 75 of local jurisdiction revenue (The Government of Canada, 2018b; 2019l). The excise duty consists of a 25 per cent share which goes to the government. Seventy-five per cent of the remaining cannabis duty stays within the local budget (The Government of Canada, 2018b). Consumers purchasing cannabis products are responsible for paying consumer tax, which depends on the province or territory and is set at 5, 13 or 15 per cent. Businesses in Canada are subject to other taxes such as corporate income tax, ranging between 11.5 and 16 per cent, dividend payout tax of 25 per cent or lower, and real estate tax set by municipalities. All of these necessarily drain cannabis businesses' financial accounts and, in turn, benefit the state and local governments (The Government of Canada, 2019l).

Statistics Canada's (2019b) most recent publication on government revenues from cannabis reveals that the state collected $79 million and $107.1 in the fourth quarter of 2018 and the first quarter of 2019, respectively. According to Statistics Canada (2020b), the population estimates for Canada in Q4 (the legalisation date's quarter) are 37,249,240 and 37,802,043 for 2019 Q1. Dividing cannabis state income values in 2018 and 2019 by population numbers gives a cannabis state income per capita estimate of $2.12 and $2.83, respectively. According

to Owram (2020), the cannabis sector regularly employed more than 247,700 people at the beginning of 2020. Licensed indoor and outdoor cultivation areas held by licensed holders cover 2,217,216 square metres and 334 hectares, respectively (The Government of Canada, 2020).

Figure 2: Cannabis sector contribution to GDP in absolute terms (million CAD) and GDP share and GDP change in Canada in November 2018 – May 2020, monthly



Adapted from Statistics Canada (2020c).

Figure 2 shows the data for cannabis sector performance expressed in basic prices (secondary vertical-axis) and cannabis sector performance as a component of Gross Domestic Product (GDP), as well as the GDP change rate in the previous month (primary vertical axis). In Canada, the Cannabis sector increased in absolute terms throughout the observed period with particular peaks in October and November 2019, hypothetically related to the first anniversary of cannabis legalisation. Cannabis sector performance during the early stage of the COVID-19 pandemic and the associated lockdown measures taken by governments, including Canada, are of particular interest here. Starting in February 2020, the cannabis sector has shown an additional increase, while the total GDP curve shows a drastic fall. As a result, even though the relative contribution of cannabis sector to the GDP is small, it shows that cannabis is somewhat immune to the recession caused by COVID-19 virus pandemic outbreak or even affected positively.

Statistics Canada (2019b) has published government revenues from cannabis in the fourth quarter of 2018 and the first quarter of 2019, with funds collected by the state being $79 million and $107.1 million. According to Statistics Canada (2020b), the population estimates for Canada in Q4 (the legalisation's date quarter) are 37,249,240 and 37,802,043 for 2019 Q1. Dividing cannabis state income values in 2018 and 2019 by the population number gives us cannabis state income per capita estimates, which are $2.12 and $2.83 for 2018 Q4 and 2019 Q1, respectively.

Another interesting phenomenon is the marijuana equity and stock index, specifically, indicators of investors' expectations regarding future sector performance. The index is equally weighted and rebalanced quarterly, the companies listed having to operate in the hemp or cannabis business. As of 19 September, the 2020 index has 18 constituents which together have a market capitalisation of $12.8 billion (The Marijuana Index, 2020). The performance of an index reflects investors' feelings about the potential of a market. The Canadian marijuana index peaked at $972.77 on 27 January 2018, the legalisation year. In 2019, expectations started to fall, reaching $101.43 on 14 March 2020. As of 9 October 2020, it constitutes $184.92, while the 52-week highs and lows are $295.69 and $85.13, respectively (The Marijuana Index, 2020). Overall, the Canadian Marijuana Index performance expresses a degree of pessimism about the sector on the part of the investors. It characterises cannabis companies' equity investments in Canada as highly volatile, potentially associated with dissonances in expected and actual sales.

Table 3: Price per gram of non-medical psychoactive cannabis in Canada before and after legalisation among users with different use frequencies

Frequency of use	**Pre-legalisation**		**Post-legalisation**		**Price percentage change**
	Average price, CAD per gram	**Number of submissions**	**Average price, CAD per gram**	**Number of submissions**	
A few times a year	7.65	1,183	9.72	70	27.2
A few times per month	7.32	1,655	9.18	85	25.4
A few times per week	7.16	3,462	8.26	154	15.3
Daily	6.58	10,238	7.55	444	14.8

Source: Statistics Canada (2019i).

Legalisation might be associated with a change in the price of cannabis. Statistics Canada reports average prices per one gram of dried cannabis, based on data submitted by households. Table 3 presents the price data and distinguishes estimates by frequency of use among respondents and compares the prices submitted before and after legalisation. The data shows an increase in the price of dried cannabis, caused by the expensiveness of legal non-medical cannabis. Such dynamics hamper the suppression of the illicit cannabis market, which is visible from the differences between legal and illicit cannabis prices presented in Table 4. Comparing the mean prices of legal and illicit cannabis shows that legal cannabis is more than half as expensive as illicit cannabis. After combining data from Tables 3 and 4, the logical conclusion would be that users with a higher frequency of use (daily, weekly) still preferred illicit supply as its purchasing price post-legalisation is well below the average legal price.

Table 4: Average prices per gram of dried non-medical cannabis in Canada by the type of supply

Type of supply	**Average price, CAD per gram**	**Number of submissions**
Legal	**9.99**	**432**
A federal-licenced producer via mail delivery	9.14	100
A government-licenced retailer in-store	10.73	184
A government-licenced retailer via mail delivery	9.65	149
Illegal	**6.37**	**503**
Other: better quality or variety of cannabis	6.64	148
Other: difficulty accessing legal cannabis	7.29	122
Other: legal cannabis was too expensive	5.71	233
Total (legal and illegal sources combined)	8.04	935

Source: Statistics Canada (2019a).

Table 5 presents the policy review summary, including the acknowledged positive and negative characteristics, including its problematic aspects and some other specifics. Canada is a pioneer in functional state-level cannabis legalisation and the regulatory feasibility of legalisation policy. It is very cautious about tracking its progress and employs data monitoring methods such as CCS and national health surveys, which provide a detailed perspective. Although it is still too early to assess the long-term effects, a preliminary assessment of the 2019 figures shows a moderate increase in cannabis use prevalence among adults and a decrease among adolescents, undoubtedly a good result. The emerging sector fuels the growth of economic activity and brings in additional income for the state.

Table 4: Summary of the Canadian cannabis legalisation policy review

Beneficial effects	**Adverse impacts and other disadvantages**	**Other specifics of the policy and related conclusions**
In 2019, the 3-month cannabis use prevalence rate declined among 15-17 years old by nearly a half compared to 2018	In 2019 the 3-month cannabis use showed an increase by roughly ten to twenty per cent of the pre-legalisation prevalence levels among representatives of the 18-24, 25-44 and 45-64 age groups, while the 65 and above age group showed a roughly 50 to 80 per cent increase	In 2019 there were no changes in daily cannabis use among residents, except for the age group of 65 and above
More comprehensive access for cannabis to ones, who substitute illicit or prescribed drugs and alcohol with cannabis, assuming it as a more safe option		Prices for street cannabis increased by 14.8 to 27 per cent after legislation and legal cannabis is roughly 50 per cent more expensive than illicit supply. Daily and weekly cannabis users are the ones mostly resisting change to legal supply channels
Cannabis sector shows an increase since the emergence in 2018 and its performance was relatively resistant to the recession caused by the COVID-19 pandemic outbreak		Legal producers who employ indoor cultivation techniques report difficulties in price competition with the black market, while some domestic producers initiated production turn-around to outdoor cultivation
In 2019 the perceived risk of cannabis use among the general population had increased, as compared to 2018		The policy changes also address additional ecological distresses and introduces measures for further prevention
Age of cannabis use initiation has shown a minor increase in 2019, as compared to 2018		Policy employs advanced mechanisms for tracking policy impacts
Over a third of cannabis users prefer legal cannabis supply	The emergence of the cannabis sector has caused additional ecological imbalance with regards to excess packaging and green waste generated	Social acceptance of cannabis non-medical use has somewhat increased in 2019 compared to 2018 and cannabis users are more inclined to disclose cannabis use
Cannabis sector employed about a quarter of a million full-time labour equivalent in early 2020		Cannabis Stock Index dynamics express the uncertainty of the financial market about the future performance of the cannabis sector; cannabis equity may be classified as a highly volatile investment
The cannabis sector has generated approximately $2.12 and $2.83 per capita of additional state income in Q4 2018 and Q1 2019, respectively		A national study has allowed identifying for significant changes in cannabis use patterns among jurisdictions

Source: Statistics Canada (2019b, 2020c, 2020d, 2019i); Government of Canada (2019j); The Marijuana Index (2020); Cain (2019); Lucas et al. (2016); Mahamad, Wadsworth, Rynard, Goodman & Hammond (2020); Turvill (2020); Lamers (2019).

2.4 United States

Since 2012, twelve jurisdictions – 11 of which are states – have legalised the recreational use of cannabis, its possession, and trade (Governing, 2019). The first legal sales started in Colorado and Washington in 2014 (State of Colorado, no date; Washington State Liquor and Cannabis Board, no date) and were followed by Oregon and Alaska in 2015 (Oregon Liquor Control Commission, 2020; 149. Alaska Department of Health and Social Services, no date). Recreational sales in Nevada started in 2017 (Cannabis Compliance Board State of Nevada, no date), while sales in California, Maine, Massachusetts, and Michigan began in 2018 (California Cannabis Portal, no date; Maine State House, 2020; Commonwealth of Massachusetts, 2020; Marijuana Regulatory Agency, no date), and in Illinois in 2020 (State of Illinois, no date). Vermont, which legalised possession and cultivation in 2018, will start selling recreational cannabis legally in 2022 (Vermont General Assembly, 2020). The District of Columbia has legalised the possession of cannabis but not sales (Metropolitan Police Department, 2015).

The primary driver of public support has been the widespread recreational use of cannabis and the lower perceived risk of abuse potential than alcohol. The criminalisation of use inflicts more damage than the use itself. It primarily results in arrests and criminal records, with the latter having a disproportional effect on minority populations. Supporters of legalisation focus on the benefits of liberalisation and regulation instead of prohibition and argue that the legal market will protect users from illegal markets and improve product safety by regulating allowed THC levels and protecting against possible contaminants (McGinty, Niederdeppe, Heley & Barry, 2017).

Purchases of recreational cannabis are restricted for minors under 21, and advertising to minors is strictly prohibited. Cannabis regulations in the US share a similar model, however certain aspects differ both among states and within them, as municipalities are frequently given authority to formulate cannabis policies and their respective limitations. Differences can be observed in cannabis use in public places, legal limitations on possession and cultivation, packaging and design standards, the volume and method of tax collection, distribution paths, the structure of licensing and state management bodies, and licensing requirements for cannabis supply chains (Alaska Department of Health and Social Services, no date; Oregon Liquor Control Commission, 2020; State of Colorado, no date; Washington State Liquor and Cannabis Board, no date; Marijuana Regulatory Agency, no date; Vermont General Assembly, 2019; Commonwealth of Massachusetts, 2020; State of Illinois, no date; Maine State House, 2020; Cannabis Compliance Board State of Nevada, no date; California Cannabis Portal, no date). The State of Colorado, for example, has adopted the following general regulations, which are quite similar to California and some other states (State of Colorado, no date):

- The legal age of 21 for purchase and possession, also for entry to point-of-sale;

- Only licensed retail stores have a right to sell to individuals, although individuals older than 21 can share and transfer between each other;
- A maximum of 1 ounce of marijuana is allowed for purchase and possession;
- Public use of cannabis is prohibited, meaning restrictions on sites such as sidewalks, ski resorts, concert venues, businesses, restaurants, cafes, bars, common areas of apartment buildings, parks, and amusement parks;
- Use on the territory of national parks and forests is forbidden;
- Retail marijuana businesses can be open between 8 am and midnight;
- All marijuana products must be sold in packaging that is resealable, child-resistant, and non-transparent;
- Marijuana products have to be labelled with a specific symbol;
- Hospitals have the right to test newborns for THC at birth and report to child protection services in case of positive results.

The table presented in Appendix 8 presents a detailed schedule of specific tax regulations applied within particular US states. It omits licensing, examination, and punitive fees, which are a part of state revenue collection mechanisms for recreational cannabis. It does not specify local taxes, as these vary among municipalities. The regulations vary significantly in structure and components of taxation mechanisms and result in effective tax rates. Individual states apply excise duty paid on the net weight of sold cannabis and retail and wholesale sales taxes expressed in a percentage of the price, either the purchasing price or a fair value set by the overseeing body. Local option taxes are also a variable part of cannabis taxation among states in the US. The table's right column suggests an effective tax rate for cannabis transactions based on a cross-policy comparison of taxation methods under the current regulatory framework. A threshold of 20 per cent was chosen to distinguish between low and moderate effective tax rates. A tax rate above 30 per cent is considered a high tax rate, while rates above 40 per cent are considered very high effective tax rates.

Table 5: Differences in prices per gram of illicit and legal non-medical cannabis in the US states California, Colorado, Michigan, Oregon, Washington, 2020

US State	Mean price estimate per 1 gram of medium or high-quality non-medical cannabis, 2020, USD		The opportunity cost of undergoing legal cannabis supply, the percentage of the illicit price
	Illicit	Legal	
California	11.74	12.72	0.08
Colorado	12.89	14.14	0.10
Michigan	11.35	15.29	0.35
Oregon	10.09	10.88	0.08
Washington	10.60	11.57	0.09

Adapted from Price of Weed – A Global Price Index for Marijuana (2020).

Due to the US's specific governmental structure and the heterogeneous legal status of cannabis and taxation regimes, several conclusions can be made from price analysis across its states. The first analysis of cannabis prices in a benchmarking group of US states is presented in Table 6. The data presented allows us to approximate the price difference between legal and illicit supply: between 8 and 35 per cent. It represents the opportunity cost of opting for the legal supply as a buyer.

The table presented in Appendix 9 and its bottom line presented in Table 7 list prices for medium- and high-quality non-medical cannabis across all US states and the District of Columbia and assign a legal status to cannabis within the regional unit. The data shows that states where cannabis is regulated, such as Nevada, California, Colorado, Washington, and Oregon, have the lowest price per one gram of average quality cannabis. In contrast, states prohibiting cannabis report higher prices. The District of Columbia allows only possession and has the most expensive cannabis. It is possible to assume that the illicit status of cannabis positively affects its black market or "street" price. A more significant effect is observed for high-quality cannabis, which is one-fifth more expensive in the "illegal" states, while medium-quality cannabis is one-tenth more costly.

Table 6: The average price per gram of non-medical cannabis in the US, by quality and legal status of cannabis, 2020

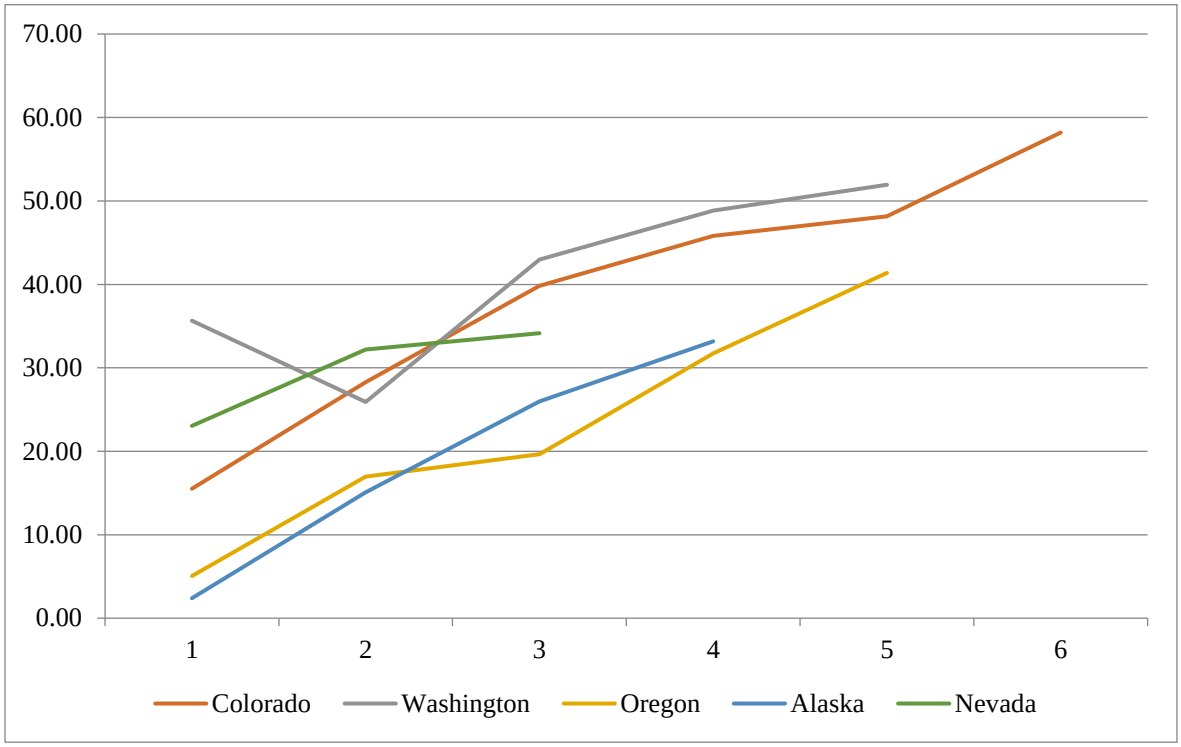
	Mean retail price estimate per gram of non-medical cannabis, USD		
Perceived quality of cannabis	**High quality (1)**	**Medium quality (2)**	**Average of (1) and (2)**
National average	11.5	9.3	10.4
Average price in the states with legal cannabis sales	9.82	8.52	9.17
Average price in the states with the illicit or decriminalised status of non-medical cannabis	11.67	9.21	10.44
Difference in mean price in legal vs illegal cannabis states, percentage of legal cannabis state price	0.19	0.08	0.14

Adapted from Marijuana Laws By U.S. State (2020); Oxford Treatment Center (2020).

The US states' cannabis legalisations employ taxation mechanisms, which allow the state to increase revenues by setting taxes and excise duties on cannabis transactions and businesses. Figure 3 depicts the data on additional state income from cannabis legalisation, which is composed of reports for fiscal years from the states included in the benchmarking group. The fiscal years were converted to fiscal years since enforcement of the respective regulation, to make the time-series more comparable. For calculating tax income per capita, population numbers per calendar year were assigned to the fiscal year and used as a proxy. No population estimates were applicable to the fiscal year time-series. With its long history

of legalisation, Colorado leads with $58.2 per resident per year of additional tax income from cannabis-related tax proceedings.

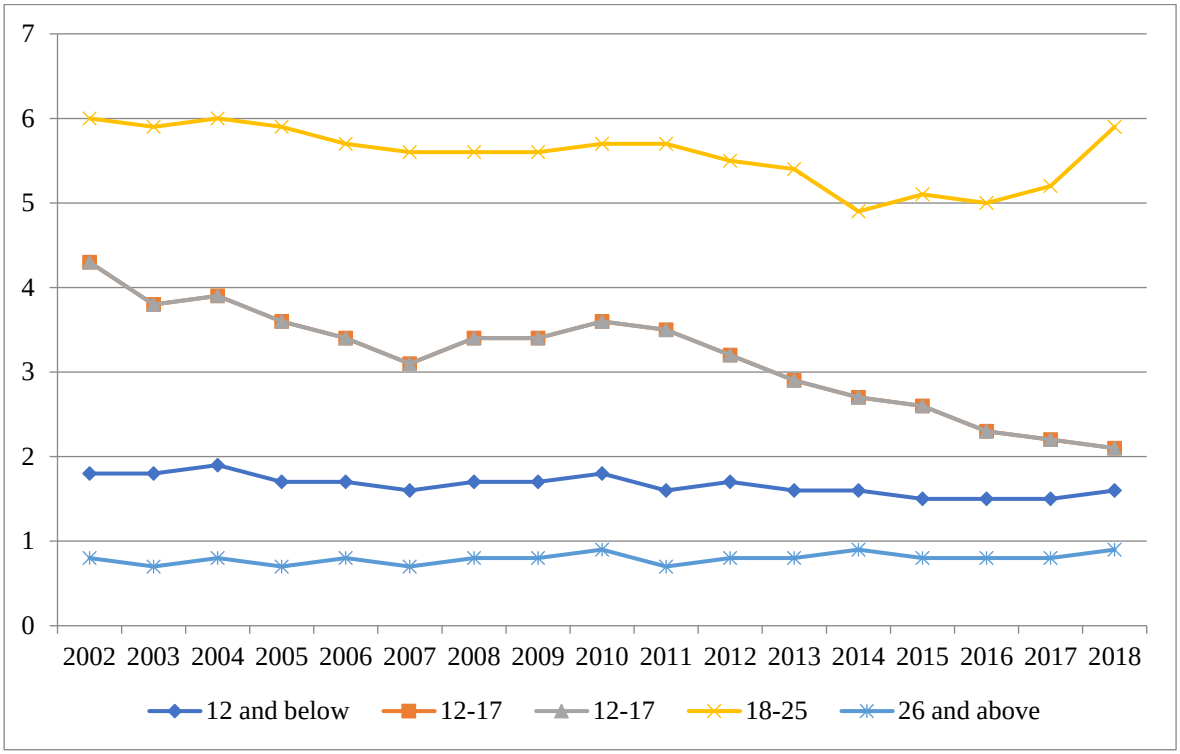
Figure 3: Cannabis State Revenue per capita, fiscal years since legalisation, USD



Adapted from The Census Bureau (2020); Washington State Liquor and Cannabis Board (2020); Colorado Department of Revenue (2020); State of Nevada - Department of Taxation (2020); Oregon Department of Revenue (2020); Alaska Department of Revenue – Tax Division (2020).

After collection, the generated funds are reallocated for the good of society. In 2015-2017, the funds collected in Colorado were distributed to the Colorado Department of Education to fund school construction, behavioural health programs, early literacy, bullying and school dropout prevention programs (Drug Policy Alliance, 2018; Colorado Department of Education, 2019). Similarly, Oregon and Nevada allocate 40 per cent of cannabis tax revenue to the state school fund (State of Nevada – Department of Taxation, 2018; Oregon Department of Revenue, no date) Alaska uses cannabis proceedings to fund drug treatment and community residential centres (Alaska Department of Revenue – Tax Division, 2020b). California dedicates 60 per cent of cannabis tax fund to youth drug use prevention and treatment programs for substance use disorder (Drug Policy Alliance, 2018). Drug war convictions have led to a loss of freedom, employment, housing, student loans, and other public benefits for previous cannabis offenders, causing significant social inequality. In California and Massachusetts, tax proceedings are pooled in funds for restorative justice, legal services, jail diversion, economic development, vocational training, mental health treatment, job placement, and other community re-entry programmes after incarceration or medical care (Drug Policy Alliance, 2018).

Figure 4: Past year marijuana use disorder among US residents, 2002-2018, percentage of age group

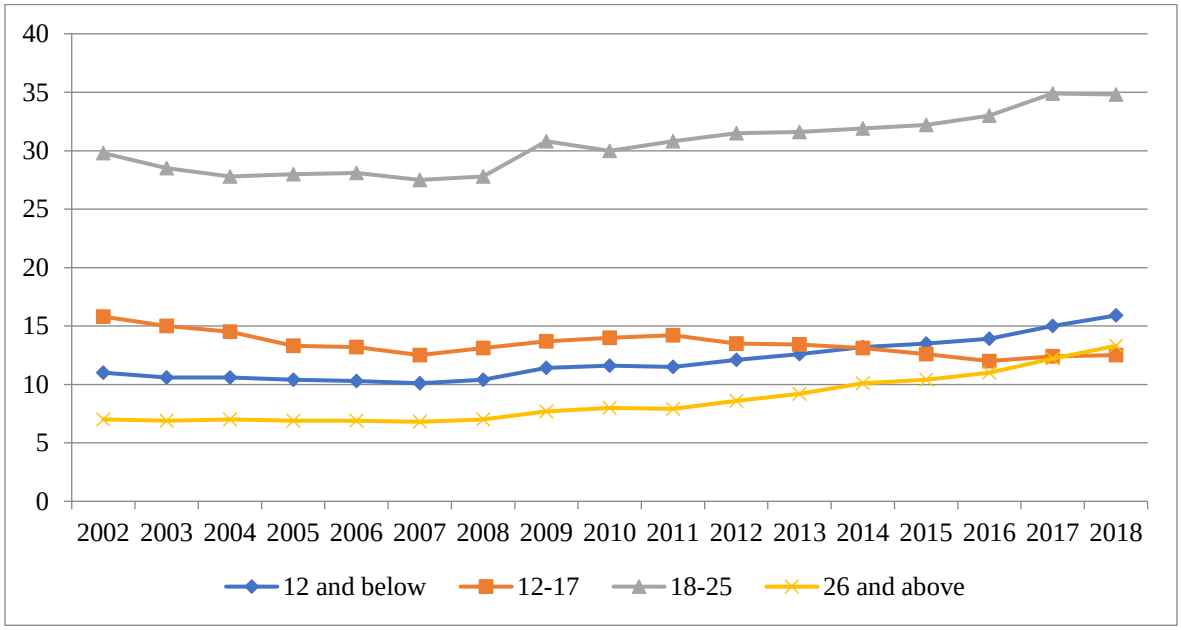


Source: Substance Abuse and Mental Health Services Administration (2019).

The data for past-year marijuana use disorder among US residents in 2002-2018 is visually represented in Figure 4. Since 2010, all age groups have shown a decreasing trend. The 26 and above age group remains steady at under one per cent of the population throughout the observed period. The youth group of 12-17 is steady or moderately decreasing, while residents aged 12 and below have remained steady. The share of young adults aged 18 to 25 with cannabis use disorder did not decrease throughout the observed period, as was the case with other age groups, which is a cause for concern.

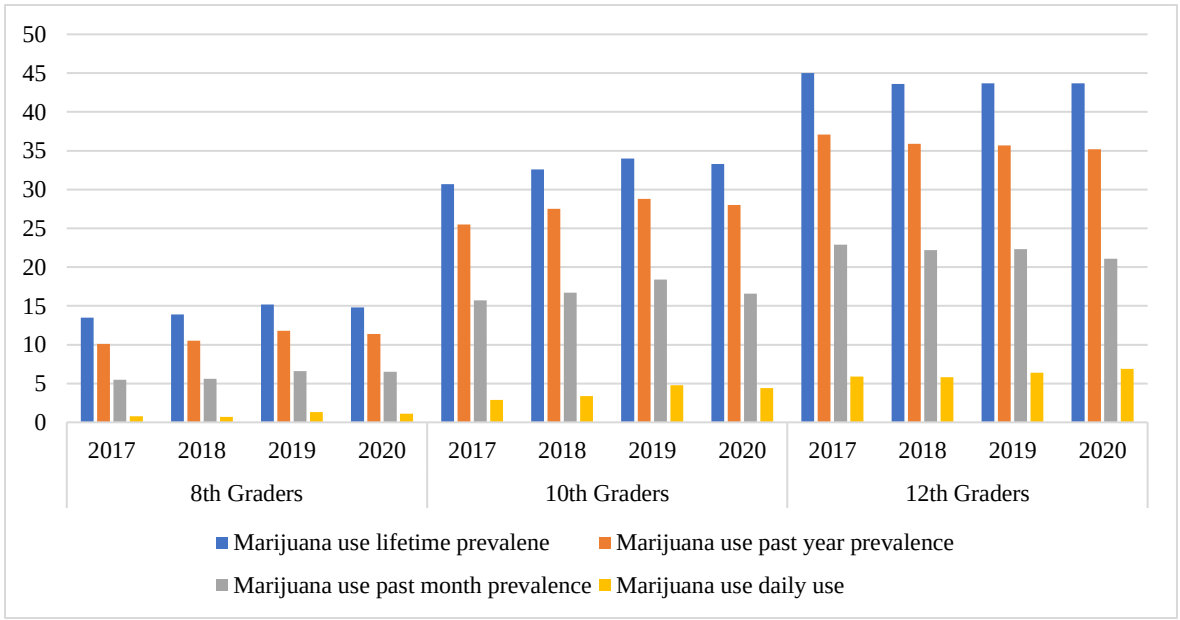
The national data for past-year cannabis use prevalence is presented in Figure 5. Alarmingly, young adults between 18 and 25 show a high share of users and represent an upwards trend. The share of the reported use by young people aged 12 to 17 years decreased throughout the observed period and remained relatively steady in recent years. The visual representation of the data series in a broader period allows for a steeper increase across all age groups from 2012 onwards, the year of Colorado and Washington legalisations. It can be assumed that cross-border regulatory changes affect public attitudes and cannabis use prevalence rates more than regulation within the jurisdiction itself. The US national survey results report a decrease in the perceived risk of weekly marijuana use among the youth and young adults in the observed period. At the same time, smoking a pack of cigarettes a day and binge drinking seem to have gained in perceived risk.

