Through the smokescreen: Is there a socio-economic case for cannabis legalisation in South Africa?

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ABSTRACT

A few American states have legalised recreational cannabis use, and many other jurisdictions are questioning cannabis prohibition. South Africa is a major producer and global supplier of cannabis, despite prohibition being actively enforced. Lacking local academic studies on the topic, this report critically discusses the relevant global literature, and tests its applicability in the South African context to ascertain whether a socio-economic case can be made for cannabis legalisation.

The primary point of analysis constituted the literature review. This provided a broad context for global and South Africa-specific cannabis prohibition and legalisation experiences vis-à-vis the associated socio-economic dynamics and impact of enforcement policies and practices. The literature review’s contents were assessed according to the conceptual framework’s four themes: harm caused by prohibition, harm prevented by prohibition, harm not prevented by prohibition, and harm related to but not caused by cannabis use.

Pertinent empirical research is relatively recent and sparse. A few appropriate studies were identified, and supplemented by theoretical research. South Africa-specific data proved inaccurate and unreliable, but transferability from international studies could be justified. The report shows that cannabis prohibition inadvertently imposes material socio-economic costs, and that a reassessment of the current policies in South Africa is warranted to ensure overall harm reduction and optimise socio-economic outcomes. Globally, cannabis relegalisation is new, and uncertainty about potential outcomes cannot be ignored. A proactive and adaptive approach to policy development and enforcement is needed until outcomes are optimised. Policy should be judged on outcomes, not on underlying moral motivation or enforcement process indicators.
PLAGIARISM DECLARATION

I know that plagiarism is wrong. Plagiarism is to use another’s work and pretend that it is one’s own.

I have used a recognised convention for citation and referencing. Each significant contribution and quotation from the works of other people has been attributed, cited and referenced.

I certify that this submission is my own work.

I have not allowed and will not allow anyone to copy this research report with the intention of passing it off as his or her own work.

Vladislav Lakčević
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Firstly I would like to thank my father, Branko Lakčević, without whom I may have never found my way to completing my MBA at the University of Cape Town. Unfortunately, while my father did get to see me begin my MBA, he is no longer around to witness the fulfilment of this piece of work. However, his battle with cancer and his use of legally prescribed medicinal cannabis treatment to alleviate the side-effects of chemotherapy and other cancer-related discomfort he suffered serve as key motivations for this research.

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<tr>
<td>Bantustans</td>
<td>Territories set aside for black South Africans as part of apartheid policy</td>
</tr>
<tr>
<td>complex adaptive system</td>
<td>A system with a large number of interacting components, whose outcome cannot be derived from the activities of the individual components, i.e., a dynamic and non-linear system</td>
</tr>
<tr>
<td>confirmation bias</td>
<td>A tendency for people to seek out or interpret information in such a way that it confirms their preconceptions, which can lead to errors of logic and statistical interpretation (Thaler &amp; Sunstein, 2008)</td>
</tr>
<tr>
<td>dagga</td>
<td>A common South African term for cannabis</td>
</tr>
<tr>
<td>decriminalisation</td>
<td>The criminal de-penalisation of certain activities; these activities can still remain regulated, accrue monetary fines or in the case of illicit substances be seized by law enforcement officials. Decriminalised activities are not permissible by law</td>
</tr>
<tr>
<td>hydroponic</td>
<td>A method of growing plants in nutrient-enriched, water-based solutions</td>
</tr>
<tr>
<td>legalisation</td>
<td>The process of changing the legal status of an activity to be permissible by law. The activity may still be regulated by law enforcement or other regulatory bodies</td>
</tr>
<tr>
<td>schedule I drug</td>
<td>Drugs with no currently accepted medical use, and with great potential for abuse. This is the highest drug schedule of the United Nations Single Convention on Narcotic Drugs and includes drugs such as cocaine, heroin and cannabis, among others (United Nations, 1972)</td>
</tr>
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LIST OF ABBREVIATIONS

ARC…………………………………………………..Agricultural Research Council (South Africa)
CBD……………………………………………………cannabidiol (non-psychoactive)
CDA……………………………………………………Central Drug Authority (South Africa)
CTP……………………………………………………cannabis for therapeutic purposes
DAFF……………………..Department of Agriculture, Forestry and Fisheries (South Africa)
GSB……………………………..(University of Cape Town) Graduate School of Business
LSE……………………………………………………….London School of Economics
NDMP………………………………….National Drug Master Plan (South Africa)
SAMJ……………………………………………………….South African Medical Journal
SAPS…………………………………………………….South African Police Service
SAPA………………………………………………….South African Press Association
SMMS………………………………………………….Strategic Market Management System
THC………………………………………………….delta-9 tetrahydrocannabinol (psychoactive)
UCT………………………………………………………..University of Cape Town
UNODC………………………………………………..United Nations Office on Drugs and Crime
1. INTRODUCTION

According to the United Nations (UNODC, 2007), the highest levels of cannabis production in the world are to be found on the African continent, estimated at roughly 25% of global production, with Morocco and South Africa leading the way. In fact, it has been estimated that South Africa is the world’s third-largest producer of cannabis (Karl Peltzer & Ramlagan, 2007; UNODC, 2009b). This view is supported by Gastrow (2003), who determined that in the year 2000 cannabis seizures by the South African Police Service (SAPS) accounted for 16% of the world total of seized cannabis.

Due to its current illegal status, all of the cannabis produced in South Africa is traded as a recreational drug on black markets locally and internationally (UNODC, 2014). This, coupled with the fact that the best-estimate cannabis prevalence rate in southern Africa is 5.0% (which in South Africa is equivalent to 2.65 million people), has led Dr van Niekerk, editor of the South African Medical Journal (SAMJ), the Anti-Drug Alliance SA and multiple international stakeholders to announce that the war on drugs has failed (Ostrowski, 1990; Quah et al., 2014; The World Bank, 2014; UNODC, 2015b; Van Kerken, 2013; Van Niekerk, 2011). The implication is that the current enforcement-led policy requires drastic revision: Policy should be judged on outcomes, not on inputs or process indicators. This sentiment was echoed in 2014 by a London School of Economics report entitled “Ending the Drug Wars: Report of the LSE Expert Group on the Economics of Drug Policy”, in which the authors assert that “it is time to end the ‘war on drugs’ and massively redirect resources towards effective evidence-based policies underpinned by rigorous economic analysis” (Quah et al., 2014, p. 3). In further endorsement, five Nobel Prize economists (among other prominent figures) signed the report’s foreword and confirmed the authors’ findings that “the current United Nations-governed global strategy of achieving a ‘drug-free world’ has failed. Pursuit of this unachievable goal has proved damaging to human security and socioeconomic development” (Quah et al., 2014, p. 8).

The total financial and social costs associated with the enforcement-led policy on cannabis in South Africa have not yet been fully quantified in any published work. Beyond the direct cost of enforcement through arrests, one needs to consider the significant and publically undisclosed costs incurred by the SAPS in terms of intelligence gathering, as well as their systematic destruction of cannabis crops (SAPS, 2015a). In 2015, a lot of media attention has been paid to the cannabis field crop spraying undertaken by the Air Wing division of the
SAPS. Unfortunately, initial media reports also suggest that this operation, which has been conducted annually for the last 20 years (SAPS, 2015a), causes significant collateral damage to some of the most impoverished communities of South Africa in the Eastern Cape (Berliner, 2015; M. Clarke & Stoobs, 2015; SAPA, 2015). Surely the money and resources spent on enforcing what appears to be a failed policy could be better utilised in South Africa? This research paper seeks to provide an objective answer to this question with regard to cannabis-related policies and practices.

Cannabis is a very versatile plant because of its many uses; however, its current prohibition in South Africa has limited it to the world of recreational drug use. “Hemp (cannabis sativa L) is an industrial crop and is one of the oldest cultivated crops in the world” (Agricultural Research Council, 2014), but cultivating hemp in South Africa is illegal. The Agricultural Research Council (ARC) (2014) of South Africa has identified “over 25,000 existing consumer products that can be produced from hemp”. In fact, the Department of Agriculture, Forestry and Fisheries (DAFF) (2012, p. 3) of South Africa issued a report in 2012 which proposes that:

Hemp is one of the most important fiber [sic] crops both for South Africa and the rest of the world. It has been cultivated longer than any other fiber [sic] crop. There seems to be a never-ending list of benefits of the hemp plant with products ranging from clothing and textile to cosmetics and insulating boards. However it is the perceived relationship with Marijuana that gave the plant a bad name. Both come from the plant family Cannabis sativa L., but from different varieties. Hemp has been grown in South Africa for medical purposes for centuries. It has been illegal in South Africa since 1903 when dagga prohibition was passed.