Figure 5: Past-year marijuana use among the US residents, 2002-2018, percentage of age group



Source: Substance Abuse and Mental Health Services Administration (2019).

Figure 6: Prevalence of marijuana use among US 8th, 10th and 12th graders, 2017-2020, percentage of age group



Source: National Institute on Drug Abuse (no date).

The Monitoring the Future nationwide survey data on marijuana use prevalence among US young respondents is depicted in Figure 6. Alarmingly, it shows an increase in marijuana use in recent years. However, the recent figures from 2020 are cause for optimism, as they

show a decrease in all prevalence types across the three groups. However, this might only be a temporary effect related to the COVID-19 pandemic outbreak, the associated isolation measures, and the temporary shutdown of education and other activities. In recent years, the trend for vaping prevalence among the US 8th, 10th and 12th graders has been on the rise, with vaping marijuana gaining in popularity in line with the rise in popularity of flavoured nicotine vaping (National Institute on Drug Abuse, 2019). In 2019, there was a nationwide outbreak of e-cigarette and vaping product-associated lung injuries among adolescents and adults in the US, particularly in Utah, Wisconsin, and Illinois (Ghinai et al., 2019; Lewis et al., 2019; Ellington et al., 2020). Patients with this condition in Illinois, Utah and Wisconsin acquired THC products primarily from informal sources.

The US's legalisation experience is an extensive field for research because of the government structure and the number of legalisations and related findings. We will summarise the findings using bullet points instead of tables, which we for other states in this chapter. The following are some of the most successful aspects of cannabis legalisation in the US states and beneficial impacts:

- Alaska, Colorado, Oregon, Nevada and Washington states were able to collect between $33 and $58 of cannabis tax income per capita per 12-month period (The Census Bureau, 2020; Washington State Liquor and Cannabis Board, 2020; Colorado Department of Revenue, 2020; State of Nevada - Department of Taxation, 2020; Oregon Department of Revenue, 2020; Alaska Department of Revenue – Tax Division, 2020; own calculations);
- Each respective state has designed schemes for the reallocation of cannabis tax proceedings into programmes and budgets serving the social and public health good (Drug Policy Alliance, 2018; Alaska Department of Revenue – Tax Division, 2020b; State of Nevada – Department of Taxation, 2018; Oregon Department of Revenue, no date; Drug Policy Alliance, 2018);
- As of January 2021, the cannabis industry supports the existence of nearly third of a million full-time jobs with estimated 77,300 new workplaces created in 2020;
- As of January 2020, the cannabis industry supports the existence of almost quarter a million full-time jobs, with new workplace creation rate anticipated to be 15 per cent year to year (Barcott, Whitney & Bailey, 2021);
- Legal cannabis possession and sales have an empirically-demonstrated positive effect on hospitality sector business with a 6.8 to 11 per cent increase in revenues with thanks to legalisation (Meehan, Rusko & Stephenson, 2020);
- Due to the cannabis sector being highly localised, it generates a high multiplier for economic output per $1 spent (Marijuana Policy Group, 2016);
- Cannabis legalisation leads to a more than 90 per cent decrease in arrests for cannabis-related crimes, leading to reduced costs of incarceration, the annual national average of which is $33,000 per inmate (Democratic Staff of the Joint Economic Committee 2018; Drug Policy Alliance, 2018; Staggs, 2018; Nichols, 2017);

- Various cross-states studies have concluded that legalisation also reduces violent and property-related crimes (Dragone, Prarolo, Vanin & Zanella, 2019; Chu & Townsend, 2019);
- Cannabis legalisation is associated with a decrease in the use of other drugs and binge drinking (Dragone, Prarolo, Vanin & Zanella, 2019);
- Marijuana use-associated treatment admissions among adolescents have declined in 2008-2017 across all US states, while declines in Colorado and Washington were more severe (Mennis & Stahler, 2020);
- Cannabis legalisation is associated with decreases in binge drinking and illicit and prescription drug use; Cannabis access decreases the demand for opioid drugs and decreases overdoses and associated fatalities; namely, legalisation makes it possible to bring down the number of total doses prescribed and associated spending by 30-32 per cent; recreational cannabis legalisation might reduce opioid-associated mortality by 20 to 35 per cent (Lake et al., 2019; Shi, Liang, Bao, An, Wallace & Grant, 2019; Chan, Burkhardt & Flyr, 2020; Piper et al. 2017).

Among the downsides of cannabis legalisation efforts, particularly its implementation and related effects, the following were identified:

- Because of the dissonance between state and federal regulation, several limitations and difficulties for cannabis businesses exist, including the inability to use tax deduction schemes and financial sector services for transactions and raising capital, which in turn means cash-only operations and the use of private capital, both of which bring associated risks; cannabis equity investors might also face legal issues (Democratic Staff of the Joint Economic Committee, 2018; Ohmer, 2013; MarketWatch, 2019; Democratic Staff of the Joint Economic Committee, 2016; 2018; The Future of the Marijuana Industry in America, 2020);
- Cannabis sector generates excess green and packaging waste, which leads to ecological imbalances (Kennedy, 2019; Black, 2017);
- Cannabis legalisation in one state negatively affects law enforcement duties in neighbouring states, this is reflected in the increase of perceived juvenile use and availability of strains; cannabis users in states with illicit cannabis are motivated to make out-of-state purchases (Wadsworth & Hammond, 2020);
- One study concluded that 75 additional traffic fatalities occur in a year because of cannabis legalisation; another study found that legalisation leads to a temporary increase of 1.1 fatalities per million on average, although this increase does not last for more than a year; a study of auto-insurance collision claims found a 6 per cent increase in claims in Colorado, Oregon, and Washington compared to control states that have not legalised cannabis (Santaella-Tenorio et al., 2020; Monfort, 2018; Leyton, 2019; Aydelotte et al., 2017);
- Since legalisation, an increase in hospitalisations in Colorado was recorded; Increases were attributed to cannabis abuse and dependence, as well as motor vehicle accidents

caused by impaired drivers and injuries attributed to falls; pediatric case reviews show an increased number of unintentional cases of cannabis ingestion by children in states with legal recreational cannabis (DiDavis, Mendelson, Berkes, Suleta, Corsi & Booth, 2016; Delling et al., 2019; Sokoya et al., 2018; Richards, Smith & Moulin, 2019);

- According to a national survey, the perceived risk of smoking marijuana 1-2 times a week has decreased among US adolescents and young adults, and is now perceived lower than that of binge drinking or a smoking pack of cigarettes a day (Substance Abuse and Mental Health Services Administration, 2019);
- A national survey found that in recent years the 12-month cannabis use prevalence among US residents in 18-25 and 12-17 age groups remained steady and increased among the 12 and below and 26 and above age groups; a steeper increase from 2012 onwards proves the phenomenon of cross-border regulation affecting public opinions and attitudes and having a more substantial effect on cannabis use prevalence than regulations across jurisdictions (Substance Abuse and Mental Health Services Administration, 2019);
- The US national figures for past-year marijuana use disorders show decreases across all age groups throughout the 2002-2018 period, except for the 18-25 age group, which remained at the same level while showing an increasing trend in recent years (Substance Abuse and Mental Health Services Administration, 2019);
- The trend of marijuana and vaping prevalence among US 8th, 10th, and 12th graders is alarming, as rates have generally increased in recent years; 2020 figures show a lower prevalence of cannabis smoking and vaping, although it might be a temporary effect of COVID-19 related isolation, which might affect the degree of parental control (National Institute on Drug Abuse, no date, 2019).

The last category relates to the findings, which were neither negative nor positive but could be valuable for the Slovenian context. It includes:

- Selecting the legal cannabis supply channel has an opportunity cost of 8 to 35 per cent of the illicit cannabis price; The most rapid increase in cannabis state income per capital was achieved in states where the average opportunity cost of going for legal cannabis supply was 8 to 10 per cent (Price of Weed – A Global Price Index for Marijuana, 2020; own calculations);
- Cannabis in states where it is decriminalised or illicit is approximately 8 to 19 per cent more expensive than in states with legal cannabis (Marijuana Laws By U.S. State, 2020; Oxford Treatment Center, 2020; own calculations);
- New regulations attempt to address the ecological downsides of the emerging sector (California Legislative Information, 2016, Kennedy, 2019);
- New legalisations in neighbouring states cause diminishing revenues with each marginal legalisation in the region; the "race-to-legalise" phenomenon (Hansen, Miller & Weber, 2020);

- In 2019 there was an outbreak of lung injuries and poisonings caused by vaping THC products acquired from informal sources (Ghinai et al., 2019; Lewis et al., 2019; Ellington et al., 2020);
- Recreational and medical marijuana legalisations can bring down alcohol sales by 12.4 per cent (Baggio, Chong & Kwon ,2018).

To conclude, the US experience, representing a set of comprehensive case studies and qualitative studies, supports research hypotheses H1 and H2.1.

The trend in increasing drug popularity in states with legalised cannabis matches US state-wide or, possibly, global trends. This provides grounds for a hypothesis that cross-border policy changes might have a comparable or even higher impact on prevalence than changes in public opinions and attitudes. At the same time, social and health risks also exist, even though it is not yet clear how severe they are and whether it is possible to avoid or mitigate them. The states that match cannabis transactions and effective tax rates and income per capita achieve a more time-effective conversion of illicit demand into legal demand.

2.5 Uruguay

This pioneer of cannabis legalisation has taken an innovative approach. This innovativeness has a long tradition, as the government legalised possession of cannabis in 1974. In 2013, it became the first country globally that introduced the state-wide legalisation of cannabis (Centre for Public Impact, 2018). There were several pre-conditions for this initiative to pass. External data has suggested the ineffectiveness of existing strategy in actions against drugs and a rapid increase in the number of drug users and drug production volume worldwide (Centre for Public Impact, 2018; Global Commission on Drug Policy, 2014).

"In June 2012 Uruguayan President Jose Mujica citing the "terrible consequences" of the dominant paradigm in global policy as well as increasing crime and consumption of harder drugs like cocaine paste…" has sent a bill to Congress, which attempted to make Uruguay first country to legalise cultivation and distribution of cannabis (InSight Crime, 2013). The first proposal was harshly criticized by the opposition, which accused the government of using its Congress majority to bring in controversial legislation without criticism (InSight Crime, 2013). In December 2012, a CIFRA poll found that two-thirds of Uruguayans opposed legalisation, and about a quarter approved it (Walsh & Ramcey, 2016). After a little more than a year, after further debate on the policy and several adjustments, the final regulation bill or Law No. 19172 was signed into law on 24 December 2013. On 2 May 2014, regulations accompanying the law were released by the executive branch (Walsh & Ramcey, 2016, Library of Congress, 2016).

Law No 19127 to Legalise and Regulate Cannabis aims to prevent abusive consumption of marijuana by educating the population about its harmful effects through special curricula and combating drug trafficking (Library of Congress, 2016). It also seeks to eliminate

existing legal paradoxes that allowed for possession but effectively blocked cannabis access to users caused by previous unclear decriminalisation policies (Walsh & Ramcey, 2016). The policy instituted a new state body, the Institute for Regulation and Control of Cannabis (hereafter: IRCCA), a federal regulatory organisation for legal cannabis (Walsh & Ramcey, 2016; Library of Congress, 2016). The final draft of the cannabis regulation gave Uruguayan citizens and permanent residents aged 18 and older access to the drug. The Uruguayan model of cannabis legalisation represents a highly distinctive approach, as it opens three possible legal, mutually-exclusive channels of cannabis supply:

I. Individuals can purchase up to 10 grams per week (40 per month) of the drug in licensed pharmacies, and the drug is to be produced by commercial growers who are approved by the state. Users must register with the IRRC before accessing the drug;
II. Users can grow up to 6 female cannabis plants with flowers per one household for personal use. The plants have to be registered with the IRCCA before cultivation;
III. Drug enthusiasts can join so-called "cannabis clubs" for shared cannabis cultivation;
IV. Such cannabis clubs of 15 to 45 members must be registered with the IRRCA and may cultivate up to 99 plants in the same space (Walsh & Ramcey, 2016).

Advertising of cannabis is prohibited in all forms. The state has full control over large-scale cannabis production by private sector entities (Walsh & Ramcey, 2016). Cerdá & Kilmer (2017) classify Uruguay's approach to cannabis supply as middle-ground one, as presented by a figure in Appendix 10. The Uruguayan policy mix is different from the so-called "standard commercial model" applied by Canada and the US, as it does not allow for product assortment (Cerdá & Kilmer, 2017).

The retail price for cannabis is fixed at 53 Uruguayan pesos ($1.23) per gram of dried flower, approximately 70 per cent of it is received by producers. The rest goes to the pharmacy after deducting a small commission (Pascual, 2020). Two producers supply two sorts of the product with a THC content of 2 and 9 per cent of THC; the THC-content is capped at 15 per cent maximum and the minimum CBD level allowed is 3 per cent (Hudak, Ramsey & Walsh, 2018; Cerdá & Kilmer, 2017). Long-term plans are targeted at a 1:1 THC/CBD potency ratio and produce cannabis with medium-low levels of THC – potent enough to compete with the black market and no higher (Cerdá & Kilmer, 2017). Consequently, the policy does not account for any assortment within the retail trade with cannabis, meaning that different products from dried cannabis flowers of certain sorts are not available for purchase. Use of cannabis in public is forbidden to the same degree as tobacco (Walsh & Ramsey, 2016).

The policy can be further characterised as (Walsh & Ramsey, 2016):

- It is designed to be state-heavy, in the sense of government's role as of a regulator and controller, which partially and indirectly operates the supply;

- It offers three exclusive methods of access to users who have to sacrifice a certain degree of privacy, with data disclosure for gaining access, access is restricted to tourists;
- Advertising of drugs and related activities is commercially restrained;
- Government has minimum tax revenue from cannabis-related activities, also so-called "variable fee" with which state charges cultivator and is used only to keep the price competitive with the black market and not maximise state income;
- It is health-focused, as it commits resources to education and public health to minimise the harm of cannabis.

Difficulties associated with Uruguayan policy implementation have led to certain inefficiencies, such as the yet low achieved number of IRCCA registrations compared to the expected registrations based on pre-legalisation forecasts. The registrations are published online on the IRCCA web page and are presented in Appendix 11. The number of registered individuals does not cover half of the initially assumed number of users. In contrast, the figures representing existing registrations suggest that Uruguay could have much more daily cannabis users than initially suggested. This, in turn, additionally supports the theory that cannabis users tend not to disclose their real attitude towards cannabis publically or in national surveys.

Table 8 lists the policy outcomes and related specifics. The Uruguayan approach to cannabis regulation sacrifices the state's economic benefits while requiring the government's presence and resources to maximise societal outcomes. Due to structural problems and lack of budget for factual state-presence in regulation and problems caused by external factors such as overseas regulation, the policy is yet to start functioning as planned. While the policy has very positive intentions with society in the scope, distribution problems paralyse the policy's further implementation. There is evidence that public attitudes towards legalisation have changed and have become more favourable. While public health and other data within the given timeline are limited, the preliminary study did not reflect any changes in attitudes towards perceived risk or increased usage among the population and adolescents. However, there was an identifiable increase in the perceived availability of cannabis among students. While this middle-ground cannabis legalisation policy is not the most indicative in terms of an economic impact on cannabis use prevalence changes, it is a great example to keep in mind in anticipation of further developments.

Table 7: Summary of the Uruguayan cannabis legalisation policy review

Beneficial effects	**Adverse impacts and other disadvantages**	**Other specifics of the policy and related conclusions**
The policy has managed to partially suppress the illicit cannabis market, which is expressed in $22.2 million of legal Uruguayan cannabis revenues in 2018; These are shared among pharmacies (12 per cent), cannabis clubs (20 per cent) and home growers (68 per cent)	The policy has feasibility issues associated with low points of access coverage, as according to the US PATRIOT Act banks are barred from serving clients engaged in controlled substances production and distribution	The policy is a unique example of being "pulled" from the state side, instead of classical "push" from the side of the public as it was opposed by a majority of Uruguayan residents before enforcement, although public acceptance of legalisation has increased in years succeeding legalisation enforcement;
The study on use among adolescents before and after legalisation has found no evidence on related changes in cannabis use prevalence rates or perceived risk of use	While designed to be state-heavy, the legalisation policy lacks sufficient financial resources for the controlling body, the IRCCA, to monitor the compliance with regulation	
	A potential weakness of a policy is the need for a citizen to submit personal and biometrical data for access to cannabis, which leads to privacy-associated dilemmas while selecting between legal and illicit supply	
Substance-use prevention curriculum used within the framework of legalisation shows particular efficiency in achieving desired outcomes	Production and logistics of cannabis to points of access remains a bottleneck, as inventory received once a week never lasts for more than 24 hours; Pharmacies are not able to inform customers regarding restocking of inventories, as advertising is prohibited	The policy is unique in the sense of setting aim scope strictly on the common good of society and ignoring the opportunity for any economic interest of the state
	The IRCCA registrations numbers yet achieved are lower than expected based on initial forecasts	

table continues

Table 8: Summary of the Uruguayan cannabis legalisation policy review (con.)

Beneficial effects	**Adverse impacts and other disadvantages**	**Other specifics of the policy and related conclusions**
While the policy did not achieve the desired outcome of a decrease in homicide rates until 2018; there is an opinion that legalisation prevented a much steeper increase	There is a potential linkage of legalisation and increase of light motor traffic fatality rates, particularly in urban settings	The policy limits foreigners' access to cannabis,
	In 2016, roughly twice as more women were using cannabis before acknowledging pregnancy compared to 2013 figures	
	The study on use among adolescents before and after legalisation has found an increased perceived availability of cannabis among students	

Source: Haberkorn (2017); Hudak, Ramsey & Walsh (2018); Center for Public Impact (2018; 2020); Pascual (2019); Walsh & Ramsey (2016); IRCCA Convención (2019); Cruz, Boidi & Queirolo (2018); Marsiglia et al., 2018; Ministerio del Interior (2020); Jorge (2020); Nazif-Munoz, Oulhote & Ouimet (2020); Castro et al. (2019); Laqueur et al. (2020).

2.6 Other cannabis regulation practices

While most of the presented examples deal with already existing overseas cases of *de jure* cannabis regulation efforts and *de facto* decriminalisation in the Netherlands, there are alternative cannabis liberalisation policies.

2.6.1 Alternative regulatory actions concerning cannabis possession

According to Hughes, Stevens, Hulme and Cassidy (2019), there are currently six different approaches for dealing with simple possession drug offences. The significant differences in policies lie in:

- Legal basis - "de jure", where policy changes are set out by law, and "de facto", where guidelines represent case regulation;
- Presence or lack of pathways for education, treatment, and social services;
- Utilisation of administrative or civil sanctions.

The six distinctive approaches are described in the following section.

Depenalisation – is the approach taken in the Netherlands and was described earlier in the thesis. It is also used in Denmark, Belgium, England, Wales, and the US. The approach aims to save law enforcement resources and avoid the unnecessary criminalisation of young people for simple possession. It has a de facto legal basis. The approach does not provide pathways for education or involve any additional treatment efforts. Individuals possessing small amounts of drugs are not sanctioned, although cautions or warnings may be issued. Depenalisation does not make changes to existing laws but requires the adoption of new law enforcement procedures and training methods. Policy outcomes include reduced collateral consequences of convictions, reduced burdens and costs for law enforcement and the justice system, increased policing of serious crimes, and increased voluntary treatment uptake (Hughes, Stevens, Hulme & Cassidy, 2019).

De jure police diversion is used in the Netherlands (hard drugs only), Australia, England (Durham, West Midlands, and Avon), and Baltimore in the United States. The logic behind the approach is that drug offences are more often a health or social issue than a criminal justice one. It aims to reduce criminalisation, preferring to refer detected offenders to health or social services they otherwise might not access. These may include alcohol and drug addiction treatment or training. This approach requires adopting new law enforcement procedures, including eligibility criteria and more police training, and the provision of health care and social support options. The outcomes include reduced collateral consequences of convictions, reduced law enforcement and justice system costs and burdens, increased knowledge and skills among people who use drugs, and reduced drug-related harms (Hughes, Stevens, Hulme & Cassidy, 2019).

***De facto* police diversion** – the approach taken in Australia is similar to the *de jure* police diversion model described above. The critical difference is the inability to retain discretion because of how the policy is formulated in law. This difference removes inconsistencies in the procedure, as all detected offenders must get a police referral. All individuals in possession of drugs are thus given the same opportunity for health care and social support. The approach requires changes in law and procedure. Such an approach boosts the outcomes presented above for de jure police diversion approach. The increase in referrals also requires more social and health programmes (Hughes, Stevens, Hulme & Cassidy, 2019).

An approach of **decriminalisation with civil or administrative sanctions** is taken in some Australian states, several US states, Spain, and Jamaica. The logic behind it is that drug possession should not be a crime and should thus be removed from criminal law; however, it should not be ignored either, so sanctions of a lower level are used. Such an approach requires legislative changes in the form of new civil or administrative laws and systems such as paying fines online. The outcomes of such a system include reduced collateral consequences of criminal convictions, reduced burdens and costs for law enforcement and the justice system, reduced stigma, and increased state revenues due to fines paid or community service work assigned (Hughes, Stevens, Hulme & Cassidy, 2019; Belackova, Roubalova & van de Ven, 2019).

Decriminalisation with targeted diversion to health and social services has been adopted in Portugal and the US states of Maryland and Nebraska. This approach recognises the harmfulness of criminalising people for mere drug possession and that harmful behaviour of drug usage can be treated with beneficial access to health and social support. What distinguishes this model from others is that most users are considered non-problematic and in no need of access to the services mentioned earlier. It is a hybrid system aimed at high-risk offenders. Requirements for such an approach include implementing new civil or administrative laws, screening and assessment procedures for high-risk offenders, creating treatment programmes and employment services. Low-risk offenders get civil or administrative sanctions, while high-risk offenders are referred for further assessment and treatment. Outcomes include greater to access to social and health treatment, with no high burden on these services. Collateral consequences of criminal convictions are also eliminated, while the policy improves social integration and reduces the costs and burdens on law enforcement and the justice system (Hughes, Stevens, Hulme & Cassidy, 2019). An analysis of Portugal's reforms suggests that such a policy reduces drug use and associated harms among problematic groups and adolescents (Hughes & Stevens, 2010; 2015). The policy has been shown to impact the reduction in the social costs of drug use, more specifically a 12 per cent decrease in the first five years and an 18 per cent decrease in ten years (Hughes, Stevens, Hulme & Cassidy, 2019; Bastos, Faria, Gonçalves & Lourenço, 2015).

The last of the six approaches described is **decriminalisation with no sanctions applied**. The logic behind it is that the criminalisation of an individual's personal drug use is wrong.

However, alternative systems are potentially harmful and counterproductive. The method is very similar to the first one presented, depenalisation. However, this response has a de jure legal basis and is set by legislative act. Under such a framework, individuals possessing cannabis in volumes intended for personal consumption face no sanctions. It is used in Germany, the US state of Vermont, and the Republic of Georgia. It only requires changes in legislation, which is why there are fewer barriers to implementing this approach than others. Outcomes include reduced collateral consequences of criminal convictions, reduced burdens and costs for law enforcement and the justice system, increased policing of serious crimes, and reduced stigma. The analysis of the German system suggests beneficial impacts, including reductions of drug-related harms and lower drug rates, particularly rates of problematic use (Hughes, Stevens, Hulme & Cassidy, 2019; Eastwood, Fox & Rosmarin, 2016).

In addition to policy responses on cannabis possession for personal use, the current policies also address home cultivation options. Twelve jurisdictions have de jure legalisation of home cultivation, including nine US states, Antigua, Barbuda, Canada, and Uruguay. Two other jurisdictions – Belgium and the Netherlands – have implemented de facto decriminalisation of cannabis home cultivation, while the Czech Republic, Spain, Jamaica and three Australian states have de jure decriminalisation. Chile and Brazil employ de jure depenalisation and South Africa, Mexico, Colombia, Costa Rica, and the Republic of Georgia use de facto depenalisation of home cannabis cultivation. The regulations differ among states; however, all include possession thresholds for production, rules about sharing the production, and sanctions for non-authorised misbehaviours (Belackova, Roubalova & van de Ven, 2019; Hughes, Stevens, Hulme & Cassidy, 2019).

A quick indicator of policy success in terms of cannabis spread can be seen in Table 1. Denmark and the Netherlands, which take a depenalisation approach, and Germany, which uses a similar decriminalisation approach with no sanctions applied, all show similar levels of cannabis use prevalence in the population. The data allows us to assume that the de jure legalisation approach to drug policy produced a less positive impact on cannabis prevalence. At the same time, depenalisation is somewhat more successful, and decriminalisation with targeted diversion is proven to be most successful in terms of cannabis use prevalence. However, such a conclusion would be wrong, as it is unknown which comes first in terms of causality, the popularity of cannabis or less punitive legislation.

2.6.2 Other cannabis regulatory practices

Since 2012, Switzerland has taken the approach of decriminalisation with administrative sanctions for cannabis possession. Cannabis with less than one per cent of THC has been considered a tobacco substitute since 2011 and is regulated accordingly and taxed at 25 per cent. The country held a referendum in 2008 on the legalisation of recreational cannabis; however, only 37 per cent of voters approved the initiative (Zobel, 2020).

According to ACT Government, cannabis possession, cultivation, impaired driving, sale, and distribution to minors are illegal in Australia. Public use of cannabis is considered an offence. Adults possessing up to 50 grams of dried cannabis or up to 150 of fresh cannabis, as well as growing up to two plants per person, with a maximum of four per household, are not penalised (ACT Government, 2020).

In Belgium, the 2003 directive was supplemented by another directive in 2005. Cases of possession of up to three grams of dried cannabis or the cultivation of a single plant at home are no longer prosecuted. The possession of cannabis in public places or near places where schoolchildren might gather can be subject to criminal sentencing (EMCDDA, 2018a). According to Kilmer, Kruithof, Pardal, Caulkins and Rubin (2013), four cannabis social clubs have launched in Belgium since 2006.

In 2015, the Jamaican Minister of Justice Mark Golding introduced an amendment to the country's Dangerous Drugs Act that brought significant regulatory changes while adhering to the United Nations international drug conventions. With this amendment, possession of up to two ounces or approximately 56.7 grams for personal use and cultivation of up to 5 plants for therapeutic and horticultural purposes were decriminalised. Exemptions were made for the Rastafarian community's sacramental use. These also allow for consumption, distribution, and transport of cannabis for events in celebration or observance of the Rastafarian faith and culture (Klein & Hanson, 2020).

The case of Spain is most complicated of all presented above. On the one hand, cannabis possession and cultivation is a criminal offence and minor possession for personal consumption is penalised with administrative sanctions (EMCDDA, 2018b). On the other hand, we have the phenomenon of cannabis associations in Spain since 1992. Hundreds of cannabis social clubs exist across the country, collectively cultivating and consuming marijuana in a private setting. However, differences between regions exist. The clubs function in a semi-legal setting in the autonomous communities of Navarre, the Basque Country, Catalonia, and other municipalities that have passed local by-laws. However, in most regions of Spain, they are frequently treated as illicit drug trafficking organisations, with their members being brought to trial and having their crops seized (Arana, 2019). The legality borderline between shared cultivation and consumption and the promotion of cannabis consumption is not substantial enough, and there is no active regulation, which would make setting clear. Meanwhile, courts of all hierarchies must carry the burden of need for additional rulings on these clubs' legal existence and participation, with each ruling individual to the club or club member (Marks, 2019).

3 CANNABIS USE IN SLOVENIA: SURVEY DESCRIPTION

For the needs of research data acquisition, the CSIRS survey was conducted among cannabis users in Slovenia in Spring 2019.

3.1 Data collection

Survey questionnaires represent the most common way of gathering data from a sample of individuals. According to Phillips and Stawarski (2008), they consist of a set of standardised, relatively structured questions, including multiple-choice questions, open-end questions, binary questions, and ranking scale questionnaires. The survey data gathered upon completion allows the researcher to test the hypothesis (Matthews & Ross, 2014).

Surveys investigating drug use behaviour are used to collect valid and accurate drug use measures that contribute to the shared knowledge and can be further used for policy information and policy adjustment. General population surveys have pros and cons. Some of the disadvantages are potential errors due to misreporting among self-reports on drug use, non-responses, and exclusion of various groups from the target population. It is a challenging task to find drug users in the general population due to the "hard-to-reach" or "hidden" populations phenomena, meaning that the use of random sampling methods may lead to either respondent loss or cases of misreporting (Adlaf, 2005). Non-random sampling methods are used to capture cannabis users and measure related behaviours. In the drug-use field, link-tracing techniques such as snowball sampling may be used (Adlaf, 2005). According to pre-set criteria, the snowball sampling method refers to selecting individuals from the population and having them provide referrals to recruit samples required for a study (Goodman, 1961).

Online surveys represent the most convenient way of data collection from a sample of individuals, particularly for collecting data for representatives of hidden population. The CSIRS survey was distributed to the initial "snowball" sample through multiple social media platforms by a list of non-profit organisations, unions, cannabis-related pages in Slovenia, and individuals. The initial message included a link to a survey and instructions to pass it on to the hidden target population: cannabis users in Slovenia.

3.2 Survey description

The online survey platform 1ka was used to conduct the survey. The survey report can be found in Appendix 6. A survey of 53 questions in the Slovenian language was published on 18 March 2019 and closed on 18 July 2019. The survey collected 2,281 responses with 1,062 complete answers. For further use in hypothesis testing and market estimate calculations, the data set was cleared to remove nonsensical responses and outliers such as extreme values for

prices of cannabis products or sequences of inconsistent answers, e.g. when the respondent indicated not being a cannabis user but reported his or her monthly cannabis expenses.

3.3 Sample description

Fifty-six per cent of the respondents were male, and 44 per cent were female. Two-thirds of them fell into the age group of 18-28 years old, 4 per cent were minors under 18, while one-third of the individuals were 29 years old or older. Most of the respondents – 40 per cent – came from the Osrednjeslovenska region, while respondents from Gorenjska and Goriška represented 10 and 9 per cent of the sample, respectively. Over a third of the respondents were regularly employed, one third were students, and the remaining third were either self-employed or high-school students. The sample tended towards younger residents with a higher share of male respondents than female ones. The demographics aligned with our expectations, as males were more frequent users of cannabis and cannabis was more popular among younger generations. The trend towards younger generations may also be related to the use of an online survey.

3.4 Description of CSIRS Survey

The academic literature provides evidence that certain factors related to cannabis consumption are associated with adverse health effects. These linkages were examined with the use of the survey and statistical methods. The survey collected short- and long-term side effects indications data from users and patterns and specifics regarding general lifestyles and cannabis use. The CSIRS survey collected the following data from cannabis users:

- **frequency of cannabis usag**e – daily, weekly, monthly, 5-11, and 1-4 times a year;
- **age of the first contact with cannabi**s – a respondent may choose among age gaps;
- **period of cannabis use** – with options to choose from 0.5 to 5 years, with a 0.5-year gap between the options, as well as an option for over five years of use;
- **alcohol use** – replied with a yes/no answer;
- **simultaneous use of alcohol and cannabis**, where the respondent could choose from three options, two about the use of cannabis and alcohol as complements (simultaneous use of both or use at different times, e.g. on different days) and one on substituting recreational alcohol use for cannabis use;
- **products used by cannabis users**, such as cannabis with lower and higher THC content, hashish resin, hashish oil, THC-infused foods, and tincture for vaping;
- **side-effects** associated with **short-term** cannabis use (after a few days) such as memory loss, passivity, lack of energy, a decrease in sexual activity, difficulties with cognitive functions, difficulties with concentration, increased appetite;
- **side-effects** associated with **long-term** cannabis use (one year and more) such as memory loss, passivity, lack of energy, a decrease of sexual activity, difficulties with

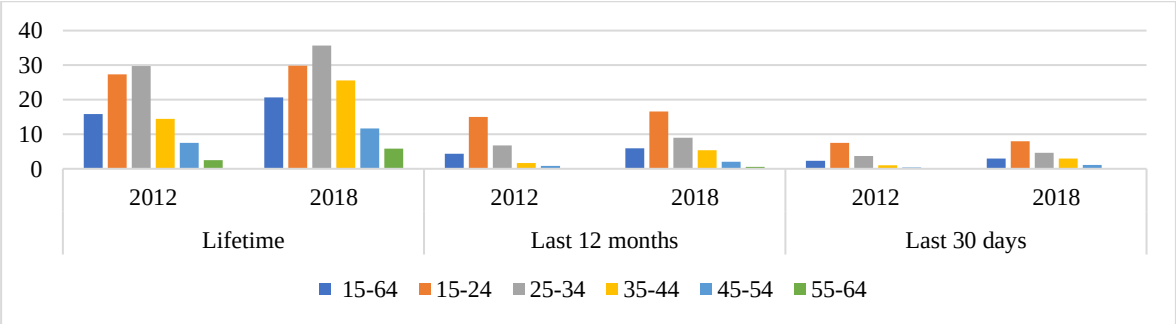
cognitive functions, difficulties with concentration, fertility reduction, increased aggressiveness, panic and anxiety disorders.

The survey also asked respondents to specify their average monthly budget for **cannabis-related expenses** and the **purchasing price** per unit for a cannabis product in euros. The descriptive statistics report for these and other questions asked in the CSIRS but not used here, are presented in Appendix 7. The H2 hypothesis was examined using descriptive statistics and the Pearson Chi-Square correlation test applied to the CSIRS data on drug use patterns and health indications. The Pearson Chi-Square test, also known as the "goodness-of-fit" test, is generally used to identify correlation linkages between categorical variables attributed to the population and the null hypothesis that states there is no relationship between the variables. The test counts cells and compares them to the expected values (Statistics Solution, 2020). The survey may be accessed on the platform (1ka, 2021) or requested directly from the author in case if it is not accessible with the link attached in the list of referrences.

4 SLOVENIA: CANNABIS USE, BEHAVIOUR. HEALTH-RELATED RISKS AND REGULATION

4.1 Spread and patterns of marijuana use

Figure 7: Cannabis use prevalence in Slovenia according to 2012 and 2018 NIJZ surveys, percentage of age group



Source: Drev & Lavtar (2014), ATADD (2018, Appendix 4).

In Slovenia, cannabis is the most prevalent illicit drug. Similar to Western trends, its popularity is growing, as illustrated by the results of the two consequent national surveys presented in Figure 7. The data shows an increase in the prevalence of cannabis use in Slovenian households: all age groups showed an increase in 2018 compared to the 2012 survey results. According to Drev and Lavtar (2014) and the National Institute of Public Health (2019a) 2011-2012 National Survey For Tobacco, Alcohol and Other Drugs in Slovenia, non-medical cannabis is the most popular illicit drug in Slovenia, particularly among the younger generation and males. The 2017-2018 survey recorded the same trends.

Selected results of the survey were requested from the NIJZ and are presented in Appendix 4. Substances such as cannabis plant material, hashish resin and oil, and THC-infused foods and drinks are used in Slovenia (Červek & Červek, 2018).

The police drug seizures figures are published in annual Slovenian Police reports by the Ministry of Interior (MNZ). The 2020 figures are presented in Appendix 5 and show an increase in seizures of cannabis and related drugs in 2015-2019. In 2018, the Slovenian Police discovered 62 cannabis cultivation sites equipped for indoor growing and seized 8,393 plants. In 2019, 75 such sites were discovered, and 5,393 sprouts were seized (Ministry of the Interior, 2020). However, increases in police statistics are not necessarily linked to increased use in Slovenian households. The phenomenon could also be associated with changing priorities of law enforcement or international illicit drug trafficking trends. North Macedonia and Albania make up the third biggest illicit cannabis-producing region globally and supply the European drug markets. Slovenia is situated in the famous "Balkan Corridor" of drug trafficking (EMCDDA, 2017; United Nations Office on Drugs and Crime, 2014).

Among the respondents to the first question of the CSIRS survey (n=1329), 93.8 per cent had either tried smoking cannabis or consumed other forms of it. This result confirms the success of the sampling technique in reaching the hidden population of cannabis users. Two-thirds of the respondents who had not tried cannabis (n=102) reported doing so out of a lack of interest. Other reasons included negative personal or public opinions on illicit drugs, fear of health-related consequences, and lack of opportunity. Fear of legal sanctions linked to cannabis was reported by less than four per cent of respondents. The majority of respondents who had tried cannabis (n=1366) reported curiosity as the primary motivating factor. Only a minority had tried cannabis because of health-associated reasons and peer pressure.

Among products used by Slovenian cannabis users, the most popular was "homegrown" outdoor marijuana with lower THC content. A somewhat lower number of respondents preferred "skunk" indoor-grown marijuana with higher THC content. Two-fifths of the respondents reported hash resin use, one-fifth reported using cannabis extracts, while THC-infused edible products were reported by one-third of the respondents. Vaporiser liquid only took up a minor share, under two per cent. About half of the respondents to the question about supply channels (n=1412) accessed their cannabis directly through the black market. More than a third of the respondents confirmed social distribution, and more than one-tenth cultivated their own cannabis. Among the respondents (n=881), over one third made scheduled purchases of cannabis at equal periods of time, while others were only occasional buyers.

The mean monthly cannabis budget reported by the respondents (n=755) was €110.46 (st.dev=178.67). Purchasing prices per unit of drug submitted were €5.69 (n=673, st.dev=2.36) for homegrown cannabis, €8.40 (n=646, st.dev.=2.40) for indoor cannabis, €36.09 (n=138, st.dev.=22.23) for hash oil, and €8.55 (n=426, st.dev.=3.29) for hashish resin. On average, cannabis users (n=1084) classified their experience with cannabis as good

rather than bad (M=3.53, st.dev 0.992). The respondents reported enjoying cannabis in group settings rather than alone (n=338, M=3.53, st.dev.=1.28). On average, respondents did not experience problems when purchasing cannabis (n=678, M=1.93, st.dev.=1.09). The demand for cannabis could be characterised as elastic rather than inelastic, as the price per unit could have impacted the purchasing quantity (n=919, M=3.79, st.dev.=1.36). Among the risks associated with purchasing, the most frequently mentioned ones were difficulties arising from the illicit status of cannabis. One-fifth of the respondents reported problems with sellers, such as unfair price-quantity or price-quality ratios and aggressive behaviour. Over a quarter of respondents with cannabis experience (n=1123) indicated their willingness to travel to destinations with legal cannabis.

4.2 Risky behaviours and associated harm

The complete CSIRS descriptive statistics analysis is presented in Appendix 7, while this subchapter addresses the potential harm associated with cannabis use and related risky behaviours in Slovenia. Respondents who did not consume cannabis regularly made up 13.4 per cent of the survey population (n=1245). Out of those who reported using cannabis (n=1078), almost half reported daily usage, while a quarter used it weekly. Among those who reported regular cannabis usage (n=1077), almost half had used it for over five years. About a third of the respondents who did not report current regular cannabis use (n=335) had used it periodically in the past, and the most reported reason for quitting was adverse psychical effects. Almost two-thirds of the respondents (n=1244) reported being between 15 and 18 years old during their first contact with cannabis, 16.2 per cent first had contact when they were between 11 and 14, and 13.3 per cent reported being between 19 and 22 years old. While almost three-quarters of respondents (n=1239) reported using alcohol, almost a third of them reported using it simultaneously with cannabis. Among the most frequently selected short-term health indications was “None of the above”, selected by over half of the respondents. Four out of ten respondents reported passivity and lack of energy, and approximately a third reported concentration problems and memory losses. Two out of ten respondents confirmed having cognitive function issues, while one out of ten reported increased appetite and decreased sexual activity. Among the health-related indications that appeared after a year or more of use, the most frequent was memory loss with 56.6 per cent of the responses, followed by passivity, lack of energy, and concentration-related problems, with four out of respondents reporting them. Approximately two out of ten reported issues with cognitive functions and anxiety, and one out of ten reported a decrease in sexual activity. A bit more than one per cent declared infertility symptoms associated with cannabis use. Only one out of ten respondents reported having none of the listed symptoms, which may be compared with over half of the respondents having short-term use effects. Nearly 15 per cent of the respondents self-reported as being addicted to cannabis.

4.3 Correlating risky use behaviours and adverse health effects

The tables in Appendix 12 give information about the results of the Pearson Chi-square test conducted on the CSIRS data to find links between specific use patterns and adverse health effects. The appendix includes statistically significant results ($p<=0.05$) and results with $p<=0.1$, which are not mentioned in our analysis.

Respondents with a higher frequency of usage were more likely to indicate long term cannabis usage side-effects than respondents with a lower frequency of usage. The variable "Memory loss" was correlated with the frequency of cannabis use (sig.: 0.018). 62.7 per cent of respondents who consumed cannabis daily reported memory loss and 58.2 per cent of the ones who reported the symptom were daily cannabis users. A decrease in the frequency of use was associated with the lesser number of respondents who indicated the effect. Respondents with a higher frequency of usage were more likely to indicate short-term cannabis use side effects than respondents with a lower frequency of usage. The variable "Passivity, lack of energy" was correlated with the frequency of cannabis use (sig.: 0.008). 35.1 per cent of respondents who consumed cannabis daily reported lacking energy or being passive, and 43.4 per cent of respondents who mentioned the effect were daily users. The variable "Difficulties with cognitive functions (difficulties with intellectual work, studying) is correlated with the frequency of cannabis use (sig.: 0.001) and 45.6 per cent of respondents who report these difficulties, use cannabis daily. For both of the studied indications, the share of respondents reporting it increases with increased use frequency.

Respondents with an earlier first contact with cannabis were more likely to indicate long-term cannabis use side-effects than respondents who first encountered cannabis later. The variable "Decrease of sexual activity" was correlated with the age of their first contact with cannabis (sig.: 0.006): 76.7 per cent of the respondents who reported a decrease in sexual activity as a long-term adverse effect associated with use had tried cannabis before the age of 18. The share of respondents who had reported the effect decreased with the higher age of initiation into cannabis use. The possibility of the harmful effects of cannabis during puberty, particularly on the human reproductive and hormonal system, could explain the connection. The variable "None of the above" was also correlated with the frequency of the age of first contact (sig.:0.000). A higher frequency of use was associated with a broader fraction of respondents, potentially due to possible misreporting among respondents or differences in health responses to cannabis use.

Respondents who were long-term cannabis users were more likely to indicate long-term cannabis use side-effects than respondents with a shorter history of usage. The variable "Memory loss" was correlated with the length of cannabis use (sig.: 0.002) and only 2.8 per cent of respondents who reported the symptom had used cannabis for less than a year. By contrast, side effects were reported by 40.3 per cent of the respondents who had used for five years or more. The variable "Decrease of sexual activity" was also correlated with the length of cannabis use (sig.: 0.032). While 2.8 per cent of respondents who reported the symptom

had used cannabis for less than one year, the share increased with the increase in use period – 46.2 per cent of those who reported using cannabis for 5 years and longer also reported a decrease in sexual activity

Respondents who used cannabis and alcohol simultaneously were more likely to indicate long-term cannabis use side-effects than respondents who consumed both drugs separately. The variable "Memory loss" was correlated with the indication of using alcohol and cannabis as complements and the combined simultaneous use of the two (sig.: 0.054). 45.9 per cent of the respondents reported the symptom and reported such a relationship in substance use patterns. The variable "Decrease of sexual activity" was also correlated with the indication of complementary alcohol and cannabis use and the combined simultaneous use of the two (sig.: 0.079). 28.2 per cent of respondents who reported that symptom, also reported a relationship in substance use patterns. The variable "Difficulties with cognitive functions (difficulties with intellectual work, studying)" was also correlated with the indication of using alcohol and cannabis as complements and the combined simultaneous use of the two (sig .: 0.079). 55.4 per cent of the respondents who reported the symptom, also reported the relationship in substance use patterns. Similarly, as with H2.2.8, the results were sufficient for hypothesis approval, but the correlation might have been caused by the sample being shifted.

Respondents who used products with a higher THC content (indoor-grown cannabis, cannabis extracts, hashish) were more likely to indicate long-term cannabis use side-effects than respondents who did not. The variable "Memory loss" was correlated with the indication of using outdoor-grown cannabis with a lower THC content (sig .: 0.027) and 91.8% of respondents who reported it, reported the use of this type of THC product. The variable "Memory loss" was also correlated with the indication of using indoor-grown cannabis with a higher THC content (sig.: 0.000) and 90.1 per cent of respondents who reported the symptom reported using of this type of THC product. The variable "Difficulties with concentration" was correlated with a variable for the indication of hashish resin use (sig.: 0.005) and 58.9 per cent of respondents who indicated the symptom also reported the use of hashish resin. The variable "Increased aggressiveness" was also correlated with the variable for the indication of hashish resin use and 78.6 per cent of respondents reporting the symptom also stated the use of hashish. The hypothesis was approved. Hashish use seems to be associated with a broader group of adverse health-effect than other products.

Respondents who used products with a higher THC content (indoor-grown cannabis, cannabis extracts, hashish) were more likely to indicate short-term term cannabis use side-effects than respondents who did not. The variable "Memory loss" was also correlated with the indication of using indoor-grown cannabis with higher THC content (sig.: 0.021) and 90.1 per cent of respondents who reported the symptom reported using a product with a higher THC content. The variable "Difficulties with concentration" was also correlated with a variable for the indication of hashish resin use (sig.: 0.031) and 52.9 per cent of respondents who indicated the mentioned symptom, also reported the use of hashish resin. The variable

"Difficulties with concentration" was also correlated with the variable for the indication of THC-infused vaporiser tincture (sig.: 0.048) and 4.6 per cent of respondents who indicated mentioned symptom, reported the use of that product. The lower percentage can be potentially explained by the overall low number of tincture users and the assumption that most of these users potentially used other THC-containing products.

The obtained data, complemented by the previously shown descriptive statistics analysis, is sufficient to claim that cannabis use is associated with health-related problems and is risky for the population. With this statement, the hypothesis H2 was approved, with the condition that liberalisation leads to an increase in cannabis use prevalence among residents.

4.4 Medicinal marijuana use

The following subchapter describes the patterns of cannabis usage for treating or easing health-related conditions. As shown in Appendix 7, the respondents (n=1130) were asked if they had ever used cannabis for medicinal purposes, and almost half did so. At the same time, the respondents (n=1127) were asked whether they had an acquaintance that had used cannabis for medical treatment purpose and over half stated yes. Among users of cannabis for medical treatment purposes (n=512), the most frequently mentioned conditions were headaches, muscle pain, depression, abdominal cramps, and appetite loss. While conditions such as epilepsy, multiple sclerosis and Crohn's disease were reported, they were in the minority. The respondents also mentioned the use of cannabis as a painkiller or for insomnia, skin conditions, anxiety, stomach, and digestion-related issues. In the case of their acquaintances, cannabis was used for medical conditions such as cancer, depression, loss of appetite, epilepsy, abdominal cramps, muscle pain, headache, multiple sclerosis and bone pains. Other illnesses for which their acquaintances used medical cannabis asthma, bronchitis, skin conditions, arthritis, glaucoma, fibromyalgia, vestibular syndrome, Parkinson's disease, and tumour formations.

4.5 Regulation

Slovenia and other member states of the European Union are obliged to follow EU regulation under the following acts: the Treaty of Lisbon; Council Regulations on Precursors; EU Council Directives; the EU Drugs Strategy by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA); and the EU Action Plan (Academy of European Law, no date; European Commission, 2017). These EU regulative acts follow the aforementioned international treaties.

According to the Legal Information System (2020a), the Production and Trafficking in Illicit Drugs Act from 1999 sets out the conditions under which the production and trafficking of illicit drugs and the possession of illegal drugs are allowed. The law prohibits the illicit possession of narcotics and defines the respective offences and penalties. It also sets the

basis for the milder punishment of perpetrators for possession of a smaller quantity of drugs for personal consumption purposes, which is a misdemeanour. Violations are penalised by fines, which may also be given alongside shorter prison sentences (Legal Information System of the Republic of Slovenia, 2020a). Such legislation is an illustration of drug decriminalisation policy case.

Within Production and Trafficking in Illicit Drugs Act, the Decree on Illicit Drugs Classification is appointed (Legal Information System. 2020a). It has the status of a by-law and outlines the drug scheduling system, thus defining which drugs are banned. According to the Legal Information System (2020c), the 2014 Decree classifies illicit drugs based on their health-harm potential and usage options. The decree divides unsafe substances into Groups I, II and III, where I stands for the most dangerous drugs without any medical potential. The 2014 Decree classifies cannabis and its derivatives as the Group I drugs (Legal Information System of the Republic of Slovenia, 2020b). Amendments to the regulation in 2016 have corrected the drugs' names, updated the list, and made clarifications. Patients with prescriptions issued by the healthcare body became eligible to purchase pharmaceutical drugs based on synthetic cannabinoids (The Official Gazette of the Republic of Slovenia, 2016). Further regulation in 2017 also relocated marijuana herb material into the II group, allowing patients with health conditions to legally purchase the herb in pharmacies with a prescription (The Official Gazette of the Republic of Slovenia, 2017).

Since the changes to the controlled substances schedules introduced in the 2017 Decree, medical cannabis and cannabinoids are now legally accessible to residents in need of medical treatment. Healthcare bodies may prescribe it; however, it is technically inaccessible to most patients, as pharmacies cannot import it, and there is no domestic supplier available (Bagar & Nolimal, 2020). Cannabis for medical purposes is regularly or occasionally used by roughly 1.5 per cent of the Slovenian population. "Cannabis users and their advocates say that the legalisation of cannabis in the country was coupled with obstacles to access, forcing many patients to turn to the illegal market. … All of this undermines the ability of patients to have secure access to a quality product that is consistent in form and dosage, which would allow them to really gain the benefits of using cannabis in a medical context" (Bagar & Nolimal, 2020). Authorised patients have legal access to medicines prepared upon request in pharmacies containing synthesised THC analogues mixed with CBD or medicines with CBD only. Both types of medicine have to be paid in full by the buyer. At the same time, conventional medicines prescribed by healthcare providers are fully covered by regular health insurance. The communication with a major domestic pharmacy chain is enclosed in Appendix 3.

5 CANNABIS CONSUMPTION ESTIMATES IN SLOVENIA: NOW AND POST-LEGALISATION

According to the EMCDDA (2012), two types of approaches can be used for calculating consumption estimates: demand-side and supply-side. Demand-side approaches are based on estimates of the prevalence of drug use, drug consumption data, and related estimates or monetary expenditures of different user groups used to estimate annual usage volumes or annual retail expenditures. Supply-side approaches are based on the quantity of drugs produced, sold, imported or exported. This allows for estimations of the volumes available for consumption. Data on drug losses (e.g., seizures by the authorities) can also be used as a proxy (EMCDDA, 2012).

5.1 Current demand

The following are the presented projections of existing demand and supply for illicit cannabis in Slovenia expressed in monetary terms per year. The methodology for current demands calculations was designed by the author.

5.1.1 Demand-side consumption estimate

The method for determining existing demand was designed and proposed by the author and was similar to the proposed Canadian model for potential demand forecast. The factors used are:

C1 (a,b,c) – Slovenia's total population is old enough to be relevant within the cannabis use context. Three age groups were considered in the projections:

a) "15-64" – broadest age class used by NIJZ survey;
b) "15+" – earliest age of first cannabis impairment, identified by NIJZ survey;
c) "11+" – earliest age of first cannabis impairment, according to CSIRS survey;

C2 (12m, 30d) – the share of the Slovenian population represented by the respective cannabis use prevalence groups, "last 12 months" (12m) and "last 30 days" (30d) prevalence groups were selected, as these were expected to reflect the share of cannabis users within the population;

C3 (d, w, m, o, r) – the respective shares of the cannabis user population, according to reported frequency of use, such as "daily" (d), "weekly" (w), "monthly" (m), occasional "5-11 times per year" (o), and rare "1-4 times per year" (r);

C4 (d, w, m, o, r) - mean monthly cannabis budgets of cannabis users, grouped according to reported frequency of use, such as "daily" (d), "weekly" (w), "monthly" (m), occasional "5-11 times per year" (o), and rare "1-4 times per year" (r);

C5m (12m, 30d) – mean monthly cannabis expenses (€) of an average cannabis user weighted by the frequency of consumption within particular cannabis use prevalence group of "last 12 months" (12m) and "last 30 days" (30d). Weighted average monthly cannabis expenses of an average user variable were calculated using equations (1) and (2):

$$\textbf{C5m (12m)}= \frac{C3(d)}{\sum C3(d,w,m,o,r)} \times C4(d) + \frac{C3(w)}{\sum C3(d,w,m,o,r)} \times C4(w) + \frac{C3(m)}{\sum C3(d,w,m,o,r)} \times C4(m) + + \frac{C3(o)}{\sum C3(d,w,m,o,r)} \times C4(5-11) + \frac{C3(r)}{\sum C3(d,w,m,o,r)} \times C4(r) \quad (1)$$

$$\textbf{C5m (30d)} = \frac{C3(d)}{\sum C3(d,w,m)} \times \mathbf{C4(d)} + \frac{C3(w)}{\sum C3(d,w,m)} \times \mathbf{C4(w)} + \frac{C3(m)}{\sum C3(d,w,m)} \times \mathbf{C4(m)} \quad (2)$$

The variables were also used in equations (3) and (4) to obtain annual illicit demand estimates based on cannabis users related to the last 12 months and last 30 days cannabis prevalence groups.

$$\textit{Current annual illicit cannabis demand (last 12 months use prevalence group)} = C1(a,b,c) \times C2(12m) \times \textit{C5m(12m)} \times 12 \quad (3)$$

$$\textit{Current annual illicit cannabis demand (last 30 days use prevalence group)} = C1(a,b,c) \times C2(30d) \times \textit{C5m (30d)} \times 12 \quad (4)$$

The proposed model produced four alternative estimates, as two age limits and two cannabis use prevalence groups were considered, as well as different average monthly cannabis use expense values.

Table 8: Current annual demand for illicit cannabis in Slovenia, by age group and prevalence rate used

Cannabis use prevalence group	Assumed age group of potential cannabis users in Slovenia		
	15-64	15+	11+
	Weighted Average Annual Expense for cannabis, by cannabis use prevalence group, million euro		
Last 12 months (6)	114	149	155
Last 30 days (7)	65	85	89

Source: own work.