These views are consistent with views expressed in many historical books on the subject of hemp and cannabis (Abel, 1980; Booth, 2003; Herer, 1985).

At present, commercial cultivation of hemp in South Africa remains prohibited by the same legislation that prohibits any form of Cannabis sativa cultivation, production or sale (see section 2.5.1 for details).

The significance of the research topic becomes evident when one considers that a change in South Africa’s stance on cannabis could effectively create industries or reinvigorate existing industries, such as textile production, that have become less competitive in the global context.
Furthermore, it is important to note that internationally the tide is turning, as more and more countries are seeking decriminalisation or complete legalisation of cannabis (Decorte & Potter, 2015; Quah et al., 2014; UNODC, 2014). There is also increasing pressure on the South African government to reconsider its stance on cannabis through the Medical Innovation Bill, which has been tabled by parliament and discussed by parliament more than once in 2015, as well as through a Constitutional Court challenge on the constitutionality of certain sections of the Drugs and Drug Trafficking Act, 1992, which is scheduled to be heard in March 2016 (M Clarke, personal communication, February 17, 2015).

In 2005 a paper by Professor Jeffrey Miron (2005), Senior Lecturer on Economics and Director of Undergraduate Studies at Harvard University, entitled “The Budgetary Implications of Marijuana Prohibition” received much traction and public support from over 500 leading economists (including three Nobel laureates), such as Milton Friedman. As the title suggests, this paper focused primarily on assessing the potential fiscal benefit of various scenarios in which marijuana prohibition is lifted and has started changing political mind-sets in the United States (US) (Hardy, 2005; Miron, 2005). It is time for a South African equivalent of the Miron report.

Significantly, at present South Africa-specific literature and cannabis-specific data have been found to be severely lacking, outdated or inaccurate. The reporting of the SAPS cannabis seizures best illustrates this point: The SAPS 2015 Annual Report states that 440 200 tons of cannabis was seized by the SAPS in 2014 (SAPS, 2015a). This figure implies that over eight kilograms of cannabis was confiscated for each person living in South Africa, suggesting a massive local cannabis industry. However, even these official SAPS (2015a) figures must be viewed circumspectly in the light of the UNODC’s (2015b) data on global cannabis (herbal and resin) seizures for 2014, which, at 7 180 tons, is over 60 times less than the SAPS-reported seizure figure for that period.

Given these observations, the challenges of and imperative for a research report which seeks to conduct a socio-economic cost–benefit analysis of legalising cannabis in South Africa become clear.
1.1 As Research question and sub-questions

As mentioned, the primary research question that this report seeks to address can be stated as follows: Is there a socio-economic business case to be made for cannabis legalisation in South Africa?

To answer this question, the report conducts a qualitative cost–benefit analysis which attempts to answer the following sub-questions:

a. What are the socio-economic costs and benefits of the current policies on cannabis?
b. What are the potential socio-economic implications of legalisation in South Africa?
c. How could the socio-economic costs of cannabis legalisation be minimised through potential policy interventions?

Once these three sub-questions are answered, one can objectively assess the current landscape against the proposed landscape and determine which is superior for South Africa from a socio-economic perspective.

The cost–benefit analysis relies on the assessment of the available data and literature, which are evaluated against the South African context in order to answer the primary research question by weighing the potential costs against the benefits of cannabis legalisation.

1.2 Clarification of scope

Admittedly the primary research question is quite broad, but given the lack of academic literature on the subject in South Africa, it is the author’s view that the first step in opening up such a debate requires this approach in order to enable further work on the subject as South Africa refines its stance.

The report focuses on developing an objective view; it is rooted in fact and supported by sound prior research (the literature) and economic theory.