The variables used and calculations are presented in Appendix 14. The equations used three population numbers based on age range: 12 month and 30-day cannabis use prevalence rates from the NIJZ 2019 study (Appendix 4), the shares of cannabis users within the population according to the frequency of use (Appendix 7), and mean monthly budgets of different cannabis users by frequency of use groups (Appendix 13). These were used to calculate the weighted average cannabis budget of an average cannabis user in Slovenia. The final result of the calculations is presented in Table 9. The projections suggest that the annual demand for cannabis in Slovenia is somewhere in the range of €114-155 million. The second estimate

suggests a somewhat minimal value of market demand, as it employs parameters of frequent cannabis users, which are more predictable in terms of demand.

5.1.2 Supply-side consumption estimate

There is no reliable data for the cannabis supply and volume in Slovenia available. However, the data on drug seizures in Slovenia are published annually by the MNZ. According to Hakkarainen, Kainulainen and Perälä (2008), the quantity of drugs seized by law enforcement represents 5 to 10 per cent of the actual market volume. However, further research suggests that police seizes between 10 and 23 per cent of the total cannabis black market in Finland. The Wilkins, Bhatta and Casswell (2002) study determined the seizure rate of cannabis in New Zealand to be between 26 and 31 per cent of the total illicit cannabis market.

To estimate the annual volume of cannabis supply in Slovenia, the annual cannabis drugs seizure volumes were multiplied by a factor reflecting the assumption of police seizing from 5 to 40 per cent of the actual illicit cannabis supply. The results of the multiplication were further multiplied with price factors from the CSIRS survey. The illicit cannabis supply-side consumption estimate model uses the following factors:

S1 (cp, dc, hr, ce) – the reported quantities of drugs seized by the Slovenian Police, expressed in grams for hashish resin and marijuana, millilitres for cannabis extract, and units for cannabis plants per calendar year. The data was taken from the 2020 MNZ annual report. The figures were multiplied by factors of 20, 10, 5, 3.33 and 2.5 to reflect assumptions of 5, 10, 20, 30 and 40 per cent seizure rates, respectively. Variables S1 (cp), S1 (dc), S1 (hr) and S1 (ce) stand for the cannabis plants, dried cannabis, hash resin, and cannabis extracts, respectively;

S2 (s, m, l) – the assumed average weight of a single cannabis plant. The study by Caulkins (2010) suggests that one sinsemilla plant produces an average output of 34 grams of dry marijuana material, here standing for S12 (s). Robinette's (2014) study refers to the US Drug Enforcement Agency's research, which determined the dry stem and branch to leaves and flowers ratio. Out of a sample of 17 unseeded sinsemilla plants aged 120 days or more, maximum and minimum values were recorded for a plant weighing about 2654 grams with about 69 per cent of the stalk and stem dry weight, and an approximately 288-gram plant with stalk and branches making up about 45 per cent of the dry weight, respectively. Based on this, the model will use weights of 130 and 811 grams of dry sinsemilla material per cannabis plant for S12 (m) and S12 (l), respectively;

S3 (id, od, hr, ce) – price (in EUR) per one unit of drugs such as potent indoor-grown (id) and lower potency outdoor-grown (od) cannabis plant material, hashish resin (hr), and cannabis extracts (ce). The price data was acquired from the CSIRS survey;

S4 (id, od) – the respective number of indoor-grown cannabis (id) users and lower potency outdoor-grown cannabis (od) users from the CSIRS survey;

S5 – weighted average price (in EUR) per 1 gram of average dry cannabis material. Calculated by inserting variables into equation (5).

$$S5 = S3(id) \times \frac{S4(id)}{\sum S4(id,od)} + S3(od) \times \frac{S4(od)}{\sum S4(id,od)} \quad (5)$$

S6 (s, m, l) – the average price (in EUR) of a single cannabis plant, with several alternative inputs for weight considered. The cannabis plant's price was derived by assuming the dry cannabis material weight per one plant S2 (s, m, l) and the weighted price of cannabis dry material per gram (S5). The average price of a cannabis plant was calculated in equation (6).

$$S6(s, m, l) = S2(s, m, l) \times S5 \quad (6)$$

Equation (7) was used to calculate the assumed total illicit cannabis supply in Slovenia.

$$\textit{Total Assumed Illicit Cannabis Supply} = S1(dc) \times S5 + S1(ce) \times S3(ce) + S1(hr) \times S3(hr) + S1(cp) \times S6(s, m, l) \quad (7)$$

Table 9: The market value of assumed illicit cannabis and THC-containing cannabis products supply in Slovenia, based on MNZ data on drug seizures 2015-2020

Assumed percentage of seized cannabis and THC-containing products of overall market volume	Reporting calendar year	Illicit supply of dried cannabis, hashish resin, cannabis extracts, million euro	Total illicit supply in a year by assumed average confiscated cannabis plant weight, million euro		
			34 gram	130 gram	811 gram
5 percent	2019	130	151	209	624
	2018	76	197	539	2963
	2017	121	186	367	1654
	2016	670	139	334	1717
	2015	71	138	326	1661
10 percent	2019	65	75	105	312
	2018	38	99	269	1482
	2017	61	93	184	827
	2016	35	69	167	859
	2015	35	35	167	859
20 percent	2019	33	38	52	156
	2018	19	49	135	741
	2017	30	46	92	413
	2016	17	35	84	429
	2015	18	35	82	415
30 percent	2019	22	25	35	104
	2018	13	33	90	493
	2017	20	31	61	275

	2016	12	23	56	286
	2015	12	23	54	277
40 percent	2019	16	19	26	78
	2018	10	25	67	370
	2017	15	23	46	207
	2016	9	17	42	215
	2015	9	17	41	208

Source: own work.

The model used figures of seized drugs published by MNZ in its annual report, a fragment of which is presented in Appendix 5. Factors S2-S5 are presented in Appendix 16, and the complete output with calculations is presented in Appendix 17. The final result is presented in Table 10. The results differ according to the assumed seizure rate, the weight of average potential dry cannabis output per confiscated plant, and the reporting year. If the police successfully identified and confiscated five per cent of the overall illicit cannabis in Slovenia, the ready-to-use drug supply in 2019 and 2018 was €130 million and €76 million, respectively. Similarly, if the police arrested 10 per cent of the overall market, the supply of cannabis estimates in 2019 and 2018 should lie within the range of €75-105 million and €99-269 million, respectively. After adding the value of confiscated plants, the market volumes could range between €151-209 million and €197-539 million in 2019 and 2018, respectively. The result is sensitive to the assumed seizure rate: assumed seizure rates of 20, 30, and 40 per cent of allow us to assume that the cannabis market estimates in 2018 and 2019 fluctuated in ranges of 38-135, 25-82, and 19-54 million euro, respectively.

5.2 Potential demand post-legalisation

According to Statistics Canada (2018), the potential cannabis demand model was developed to forecast the extent to which legal cannabis could replace its illegal counterpart after legalisation. The model relies on assumed values of certain values and National Cannabis Survey input data. The original model consisted of eleven factors, but only ten were used to study the Slovenian case, as factor D11 was used for calendar period adjustment, which was irrelevant in the proposed forecast for Slovenia. The factors used were:

D1 (a, b) – the number of population old enough to purchase cannabis legally, the selected legal age thresholds are 18 (a) and 21 (b) years old;

D2 – cannabis user population share or 12-month cannabis use prevalence rate;

D3 – the share of current illicit cannabis users who intended to switch to legal cannabis after legalisation;

D4 – the share of current illicit cannabis users who had not yet made up their mind on whether they would switch to legal cannabis after legalisation;

D5 – the share of current illicit cannabis users who had not yet decided whether they would switch to legal cannabis after legalisation and will decide to switch;

D6 – the share of the population which is not currently using cannabis;

D7 – the share of the population that self-reported as non-users of cannabis and intended to try using cannabis after legalisation;

D8 – the share of the population that self-reported as be non-users of cannabis and had not yet decided whether would start using cannabis after legalisation;

D9 – the share of the population that self-reported as non-users of cannabis and which had not yet decided whether they would start using cannabis and will decide to start using it;

D10 – the tenth factor in the calculation was the average amount spent by cannabis users on the substance during the past three months. With data collected from "Cannabis in Slovenia and Its' Regulation" (CSIRS) survey, the weighted average monthly cannabis expense value of an average cannabis user was calculated and used as a factor. An author proposed the calculation method. It is described in the next chapter as the calculation method for D10 is identical to one for calculating the C5m (12m) factor, only multiplied by 3. The variable represents a monthly estimate. The factors were further used in equations 8, 9 and 10:

$$\textit{Potential legal demand} = D1(a,b)\times(D2\times(D3+D4\times D5)+D6\times(D7+D8\times D9\times D10 \quad (8)$$

$$\textit{Potential illegal demand} = D1(a,b)\times((D2\times(1-D3-D4\times D5))\times D10 \quad (9)$$

$$\textit{Total cannabis demand post-legalisation} = (1)+(2) \quad (10)$$

The table presented in Appendix 15 demonstrates the variables used, their values, and descriptions. The final calculations were done using two age groups, potentially eligible to purchase cannabis: adults aged 18 years old and over, as well as 21 years old and above. For both ages the forecast was done in two variations, each representing the respective scenario. The first scenario employed the variable inputs used by Statistics Canada for forecasting the post-legalisation cannabis market. These variables are:

D3 (1) - 49.2 per cent, which represents the share of cannabis users who supposedly intended to switch from illicit to legal cannabis post-legalisation;

D7 (1) – 5.9 per cent, which represents the share of non-cannabis users within the population who had the intention of trying cannabis post-legalisation;

D8 (1) – 9.4 per cent, which stands for the share of the population that were self-reported non-users of cannabis and had not yet decided whether they would try using cannabis post-legalisation.

The second scenario showed that the D7 and D8 variables were twice as lower than initially assumed ones and applied to D7 (2) and D8 (2), respectively. The cannabis user population share intending to use the legal cannabis supply D3 (2) was also twice as lower than that initially assumed by Statistics Canada (2018). It was 25 per cent, which indeed is closer to reality, as the Canada Cannabis Survey 2019 (The Government of Canada, 2019j) found that roughly a third of total cannabis users in 2019 had purchased legal cannabis. The rest of the factors were shared by both scenarios and were supplied by the original model, Slovenian national data sources, and the CSIRS results.

Table 11 demonstrates the results of calculations. The first scenario, using combined Statistics of Canada (2018) and Slovenian national data inputs forecasted €333 million and €322 million for legal cannabis demand in the case of the 18 and 21 years old legal thresholds, respectively. Similarly, it suggested €55 million and €53.2 million of illicit market demand for the 18 and 21 legal age scenarios. In comparison, the overall cannabis demand would total at €388 million for the 18 years old legal age scenario and €375 million for the 21 years old scenario. The second scenario showed twice lower shares of current users intending to switch to legal supply post-legalisation and new users of cannabis post-legalisation. The calculation results for the second scenario, using legal ages of 18 and 21, were as follows: €176 million and €169.8 million for legal demand, €90 million and €87 million for illicit demand, and total spending of €266 million and €257 million, respectively.

Table 10. Potential post-legalisation scenarios in Slovenia

	Scenario I		Scenario II	
Legal age for cannabis use	D3(1), D7(1), D8 (1)		D3(2), D7(2), D8(2)	
	Per 3-month period, million euro	Per year, million euro	Per 3-month period, million euro	Per year, million euro
(1) Potential legal demand post-legalisation				
18+	83	333	44	176
21+	81	322	42	170
(2) Potential illegal demand post-legalisation				
18+	14	55	23	90
21+	13	53	22	87
(3) Annual total consumer spending for cannabis post-legalisation				
18+	-	388	-	266
21+		375		257

Source: own work.

The policy may have economic externalities such as an expected decrease in demand for related goods like alcohol and analgesic drugs. Alcohol is the most prevalent recreational drug in Slovenia with a long history of production and consummation. According to the Statistical Office of the Republic of Slovenia (SURS, 2018) in 2016, a Slovenian adult consumed 10.5 litres of pure alcohol on average. More than five litres represent wine, more

than four beer, while spirits represent less than one litre. According to the Ministry of Health of the Republic of Slovenia (2020), 43 per cent of the Slovenian population in the 25-64 age range scored as high-risk alcohol users. Every other resident aged 17 has been seriously intoxicated with alcohol at least twice in his life. The trend of younger females drinking more frequently in recent years has been identified. More than 900 deaths in Slovenia every year are caused by the adverse health effects of alcohol and traffic incidents related to alcohol-impaired driving (Ministry of Health of the Republic of Slovenia, 2020). The presented data shows that the alcohol problem in Slovenia is pervasive. As shown in Appendix 7, about three-quarters of the CSIRS respondents (n=1239) reported the use of alcoholic beverages.

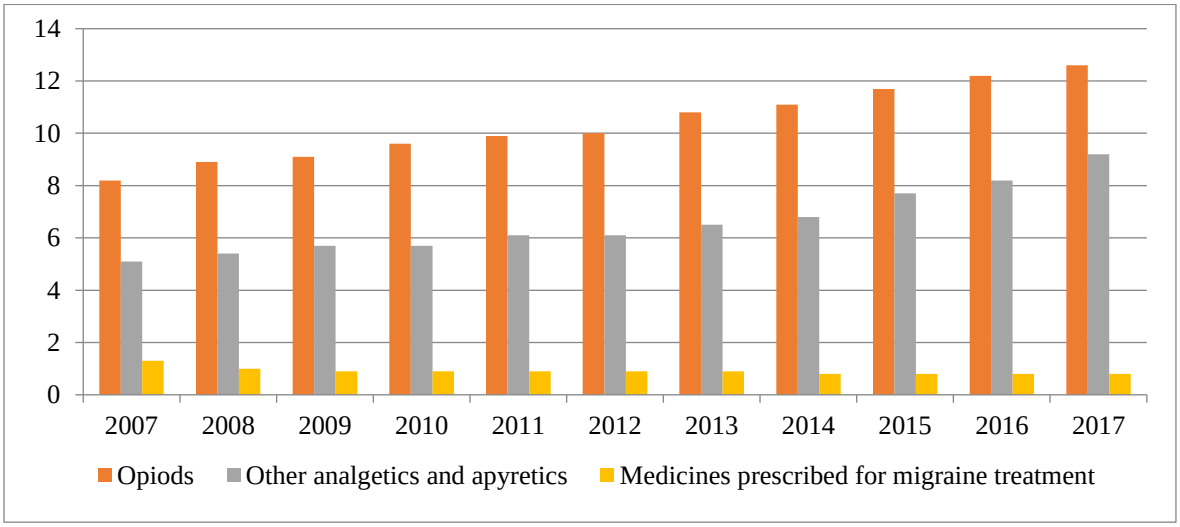
Multiple studies were conducted to determine whether cannabis and alcohol were complements or substitutes. Conclusions vary, as they confirm both theories or none in some instances. As demonstrated earlier, in terms of alcohol sales, the substitution effect between the related goods was proven in the US, and sales volumes of alcohol can drop by 15 per cent post-liberalisation. As shown in Appendix 7, the respondents (n=1337) were asked about their attitudes towards alcohol and cannabis and the relationship between them. For almost a quarter of the respondents, cannabis was a recreational drug that substituted for alcohol, and about two-fifths reported a complementary relationship with usage in different periods. Almost a third of the respondents reported a complementary relationship with the simultaneous use of marijuana and alcohol.

Analgesic drugs represent another possible related good. Specifically, opioids, either illicit or prescribed by healthcare bodies. Opioid medicines, with their debatable impact on the individuals' socioeconomic aspects, are of particular relevance in Slovenia, as the trend of legal prescription shows an increasing slope. According to the report on drugs used by healthcare institutions by the National Institute of Public Health (2019b), Slovenian healthcare bodies prescribed 1.4 million receipts for analgesics in 2018, which is 1.5 per cent more than in 2017. Overall expenses for these drugs are €15.8 million, which is approximately one per cent more than in 2017. On average, 25.8 per cent of the Slovenian population were prescribed at least one prescription for an analgesic drug in 2018. Moreover, 0.1 per cent of the Slovenian population within the 0-19 age group were prescribed opioids.

Similarly, 5.1 per cent of 20-64-year-old individuals and 18.6 per cent of individuals older than 65 were prescribed opioids. Opioids represented 28.5 per cent of the issued prescriptions for analgesic purposes of consumption and 48.1 per cent of healthcare analgesic expenses in 2018. In Slovenia, insurance covers these costs for its residents. The insurance cost is split between a private insurance fund and a state healthcare fund. Overall, there were 8,888,477 prescriptions prescribed in 2018 for opioid medicines. The average cost of 1 recipe was €19, which totals at almost €169 million of expenses within one year (National Institute of Public Health, 2019b).

The data illustrated in Figure 8 shows an increasing trend in opioid and analgesics usage in Slovenia based on the daily defined dosage per 1000 households per day. An increase in drug use attests to the relevance of the concern. As mentioned before, a study carried out in the US found that cannabis legalisation may cut the number of opioid prescriptions by approximately one-third of the pre-legalisation level.

Figure 8: The trend of opioids and analgesics usage in Slovenia (in DDD – daily dosage of drug per 1000 households per day)



Source: National Institute of Public Health (2019b).

6 POLICY RECOMMENDATIONS FOR SLOVENIA

In the following section I present the summary findings and offer suggestions to the questions concerning successful legislation policy. Research question H1, which stands for cannabis use and sales legalisation having a potential for economic benefits, was supported in the Netherlands, US, and Canada cases. These benefits include additional employment, business growth, and additional revenue for the government, which can be reinvested into society. The legality of cannabis boosts the tourism sector, as proven by data from the Netherlands, the US, and the CSIRS. Moreover, such legislative change typically leads to lower crime rates, decreased social inequality, and more effective redistribution of legal enforcement resources. The first state to legalise in the region attracts much attention from cross-border cannabis enthusiasts, leading to increased state revenue.

Cannabis liberalisation may hurt the demand for alcohol and pharmaceutical products, particularly opioids. On the one hand, it may be beneficial for society if cannabis proves to be a more safe substitute for either of the drugs and decreases the economic burden placed on state and insurance companies related to healthcare coverage. On the other hand, the decrease in alcohol sales may affect state income by decreasing the excise duties collected. Moreover, liberalisation is expected to affect consumption and corporate tax collected from

domestic pharmaceutical companies, breweries, and distilleries if medical and non-medical marijuana become price-competitive post-legalisation and accepted by the public. The competitiveness of medical marijuana and its effect on public finances is defined by its price and coverage by basic health insurance, which currently does not include drugs with cannabinoids accessible in pharmacies.

The projected illicit cannabis consumption demand estimate is between €65 million and €155 million of annual demand as opposed to illicit cannabis supply, which is between €75 million and €269 million. The projections for marijuana sales post-legalisation are between €170 million and €333 million for legal cannabis and between €53 million and €90 million for illicit cannabis. The average costs of cannabis production may vary between €0.25 and €1 per gram (Caulkins, 2010). However, with the current average retail price ranging from €5.7 to €8.4, there is sufficient room for a profit margin for intermediaries and a tax margin for the state or municipalities. Based on the arguments stated above and the presented projections, H1 was accepted.

Research question of H2 deals with the social risks that cannabis legalisation brings, particularly for public safety and health. Both US and Canada have shown a modest increase in cannabis use among the mature and elderly population since cannabis liberalisation. The Netherlands provides us with a long-term post-legislation perspective and shows higher rates than most EU states. States that have legalised cannabis have adopted special education curricula, which achieve cannabis diversion goals, as confirmed in Uruguay and Canada. Perceived risks of cannabis use have increased in Canada since legalisation, whereas perceived risks are low in the US, particularly among adolescents. According to existing data, drug use among adolescents has decreased in Canada, while US adolescents' statistics show alarming numbers of cannabis use and vaping in particular. The US national data of drug use prevalence shows a spike in cannabis use prevalence starting with the first legalisations in Washington and Colorado. This data might mean that cannabis popularity and associated use prevalence are more affected by public attitudes changes than state regulation. There is a certain probability that cannabis use prevalence rates among Slovenian residents will continue to increase, as a marginal improvement of public attitudes accompanies each new cannabis liberalisation policy.

Cannabis liberalisation is associated with a decrease in the number of convictions for cannabis possession and related costs for society and public finances. However, liberalisation in one state leads to an increase in cross-border illicit transactions and cannabis-related crimes rates in neighbouring states which do not pursue a similar policy. Moreover, domestic criminal elements may attempt to take advantage of legalisation for the involvement of organised crime in cannabis production and trafficking, as has been the case in the Netherlands. Based on our review of foreign cases, it is possible to assume that legalisation of cannabis leads to a modest increase in impaired driving and related fatalities, which do not sustain. It may also be associated with increased trauma within the family and increases in treatment related to cannabis use. These effects may be classified as adverse by

insurance companies, as they may increase the number of claims, even if only temporarily. Moreover, the cannabis sector generates excess green and packaging waste, leading to ecological imbalances and emerging policies in the US and Canada.

The CSIRS survey has identified a correlation between particular risky cannabis use patterns and adverse health indications. These include the combined use of cannabis with alcohol, early age of the first contact with the drug, use of high-THC products, and higher frequency of use. About 15 per cent of cannabis users stated they were addicted, and 6 per cent were unwilling to respond. Among frequent long-term adverse health effects reported by Slovenian cannabis users are loss of memory, passivity and lack of energy, concentration problems, less frequent panic and anxiety attacks, problems with cognitive functions, and decreased sexual activity. About 15 per cent of cannabis users responded that their cannabis use had morphed into an addiction. While alcohol is frequently used in Slovenian households, the combined use of cannabis and alcohol was reported only by one-third of cannabis users. Such behaviour was identified as correlating with certain long term adverse effects of cannabis use. This, in turn, means that risks of use could become more significant if alcohol users complemented it with cannabis rather than a substitute. The arguments presented above, and our empirical study illustrates that cannabis liberalisation does entail additional risks for society and, most of all, public health and safety and H2 was, thus, accepted.

The third research question stated that there is an optimal policy mix, which made it possible to mitigate social risks and maximise economic benefits. Strictly speaking, only Canada has thus far managed to launch a fully-functional legalisation policy. None of the policies has yet achieved the desired effect of significantly suppressing the black market, as this requires more effort than the legalisation of cannabis trade and possession alone. The post-legislation period length does not allow us to draw reliable conclusions on social risks and their severity. Therefore, with the existing methodology and data, testing the H3 hypothesis was not viable.

The first decision should start with a public initiative and, potentially, a ballot or referendum, as was the case in US states, Canada, Switzerland, New Zealand, and other countries. The public push may lead to further discussion on the initiative and the potential formulation and enactment of legalisation policies. However, Uruguay's case shows that “forced” cannabis legalisation policies can, with time, also achieve high public support.

The state may choose between legalisation policies or alternative policies liberalising the possession and cultivation of cannabis. Belgium has taken a depenalisation approach, and Portugal uses decriminalisation with targeted diversions. Both states have achieved positive results in dealing with drug use and associated harm. The Netherlands has the oldest and most liberal cannabis decriminalisation policy, which has evolves throughout time. There are two known types of legalisation models. The first one is the standard capitalistic approach used in several US states and Canada, which legalises possession and sales and creates a cannabis sector, allowing the private sector to establish supply chains while tightly

controlling it and collecting additional tax income. Uruguay's middle-ground approach focuses entirely on the social good and black market suppression efforts and the state's participation in the supply of cannabis and the distribution of low-THC, potent, and inexpensive cannabis. The incremental differences between policy approaches are the state's economic interest on the one hand and the ability to more effectively crowd out illicit suppliers off the market with a lower price on the other.

The primary factor of a policy's success is its feasibility in local, overseas and international regulatory contexts. The obstacles associated with regulatory dissonance is well-presented by the example of US states and Uruguay, whose success is seriously hampered by the US federal regulation, particularly in the banking sector. While supply in Uruguay became paralyzed, US cannabis businesses carried out operations in cash, raised strictly private capital, and could not use accounting standards for tax deductions. Cannabis policy in Spain is the most critical scenario. Regional liberalising regulations contradict state regulation, leading to the organization of "semi-legal" social clubs and additional prosecution costs. Similarly, Slovenian cannabis liberalisation and regulation law would contradict EU legal guidelines and cause similar difficulties, while the Slovenian financial sector would also have to comply with the EU law. For Slovenia to successfully implement the policy, two suggestions may be put forward. The first would be to wait for precedents to be established globally. According to Prohibition Partners (2021), both US president Joe Biden and vice president Kamala Harris are supporters of cannabis regulation. Cannabis is thus likely to be rescheduled or even removed from the Controlled Substances Act, which would impact the US and Uruguay situation and create another precedent for deviating from international conventions. Moreover, Luxembourg is likely to become the first EU member state to have legal and regulated marijuana, thus creating another precedent (Boffey, 2019). The alternative would be to liberalise cannabis by removing it from the Decree which would either lead to cash-only transactions for the cannabis business, with all of its related disadvantages, or the creation of a payment system, which would show the need for a controlling body for cannabis.

The US states' analysis showed that where the opportunity cost of buying legal cannabis was at around 10 per cent of illicit cannabis cost, states managed to convert illicit demand into legal demand more effectively than states with 30 per cent opportunity cost. While a US cross-state review identified that strictness of policy was positively associated with cannabis market price, Canada's experience showed an increase in the average market price of cannabis with legalisation. An immense resistance to shifting to legal supply was put up by frequent (daily and weekly) users.

The recommendation for liberalising states is to opt for a hybrid cannabis supply approach by offering three mutually-exclusive opportunities: the cultivation of pre-registered plants, the purchase of ready-to-use cannabis at retailers or through membership in cannabis social clubs. The latter might prove an excellent alternative to the Netherlands' coffee shops, as it isolates cannabis use away from the public and adolescents in particular. While the

controlling state would continuously audit distribution and production, the supply chain would be in the private business domain for higher market effectiveness.

To effectively fight the black market, it is essential to provide legal producers with an environment in which they could remain price-competitive with the black market. This requires the active monitoring of cannabis market changes and quickly responding with tax regulation adjustments to change the price. The target price difference between legal average may be set between 10 and 15 per cent of the illicit cannabis price, meaning that legalisation day zero will give retailers the ability to sell outdoor and indoor-grown cannabis for approximately €5 and €7 per gram, respectively. The controlling body shall continuously monitor the illicit cannabis market price and cannabis supply channel preferences and react by decreasing tax rates according to the schedule designed upfront. The argument opposing such a solution could be that such a method may prove fatal in the long-term for the state revenue and legal cannabis businesses, as black market sellers may push the price down to the production cost level. This holds true if the regulation of non-sanctioned cannabis sales becomes softer and moves illicit cannabis from the black market to the grey market, as illustrated by California's case. If the market price is determined by lowering related taxes, it will lower economic incentives for individuals to engage in the illicit drug business, although it will not entirely eliminate the black market through price competition. The remaining incentives shall be suppressed by legal enforcement and the controlling regulatory body.

The following is a suggestion of a control tool that could help promote legal cannabis instead of illicit cannabis. Legal cannabis in the Netherlands is marked with a stamp which differs among provinces. In Uruguay, to buy or cultivate cannabis or become a social club member, individuals must apply at a registry established and administered by the controlling body. The suggested control method is to establish a registry of cannabis transactions. Everything related to cannabis being bought, sold, gifted, obtained, and cultivated independently is entered into the registry. The registry stores the data and provides a QR code sticker or digital receipt, which a controlling body inspector could verify to reference specific cannabis material and related events. The data entered into the registry should be sufficient to distinguish between cannabis sorts and the date, strain, weight, and other parameters. The controlling body may call for an additional examination of samples and sanctions with fees for severe deviations of the factual chemical content from samples in the registry. The registry used for cannabis access in Uruguay has caused privacy concerns among users. Nowadays, this could be addressed with technology, specifically blockchain, to achieve an individual's desired level of privacy. If Slovenia decided to establish a payment system for cannabis, it would increase the controlling body's grip.

The taxation mechanism is subject to another dilemma. Petek’s report (2019) contains recommendations for making further adjustments to California’s cannabis taxes based on preventing price undercutting by the illicit market, ensuring that sufficient funds are generated for funding state programs discouraging cannabis use among the youth and is of

particular interest here. The three primary issues to be addressed before setting the actual rate are selecting tax type, taxable events, and collection points. The latter may be either cultivators, manufacturers or retailers. The types of taxes considered are basic ad valorem tax, weight-based tax, potency-based tax, and tiered ad valorem tax (set as a percentage of the price with different rates based on potency or product type). They perform differently based on the criteria. Potency-based tax is the most effective in terms of harm reduction, while basic ad valorem tax is the most attractive in terms of ease of administration. Weight-based tax generally performs the worst based on the above criteria. It is recommended to substitute the existing ad valorem tax with a potency-based tax only if simplicity of administration is not the primary criterion. The report suggests using a potency-based tax rate between $0.006 and $0.009 per milligram of THC (Petek, 2019). The same rate could be considered with homogenous potency-based tax. The dilemma is whether to prioritise illicit market suppression by shifting down tax rates or fuel state revenues by selecting a higher tax rate.

One suggestion is to tax cannabis units as long as they do not cross a certain THC threshold. The potency of cannabis in Uruguay is capped at 10 per cent. Simultaneously, the policy seeks to cover cannabis products with a 1:1 or higher CBD to THC ratio, as CBD counteracts the psychoactive effect of THC. Therefore, the suggestion would be to have a stimulative lower tax rate for lower potency products. The state may also use progressive tax schedules with the rate per milligram of THC increasing after exceeding the 5, 10, 15, 20, 25, 30, and more per cent THC content thresholds. At the same time, the mechanism could include CBD to THC ratio criteria within the taxation mechanism itself to stimulate the production of less harmful drugs. The state of Switzerland compares low-THC hemp retail sales to tobacco substitutes and taxes them accordingly; a solution which might be considered for Slovenia, regardless of the legal status of potent cannabis.

Additional state income is a result of cannabis transactions. Social clubs membership fees are used primarily for financing the active controlling body and for other purposes such as funding various educational curricula dealing with cannabis-related risks, public health, and programmes for combatting ongoing social issues. The cannabis controlling body should have sufficient resources for carrying out extensive duties, which is seemingly crucial for suppressing the black market. Moreover, legal enforcement may reallocate resources for illicit drug production and distribution. New infrastructure is required to use potency-based tax, have control over regulation compliance, the functioning of the cannabis registry, and conducting precise chemical examinations of cannabis samples, particularly in the field.

Within the context of the cannabis liberalisation policy, education on cannabis use and associated risks should allow residents to make appropriate decisions based on reliable information. While cannabis legalisation supports the diversion of cannabis users from other drugs, there is also a need to separate cannabis and alcohol in curricula and regulation, which prohibits using cannabis and alcohol in public. Regulations on the public use of cannabis may be solely prohibitive, particularly if they enable the formation of social clubs where

users may socialize during cannabis use. Alternatively, policies could be softer. Similar limitations could be applied to cannabis use in public as tobacco and alcohol use, i.e. limiting its use in closed spaces and near or inside public institutions and related infrastructure (e.g. schools, healthcare institutions, public transport, etc).

Among other recommendations, cannabis legalisation policy should determine legal age, respond to ecological challenges, and decide whether to allow foreigners access to cannabis and tolerate associated nuisances in exchange for economic benefits or close the "back door", which would pose an additional challenge for controlling bodies. Regions may gain the right to veto the regulation and change certain policy elements, such as age access criteria or possession limits. Upfront regulation may be used in the case of vape devices and associated products to avoid potential spikes in use. Prohibiting advertising and using unappealing/child-proof/eco-friendly packaging with the chemical content labelled should become an industry standard, assigned by regulation.

CONCLUSION

The thesis addressed the problem of cannabis liberalisation policy, the estimated related economic and social consequences, and public safety and health risks. We did an extensive review of the literature on existing cannabis liberalisation policies, particularly literature related to implementation and the consequences. Based on our methodology, we made projections of current illicit cannabis consumption estimates of both demand and supply, which range from €65 million to €155 million and €75 million to €269 million per year, respectively. The projections for potential post-legalisation legal and illicit demand for non-medical cannabis were made using the same methodology used by Canadian policymakers. Yearly legal sales post-legalisation are estimated to range between €170 million and €333 million. Illicit sales, however, are estimated to be between €53 million and €90 million. The supply model uses Slovenian Police figures for volumes of drugs seized. The current and potential demand model uses the cannabis use prevalence within the population data provided by the National Institute of Public Health. All three projections support hypothesis H1, which states that cannabis liberalisation policy brings economic benefits.

To support models with missing inputs, we designed and conducted the CSIRS survey, with which we reached 0.5 per cent of the Slovenian population. The survey also provided us with data on risky behaviours and adverse health indications attributed to cannabis. We used the Pearson Chi-Square to establish a link between particular risk factors (such as early contact with cannabis, combined use with alcohol, the use of high potency products, and frequent use) and adverse health indications such as issues with memory, concentration, energy, libido, and cognitive abilities. The study supports hypothesis H2, which states that cannabis liberalisation brings social risks, namely public health risks.

The research question H3 suggests the existence of a policy which would minimise the risks and maximise economic benefit. However, because of the lack of appropriate methodology and the fact that the existing data covered a timespan that was too short to reach a conclusion, testing the hypothesis was impossible. The thesis's conclusion gives extensive policy recommendations and policy expectations, which identify aspects deserving of attention when formulating policies, e.g. the feasibility of overseas and international regulation, supply methods, tax mechanisms, etc. With an existing data for foreign cannabis liberalisation efforts, we may assume that increase of drug use with regards to liberalisaiton is somewhat inevitable. The amplitude of increase, particualrly among age groups, may be affected through policy design, although the impact of respective socio-demographic factors is unknown and thus can not be neglected. The business and state's economic perspective of a respective cannabis liberalistion policy also varies significantly among states and it may be either addressed (e.g. Canada, US), somewhat addressed (e.g. Netherlands) or not addressed at all (e.g. Uruguay, decriminalisation models used in Europe).

The primary limitation of our study is related to the assumption that the impact of legalisation on social and health indicators is visible only within a long-term perspective. Another challenge we faced was hidden populations and incomplete or insincere responses to surveys, as individuals tend to conceal their experience and attitudes towards controversial substances (Adlaf, 2005). When evaluating the economic implications of hypothetical legalisation, we were met with a lack of official state spending figures for the prosecution, enforcement, and trial of cannabis-related crimes, making it hard to quantify state savings.

There is evidence of populations with different degrees of prior exposure to gambling having different gambling legalisation rates. This is also affected by other social and economic factors (Williams, Rehm & Stevens, 2011). While there are complex differences between environments and their populations, effects can also vary, meaning that the results studied are specific to both the jurisdiction and the time period.

The thesis put non-medical cannabis legalisation under the scope, although it also touched on certain aspects of medical cannabis in Slovenia. On the one hand, medical cannabis legalisation does not require the initial legalisation of recreational cannabis. On the other hand, the regulatory difficulties of medical cannabis legalisation are connected with the legal status of cannabis as a drug. Medical and recreational cannabis regulation are thus related subjects and should be considered in parallel.

REFERENCE LIST

1. 1ka. (2020). *Konoplja v Sloveniji in njena regulacija*. Retrieved on 19 April 2020 from https://www.1ka.si/a/207486
2. Academy of European Law. (no date). *The EU Drugs Strategy & Action Plan Background documentation*. Retrieved on 29 September 2020 from http://www.era-comm.eu/Drugs_Supply_Reduction/library.html
3. ACT Government. (2020). *Know the ACT Cannabis rules*. Retrieved on 29 September 2020 from https://www.act.gov.au/cannabis/home
4. Adlaf, E. M. (2005). Collecting drug use data from different populations. In *Epidemiology of drug abuse* (pp. 99–111). Boston: Springer.
5. Aizpurua-Olaizola, O., Elezgarai, I., Rico-Barrio, I., Zarandona, I., Etxebarria, N. & Usobiaga, A. (2017). Targeting the endocannabinoid system: future therapeutic strategies. *Drug discovery today*, *22*(1), 105–110.
6. Alaska Department of Health and Social Services. (no date). *Get the Facts About Marijuana.* Retrieved on 29 September 2020 from http://dhss.alaska.gov/dph/Director/Pages/marijuana/facts.aspx
7. Alaska Department of Revenue – Tax Division. (2020a). *Marijuana Tax Reports.* Retrieved on 29 September 2020 from http://tax.alaska.gov/programs/programs/reports/index.aspx?60000
8. Alaska Department of Revenue – Tax Division. (2020b). *Marijuana Tax*. Retrieved on 29 September 2020 from http://tax.alaska.gov/programs/programs/index.aspx?60000
9. Alvarez, S. (2015). Do some addictions interfere with fertility? *Fertility and sterility*, *103*(1), 22–26.
10. Arana, X. (2019). *Cannabis Regulation in Europe: Country Report Spain*. Retrieved on 29 September 2020 from http://fileserver.idpc.net/library/cr_spain_final.pdf
11. Aydelotte, J. D., Brown, L. H., Luftman, K. M., Mardock, A. L., Teixeira, P. G., Coopwood, B. & Brown, C. V. (2017). Crash fatality rates after recreational marijuana legalization in Washington and Colorado. *American journal of public health*, *107*(8), 1329–1133.
12. Bagar, T. & Nolimal, D. (2020). *ICANNA: cannabis in Slovenia*. Retrieved on 29 September 2020 from https://www.healtheuropa.eu/icanna-cannabis-in-slovenia/102610/.
13. Baggio, M., Chong, A. & Kwon, S. (2018). Marijuana and alcohol: Evidence using border analysis and retail sales data. *Canadian Journal of Economics/Revue canadienne d'économique, 53*(2), 563–591.
14. Barcott, B., Whitney, B. & Bailey, J. (2021). *The US cannabis industry now supports 321,000 full-time jobs*. Retrieved on 26 February 2021 from https://www.leafly.com/news/industry/cannabis-jobs-report
15. Bastos, A., Faria, C., Gonçalves, D. & Lourenço, H. (2015). Envelhecimento ao longo da vida e prática gerontológica: Algures entre o pronto-avestir e o fato à medida? *Exedra: Revista Científica,* (2), 11–28.

16. Belackova, V., Roubalova, M. & van de Ven, K. (2019). Overview of "home" cultivation policies and the case for community-based cannabis supply. *International Journal of Drug Policy, 71*, 36–46.
17. Black, L. (2017). *Washington's Weed Industry Has a Million-Pound Waste Problem*. Retrieved on 29 September 2020 from https://www.thestranger.com/weed/2017/07/26/25307388/washingtons-weed-industry-has-a-million-pound-waste-problem
18. Boffey, D. (2021, 7 August). Luxembourg to be first European country to legalise cannabis. *The Guardian.* Retrieved on 26 January 2021 from https://www.theguardian.com/world/2019/aug/07/luxembourg-to-be-first-european-country-to-legalise-cannabis
19. Bridgeman, M. B. & Abazia, D. T. (2017). Medicinal cannabis: history, pharmacology, and implications for the acute care setting. *Pharmacy and Therapeutics, 42*(3), 180.
20. Cain, P. (2019, 17 December). At 25 cents a gram to produce, is outdoor-grown cannabis the key to lower legal prices? *Global News.* Retrieved on 29 September 2020 from https://globalnews.ca/news/6258000/outdoor-grown-cannabis-lower-legal-weed-prices/
21. California Cannabis Portal. (no date). *Cannabis Legislation.* Retrieved on 29 September 2020 from https://cannabis.ca.gov/cannabis-legislation/
22. California Legislative Information. (2016). *Senate Bill No. 383 CHAPTER 395.* Retrieved on 29 September 2020 from https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB1383
23. Cannabis Compliance Board State of Nevada. (no date). *Adult-Use Cannabis.* Retrieved on 29 September 2020 from https://ccb.nv.gov/nevada-cannabis-program/#item-1
24. Castro, M. M., Pinto, F., Pereiras, C., Castells, A. F., Agoglia, C. V., Duarte, V., Barceló, J., Sosa, C. & González, G. (2019). Autodeclaración del consumo de marihuana, tabaco, alcohol y derivados de cocaína en embarazadas en 2013 y 2016, Montevideo, Uruguay. A*adicciones*, *32*(3), 173–180.
25. Caulkins, J. P. (2010). E*stimated cost of production for legalized cannabis. RAND Corporation, WR-764.* Santa Monica, CA: RAND.
26. Centre for Disease Control and Prevention. (2018). *Marijuana: How Can It Affect Your Health?* Retrieved on 29 September 2020 from https://www.cdc.gov/marijuana/health-effects.html
27. Centre for Public Impact. (2016*). The Dutch policy on marijuana use – continuity and change.* Retrieved on 29 September 2020 from https://www.centreforpublicimpact.org/case-study/dutch-policy-marijuana-use-continuity-change/
28. Centre for Public Impact. (2018). *Marijuana legalisation in Uruguay*. Retrieved on 29 September 2020 from https://www.centreforpublicimpact.org/case-study/marijuana-legalisation-in-uruguay/
29. Cerdá, M. & Kilmer, B. (2017). Uruguay's middle-ground approach to cannabis legalization. *The International journal on drug policy, 42*, 118.
30. Červek, J. & Červek, V. (2018). Medicinska konoplja v onkologiji. *Okno*, (32), 36.

31. Cannabis. (2020). In *Encyclopaedia Britannica*. Retrieved on 29 September 2020 from https://www.britannica.com/plant/cannabis-plant
32. Chan, N. W., Burkhardt, J., & Flyr, M. (2020). The effects of recreational marijuana legalization and dispensing on opioid mortality. *Economic Inquiry, 58*(2), 589–606.
33. Chandra, S., Radwan, M. M., Majumdar, C. G., Church, J. C., Freeman, T. P. & ElSohly, M. A. (2019). New trends in cannabis potency in USA and Europe during the last decade (2008–2017). *European archives of psychiatry and clinical neuroscience*, *269*(1), 5–15.
34. Chu, Y. W. L. & Townsend, W. (2019). Joint culpability: The effects of medical marijuana laws on crime. *Journal of Economic Behavior & Organization, 159,* 502–525.
35. Cluskey, P. (2020, 6 February). High time: Netherlands moves to clean up absurd cannabis policy. *Irish Times.* Retrieved on 29 September 2020 from https://www.irishtimes.com/business/innovation/high-time-netherlands-moves-to-clean-up-absurd-cannabis-policy-1.4160217
36. Colorado Department of Education. (2019). *Marijuana Tax Revenue and Education FAQ.* Retrieved on 29 September 2020 from https://www.cde.state.co.us/communications/20170919mjqanda
37. Colorado Department of Revenue. (2020). *Marijuana Tax Data*. Retrieved on 29 September 2020 from https://www.colorado.gov/pacific/revenue/colorado-marijuana-tax-data
38. Commonwealth of Massachusetts. (2020). *Massachusetts law about marijuana*. Retrieved on 29 September 2020 from https://www.mass.gov/info-details/massachusetts-law-about-marijuana#recreational-marijuana-
39. Cruz, J. M., Boidi, M. F. & Queirolo, R. (2018). The status of support for cannabis regulation in Uruguay 4 years after reform: Evidence from public opinion surveys. *Drug and Alcohol Review, 37,* S429–S434.
40. Decorte, T., Lenton, S. & Wilkins, C. (Eds.). (2020). *Legalizing cannabis: experiences, lessons and scenarios*. London: Routledge.
41. Delling, F. N., Vittinghoff, E., Dewland, T. A., Pletcher, M. J., Olgin, J. E., Nah, G., Aschbacher, K., Fang, C. D., Lee, E. S., Fan, S. M. & Kazi, D. S. (2019). Does cannabis legalisation change healthcare utilisation? A population-based study using the healthcare cost and utilisation project in Colorado, USA. *BMJ open, 9*(5), e027432.
42. Democratic Staff of the Joint Economic Committee. (2018). *The National Cannabis Economy.* Retrieved on 29 September 2020 from https://www.jec.senate.gov/public/_cache/files/bf473de9-98bb-4465-a310-de992926409a/national-cannabis-economy-final.pdf
43. Di Forti, M., Quattrone, D., Freeman, T. P., Tripoli, G., Gayer-Anderson, C., Quigley, H. & La Barbera, D. (2019). The contribution of cannabis use to variation in the incidence of psychotic disorder across Europe (EU-GEI): a multicentre case-control study. *The Lancet Psychiatry, 6*(5), 427–436.

44. DiDavis, J. M., Mendelson, B., Berkes, J. J., Suleta, K., Corsi, K. F. & Booth, R. E. (2016). Public health effects of medical marijuana legalization in Colorado. *American journal of preventive medicine, 50*(3), 373–379.
45. Dills, A. K., Goffard, S. & Miron, J. (2017). *The effects of marijuana liberalizations: Evidence from monitoring the future* No. w23779. Cambridge: National Bureau of Economic Research.
46. Dolin, B. (2001). *National drug policy: The Netherlands*. Retrieved on 29 September 2020 from https://sencanada.ca/content/sen/committee/371/ille/library/dolin1-e.htm
47. Dragone, D., Prarolo, G., Vanin, P. & Zanella, G. (2019). Crime and the legalization of recreational marijuana. *Journal of economic behavior & organization, 159,* 488–501.
48. Drev, A. & Lavtar, D. (2014). *Anketa o uporabi tobaka, alkohola in drugih drog 2011-2012: podatki o razširjenosti uporabe marihuane/hašiš*a. Retrieved on 29 September 2020 from https://www.nijz.si/files/uploaded/anketa_o_uporabi_tobaka_alkohola_in_drugih_drog_2011_2012.pdf
49. Drug Policy Alliance. (2018). *From Prohibition to Progress: A Status Report on Marijuana Legalization.* Retrieved on 29 September 2020 from https://www.drugpolicy.org/sites/default/files/dpa_marijuana_legalization_report_feb14_2018_0.pdf
50. DutchAmsterdam. (2014). *The connection between Amsterdam's coffeeshops and organized crime.* Retrieved on 29 September 2020 from https://www.dutchamsterdam.nl/686-amsterdam-coffeeshops-organized-crime
51. Eastwood, N., Fox, E. & Rosmarin, A. (2016). *A Quiet Revolution: Drugdecriminalisation Across the Globe*. Retrieved on 29 September 2020 from https://www.release.org.uk/sites/default/files/pdf/publications/A%20Quiet%20Revolution%20-%20Decriminalisation%20Across%20the%20Globe.pdf
52. Ellington, S., Salvatore, P. P., Ko, J., Danielson, M., Kim, L., Cyrus, A., Wallace, M., Board, A., Krishnasamy, V., King, B. A. & Rose, D. (2020). Update: product, substance-use, and demographic characteristics of hospitalized patients in a nationwide outbreak of E-cigarette, or Vaping, Product Use–Associated Lung Injury—United States, August 2019–January 2020. *Morbidity and Mortality Weekly Report, 69*(2), 44.
53. European Monitoring Centre for Drugs and Drug Addiction. (2012). *EMCDDA INSIGHTS Cannabis production and markets in Europe*. Retrieved on 29 September 2020 from http://www.emcdda.europa.eu/attachements.cfm/att_166248_EN_web_INSIGHTS_CANNABIS.pdf
54. European Monitoring Centre for Drugs and Drug Addiction. (2017). *Cannabis legislation in Europe: an overview*. Retrieved on 29 September 2020 from https://www.emcdda.europa.eu/system/files/publications/4135/TD0217210ENN.pdf
55. European Monitoring Centre for Drugs and Drug Addiction. (2018a). *Belgium - Country Drug Report 2018*. Retrieved on 29 September 2020 from https://www.emcdda.europa.eu/countries/drug-reports/2018/belgium/drug-laws-and-drug-law-offences_en

56. European Monitoring Centre for Drugs and Drug Addiction. (2018b). *Spain - Country Drug Report 2018*. Retrieved on 29 September 2020 from https://www.emcdda.europa.eu/countries/drug-reports/2018/spain/drug-laws-and-drug-law-offences_en
57. European Monitoring Centre for Drugs and Drug Addiction. (2019). *Statistical Bulletin 2018 — prevalence of drug us*e. Retrieved on 29 September 2020 from https://www.emcdda.europa.eu/data/stats2018/gps_en
58. European Monitoring Centre for Drugs and Drug Addiction & Europol. (2019). *EU Drug Markets Report 2019.* Retrieved on 29 September 2020 from https://www.emcdda.europa.eu/system/files/publications/12078/20192630_TD0319332ENN_PDF.pdf
59. Etter, J. F. (2015). Electronic cigarettes and cannabis: an exploratory study. *European addiction research*, *21*(3), 124–130.
60. Filbey, F. M., Aslan, S., Calhoun, V. D., Spence, J. S., Damaraju, E., Caprihan, A. & Segall, J. (2014). Long-term effects of marijuana use on the brain. *Proceedings of the National Academy of Sciences*, *111*(47), 16913–16918.
61. Freeman, T. P., Hindocha, C., Green, S. F. & Bloomfield, M. A. (2019). Medicinal use of cannabis based products and cannabinoids. *Bmj*, *365*.
62. Friedman, M. (1972). Prohibition and drugs. *Newsweek, 1*, 104.
63. Ghinai, I., Pray, I. W., Navon, L., O'Laughlin, K., Saathoff-Huber, L., Hoots, B., Kimball, A., Tenforde, M. W., Chevinsky, J. R. & Layer Ezike, N. (2019). E-cigarette product use, or vaping, among persons with associated lung injury—Illinois and Wisconsin, April–September 2019. *Morbidity and Mortality Weekly Report*, *68*(39), 865.
64. Goodman, L. A. (1961). Snowball sampling. *The annals of mathematical statistics*, *32*(2), 148–170.
65. Gottlieb, A. (1993). *Cooking with Cannabis: The Most Effective Methods of Preparing Food and Drink with Marijuana, Hashish*. Berkeley: Ronin Publishing.
66. Governing. (2019). *State Marijuana Laws in 2019 Map*. Retrieved on 29 September 2020 from https://www.governing.com/gov-data/safety-justice/state-marijuana-laws-map-medical-recreational.html
67. Government of Canada. (2018a). *Canada Gazette Part II*. Retrieved on 29 September 2020 from http://gazette.gc.ca/rp-pr/p2/2018/2018-07-11/pdf/g2-15214.pdf
68. Government of Canada. (2018b). *EDN55 Calculation of Cannabis Duty and Additional Cannabis Duty on Cannabis Products*. Retrieved on 29 September 2020 from https://www.canada.ca/en/revenue-agency/services/forms-publications/publications/edn55/calculation-cannabis-duty-additional-cannabis-duty-cannabis-products.html
69. Government of the Netherland. (no date*). Toleration policy regarding soft drugs and coffee shops.* Retrieved on 29 September 2020 from https://www.government.nl/topics/drugs/toleration-policy-regarding-soft-drugs-and-coffee-shops

70. Haberkorn, L. (2017). *A majority of pharmacists in Uruguay don't want to sell pot, here's why*. Retrieved on 29 September 2020 from https://www.thecannabist.co/2016/07/06/uruguay-marijuana-pharmacies/57627/
71. Hakkarainen, P., Kainulainen, H. & Perälä, J. (2008). Measuring the cannabis market in Finland—A consumption-based estimate. *Contemporary Drug Problems, 35*(2–3), 321–345.
72. Hall, W. & Degenhardt L. (2009). Adverse health effects of non-medical cannabis use. *The Lancet, 374*(9698), 1383–1391.
73. Hall, W., Stjepanović, D., Caulkins, J., Lynskey, M., Leung, J., Campbell, G. & Degenhardt, L. (2019). Public health implications of legalising the production and sale of cannabis for medicinal and recreational use. *The Lancet, 394*(10208), 1580–1590.
74. Hansen, B., Miller, K. & Weber, C. (2020). Federalism, partial prohibition, and cross-border sales: Evidence from recreational marijuana. *Journal of Public Economics, 187,* 104159.
75. Huang, Y., Zhang, Z., Tashkin, D., Feng, B., Straif, K. & Hashibe, M. (2016). An epidemiologic review of marijuana and cancer: an update. *Cancer Epidemiol Biomarkers Prev, 24*(1), 15–31.
76. Hudak, J., Ramsey, G. & Walsh, J. (2018). *Uruguay's cannabis law: Pioneering a new paradigm.* Retrieved on 29 September 2020 from https://www.brookings.edu/wp-content/uploads/2018/03/gs_032118_uruguaye28099s-cannabis-law_final.pdf
77. Hughes, C. E. & Stevens, A. (2010). What can we learn from the Portuguese decriminalization of illicit drugs? *The British Journal of Criminology, 50*(6), 999–1022.
78. Hughes, C. E. & Stevens, A. (2015). A resounding success or a disastrous failure: re-examining the interpretation of evidence on the Portuguese decriminalization of illicit drugs. In *New Approaches to Drug Policies* (pp. 137–162). London: Palgrave Macmillan.
79. Hughes, C., Stevens, A., Hulme, S. & Cassidy, R. (2019). Models for the decriminalisation, depenalisation and diversion of illicit drug possession: An international realist review.
80. InSight Crime. (2013). *Uruguay: Marijuana, Organized Crime and the Politics of Drugs.* Retrieved on 29 September 2020 from https://www.insightcrime.org/images/PDFs/2016/uruguay_legalization.pdf
81. IRCCA Convención. (2019). *Mercado regulado del cannabis. Informe VII.* Retrieved on 29 September 2020 from http://files.idpc.net/library/InformeMercado ReguladoCannabis-30jun2019.pdf
82. Jorge, M. A. (2020). Short term effects of cannabis legalization in uruguay on crime: an analysis using synthetic control. *Dubrovnik International Economic Meeting, 5*(1), 9–28.
83. Kendall, D. A. & Yudowski, G. A. (2017). Cannabinoid receptors in the central nervous system: their signaling and roles in disease. *Frontiers in cellular neuroscience, 10,* 294.

84. Kennedy, B. (2019). *The cannabis industry generates tons of extra waste. Here's why.* Retrieved on 29 September 2020 from https://www.leafly.com/news/industry/the-cannabis-industry-generates-tons-of-extra-waste-heres-why
85. Kilmer, B., Kruithof, K., Pardal, M., Caulkins, J. P. & Rubin, J. (2013). *Multinational overview of cannabis production regimes.* Retrieved on 29 September 2020 from https://www.tni.org/my/node/17186#note3b
86. Klein, A. & Hanson, V. (2020). *Ganja licensing in Jamaica: Learning lessons and setting standards.* Retrieved on 29 September 2020 from http://fileserver.idpc.net/library/Ganja_licensing_in_Jamaica.pdf
87. Lake, S., Walsh, Z., Kerr, T., Cooper, Z. D., Buxton, J., Wood, E., Ware, M. A. & Milloy, M. J. (2019). Frequency of cannabis and illicit opioid use among people who use drugs and report chronic pain: A longitudinal analysis. *PLoS medicine*, *16*(11), e1002967.
88. Lamers, M. (2019). *Canada has a cannabis packaging problem: Here's what businesses are doing about it.* Retrieved on 29 September 2020 from https://mjbizdaily.com/how-canadian-cannabis-companies-are-handllng-packaging-problems/
89. Laqueur, H., Rivera-Aguirre, A., Shev, A., Castillo-Carniglia, A., Rudolph, K. E., Ramirez, J., Martins, S. S. & Cerdá, M. (2020). The impact of cannabis legalization in Uruguay on adolescent cannabis use. *International Journal of Drug Policy, 80,* 102748.
90. League of Nations. (1925, 19 February). *Second International Opium Convention.* Retrieved on 29 September 2020 from https://treaties.un.org/doc/Treaties/1925/02/19250219%2006-36%20AM/Ch_VI_6_6a_6bp.pdf
91. Legal Information System of the Republic of Slovenia. (2020a). *Drugs Production and Trafficking Act (ZPPPD)"z.* Retrieved on 29 September 2020 from http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO1388#
92. Legal Information System of the Republic of Slovenia. (2020b). *Decree on the Classification of Illicit Drugs.* Retrieved on 29 September 2020 from http://www.pisrs.si/Pis.web/pregledPredpisa?id=URED6743.
93. Lewis, N., McCaffrey, K., Sage, K., Cheng, C. J., Green, J., Goldstein, L., Campbell, H., Ferrell, D., Malan, N., LaCross, N. & Maldonado, A. (2019). E-cigarette use, or vaping, practices and characteristics among persons with associated lung injury–Utah, April–October 2019. *Morbidity and Mortality Weekly Report, 68*(42), 953.
94. Leyton, M. (2019). Cannabis legalization: Did we make a mistake? *Journal of psychiatry & neuroscience, 44*(5), 291.
95. Library of Congress. (2016). *Decriminalization of Narcotics: Uruguay*. Retrieved on 29 September 2020 from https://www.loc.gov/law/help/decriminalization-of-narcotics/uruguay.php
96. Lopez-Quintero, C., de los Cobos, J. P., Hasin, D. S., Okuda, M., Wang, S., Grant, B. F. & Blanco, C. (2011). Probability and predictors of transition from first use to dependence on nicotine, alcohol, cannabis, and cocaine: results of the National

Epidemiologic Survey on Alcohol and Related Conditions (NESARC). *Drug and Alcohol Dependence, 115*(1–2), 30–120.