As noted by both the ARC (2014) and the DAFF (2012), there is likely vast potential for industrial applications of hemp. A thorough assessment of the potential hemp industry would entail an equally substantial piece of work (or multiple pieces of work), which falls beyond the scope of the research report. Nonetheless, the potential impact of cannabis (hemp) legalisation must be assessed to some extent, as it may have the power to bring material benefits to some of South Africa’s industries, such as biofuel, textiles, paper, building material and animal feed, among others.
The physiological effects of consumption – the medicinal and recreational effects – are simply touched on, as this is not the primary focus of the research. Discussion of this issue is limited to providing potential societal and economic impacts of cannabis legalisation, as well as use and abuse trends based on recent published works from prominent journals and researchers.

The research explores policy options that the government may want to consider, with a view to optimising socio-economic outcomes of legalised cannabis. But this, too, is not the primary focus of the study. It may also be somewhat premature given the current lack of direction from the South African government on the subject of future cannabis policy.

1.3 Research assumptions

While literature on the topic is widely available from countries that have taken a more proactive stance on cannabis legalisation than South Africa, it is critical to bear in mind that in the South African context little academic work has been done on the subject, particularly from an economic perspective. This necessitates certain research assumptions to be in place.

International agencies such as UNODC, the World Health Organization (WHO) and the Global Drug Survey provide views based on the best available approximations and/or survey data in terms of production and consumption of cannabis in South Africa. This point serves as a key assumption used throughout this research report. These sources rely on voluntary submissions from national governments, individuals or other stakeholders. Thus survey participants may have underlying motives to under-report the extent of drug prevalence rates. Rather than being a limitation, the incentive to under-report is arguably equal for most survey participants and as a result making comparisons on a relative basis across countries should remain valid.

Another key assumption is that international studies and research with regard to assessing social and economic impacts of cannabis policy changes are comparable to potential outcomes in South Africa. This assumption is tested thoroughly throughout the research.

Any further assumptions that may be required for the purpose of completing the research are clearly communicated where appropriate within the report.
1.4 Research ethics

The research required for answering the question has been conducted respectfully and transparently.

Each of the authors, companies and government organisations whose research and data have been used is appropriately referenced in the report.

While the research report is primarily a literature review, the author sought guidance from experts in the field of criminology and the cannabis industry. These individuals were made fully aware of the research question, and disclosed information voluntarily. No direct quotes or information gathered from those interviews are used in this report, although with their consent the interviewees have been included in the Acknowledgements.

The author’s GSB ethical clearance application was officially approved by the university’s Ethics in Research Committee on 5 October 2015.
2. LITERATURE REVIEW

This section provides important historical context for cannabis prohibition internationally and in South Africa. It also reviews the pertinent literature that is used in answering the primary research question and associated sub-questions (as discussed in section 1.1). Applicability/transferability of literature and research to the South African context is discussed in this section wherever appropriate.

The literature on this topic is quite fragmented and focuses on either:

a. the impact or potential industrial applications of cannabis (hemp) or
b. the impact of legalising what is currently considered an illegal drug for medicinal and/or recreational use.

No literature is available that directly relates to the research question of assessing the viability of developing a socio-economic case for legalisation of cannabis as a plant for industrial, medicinal and responsible adult use purposes. In the light of this finding, the literature review that follows is structured to optimally combine the various pieces of research that are available on the research topic.

2.1 The turbulent history of the cannabis plant

According to the UNODC (2012, p. 1) “cannabis is produced in nearly every country worldwide, and is the most widely produced illicit drug”. Such extensive cannabis cultivation may be unsurprising given the cultural and industrial applications of the cannabis plant (Abel, 1980; Booth, 2003; Decorte & Potter, 2015). In fact, multiple sources suggest that cannabis (hemp) was one of the first crops to be grown by man, with cultivation first occurring between 4 000 and 6 000 years ago, in China (Booth, 2003; Fortenbery & Bennett, 2004; Herer, 1985; Kraenzel et al., 1998).
2.1.1 The early years in Europe and the United States

Booth (2003) and Roulac (1997) note that during the 16th century hemp became a dominant crop in Britain and Russia’s primary export crop. In fact, Herer (1985) recounts that one of Napoleon’s primary motives for invading Russia in 1812 was to compel Czar Alexander I to stop exporting hemp to Britain, as at the time Russian hemp accounted for 90% of Britain’s marine hemp, which was used for sails, ropes, rigging and nets.

According to Kraenzel et al. (1998, p. 16), colonials arriving in America found hemp growing in the wild, and the plant grew in importance to the point that it:

played a key part in our nation’s independence. The first two drafts of the Declaration of Independence were printed on it, colonial soldiers dressed in it, and the first flag was sewn from it. Presidents Washington and Jefferson both grew hemp on their plantations to meet market demand. Benjamin Franklin began his penny printing press with it. After America gained its freedom and began to expand west, it was hemp that covered the wagons. When Levi Garret began selling his jeans to miners in California, he made them from hemp. Hemp was even used as legal tender to make up for the lack of printed money and promote its growth.

By the 1800s, the US began importing hemp from Russia. The Russian technology which separated the fibres from the plant stalk was much more cost-effective and resulted in better properties of products (Kraenzel et al., 1998).

In the late 1800s, the U.S. hemp industry began to decline, however. Reasons included the development of the cotton gin (which reduced labor costs for Southern cotton production), the advent of steam- and petroleum-powered ships (which reduced the demand for cordage and sailcloth materials), and imports of cheaper jute and abaca. Abaca gradually replaced hemp for use in marine cordage due to its weight, ability to float, and greater resistance to salt water corrosion. (Fortenbery & Bennett, 2004, p. 98)
2.1.2 Cannabis prohibition in South Africa

The earliest available discussion paper on cannabis produced by the South African government dates back to 1987, six years before prohibition was enforced in this country. The paper appears to be motivated by the premise that cannabis consumption leads to insanity in native Indian immigrants (Natal (Colony). Indian Immigrants Commission, 1987). The report in fact recommends that:

- rules be passed by His Excellency the Governor Council, under Section 70 of Law No. 2 of 1870 to the following effect:-
  
  a. Prohibiting the cultivation by Indian Immigrants, of any variety of cannabis, the hemp plant.
  
  b. Prohibiting the smoking or the possession, by Indian Immigrants of any portion of the hemp plant, whether wild or cultivated, save by medical advice, the proof whereof shall be on the smoker or possessor.
  
  c. Prohibiting the sale, to Indian Immigrants, of any portion of the hemp plant, whether wild or cultivated, by any person other than duly licensed vendor, who shall require, before such sale, the production of a satisfactory certificate.
  
  d. Imposing a stamp duty upon all licenses issued under the rules.
  
  e. Authorising the destruction of any variety of the hemp plant cultivated or found without any authority, in possession of Indian Immigrants, by order of the Resident magistrate of the district. (Natal (Colony). Indian Immigrants Commission, 1987, p. 7)

Paterson (2009, p. 46) suggests that “the findings of the Indian Immigrant Commission Report framed the future debates on cannabis in South Africa. The themes presented in this report (labourer indolence, crime and insanity) recurred throughout debates on cannabis, up to the point of national prohibition” in 1928.

Evidently, at its very core, cannabis prohibition in South Africa was initially racially motivated.
2.1.3 The beginning of global prohibition, through international control systems

In 1921 the Council of the League of Nations called for an Advisory Committee on the Traffic in Opium and Dangerous Drugs, to which the South African Government submitted the following:

Pretoria November 28th 1923

With reference to your letter no. 12/A/22951/17217 dated September 6th 1922, on the above subject and to my letter no. 29/8/85 dated December last, forwarding copies of the Regulations promulgated under Proclamation no. 181 of 1922, I have the honour to inform you that, from the point of view of the Union of South Africa, the most important of all the habit-forming drugs is Indian Hemp or ‘Dagga’ and this drug is not included in the International List. It is suggested that the various Governments being parties to the International Opium Convention should be asked to include in their lists of habit-forming drugs the following:

Indian hemp: including the whole or any portion of the plants, *Cannabis indica* or *Cannabis sativa*.

Signed, J.C. Van Tyen, for Secretary to the Prime Minister. (As cited in Paterson, 2009, p. 53)

At the second sitting of the Opium Conference in 1924/25 a new International Opium Convention was adopted, the main achievement of which was to “institutionalize [sic] the international control system and to extend the scope of control to cannabis” (UNODC, 2009b, p. 193). While this piece of law was limited to the international dimension of the cannabis trade and did not request signatories to control domestic production or consumption, it does indicate a change in countries’ attitudes towards the plant. In effect this marked the beginning of global cannabis prohibition, at least in part through a motion brought forward by South Africa and supported by Egypt.