97. Lucas, P., Walsh, Z., Crosby, K., Callaway, R., Belle- Isle, L., Kay, R., Capler, R & Holtzman, S. (2016). Substituting cannabis for prescription drugs, alcohol and other substances among medical cannabis patients: The impact of contextual factors. *Drug and Alcohol Review, 35*(3), 326–333.
98. MacCoun, R. & Reuter, P. (2001a). Evaluating alternative cannabis regimes. *The British Journal of Psychiatry, 178*(2), 123–128.
99. MacCoun, R. J. (2011). What can we learn from the Dutch cannabis coffeeshop system? *Addiction, 106*(11), 1899–1910.
100. Mahamad, S., Wadsworth, E., Rynard, V., Goodman, S. & Hammond, D. (2020). Availability, retail price and potency of legal and illegal cannabis in Canada after recreational cannabis legalisation. *Drug and alcohol review, 39*(4), 337–346.
101. Maine State House. (2020). *Recreational Marijuana in Maine.* Retrieved on 29 September 2020 from https://legislature.maine.gov/lawlibrary/recreational_marijuana_in_maine/9419
102. Investopedia. (2020). *Marijuana Laws By U.S. State*. Retrieved on 29 September 2020 from https://www.investopedia.com/marijuana-legality-by-state-4844504# district-of-columbia-marijuana-laws-legalized
103. Marijuana Policy Group. (2016). *The Economic Impact of Marijuana Legalization in Colorado.* Retrieved on 29 September 2020 from http://www.agfseries2.com/_literature_144032/The_Economic_Impact_of_Marijuana_Legalization_in_Colorado
104. Marijuana Regulatory Agency. (no date). *Laws, Rules, Bulletins, Grants & Other Resources.* Retrieved on 29 September 2020 from https://www.michigan.gov/mra/0,9306,7-386-82631---,00.html
105. MarketWatch. (2019). *Investing in cannabis companies can threaten federal employees' security clearances*. Retrieved on 29 September 2020 from https://www.marketwatch.com/story/forget-elon-musks-marijuana-smoking-security-clearance-troubles-just-investing-in-cannabis-stocks-can-cause-you-problems-2019-03-11
106. Marks, A. (2019). Defining "personal consumption" in drug legislation and Spanish cannabis clubs. *International & Comparative Law Quarterly, 68*(1), 193–223.
107. Marsiglia, F. F., Kulis, S. S., Kiehne, E., Ayers, S. L., Libisch Recalde, C. A. & Sulca, L. B. (2018). Adolescent substance-use prevention and legalization of marijuana in Uruguay: A feasibility trial of the keepin'it REAL prevention program. *Journal of Substance use, 23*(5), 457–465.
108. Matthews, B. & Ross, L. (2014). *Research methods*. London: Pearson Higher Ed.
109. McGinty, E. E., Niederdeppe, J., Heley, K. & Barry, C. L. (2017). Public perceptions of arguments supporting and opposing recreational marijuana legalization. *Preventive medicine, 99*, 80–86.

110. Meehan, B., Rusko, C. J. & Stephenson, E. F. (2020). (Pot) Heads in Beds: The Effect of Marijuana Legalization on Hotel Occupancy in Colorado and Washington. *Journal of Regional Analysis & Policy, 50*(1), 46–53.
111. Mennis, J. & Stahler, G. J. (2020). Adolescent treatment admissions for marijuana following recreational legalization in Colorado and Washington. *Drug and alcohol dependence, 210,* 107960.
112. Metropolitan Police Department. (2015). *The Facts on DC Marijuana Laws*. Retrieved on 29 September 2020 from https://mpdc.dc.gov/marijuana
113. Ministerio del Interior. (2020). *Informe semestral de homicidios - 1º de Enero al 30 de junio (2018-2019).* Retrieved on 29 September 2020 from https://www.minterior.gub.uy/observatorio/images/pdf/2019/homicidios_primersem.pdf
114. Ministry of Health of the Republic of Slovenia. (2020). *Alkohol*. Retrieved on 29 September 2020 from https://www.gov.si/teme/alkohol/
115. Ministry of the Interior. (2020). *Letno poročilo o delu policije za leto 2019*. Retrieved on 29 September 2020 from https://www.policija.si/images/stories/Statistika/LetnaPorocila/PDF/LetnoPorocilo2019_popr.pdf
116. Monfort, S. (2018). Effect of recreational marijuana sales on police-reported crashes in Colorado, Oregon, and Washington. Arlington: Insurance Institute for Highway Safety.
117. National Institute of Public Health. (2019a). *Nacionalna raziskava o tobaku, alkoholu in drugih drogah.* Retrieved on 29 September 2020 from https://www.nijz.si/sl/podatki/anketa-o-uporabi-tobaka-alkohola-in-drugih-drog
118. National Institute of Public Health. (2019b). *Poraba ambulantno predpisanih zdravil v Sloveniji v letu 2018.* Retrieved on 29 September 2020 from https://www.nijz.si/sites/www.nijz.si/files/publikacije-datoteke/poraba_zdravil_2018_0.pdf
119. National Institute on Drug Abuse. (2019). *Monitoring the Future 2019 Survey Results: Vaping.* Retrieved on 29 September 2020 from https://www.drugabuse.gov/drug-topics/trends-statistics/infographics/monitoring-future-2019-survey-results-vaping
120. National Institute on Drug Abuse. (no date). *Monitoring the Future Study: Trends in Prevalence of Various Drugs.* Retrieved on 29 September 2020 from https://www.drugabuse.gov/drug-topics/trends-statistics/monitoring-future/monitoring-future-study-trends-in-prevalence-various-drugs
121. Nazif- Munoz, J. I., Oulhote, Y. & Ouimet, M. C. (2020). The association between legalization of cannabis use and traffic deaths in Uruguay. *Addiction, 115*(9), 1697–1706.
122. Neubauer, D., Perkovič-Benedik, M. & Osredkar, D. (2019). Recommendations for the use of Cannabidiol and Cannabinoids (Medical Cannabis) in Paediatrics. *Child Neurology. Series in Child Neurology, 2*(23), 5–35.
123. Nichols, C. (2017). *Does it cost $75K per year to lock up an inmate in California?* Retrieved on 29 September 2020 from https://www.politifact.com/factchecks/2017/aug/09/kamala-harris/does-it-cost-75k-year-lock-inmate-california/.
124. Ohmer, A. (2013). Investing in Cannabis: Inconsistent Government Regulation and Constraints on Capital. *Journal of Private Equity & Venture Capital Law, 3,* 97.

125. Oregon Department of Revenue. (2020). *Oregon marijuana tax statistics*. Retrieved on 29 September 2020 from https://www.oregon.gov/dor/programs/gov-research/Pages/research-marijuana.aspx
126. Oregon Department of Revenue. (no date). *Marijuana taxes*. Retrieved on 29 September 2020 from https://www.orcities.org/application/files/1615/6078/5277/2019SSRFullReport.pdf
127. Oregon Liquor Control Commission. (2020). *Oregon Liquor Control Comission Chaprter 845 Division 25 RECREATIONAL MARIJUANA.* Retrieved on 29 September 2020 from https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=3873
128. Owram, K. (2020). *The cannabis sector is still hiring and the number of applicants looking for work has exploded*. Retrieved on 29 September 2020 from https://financialpost.com/cannabis/cannabis-business/pot-job-seekers-surge-as-sector-is-still-hiring-cannabis-weekly
129. Oxford Treatment Center. (2020). *The Average Cost of Marijuana by State*. Retrieved on 29 September 2020 from https://www.oxfordtreatment.com/substance-abuse/marijuana/average-cost-of-marijuana/
130. Pain, S. (2015). A potted history. *Nature*, *525*(7570), 10–11.
131. Pascual, A. (2019). *Legal recreational marijuana diverts $22 million from Uruguay's black market.* Retrieved on 29 September 2020 from https://mjbizdaily.com/legal-recreational-marijuana-diverts-22-million-from-uruguays-black-market/
132. Pascual, A. (2020). *Supply issues still hinder Uruguay recreational cannabis market growth.* Retrieved on 29 September 2020 from https://mjbizdaily.com/supply-issues-still-hinder-uruguay-recreational-cannabis-market-growth/
133. Pertwee, R. G. (2008). The diverse CB1 and CB2 receptor pharmacology of three plant cannabinoids: Δ9- tetrahydrocannabinol, cannabidiol and Δ9- tetrahydrocannabivarin. *British journal of pharmacology*, *153*(2), 199–215.
134. Petek, G. (2019). *How high? adjusting california's cannabis taxes.* Retrieved on 29 September 2020 from https://lao.ca.gov/reports/2019/4125/cannabis-taxes-121719. pdf
135. Phillips, P. P. & Stawarski, C. A. (2008). *Data collection: Planning for and collecting all types of data*. Hoboken: John Wiley & Sons.
136. Piper, B. J., DeKeuster, R. M., Beals, M. L., Cobb, C. M., Burchman, C. A., Perkinson, L., Lynn, S. T., Nichols, S. D. & Abess, A. T. (2017). Substitution of medical cannabis for pharmaceutical agents for pain, anxiety, and sleep. *Journal of Psychopharmacology*, *31*(5), 569–575.
137. Potter, G., Bouchard, M. M. & Decorte, M. T. (2013). *World wide weed: Global trends in cannabis cultivation and its control*. Farnham: Ashgate Publishing, Ltd.
138. Price of Weed – A Global Price Inddex for Marijuana. (2020). *What is Marijuana really worth?* Retrieved on 29 September 2020 from http://www.priceofweed.com/?mloc=1
139. Pristavec Đogić, M. (2019). *Konoplja in njena pridelava v medicinske namene*. Ljubljana: National Assembly of the Republic of Slovenia, Research and Documentation Division.

140. Prohibition Partners. (2020). *The European Cannabis Report.* 5th ed. Retrieved on 29 September 2020 from https://prohibitionpartners.com/report-uploads/The%20European%20Cannabis%20Report%E2%84%A2%20-%205th%20Edition.pdf
141. Prohibition Partners. (2021). *Prohibition partners' top ten cannabis trends for 2021.* Retrieved on 29 September 2020 from https://prohibitionpartners.com/2021/01/20/ten-cannabis-trends-2021/
142. Richards, J. R., Smith, N. E. & Moulin, A. K. (2017). Unintentional cannabis ingestion in children: a systematic review. *The Journal of Pediatrics, 190,* 142–152.
143. Robinette, G. (2014). *Weeding Cannabis Fields: How Not to Weigh a Witch*. Valparass: Garffiti Militante Press.
144. Sansone, R. A. & Sansone, L. A. (2014). Marijuana and body weight. *Innovations in clinical neuroscience, 11*(50), 7–8.
145. Santaella-Tenorio, J., Wheeler-Martin, K., DiMaggio, C. J., Castillo-Carniglia, A., Keyes, K. M., Hasin, D. & Cerdá, M. (2020). Association of recreational cannabis laws in Colorado and Washington state with changes in traffic fatalities, 2005-2017. *JAMA internal medicine, 180*(8), 1061–1068.
146. Savas, D. (2001). *Public opinion and illicit drugs: Canadian attitudes towards decriminalizing the use of marijuana*. Retrieved on 29 September 2020 from https://www.fraserinstitute.org/sites/default/files/SensibleSolutionsSavas.pdf
147. Shi, Y., Liang, D., Bao, Y., An, R., Wallace, M. S. & Grant, I. (2019). Recreational marijuana legalization and prescription opioids received by Medicaid enrollees. *Drug and alcohol dependence, 194,* 13–19.
148. Sidney, S. (2002). Cardiovascular consequences of marijuana use. *The Journal of Clinical Pharmacology*, 42(11), 15–70.
149. Sokoya, M., Eagles, J., Okland, T., Coughlin, D., Dauber, H., Greenlee, C. & Winkler, A. A. (2018). Patterns of facial trauma before and after legalization of marijuana in Denver, Colorado: a joint study between two Denver hospitals. *The American Journal of Emergency Medicine, 36*(5), 780–783.
150. Staggs, B. (2018, 7 November). Prop. 64 didn't legalize every cannabis crime, but arrests are falling fast. *Mercury News.* Retrieved on 29 September 2020 from https://www.mercurynews.com/2018/07/11/prop-64-didnt-legalize-every-cannabis-crime-but-arrests-are-falling-fast/
151. State of Colorado. (no date). *Laws about marijuana use*. Retrieved on 29 September 2020 from https://www.colorado.gov/pacific/marijuana/laws-about-marijuana-use
152. State of Illinois. (no date). *Adult use cannabis summary*. Retrieved on 29 September 2020 from https://www2.illinois.gov/IISNews/20242-Summary_of_HB_1438__The_Cannabis_Regulation_and_Tax_Act.pdf
153. State of Nevada – Department of Taxation. (2018). *June marijuana revenue statistics news release.* Retrieved on 29 September 2020 from https://tax.nv.gov/uploadedFiles/taxnvgov/Content/TaxLibrary/News-Release-June-Marijuana.pdf?

154. State of Nevada – Department of Taxation. (2020). *Marijuana statistics and reports.* Retrieved on 29 September 2020 from https://tax.nv.gov/Publications/Marijuana_Statistics_and_Reports/
155. Statistical Office of the Republic of Slovenia. (2018). *Kako so opremljena gospodinjstva v Sloveniji in kako (pre)živijo? Koliko dni povprečno smo na bolniškem dopustu?* Retrieved on 29 September 2020 from https://www.stat.si/StatWeb/News/Index/7191
156. Statistical Office of the Republic of Slovenia. (2019). *Število prebivalstva po posameynih starostih*. Retrieved on 29 September 2020 from https://pxweb.stat.si/SiStatDb/pxweb/sl/10_Dem_soc/10_Dem_soc__05_prebivalstvo__10_stevilo_preb__05_05C10_prebivalstvo_kohez/?tablelist=true
157. Statistics Canada. (2018). *Estimating the demand for cannabis*. Retrieved on 29 September 2020 from https://www150.statcan.gc.ca/n1/pub/13-605-x/2018001/article/54963-eng.htm
158. Statistics Canada. (2019a). *Source of dried cannabis transaction, post-legalization.* Retrieved on 29 September 2020 from https://www150.statcan.gc.ca/n1/daily-quotidien/190410/t002c-eng.htm
159. Statistics Canada. (2019b). *Government revenues from the sale of cannabis, fourth quarter of 2018 and first quarter of 2019*. Retrieved on 29 September 2020 from https://www150.statcan.gc.ca/n1/daily-quotidien/190619/t001e-eng.htm
160. Statistics Canada. (2020a). *Retail trade sales by province and territory monthly (x 1,000,000).* Retrieved on 29 September 2020 from https://www150.statcan.gc.ca/t1/tbl1/en/cv!recreate.action?pid=2010000801&selectedNodeIds=2D30,3D2&checkedLevels=0D1&refPeriods=20200101,20200401&dimensionLayouts=layout3,layout2,layout2,layout3&vectorDisplay=false
161. Statistics Canada. (2020b). *Population estimates, quarterly.* Retrieved on 29 September 2020 from https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1710000901#timeframe
162. Statistics Canada. (2020c). *Historical (real-time) releases of gross domestic product (GDP) at basic prices, by industry, monthly (x 1,000,000).* Retrieved on 29 September 2020 from https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610049101&cubeTimeFrame.startMonth=11&cubeTimeFrame.startYear=2018&cubeTimeFrame.endMonth=09&cubeTimeFrame.endYear=2020&referencePeriods=20181101%2C20200901
163. Statistics Canada. (2020d). *Prevalence of cannabis use and daily or almost daily use in the past 3 months, by before or after legalization and selected demographics, household population aged 15 or older, Canada (provinces only), 2018 and 2019*. Retrieved on 29 September 2020 from https://www150.statcan.gc.ca/n1/pub/82-003-x/2020002/article/00002/tbl/tbl01-eng.htm
164. Statistics Netherlands (CBS). (2020*). Life style and (preventive) health examination; personal characteristics.* Retrieved on 29 September 2020 from https://opendata.cbs.nl/#/CBS/en/dataset/83021ENG/table?searchKeywords=cannabis

165. Statistics Solution. (2020). *Using Chi-Square Statistics in Research*. Retrieved on 29 September 2020 from https://www.statisticssolutions.com/using-chi-square-statistic-in-research/
166. Substance Abuse and Mental Health Services Administration. (2019*). Key Substance Use and Mental Health Indicators in the United States Results from the 2018 National Survey on Drug Use and Health.* Retrieved on 29 September 2020 from https://www.samhsa.gov/data/sites/default/files/cbhsq-reports/NSDUHNational FindingsReport2018/NSDUHNationalFindingsReport2018.pdf
167. Tahirali, J. (2016). *7 in 10 Canadians support marijuana legalization: Nanos poll.* Retrieved on 29 September 2020 from https://www.ctvnews.ca/canada/7-in-10-canadians-support-marijuana-legalization-nanos-poll-1.2968953
168. Tashkin, D. P. (2013). Effects of marijuana smoking on the lung. *Annals of the American Thoracic Society*, *10*(3), 239–247.
169. The Census Bureau. (2020). *The U.S. Population Estimates.* Retrieved on 29 September 2020 from https://www.census.gov/glossary/#term_Populationestimates
170. The Future of the Marijuana Industry in America. (2020). In *Investopedia*. Retrieved on 29 September 2020 from https://www.investopedia.com/articles/investing/111015/future-marijuana-industry-america.asp
171. The Government of Canada (2016). *A Framework for the Legalization and Regulation of Cannabis in Canada.* Retrieved on 29 September 2020 from https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/laws-regulations/task-force-cannabis-legalization-regulation/framework-legalization-regulation-cannabis-in-canada.html
172. The Government of Canada. (2019a). *Cannabis and your health*. Retrieved on 29 September 2020 from https://www.canada.ca/en/services/health/campaigns/cannabis/health-effects.html
173. The Government of Canada. (2019b). *Cannabis Legalization and Regulation*. Retrieved on 29 September 2020 from https://www.justice.gc.ca/eng/cj-jp/cannabis/
174. The Government of Canada. (2019c). *A Framework for the Legalization and Regulation of Cannabis in Canada.* Retrieved on 29 September 2020 from https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/laws-regulations/task-force-cannabis-legalization-regulation/framework-legalization-regulation-cannabis-in-canada.html
175. The Government of Canada. (2019d). *Controlled Drugs and Substances Act (S.C. 1996, c.19).* Retrieved on 29 September 2020 from https://laws-lois.justice.gc.ca/eng/acts/c-38.8/page-4.html#h-8l
176. The Government of Canada. (2019e). *Cannabis Tracking System Order: SOR/2019-202.* Retrieved on 29 September 2020 from http://www.gazette.gc.ca/rp-pr/p2/2019/2019-06-26/html/sor-dors202-eng.html
177. The Government of Canada. (2019f). *Record suspensions*. Retrieved on 29 September 2020 from https://www.canada.ca/en/parole-board/services/record-suspensions.html

178. The Government of Canada. (2019g). *Quarterly Compliance and Enforcement Report - Inspection Data Summary - Access to Cannabis for Medical Purposes Regulations.* Retrieved on 29 September 2020 from https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/compliance-enforcement/medical-cannabis-quarterly-compliance-enforcement-report-inspection-data-summary.html
179. The Government of Canada. (2019h). *Regulations under the Cannabis Act*. Retrieved on 29 September 2020 from https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/laws-regulations/regulations-support-cannabis-act.html
180. The Government of Canada. (2019i). *Price by frequency of use, pre-legalization and post-legalization.* Retrieved on 29 September 2020 from https://www150.statcan.gc.ca/n1/daily-quotidien/190410/t001c-eng.htm
181. The Government of Canada. (2019j). *Canadian Cannabis Survey 2019 – Summary.* Retrieved on 29 September 2020 from https://www.canada.ca/en/health-canada/services/publications/drugs-health-products/canadian-cannabis-survey-2019-summary.html
182. The Government of Canada. (2019k). *Cannabis duty – Apply for a cannabis licence from the CRA*. Retrieved on 29 September 2020 from https://www.canada.ca/en/revenue-agency/services/tax/businesses/topics/excise-duties-levies/apply-cannabis-licence.html
183. The Government of Canada. (2019l). *Excise duty framework for cannabis*. Retrieved on 29 September 2020 from https://www.canada.ca/en/revenue-agency/campaigns/cannabis-taxation.html
184. The Government of Canada. (2020). *Cannabis market data: Overview*. Retrieved on 29 September 2020 from https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/research-data/market.html
185. The Marijuana Index. (2020). *Canadian Marijuana Index*. Retrieved on 29 September 2020 from https://marijuanaindex.com/stock-quotes/canadian-marijuana-index-tracking-top-cannabis-stocks-in-canada/
186. The Official Gazette of the Republic of Slovenia. (2016). *892. Rules amending and updating the Decree on the Classification of Drugs, page 3013*. Retrieved on 29 September 2020 from https://www.uradni-list.si/glasilo-uradni-list-rs/vsebina/2016-01-0892?sop=2016-01-0892
187. The Official Gazette of the Republic of Slovenia. (2017). *673. Rules amending and updating the Decree on the Classification of Drugs, page 1936*. Retrieved on 29 September 2020 from https://www.uradni-list.si/glasilo-uradni-list-rs/vsebina/2017-01-0673?sop=2017-01-0673
188. Thomas, B. F. & ElSohly, M. A. (2016). The botany of Cannabis sativa L. *The Analytical Chemistry of Cannabis*, 1–26.
189. Thomas, B. F. & Pollard, G. T. (2016). Preparation and distribution of cannabis and cannabis-derived dosage formulations for investigational and therapeutic use in the United States. *Frontiers in Pharmacology*, *7*, 285–291.

190. Turvill, W. (2020, 18 March). The legal stuff is garbage': why Canada's cannabis black market keeps thriving. *The Guardian.* Retrieved on 29 September 2020 from https://www.theguardian.com/society/2020/mar/18/cannabis-canada-legal-recreatio nal-business
191. United Nations Office on Drugs and Crime. (2014). *The illicit drug trade through South'Eastern Europe.* Retrieved on 29 September 2020 from https://www.unodc.org/ documents/data-and-analysis/Studies/Illicit_DT_through_SEE_REPORT_2014_web. pdf
192. United Nations. (1961, 30 March). *Single Convention on Narcotic Drugs.* Retrieved on 29 September 2020 from https://www.unodc.org/pdf/convention_1961_en.pdf
193. United Nations. (1971, 21 February). *Convention on Psychotropic Substances.* Retrieved on 29 September 2020 from https://www.unodc.org/pdf/convention_ 1971_en.pdf
194. United Nations. (1988, 20 December). *United Nations Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances.* Retrieved on 29 September 2020 from https://www.unodc.org/pdf/convention_1988_en.pdf
195. Van Gerpen, S., Vik, T. & Soundy, T. J. (2015). *Medicinal and recreational marijuana: what are the risks?* Sioux Falls: South Dakota Medicine.
196. Vermont General Assembly. (2019). *Bill S.54 as introduced 2019*. Retrieved on 29 September 2020 from https://legislature.vermont.gov/Documents/2020/Docs/BILLS/ S-0054/S-0054%20As%20Introduced.pdf
197. Volkow, N., Swanson, J., Evins, A., DeLisi, L. E., Meier, M. H., Gonzalez, R., Bloomfield, M. A., Curran, H. V. & Baler, R. (2016). Effects of cannabis use on human behavior, including cognition, motivation, and psychosis: a review. *JAMA Psychiatry 73*(3), 292–297.
198. Wadsworth, E. & Hammond, D. (2020). Out-of-state cannabis purchases in the United States. *Drug and alcohol dependence, 207,* 107822.
199. Wall, M. M., Liu, J., Hasin, D. S., Blanco, C. & Olfson, M. (2019). Use of marijuana exclusively for medical purposes. *Drug and alcohol dependence*, *195*, 13–15.
200. Walsh, J. & Ramsey, G. (2016). *Uruguay's drug policy: Major innovations, major challenges.* Washington: Brookings.
201. Washington State Liquor and Cannabis Board. (2020). *Annual report*. Retrieved on 29 September 2020 from https://lcb.wa.gov/about/annual-report
202. Washington State Liquor and Cannabis board. (no date). *FAQs on Marijuana.* Retrieved September 29, 2020, from https://lcb.wa.gov/mj2015/faqs_i-502
203. Wen, J., Meng, F., Ying, T. & Belhassen, Y. (2020). A study of segmentation of cannabis-oriented tourists from China based on motivation. *Current Issues in Tourism, 23*(1), 36–51.
204. Wilkins, C., Bhatta, K. & Casswell, S. (2002). The effectiveness of cannabis crop eradication operations in New Zealand. *Drug and Alcohol Review*, *21*(4), 369–374.
205. Williams, R. J., Rehm, J. & Stevens, R. M. (2011). *The social and economic impacts of gambling*. Lethbridge: Faculty of Health Sciences.

206. World Health Organization. (2010). *Cannabis*. Retrieved September 29, 2020, from https://www.who.int/substance_abuse/facts/cannabis/en/
207. Zobel, F. (2020). *Cannabis Regulation in Europe: Country Report Switzerland.* Amsterdam: Transnational Institute.

APPENDICES

Appendix 1: Povzetek (Summary in Slovene language)

V navedeni magistrski nalogi je predstavljena obsežna študija o konoplji, njeni uporabi in njenih učinkih, povezanih trgih in načinih njene regulacije. Prispevek je uspel združiti študije o učinkih legalizacije konoplje na družbene in ekonomske spremenljivke. V prispevku je opravljen pregled vseh razpoložljivih ureditvenih režimov, ki se uporabljajo po svetu, in rezultatov, kot so gospodarske koristi in škodljivi družbeni vplivi V nalogi je predstavljenih tudi več alternativnih ocen za povpraševanje po konoplji ter ocena nezakonite porabe konoplje v Sloveniji. V nalogi so orisani škodljivi učinki uporabe konoplje na slovenske uporabnike konoplje na podlagi zbranih podatkov CSIRS ankete. Študija ugotavlja statistično povezavo posebnega vedenja z indikacijami škodljivih vplivov na zdravje, povezanimi z uporabo konoplje. Študijo smo zaključili s potrditvijo glavnih hipotez, ki ovrednotijo potencial za gospodarsko korist in socialna tveganja za državo.

Appendix 2: Studies on the potential of cannabinoids' use for medicinal purposes

Research subject(-s)	Brief description of study conclusion(-s)	Source
CBD as antitumor agent	CBD proves anti-tumour effect on Human Glioma (tumour), limits tumour invasion	Vaccani et al., 2005
Cannabinoids in cancer treatment	Cannabinoids are found to induce apoptosis (programmed cell death) at astrocytomas (tumour cells)	Cudaback et al., 2010
delta-9-THC, delta-8-THC, CBD	Increase of life span among mice carrying Lewis lung tumors; decreasing primary tumour size	Friedman, 1977
Cannabinoid receptor systems	Cannabinoid receptor system manipulations have therapeutic potential, antitumor effect of cannabinoids is demonstrated	Jones & Howl, 2003
Cannabinoids' effect on gliomas	Cannabinoids kill glioma cells selectively, meaning protection of non-transformed into glioma cells from death	Velasco et al., 2004
Cannabinoids in cellular proliferation	Cannabinoids are found to induce apoptosis in tumour cells	Lôpez-Rodríguez et al., 2005
CBD chemo preventive effect	CBD reduced mice colon cancer tumour and counteracted further changes in mice	Aviello, 2012
THC and colon cancer	THC induces mediated apoptosis in colorectal cancer cells	Greenhough et al., 2007
Cannabigerol (CBG)	CBG hampers colon cancer progression in vivo and selectively inhibits the growth colorectal cells	Borelli et al., 2014
Cannabinoids as inflammatory agents	Cannabis-derived substances with cannabinoids help to decrease chronic cancer-caused inflammation	Liu et al., 2010
Combination of THC, CBD, TMZ in GBM treatment	Glioblastoma (brain tumour) is highly resistant to current anticancer treatments (TMZ), however, in combined application with THC and CBD shows improved therapeutic effect, in both TMZ sensitive and TMZ-resistant tumours	Torres et al., 2011
CBD inhibits proliferation in brain tumour treatment	CBD helps to control tumour growth; selectively kills cancer cells	Solinas, 2013
Delta-8-THC and delata-9-THC in oral cancer treatment	Cannabinoids are proven as highly potent inhibitors of cellular respiration and are toxic to human oral cancer tumour	Whyte et al., 2010
Multiple studies of cannabinoids in breast cancer treatment	Cannabinoids possess anticancer activity, compounds exert anti-proliferative, pro-apoptotic; anti-migratory and anti-invasive actions in a wide spectrum of cancer cells; also at metastasis; cannabinoids show ability to control aggressiveness of cancer tumour	Caffarel et al., 2012; McAllister et al., 2007; McAllister et al., 2011
Studies of cannabinoids in lung cancer treatment	Cannabinoids prove efficacy with inhibition of non-small cell lung cancer growth and metastasis	Ramer et al., 2012; Preet et al., 2011
Cannabinoids in prostate cancer	Cannabinoids induce carcinoma cell apoptosis	Ramos & Bianco, 2012; Mimeault et al., 2003
Cannabinoids in leukaemia treatment	Cannabinoids induce cell apoptosis in blood	Jia et al., 2006
Studies on cannabinoids in cancer skin treatment	Cannabinoids administered locally and orally, show inhibiting effect in skin cancer tumours; further potential for usage against multiple pathological skin conditions (acne, seborrhoea, allergic dermatitis, itch and pain, psoriasis, hair growth disorders, systemic sclerosis and cancer)	Casanova et al., 2003; Bíró et al., 2009
Cannabinoids in leaver cancer	Hepatocellular carcinoma growth was inhibited	Vare et al., 2011
Cannabinoids in intestinal inflammation and cancer	Evidence suggests that cannabinoids may exert beneficial effects in intestinal inflammation and cancer	Izzo & Camilleri, 2009

Appendix 3: Cannabis and cannabinoid products available in pharmacy in Slovenia

Pozdravljeni,

V enotah Lekarne Ljubljana so v obliki živil/prehranskih dopolnil na voljo naslednji izdelki:

Naziv artikla	Naziv uvoznika	status izdelka	maloprodajna cena v lekarni
HEMP MEDICA COOL KONOPLJIN ČAJ META VR 25X	HERBA MEDICA d.o.o.	živilo	5,98 €
HEMP MEDICA CLEAR KONOPLJIN ČAJ ZELENI VR 25X	HERBA MEDICA d.o.o.	živilo	5,98 €
HEMP MEDICA FIT KONOPLJIN ČAJ ČRNI VR 25X	HERBA MEDICA d.o.o.	živilo	5,98 €
HEMP MEDICA CLEAR KURKUMA KAPS 30X	HERBA MEDICA d.o.o.	prehransko dopolnilo	24,91 €
HEMP MEDICA FIT MG KAPS 30X	HERBA MEDICA d.o.o.	prehransko dopolnilo	24,91 €
HEMP MEDICA COOL PASIJONKA,HMELJ KAPS 30X	HERBA MEDICA d.o.o.	prehransko dopolnilo	24,91 €

Živila in prehranska dopolnila so na voljo brez recepta in so v prosti prodaji.

Zdravila, ki vsebujejo dronabinol in kanabidiol zdravnik predpiše na recept in so v celoti plačljiva.

Zdravila se izdelajo magistralno, v lekarni, glede na predpis zdravnika. Vsebujejo lahko dronabinol (sintezni tetrahidrokanavinol oz. THC), kanabidiol (CBD) ali kombinacijo obeh učinkovin.

Največkrat zdravnik predpiše zdravilo, ki vsebuje dronabinol in kanabidiol. Cena za 30 ml magistralnega zdravila je 180 €.

Cena magistralnega zdravila s kanabidiolom je 130 € za 30 ml.

Lep pozdrav,

[redacted]
Farmacevtski tehnik

T: 01 230 61 24
F: 01 230 61 30
[redacted]

Appendix 4: National survey for tobacco, alcohol and other drugs 2018 (ATADD 2018)

Nacionalna raziskava o tobaku, alkoholu in drugih drogah 2018 (ATADD 2018)

Zahtevek za podatke (g. Kirill Runov)

POJASNILO O NATANČNOSTI OCEN
Ocene vrednosti, ki so izpisane v majhni velikosti, so manj zanesljive.
Ocene, ki so nezanesljive, imajo oznako N.

Metodologija izvedbe raziskave:
https://www.nijz.si/sl/podatki/nacionalna-raziskava-o-tobaku-alkoholu-in-drugih-drogah

Navajanje vira podatkov:
Nacionalna raziskava o tobaku, alkoholu in drugih drogah 2018 (ATADD 2018), Nacionalni inštitut za javno zdravje

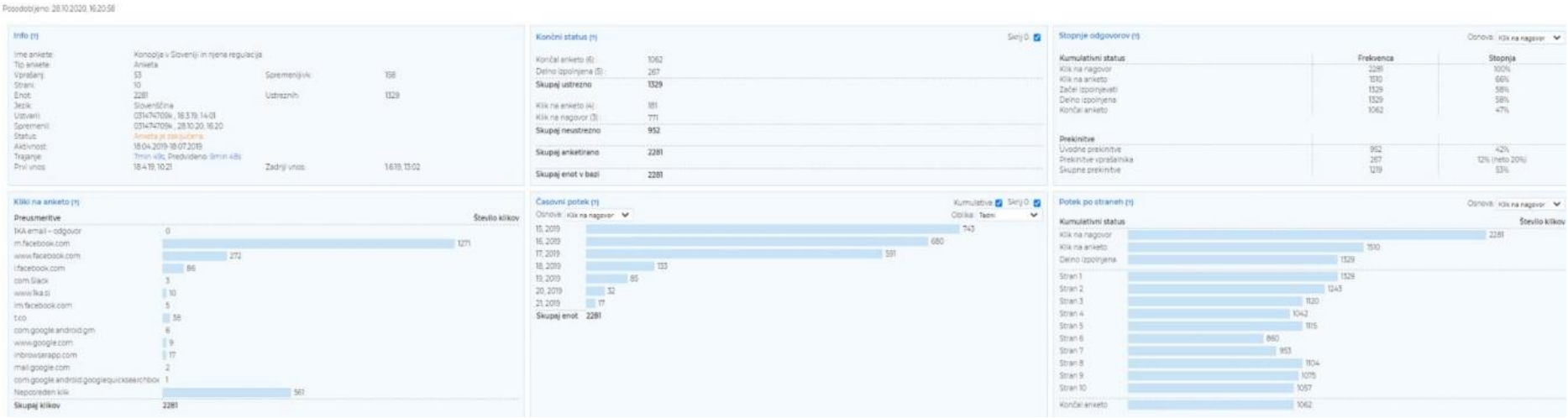
		Vsi	Spol		Starostna skupina - 10-letni razredi					Dosežena izobrazba - 4 skupine				Zaposlitveni status - 5 skupin				
odstotki	kategorija	vsi	Moški	Ženske	15 - 24 let	25 - 34 let	35 - 44 let	45 - 54 let	55 - 64 let	Osnovnoš olska izobrazba ali manj	Nižja ali srednja poklicna izobrazba	Srednja strokovna ali splošna izobrazba	Višja strokovna izobrazba več	Zaposlen, samozapo slen, kmetovale c	Učenec, dijak, študent	Upokojen ec	Brezposel n	Drugo
marihuana_LTP: Uporaba marihuane kadarkoli v življenju - LTP. Vključena je uporaba kanabisa ali hašiša.			χ²		χ²													
	da	20.7%	24.7%	16.5%	29.8%	35.7%	25.6%	11.7%	5.8%	12.1%	13.3%	21.9%	30.2%	22.4%	20.6%	31.3%	6.4%	3.9%
	ne	79.3%	75.3%	83.5%	70.2%	64.3%	74.4%	88.3%	94.2%	87.9%	86.7%	78.1%	69.8%	77.6%	79.4%	68.7%	93.6%	96.1%
marihuana_LYP: Uporaba marihuane v zadnjih 12 mesecih - LYP. Vključena je uporaba kanabisa ali hašiša.			χ²		χ²													
	da	5.9%	7.8%	3.8%	16.6%	9.0%	5.4%	2.0%	0.6%	6.7%	3.7%	6.2%	6.3%	4.8%	6.6%	17.9%	2.2%	1.0%
	ne	94.1%	92.2%	96.2%	83.4%	91.0%	94.6%	98.0%	99.4%	93.3%	96.3%	93.8%	93.7%	95.2%	93.4%	82.1%	97.8%	99.0%
marihuana_LMP: Uporaba marihuane v zadnjih 30 dneh - LMP. Vključena je prevalenca kanabisa ali hašiša.			χ²		χ²													
	da	3.0%	4.3%	1.6%	8.0%	4.6%	3.0%	1.1%	0.2%	3.7%	2.1%	3.1%	2.9%	2.3%	4.8%	8.7%	2.2%	0.5%
	ne	97.0%	95.7%	98.4%	92.0%	95.4%	97.0%	98.9%	99.8%	96.3%	97.9%	96.9%	97.1%	97.7%	95.2%	91.3%	97.8%	99.5%

Appendix 5: Selected Confiscated illicit drug in Slovenia 2015-2019

Zasežene prepovedane droge

Vrsta prepovedane droge	Enota mere	Količina oz. število				
		2015	2016	2017	2018	2019
Konoplja – rastlina	grami	20,6	2,6	71,7	16,2	342,3
	kosi	14.114,9	14.632,7	13.605,8	25.640,2	4.386,3
Konoplja – rastlina [marihuana]	grami	498.605,4	501.349,8	842.236,3	529.507,6	881.530,8
Konoplja – smola [hašiš]	grami	2.544,3	874,5	19.776,2	1.294,5	8.775,1
	mililitri	24,3	2.870,5	137,8	324,0	715,2
Konoplja – ekstrakti	grami	1.557,6	58,7	24,8	338,6	2.219,1
	mililitri	2.260,1	57,6	1.559,1	3.191,0	8.455,6

Appendix 6: Online survey platform 1ka online report for CSIRS survey



Appendix 7: Descriptive statistics report for CSIRS survey dataset

Q1

Sex	Frequency	Valid Percent
Male	697	56.5
Female	537	43.5
Total	1234	100.0

Q2

At which age group you fall into?	Frequency	Valid Percent
Less than 18 years old	54	4.4
18-28 years old	824	66.8
29-40 years old	241	19.5
41-60 years old	100	8.1
61 or more years old	15	1.2
Total	1234	100.0

Q3

At which statistical region do you reside?	Frequency	Valid Percent
Osrednjeslovenska	529	42.9
Primorsko-notranjska	44	3.6
Jugovzhodna Slovenija	40	3.2
Obalno-kraška	62	5.0
Goriška	48	3.9
Gorenjska	128	10.4
Zasavska	38	3.1
Posavska	22	1.8
Podravska	124	10.0
Pomurska	51	4.1
Koroška	33	2.7
Savinjska	86	7.0
Not willing to respond	29	2.4
Total	1234	100.0

Q4

What is your occupational status?	Frequency	Valid Percent
Studying (middle/high school)	205	14.9
Studying (university program)	403	29.2
Full-time job	460	33.4
Sole proprietorship	95	06.9
Professional sport	14	1
Entrepreneur (managing company)	55	4
Pensioner	16	1.2
Unemployed	72	5.2
I take care for a baby	7	0.5
Other	51	3.7
Total	1378	100.0

Q5

Which degree of education have you completed?	Frequency	Valid Percent
I. Incomplete primary school	10	.8
II. Primary school	174	14.1
III. Lower professional education (2 years program)	24	1.9
IV. Middle professional education (3 years program)	136	11.0
V. Gimnasium, middle professional - technical education, middle technical or other professional education	537	43.5
VI/1. High school program (till 1994), high school professional program	54	4.4
VI/2. Specialization after high school program	166	13.5
VII. Specialization after high school professional program	92	7.5
VIII/1. Specialization after university program, Master of Science	25	2.0
VIII/2. Doctor of Science (Bolonia program classification: Doctor of Science (3. Bolonia level)	16	1.3
Total	1234	100.0

Q6

What is your regular monthly income?	Frequency	Valid Percent
0-250 €	316	25.6
251-501 €	221	17.9
501-1000 €	331	26.8
1001-1500 €	213	17.3
1501-2000 €	93	7.5
2001-2500 €	13	1.1
2501-3000 €	12	1.0
2501-3000 €	13	1.1
3001-3501 €	8	.6
3501-4000 €	5	.4
More than 4000 €	9	.7
Total	1234	100.0

Q7

Do you attend sport activities (as professional/leisure activity)?	Frequency	Valid Percent
Yes	779	63.4
No	450	36.6
Total	1229	100.0

Q8

Have you ever tried to smoke cannabis (or consumed it in any other form)?	Frequency	Valid Percent
Yes	1247	93.8
No	82	6.2
Total	1329	100.0

Q9

Why you have not (yet) consumed marijuana?	Frequency	Valid percent	Percent of Cases
I have no interest in it	55	53.9%	67.9%
I did not have an opportunity	8	7.8%	9.9%
I am afraid of negative health consequences	11	10.8%	13.6%
I am afraid of legal punishment which is linked to it	3	2.9%	3.7%
Due to personal (/or) public opinion regarding illicit drugs	18	17.6%	22.2%
Other	7	6.9%	8.6%
Total	102	100.0%	125.9%

Q10

Why did you try cannabis for the first time?	Frequency	Valid percent	Percent of Cases
Curiosity	1141	83.5%	91.6%
Peer pressure	88	6.4%	7.1%
Health-associated reasons	90	6.6%	7.2%
Other	47	3.4%	3.8%
Total	1366	100.0%	109.7%

Q11

How frequently do you consume cannabis (products with THC content)?	Frequency	Valid Percent	Drug use prevalence prevalence equivalent	**How frequently do you consume cannabis (products with THC content)?**	Frequency	Valid Percent
Daily	510	41.0	Use within last 30 days	Daily	510	47.3
Weekly	268	21.5		Weekly	268	24.9
Monthly	131	10.5		Monthly	131	12.2
5-11 times per year	74	5.9	Use within last 12 months	5-11 times per year	74	6.7
1-4 times per year	95	7.6		1-4 times per year	95	8.8
I do not use cannabis	167	13.4		Total	1078	100.0
Total	1245	100.0				

Q12

How long this period lasts?	Frequency	Valid Percent	**How long this period lasts?**	Frequency	Valid Percent
0,5 year	50	4.6	Up to 2 years	242	22.5
1 year	53	4.9	2.5-5 years	360	33.4
1,5 years	42	3.9	5+ years	475	44.1
2 years	97	9.0	Total	1077	100
2,5 years	42	3.9			
3 years	97	9.0			
3,5 years	27	2.5			
4 years	96	8.9			
4,5 years	20	1.9			
5 years	78	7.2			
More than 5 years	475	44.1			
Total	1077	100.0			

Q13

Was there a period in your life, when you were regularly consuming marijuana?	Frequency	Valid Percent
Yes	119	35.5
Ne	216	64.5
Total	335	100.0

Q14

How long did this period last?	Frequency	Valid Percent
0,5 year	24	20.2
1 year	8	6.7
1,5 years	5	4.2
2 years	20	16.8
2,5 years	6	5.0
3 years	14	11.8
3,5 years	2	1.7
4 years	10	8.4
4,5 years	1	.8
5 years	11	9.2
More than 5 years	18	15.1
Total	119	100.0

Q15

How frequently did you enjoy marijuana (products with THC content)?	Frequency	Valid Percent	Real ex-users							
			Frequency	Valid Percent		Frequency	Valid Percent		Frequency	Valid Percent
Daily	61	50.4	61	0.508	Frequent users	113	0.942	Daily users	61	0.508
Weekly	52	43.0	52	0.433						
Monthly	5	4.1	5	0.042	Non-frequent users	7	0.058	All other users	59	0.492
5-11 times per year	1	.8	1	0.008						
1-4 times per year	1	.8	1	0.008						
I do not use cannabis	1	.8	Exlude							
Total	121	100.0	120							

Q16

Why did you terminate cannabis consumption?	Frequency	Valid Percent	Percent of Cases
Negative health effects	9	4.1%	7.4%
Negative psychical effects	51	23.1%	42.1%
Limitations which arise due to the illicit status of cannabis	15	6.8%	12.4%
Due to your family establishment	6	2.7%	5.0%
Due to studies/schooling	24	10.9%	19.8%
Because of work or business	26	11.8%	21.5%
Financial distress	6	2.7%	5.0%
Did not have access to marijuana (products with THC content)	4	1.8%	3.3%
Because of other personal reasons	48	21.7%	39.7%
You have relocated yourself to other city or country	6	2.7%	5.0%
Due to the lack of partners for group cannabis usage	7	3.2%	5.8%
None of the above	11	5.0%	9.1%
Other	8	3.6%	6.6%

Q17

Which products with THC content you consume?	Frequency	Valid Percent	Percent of Cases	Notes
"Home grown" marijuana (low THC content) - outdoor	913	32.3%	84.8%	Outdoor - low THC
"Skunk" marijuana (high THC content) - indoor	790	28.0%	73.4%	Indoor - high THC
Hash reisin	424	15.0%	39.4%	
Hash oil	214	7.6%	19.9%	
Edibles with THC content (for example: cookies)	381	13.5%	35.4%	
Vaporiser liquid	55	1.9%	5.1%	
None of the above	11	.4%	1.0%	
Other	37	1.3%	3.4%	
Total	2825	100.0%	262.3%	

Q18

At which age did you consume cannabis for the first time?	Frequency	Valid Percent
Before 10 years old	8	.6
11-14 years old	202	16.2
15-18 years old	803	64.5
19-22 years old	166	13.3
23-26 years old	30	2.4
27-30 years old	5	.4
31-34 years old	4	.3
35-38 years old	6	.5
39-42 years old	2	.2
43-46 years old	4	.3
47-50 years old	1	.1
51-54 years old	4	.3

Q19

Do you consume alcoholic beverages?	Frequency	Valid Percent
Yes	910	73.4
No	329	26.6
Total	1239	100.0

Q20

Describe your attitude towards alcohol and products with THC content?	Frequency	Valid Percent	Percent of Cases
Complementing goods (I use alcohol and goods with THC content, at the same time)	344	25.7%	31.0%
Complementing goods (I use alcohol and goods with THC content, at the different chronological periods (for example: on different days))	451	33.7%	40.6%
Cannabis is a substitute good for alcohol (as I enjoy THC containing products for recreative purposes, I do not consume alcohol)	261	19.5%	23.5%
I do not consume alcohol	183	13.7%	16.5%
Other	98	7.3%	8.8%
Total	1337	100.0%	120.3%

Q21

How do you access products with THC content?	Frequency	Valid Percent	Percent of Cases
Black market	717	50.78	70.5%
Friends/acquaintances share it with me (for example: passing on cigarette or "joint" during the consummation session)	493	34.92	1.1%
I do cultivate on my own	191	13.53	48.5%
Through the pharmacy (I have a medical pass from my doctor)	11	0.78	18.8%
Total	1412	100	138.8%

Notes:
Drug dealers
Social distribution
Grow-it-yourselvers
Medical cannabisl users, synthetic cannabinoids medicines

Q22

	N	Minimum	Maximum	Mean	Std. Deviation
What is the value of your average monthly expenditure for marijuana or THC containing products? (in €)	755	2	3000	110.46	178.667

Q23

Describe your attitude towards alcohol and products with THC content?	Frequency	Valid Percent	Percent of Cases
Complementing goods (I use alcohol and goods with THC content, at the same time)	344	29.8%	31.0%
Complementing goods (I use alcohol and goods with THC content, at the different chronological periods (for example: on different days))	451	39.1%	40.6%
Cannabis is a substitute good for alcohol (as I enjoy THC containing products for recreative purposes, I do not consume alcohol)	261	22.6%	23.5%
Other	98	8.5%	8.8%
Total	1154	100.0%	103.9%

Q25

	N	Minimum	Maximum	Mean	Std. Deviation
At what price (in €) per 1 gram, on average, you purchase hash resin?	426	2	20	8.55	3.287
At what price (in €) per 1 millilitre, on average, you purchase hash oil?	138	10	148	36.09	22.227
At what price (in €) per 1 gram, on average, you purchase "skunk" cannabis (high THC content)?	646	3	20	8.40	2.401
At what price (in €) per 1 gram, on average, you purchase "homegrown" cannabis (low THC content)?	673	2	20	5.69	2.358

Q26

Select a statement, which most appropriately describes the frequency of your THC containing products purchases	Frequency	Valid Percent
Buying regularly (equal chronological periods)	316	35.9
Purchase frequencies depend on opportunity (unequal chronological periods)	565	64.1
Total	881	100.0

Q27

	N	Minimum	Maximum	Mean	Std. Deviation
I do have positive experiences with cannabis (products with THC conent). 1 = Bad experience and 5 = Good experience	1084	1	5	4.28	.992

Q31

What are your difficulties associated with access to marijuana (products with THC content)?	Responses		Percent of Cases
	N	Percent	
Unfair sellers (difficulties are expressed in mismatches between price and quantity)	150	13.1%	25.3%
Unfair sellers (difficulties are expressed in mismatches between expected and actual quality)	164	14.3%	27.7%
Sellers are aggressive	21	1.8%	3.5%
Lack of sellers	123	10.7%	20.7%
Sellers are not punctual (being late)	205	17.9%	34.6%
Difficulties, which arise due to the illicit status of marijuana and THC containing products	232	20.2%	39.1%
Other	46	4.0%	7.8%
I do not experience difficulties with accessing to cannabis	205	17.9%	34.6%
Total:	1146	100.0%	193.3%

Q32

Do you consider yourself addicted to cannabis?	Frequency	Valid Percent
Yes	114	14.6
No	619	79.3
I am not willing to respond	48	6.1
Total	781	100.0

Q33

Have you noticed any of following side effects after usage of THC containing products (for example, several days after)?	Responses		Percent of Cases
	N	Percent	
Loss of memory	159	15.1%	29.6%
Passivity, lack of energy	229	21.8%	42.6%
Decrease of sexual activity	47	4.5%	8.7%
Problems with cognitive functions (difficulties with intellectual work, studying)	115	11.0%	21.4%
Concentration problems	158	15.0%	29.4%
None of the above	288	27.4%	53.5%
Increased appetite	54	5.1%	10.0%
Total	1050	100.0%	195.2%

Q34

Have you noticed any of following side effects after long term (1 year or longer) consumption of THC containing products?	Responses		Percent of Cases
	N	Percent	
Loss of memory	189	27.3%	56.6%
Passivity, lack of energy	138	19.9%	41.3%
Decrease of sexual activity	43	6.2%	12.9%
Problems with cognitive functions (difficulties with intellectual work, studying)	63	9.1%	18.9%
Concentration problems	128	18.5%	38.3%
Fertility decrease	4	.6%	1.2%
Increased aggressiveness	15	2.2%	4.5%
Panic, anxiety issues	75	10.8%	22.5%
None of the above	37	5.3%	11.1%
Total	692	100.0%	207.2%

Q35

Is legal cannabis (legally allowed trade and consummation of THC containing products) a factor, which might impact your choice of travel destination?	Frequency	Valid Percent
Yes, I travel (or willing to travel) to the states, where cannabis is legal	300	26.7
No, the legality of cannabis does not affect my travelling decisions	823	73.3
Total	1123	100.0

Q36

Do you agree, that medical usage of cannabis should be regulated and so accessible to ill individuals through the medical recipe?	Frequency	Valid Percent
Yes	1097	97.3
No	30	2.7
Total	1127	100.0

Q37

Did you ever apply cannabis for health-related purposes?	Frequency	Valid Percent
Yes	512	45.3
No	618	54.7
Total	1130	100.0

Q38 Other types of illnesses

Summary of similar responses	Frequency
Insomnia	22
Anxiety, stress, depression, burnout	13
Astma, bronchitis	9
Cramps, muscle relaxation	7
Skin conditions	20
Various pains	36
Stomach and digestion issues	6
Total:	113

Q38

Which adverse health conditions have you treated (eased) with an application of cannabis (products with THC content)?	Responses		Percent of Cases
	N	Percent	
Multiple sclerosis	14	1.1%	2.8%
Cancer	32	2.5%	6.3%
Depression	217	16.9%	42.7%
Appetite loss	144	11.2%	28.3%
Epilepsy	17	1.3%	3.3%
Crohn's disease	13	1.0%	2.6%
Pains, associated with menstrual cycle (abdominal cramps)	136	10.6%	26.8%
Headache	279	21.7%	54.9%
Muscle pain	205	16.0%	40.4%
Bone pain	81	6.3%	15.9%
Other types of illnesses	146	11.4%	28.7%
Total	1284	100.0%	252.8%

Q39

Which adverse health conditions have they treated (eased) with an application of cannabis (products with THC content)?	Responses		Percent of Cases
	N	Percent	
Multiple sclerosis	173	8.8%	32.3%
Cancer	414	21.2%	77.2%
Depression	205	10.5%	38.2%
Loss of appetite	155	7.9%	28.9%
Epilepsy	160	8.2%	29.9%
Crohn's disease	89	4.6%	16.6%
Pains, associated with menstrual cycle (abdominal cramps)	157	8.0%	29.3%
Headache	196	10.0%	36.6%
Muscle pain	190	9.7%	35.4%
Bone pain	144	7.4%	26.9%
Other types of illnesses	73	3.7%	13.6%
Total	1956	100.0%	364.9%

Q39 Other types of illnesses

Summary of similar responses	Frequency
Anxiety, stress, depression, burnout	1
Asthma, bronchitis	3
Skin conditions	3
Various Pains	6
Inflammations, arthritis	2
Support in Cancer Treatment	1
Epilepsy	1
Insomnia	8
Glaucoma	1
Fibromyalgia	1
Thyroid Gland Fault	1
Vestibular Syndrome	2
Rheumatic Arthritis	2
Dementia	1
Parkinson Disease	2
Alzheimer	2
Tumours	1
Total	43

Q40

Do you know anybody who uses cannabis for medical conditions' treatment?	Frequency	Valid Percent
Yes	681	60.4
No	446	39.6
Total	1127	100.0

Q41

Do you agree with the statement, that current regulation of cannabis is not optimal and changes are required?	Frequency	Valid Percent
Yes	1032	95.8
No	45	4.2
Total	1077	100.0

Q42

Do you agree with the statement, "In case of cannabis legalisation, regulation should be following resident's wishes and so (/possibly) differ among different municipalities"?	Frequency	Valid Percent
Yes	345	32.1
No	730	67.9
Total	1075	100.0

Q43

Cannabis (trade with THC-contatining products) shall be legalised for:	Responses		Percent of Cases
	N	Percent	
Recreational usage	874	41.6%	81.0%
Medical usage	960	45.7%	89.0%
Usage within religious context	241	11.5%	22.3%
I do not support legalization	26	1.2%	2.4%
Total	2101	100.0%	194.7%

Q44

Individuals shall be more informed regarding cannabis, as of positive and negative consequences of consummation.	Frequency	Valid Percent
Yes, individuals should be more informed.	972	91.3
No, individuals are already enough informed.	73	6.9
Awareness of individuals regarding marijuana and the effects of its usage are not important.	20	1.9
Total	1065	100.0

Q45

If recreational usage of marijuana (including consumption and trade of THC-containing products) would be legalised, how should it look like, limitation-wise?	Frequency	Valid Percent
Without limitations (except for the usage of motor vehicles and closed spaces, similarly as with tobacco products regulation)	425	40.5
The only limitations are applied to the public surfaces, such as schools, playgrounds, hospitals, public parks and similar.	367	35.0
Allowed only in "social clubs" (regular members of which have a right for consummation within club evenings and events)	21	2.0
Allowed only in specially designated for that purpose location, such as "coffee shops"	144	13.7
Allowed within religious ritual, in particular, religion-related locations	2	.2
Allowed within coffee shops and religion-related locations	29	2.8
Allowed within social clubs and religion-related locations	9	.9
Other	52	5.0
Total	1049	100.0

Q46

If cannabis would be legalised, who could have a right for trade with cannabis and THC-containing products, in your opinion?	Frequency	Valid Percent
A free market with limitations similar to one applied for tobacco products (retailers and hospitality services suppliers having permission for such activity)	298	28.7
Licensed cannabis retailers (example: dispensaries, coffee shops)	201	19.3
Licensed wholesale cannabis resellers	29	2.8
Pharmacies	66	6.4
State organisations	10	1.0
Licensed resellers (both, retail and wholesale trade)	83	8.0
Licensed resellers (both, retail and wholesale trade) and pharmacies	212	20.4
Licensed resellers (both, retail and wholesale trade) and state institutions	6	.6
Licensed resellers (both, retail and wholesale trade) and state institutions, pharmacies	67	6.4
Regulated "social clubs", where members have right for colelctive cannabis usage within club events	6	.6
Regulated "social clubs" and pharmacies	14	1.3
Regulated social clubs and state institutions	2	.2
Regulated social clubs and state institutions	14	1.3
Other	31	3.0
Total	1039	100.0

Q47

If the cannabis would be legalised, who could process it, in your opinion?	Frequency	Valid Percent
Nobody	9	.9
All individuals above 18 years old	336	32.5
All individuals above 18 years old (in smaller amounts only)	181	17.5
Licensed processors	178	17.2
State institutions	12	1.2
Members of "social clubs", for the purpose of individual consumption	4	.4
Licenced processors and state institutions	39	3.8
Members of "social clubs", for the purpose of individual consumption and state institutions	5	.5
All individuals above 18 years old (in smaller amounts only) and licensed processors	159	15.4
All individuals above 18 years old (in smaller amounts only) and state institutions	5	.5
All individuals above 18 years old (in smaller amounts only), licensed processors and state institutions	81	7.8
All individuals above 18 years old (in smaller amounts only), members of "social clubs" and state institutions	5	.5
All individuals above 18 years old (in smaller amounts only), members of "social clubs"	5	.5
Other	16	1.5
Total	1035	100.0

Q48

Should the content of THC within product be regulated and labelled?	Frequency	Valid Percent
Yes	929	90.3
No	100	9.7
Total	1029	100.0

Q49

Should the number of products with THC content sold per person be regulated?	Frequency	Valid Percent
Yes	402	39.0
No	629	61.0
Total	1031	100.0

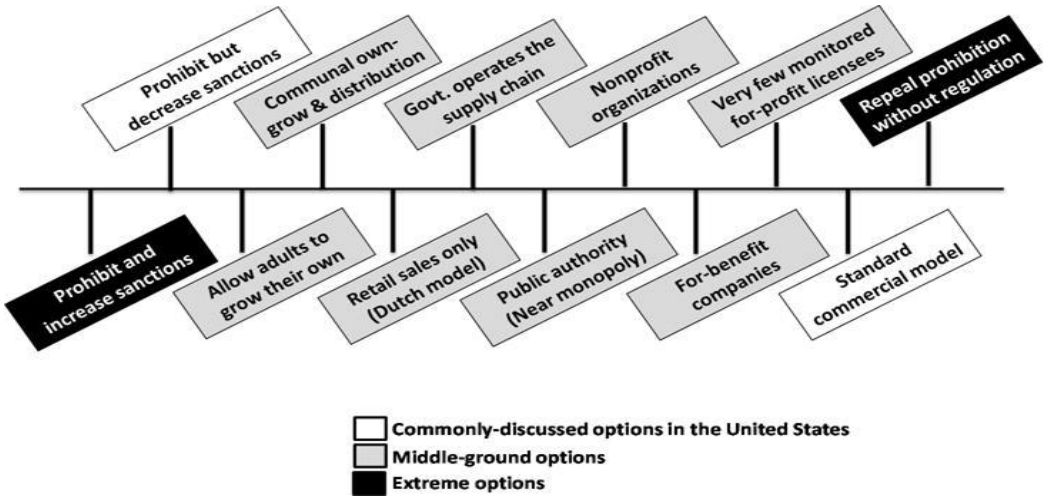
Appendix 8: Taxation of non-medical cannabis across the US states

State/district	Legislation approval	Taxation method	Effective tax rate comparative assessment
Alaska	Ballot Measure 2 approved in 2014, retail sales started in October 2016	An excise tax of 50USD/ounce of flowers; 15USD/ounce of stems and leaves; 25/ounce for immature flowers/buds (added in October 2018)	Moderate
Arizona	Proposition 207 or Marijuana Legalization Initiative will be held in November 2020 Ballot	16 per cent tax on sales in addition to the privilege and use taxes	-
California	Proposition 64 was approved in 2016; retail sales started on January 2018	Cultivation Tax 9.65USD/ounce of flowers (9.25USD before 1.1.2020), 2.87USD/ounce of leaves (2.87USD before 1.1.2020) and 1.35USD/ounce of fresh plant material (1.35USD before 1.1.2020); Excise tax of 15 per cent of retail sales; state retail tax (7.25 per cent plus local taxes)	High
Colorado	Approved with Constitutional amendment 64 in 2012, retail sales started in January 2014	An excise tax of 15 per cent of average market rate when selling to retail stores; Retail tax of 15 per cent (10 per cent before July 2017); Local Option Retail tax of up to 8 per cent; 2.9 per cent of an additional retail sales tax was applied till July 2017	Very high
District of Columbia	Approved with Ballot Initiative 71 in 2017	The legislation allows for possession of fewer than two ounces of marijuana, and as cultivation and distribution are prohibited by the federal law and taxes are not applied	-
Illinois	Approved by Bipartisan Bill H.B. 1438 passed by the General Assembly in May 2019, retail sales started in January 2020	7 per cent on sales to dispensaries; Retail Excise Tax: 10 per cent on cannabis with a THC level of 35 per cent or less, 20 per cent on cannabis-infused products; 25 per cent on cannabis with a THC level above 35 per cent	Moderate
Maine	Approved by Ballot Question 1 in 2016, allowing for marijuana cultivation and possession from 30th of January 2017	Excise tax: 335USD per pound of flowers, 94USD per pound of trim, 1.5USD per seedling, 0.35USD per seed; Retail sales tax of 10 per cent	Moderte
Massachusetts	Approved with Ballot Question 4 in 2016, sales started in July 2018	An excise tax of 10.75 per cent on retail sales; Retail sales tax of 6.25 per cent; Local Option Excise Tax of up to 3 per cent	Moderate
Michigan	Approved with Ballot Proposal 1 in 2018, sales started in December 2019	Retail Excise Tax of 10 per cent; State Sales tax of 6 per cent	Low
Montana	Approved with Montana I-190, Marijuana Legalization and Tax Initiative in 2020 Ballot, applications of potential providers and dispensaries are accepted starting on January 2022	Retail sales tax of 20 per cent for marijuana and marijuana-infused products	Moderate
Nevada	Approved with Ballot Question 2 in 2016 and Ballot Question in 2017, sales started in July 2017	Wholesale Excise Tax of 15 per cent on Fair Market Value determined by the Department of Taxation; Retail tax of 10 per cent; Sales tax of 6.85 per cent plus local taxes	High
New Jersey	Marijuana Legalization Amendment will be considered within November 2020 Ballot	The ballot proposition suggests state sales tax of 6.625 per cent and prohibits additional state sales taxes; local option tax considered would allow local governments to enact up to 2 per cent of recreational marijuana tax	-
Oregon	Approved within Initiative Measure 91 in 2014, due to which possession of up to eight ounces and four plants are allowed, retail sales started in October 2016	Retail Sales tax of 17 per cent; local option sales tax up to 3 per cent	Moderate
South Dakota	South Dakota Constitutional Amendment A is on November 2020 Ballot	The suggested amendment sets marijuana Sales Tax at 15 per cent	Low
Vermont	In January 2018 H. 511 act was signed by the governor, it allows for possession of one ounce of marijuana and two plants	The act did not allow for retail sales; however, it established a Marijuana Advisory Commission which could submit recommendations for future retail sales legislations	-
Washington	Approved with Measure Initiative 502 in 2012 and allowed possession, sales and distribution, it also required the State Liquor Control Board to regulate and tax retail sales. H2136 regulation in 2015 changed the name of overseeing organisation to the Washington State Liquor and Cannabis Board	Retail Sales tax of 37 per cent; 6.5 per cent state sales plus local tax	Very high

Appendix 9: Prices of high and medium quality cannabis across the US states, with respective legal statuses of non-medical cannabis, USD

Sourcre:	Governing, 2019	Oxford Treatment Center, 2020		
US State or municipality	**Non-medical cannabis legal status**	**Mean retail price estimate per 1 gram of non-medical cannabis, USD**		
		High quality (1)	**Medium quality (2)**	**Average of (1) and (2)**
District of Columbia	Legal possession	21.09	19.44	20.26
South Dakota	Illegal (Ballot 2020)	12.38	11.82	12.10
Virginia	Decriminalised	12.88	10.97	11.92
Iowa	Illegal	12.80	10.86	11.83
Illinois	Legal	12.49	10.48	11.48
Vermont	Legal possession	12.20	10.58	11.39
Pennsylvania	Illegal	12.63	10.12	11.38
Maryland	Decriminalised	12.73	9.98	11.36
New Jersey	Illegal (Ballot 2020)	12.13	10.55	11.34
Wyoming	Illegal	11.22	11.36	11.29
New Hampshire	Decriminalised	11.82	10.65	11.23
Wisconsin	Illegal	12.13	10.12	11.13
Kansas	Illegal	12.13	10.02	11.08
Missouri	Decriminalised	12.52	9.59	11.06
Massachusets	Legal	12.03	9.98	11.01
West Virginia	Illegal	12.80	9.03	10.92
North Dakota	Decriminalised	13.55	8.29	10.92
Louisiana	Illegal	12.66	9.10	10.88
Connecticut	Decriminalised	11.75	9.91	10.83
North Carolina	Decriminalised	12.06	9.52	10.79
Minnesota	Decriminalised	9.88	11.68	10.78
Oklahoma	Illegal	12.17	9.38	10.78
New York	Decriminalised	11.89	9.56	10.72
Delaware	Decriminalised	11.99	9.35	10.67
Alaska	Legal	10.51	10.76	10.64
Tennessee	Illegal	12.17	8.82	10.49
Hawaii	Decriminalised	11.08	9.42	10.25
Alabama	Illegal	12.10	8.08	10.09
Arkansas	Illegal	11.68	8.47	10.07
Texas	Illegal	11.46	8.57	10.02
Indiana	Illegal	11.75	8.29	10.02
Ohio	Decriminalised	11.64	8.29	9.96
Michigan	Legal	10.23	9.63	9.93
Rhode Island	Decriminalised	10.86	8.99	9.93
South Carolina	Illegal	11.85	8.01	9.93
Nebraska	Decriminalised	10.90	8.75	9.82
Georgia	Decriminalised in	11.22	8.29	9.75
Kentucky	Illegal	11.96	7.16	9.56
Arizona	Illegal (Ballot 2020)	10.48	8.22	9.35
Florida	Illegal	10.55	8.01	9.28
Utah	Illegal	9.91	8.61	9.26
Maine	Legal	10.16	8.22	9.19
Mississipi	Decriminalised	12.31	6.00	9.15
Idaho	Illegal	9.67	8.61	9.14
Montana	Illegal (Ballot 2020)	9.49	8.64	9.07
New Mexico	Decriminalised	10.02	8.04	9.03
Nevada	Legal	9.52	8.25	8.89
California	Legal	9.07	7.30	8.18
Colorado	Legal	8.54	7.05	7.80
Washintgton	Legal	8.22	6.95	7.58
Oregon	Legal	7.44	6.60	7.02
Mean		**11.50**	**9.30**	**10.40**
Average price in the states with legal cannabis sales		**9.82**	**8.52**	**9.17**
Average price in the states with illicit or decriminalized status of cannabis		**11.67**	**9.21**	**10.44**

Appendix 10: Cannabis supply alternatives



Appendix 11: IRCCA registrations 2018-2020

Number of	IRCCA registrations on			
	04.05.2020	**12.31.2019**	**12.31.2018**	**11.09.2020**
(1) Buyers	41174	39004	31933	42185
(2) Home growers	8278	7919	7817	9435
(3) Club members	4768	2897	1683	5031
(4) Clubs	158	154	114	160
(1) + (2) + (3) =	**54220**	49820	41433	56651

Appendix 12: Summary of statistically significant results, per hypotheses pair.

H2.2.1 & 2.2.2

Group of adverse health-related indications	Variable	Pearson Chi-Square test of correlation		Percentage of respondents indicating adverse effect within frequency of use group				
		Chi-square	Significance	Daily	Weekly	Monthly	5-11 times per year	1-4 times per year
Long-term	Memory loss	11.868	,018*	58.2%	30.2%	6.6%	1.6%	3.3%
Short-term	Passivity, lack of energy	13.826	,008*	56.7%	23.3%	8.7%	6.7%	4.7%
	Decrease in sexual activity	18.619	,064b	43.4%	31.1%	9.4%	9.0%	7.1%
	Difficulties with cognitive functions (difficulties with intellectual work, studying)	30.187	,001*	35.6%	28.8%	15.4%	11.5%	8.7%
	None of the above	30.187	,000*	59.0%	22.3%	11.0%	6.7%	1.1%

H2.2.3 & 2.2.4

Group of adverse health-related indications	Variable	Pearson Chi-Square test of		Percentage of respondents indicating adverse effect within age of first contact with cannabis				
		Chi-square	Significance	Under 18 years	19-22 years	23-26 years	31-38 years	Above 50 years
Long-term	Memory loss	7.166	,067a,b	91.0%	8.5%	0.5%	0.0%	0.0%
	Decrease of sexual activity	12.316	,006a,b,*	76.7%	23.3%	0.0%	0.0%	0.0%
	None of the above	36.091	,000a,b,*	73.0%	10.8%	10.8%	0.0%	5.4%
Short-term	Exceptionally increased appetite	18.491	,005a,b,*	83.3%	11.1%	1.9%	1.9%	1.9%

H2.2.5 & 2.2.6

Group of adverse health-related indications	Variable	Pearson Chi-Square test of correlation		Percentage of respondents indicating adverse effect within period of cannabis use group					
		Chi-square	Significance	< 1 year	< 2 years	< 3 years	< 4 years	< 5 years	> 5 years
Long-term	Memory loss	18.847	,002*	2.8%	16.0%	12.7%	14.4%	13.8%	40.3%
	Decrease of sexual activity	12.182	,032*,b	2.6%	17.9%	0.0%	25.6%	7.7%	46.2%
	Increased	16.262	,006*,b,c	0.0%	14.3%	0.0%	35.7%	28.6%	21.4%

H2.2.7 & 2.2.8

Group of adverse health-related indications	Variable	Complementary goods (I consume alcohol and THC-containing products simultaneously)			I do not use alcohol			Complementary goods (I consume alcohol and THC-containing products within different chronological periods (e.g. on different days))		
		Pearson Chi-Square test of correlation		Percentage of respondents indicating behaviour within respondents group indicating adverse health effect	Pearson Chi-Square test of correlation		Percentage of respondents indicating behaviour within respondents group indicating adverse health effect	Pearson Chi-Square test of correlation		Percentage of respondents indicating behaviour within respondents group indicating adverse health effect
		Chi-square	Significance		Chi-square	Significance		Chi-square	Significance	
Long-term	Memory loss	3.723	.054	45.9%	340.4%	6.5%	9.9%			
	Decrease of sexual activity	5.624	,018*	28.2%	-					
	Difficulties with cognitive functions (difficulties with intellectual work, studying)	5.624	,018*	55.4%	3.501	.061	5.4%	-		
	Panic, anxious disorders	-			4.719	,030*	5.5%			
Short-term	Memory loss				7.343	,007*	7.4%			
	Passivity, lack of energy				4.690	,030*	9.9%	10.599	,001*	52.4%
	Difficulties with cognitive functions (difficulties with intellectual work, studying)				7.126	,008*	5.8%	-		
	None of the above				5.156	,023*	17.0%	4.719	,030*	39.2%

H2.2.9 & 2.2.10

Group of adverse health-related indications	Variable	Outdoor "home-grown" cannabis (lower THC content)			Indoor "skunk" cannabis (higher THC content)			Hashish			Vaporizer tincture		
		Chi-square	Significance	Percentage of product type users within respondents reporting health condition group	Chi-Square	Significance	Percentage of product type users within respondents reporting health condition group	Chi-Square	Significance	Percentage of product type users within respondents reporting health condition group	Chi-Square	Significance	Percentage of product type users within respondents reporting health condition group
Long-term	Memory loss	4.876	,027*	91.8%	24.2	,000*	90.1%	-					
	Difficulties with concentration	-						7.914	,005*	58.9%	-		
	Increased aggressiveness							5.425	,020*	78.6%			
Short-term	Memory loss	-			3.332	.068	84.7%	5.291	,021*	51.3%			
	Difficulties with cognitive functions (difficulties with intellectual work, studying)	-						4.675	,031*	52.9%	3.893	,048*	4.6%
	None of the above	-			10.441	,001*	84.8%	-					
	Exceptionally increased appetite	-			7.213	,007*	65.4%						

Appendix 13: Average cannabis monthly budgets among cannabis users by frequencies of cannabis use, SPSS output

Statistics

Koliko so vaši povprečni mesečni izdatki za konopljo oz. izdelke z vsebnostjo THC-ja (v €)?

Dnevno	N	Valid	411
		Missing	0
	Mean		201.46
	Std. Deviation		434.310
	Minimum		10
	Maximum		5000
Tedensko	N	Valid	202
		Missing	0
	Mean		49.06
	Std. Deviation		43.789
	Minimum		10
	Maximum		300
Mesečno	N	Valid	64
		Missing	0
	Mean		37.34
	Std. Deviation		54.270
	Minimum		10
	Maximum		300
5-11 krat na leto	N	Valid	22
		Missing	0
	Mean		69.50
	Std. Deviation		211.501
	Minimum		10
	Maximum		999
1-4 krat na leto	N	Valid	7
		Missing	0
	Mean		20.71
	Std. Deviation		16.938
	Minimum		10
	Maximum		50
Ne uživam konoplje	N	Valid	1
		Missing	0
	Mean		78.00
	Minimum		78
	Maximum		78

Appendix 14: Current illicit demand for cannabis in Slovenia, factors and calculations

Equation variable	Population of Slovenia, SURS (2019)	
	Age group	Number of residents
C1(a)	15-64	1355926
C1(b)	15+	1774357
C1(c)	11+	1854499

Equation variable	Cannabis use prevalence group	Percentage of 15-64 years old group
C2(12m); D2	Last 12 months	5.9%
C2(30d)	Last 30 days	3%

Equation variable or calculation element	C3(d,w,m,o,r)	C3(d,w,m,o,r)/∑C3(d, w,m,o,r)	C3(d,w,m)/∑C3(d,w,m)	C4(d,w,m,o,r)
Cannabis users (respondents that ever used cannabis), by frequency of use	Cannabis use life prevalence	Current users (12 months use prevalence)	Current users (30 days use prevalence)	Mean monthly expense for cannabis, by frequencies of cannabis consumption, euro
Daily	41%	47.3%	56%	201.5
Weekly	21.5%	24.9%	29%	49.1
Monthly	10.5%	12.2%	14%	37.3
5-11 times a year	5.9%	6.9%	-	69.5
1-4 times a year	7.6%	8.8%		20.7
I do not consume cananbis	13.4%	-		-
Total	100%	100%	100%	

Equation variable	Cananbis use prevalence group	Weighted average monthly cannabis budget of an average cannabis user
C5m(12m)	Last 12 months (4)	119
C5m(30d)	Last 30 days (5)	133

Appendix 15: Model for post-legalisation cannabis market demand estimate

Model factor	Value	
D1 – total population old enough to purchase cannabis according to the legislation. (SURS, 2019)	D1(1): 18+ years old population	D1(2): 21+ years old population
	1719085	1661903
D2 – a share of the population which currently uses cannabis. The value represents the most up-to-date known share of the population with cannabis use contacts within the last 12 month period. (NIJZ**,** 2019, Appendix 6)	5.9%	
D3 – a share of the cannabis-using population that intends to switch to legal cannabis after legalisation.	D3(1): Statistics Canada, 2018	D3(2): D3(1)*0.5
	49.2%	25%
D4 – a share of the population that is currently using illicit cannabis and yet have not formed an opinion on whether they will switch to legal cannabis after legalisation. (Statistics Canada, 2018)	25.2%	
D5 – share of the population currently using illicit cannabis and have not yet decided whether they will switch to legal cannabis after legalisation and that will decide to switch. (Statistics Canada, 2018)	50%	
D6 – a share of the population (percentage and number), which are not currently using cannabis and is calculated as D1 minus D2.	94.12%	
	1617950	
D7 – a share of the population that reported themselves to be non-users of cannabis and who intend to try using cannabis after legalisation.	D7(1): Statistics Canada, 2018	D7(2): D7(1)*0.5
	5.9%	3.0%
D8 – a share of the population that reported themselves to be non-users of cannabis and not yet decided, whether they will initiate use post-legalisation.	D8(1): Statistics Canada (2018)	D8(2): D8(1)*0.5
	9.4%	4.7%
D9 – a share of the population that reported themselves as current non-users of cannabis and which have not decided yet whether they will start using it and that, in the end, will decide to start using it. This share is unknown and is considered to be 50 per cent. (Statistics Canada, 2018)	50%	
D10 – the weighted average expense of cannabis use for three months, which is used in the first cannabis demand estimate model as **C5m(12m).**	356 EUR	

Appendix 16: Factors used in supply-side cannabis consumption estimate in Slovenia

S2 (s,m,l)			S5	S3 (id)	S3 (od)	S3 (hr)	S3 (ce)	S4 (id)	S4 (od)
Cannabis plant price (EUR), based on the assumed weight of a confiscated plant			Weighted average price per gram of seized cannabis:	Mean price per gram of indoor-grown cannabis	Mean Price per gram of outdoor-grown cannabis	Mean Price per gram of hashish resin	Mean price per 1ml of hashish oil (cannabis extract)	Indoor cannabis market share proxy	Outdoor cannabis market share proxy
34 gram	130 gram	811 gram	6.94	8.40	5.69	8.55	36.09	0.46	0.54
236	902	5630							

Appendix 17: Projected cannabis supply in Slovenia calculation, by assumed seized rate and average dry cannabis output per plant

Assumed Illicit Cannabis Supply					Assumed cananbis volume (EUR)			Cannabis plants' price (mil. EUR)			Illicit Supply of dried cannabis, hash reisin, cannabis extracts (mil. EUR)	Total Illicit Supply in a year (mil. EUR)		
								Cannabis plant weight is				Cannabis plant weight is		
Reporting calendar year	Cannabis plants (pcs.)	Cannabis quantity (g.)	Hash resin quantity (g.)	Cannabis extracts quantity (ml.)	Dried Cannabis	Hash resin	Cannabis extracts	34 g.	130 g.	811 g.		34 g.	130 g.	811 g.
Assumption: 5 percent of total illicit cannabis is seized.														
2019	87726	17630616	175502	169112	122392607	1501242	6102737	21	79	494	**130.0**	**151**	**209.2**	**623.9**
2018	512804	10590152	25890	63820	73517358	221463	2303070	121	463	2887	**76.0**	**197**	**538.8**	**2963.1**
2017	272116	16844726	395524	31182	116936920	3383309	1125263	64	246	1532	**121.4**	**186**	**367.0**	**1653.5**
2016	292654	10026996	17490	1152	69607902	149609	41572	69	264	1648	**69.8**	**139**	**333.9**	**1717.4**
2015	282298	9972108	50886	45202	69226866	435278	1631203	67	255	1589	**71.3**	**138**	**326.1**	**1660.6**
Assumption: 10 percent of total illicit cannabis supply is seized.														
2019	43863	8815308	87751	84556	61196304	750621	3051369	10	40	247	**65.0**	**75**	**104.6**	**311.9**
2018	256402	5295076	12945	31910	36758679	110731	1151535	61	231	1444	**38.0**	**99**	**269.4**	**1481.6**
2017	136058	8422363	197762	15591	58468460	1691654	562632	32	123	766	**60.7**	**93**	**183.5**	**826.7**
2016	146327	5013498	8745	576	34803951	74805	20786	35	132	824	**34.9**	**69**	**167.0**	**858.7**
2015	146327	5013498	8745	576	34803951	74805	20786	35	132	824	**34.9**	**35**	**167.0**	**858.7**
Assumption: 20 percent of total illicit cannabis supply is seized.														
2019	21932	4407654	43876	42278	30598152	375311	1525684	5	20	123	**32.5**	**38**	**52.3**	**156.0**
2018	128201	2647538	6473	15955	18379340	55366	575767	30	116	722	**19.0**	**49**	**134.7**	**740.8**
2017	68029	4211182	98881	7796	29234230	845827	281316	16	61	383	**30.4**	**46**	**91.8**	**413.4**
2016	73164	2506749	4373	288	17401975	37402	10393	17	66	412	**17.4**	**35**	**83.5**	**429.4**
2015	70575	2493027	12722	11301	17306717	108820	407801	17	64	397	**17.8**	**34**	**81.5**	**415.2**
Assumption: 30 percent of total illicit cannabis supply is seized.														
2019	14606	2935498	29221	28157	20378369	249957	1016106	3	13	82	**21.6**	**25**	**34.8**	**103.9**
2018	85382	1763260	4311	10626	12240640	36874	383461	20	77	481	**12.7**	**33**	**89.7**	**493.4**
2017	45307	2804647	65855	5192	19469997	563321	187356	11	41	255	**20.2**	**31**	**61.1**	**275.3**
2016	48727	1669495	2912	192	11589716	24910	6922	12	44	274	**11.6**	**23**	**55.6**	**286.0**
2015	47003	1660356	8473	7526	11526273	72474	271595	11	42	265	**11.9**	**23**	**54.3**	**276.5**
Assumption: 40 percent of total illicit cannabis supply is seized.														
2019	10966	2203827	21938	21139	15299076	187655	762842	3	10	62	**16.2**	**19**	**26.1**	**78.0**
2018	64101	1323769	3236	7978	9189670	27683	287884	15	58	361	**9.5**	**25**	**67.4**	**370.4**
2017	34015	2105591	49441	3898	14617115	422914	140658	8	31	192	**15.2**	**23**	**45.9**	**206.7**
2016	36582	1253375	2186	144	8700988	18701	5197	9	33	206	**8.7**	**17**	**41.7**	**214.7**
2015	35287	1246514	6361	5650	8653358	54410	203900	8	32	199	**8.9**	**17**	**40.8**	**207.6**