From 1925, most nations began changing their laws either to totally prohibit the use of cannabis or to restrict it for scientific and medical purposes (Booth, 2003; Kraenzel et al., 1998; Paterson, 2009; UNODC, 2009b). These moves also severely restrict commercial hemp farming, as the local laws tend to target the cannabis plant (of which hemp is a variety).
2.1.4 Emerging global trends and attitudes towards cannabis

As Decorte and Potter (2015, p. 221) explain:

Historically, the spread of cannabis cultivation across the globe primarily reflected the industrial utility of hemp. It is [only] with the emergence of modern patterns of cannabis use in the developed world that we have seen major changes in patterns of cannabis production. As demand for cannabis increased globally, fuelled by the developments of the ‘counter-culture’ of the 1960s and 1970s, so cultivation in the developing world began to take on new dimensions.

Decorte and Potter (2015) further argue that demand in developed countries for cannabis as a drug has led to large-scale cultivation of the plant in developing markets that did not have the traditions of cannabis cultivation found in Asia and the Middle East. This view is still observable in the UNODC (UNODC, 2007, 2009a, 2009b, 2012, 2014) studies that consistently highlight increasing cannabis production trends in developing markets, and point out that the major trafficking routes primarily lead to developed markets (see Figure 1).

Figure 1: Trafficking trends and routes of cannabis (UNODC, 2009b, p. 106)
Globally the perceived risks of cannabis consumption have been on a downward trend for some time, and countries are beginning to reassess their position on cannabis prohibition (Decorte & Potter, 2015; Quah et al., 2014; UNODC, 2014). While legal approaches to cannabis vary around the world and are changing, as of April 2015 the recreational use of cannabis is completely legal (at national level) only in Uruguay and North Korea. However, many countries either do not strictly enforce cannabis prohibition or have decriminalised its use (Decorte & Potter, 2015). In the US, four states have legalised cannabis use, but it remains illegal at federal level. The general consensus is that if the trend of state-level legalisation continues, a push for national-level legalisation is possible within the next 10 years (Quah et al., 2014).

Nonetheless, the United Nations (1972) Single Convention on Narcotic Drugs of 1961 serves as a key international treaty that prohibits production and supply of cannabis, among other drugs, globally. This Convention classifies the cannabis plant’s flower and cannabis resin as a schedule I drug, together with cocaine and heroin (United Nations, 1972). The Convention does however distinguish between the uses of the cannabis plant, and explicitly exempts cannabis if it is grown for industrial purposes (industrial hemp fibre and seed) or horticultural purposes (United Nations, 1972). The Convention is further supported by the United Nations (1988) Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances of 1988.

In 2016, a Special Session of the United Nations General Assembly on the World Drug Problem (UNGASS 2016) has been scheduled in which debate on the current emphasis on punitive approaches to drugs classified as illicit will be discussed (UNODC, 2015a). Undoubtedly this session will also raise the issue of cannabis as a schedule I drug given that Uruguay (a signatory to both conventions discussed above) has legalised cannabis at national level.
2.2 A brief overview of the cannabis plant

Indian hemp, ganja, kif, marijuana and dagga, among many other names (Abel, 1980; Booth, 2003; Crampton, 2015; Gastrow, 2003; Herer, 1985), refer to the species of plant known as *Cannabis sativa*. This plant, according to the UNODC (2015b, p. 277), is “grown almost everywhere in the world”, yet taxonomists are unable to reach consensus in terms of the sub-species associated with it (R. Clarke & Watson, 2007). Some taxonomists divide the species into two sub-species based primarily on cannabinoid content and uses (medicinal/recreational and industrial), for example. Other taxonomists divide the cannabis plant into three separate species: *Cannabis sativa*, *Cannabis indica* and *Cannabis ruderalis*. Another group refuses to acknowledge *Cannabis ruderalis* as a sub-species (R. Clarke & Watson, 2007). In this research report, *Cannabis sativa* is considered to include all wild, hemp and drug cannabis races, much as Clarke and Watson (2007) treat the issue.

This confusion in biological sub-definitions explains to a large extent why hemp cultivation, other than for research purposes (often commissioned or at least controlled by the respective governments), is forbidden in many countries around the world, including South Africa (Abel, 1980; Agricultural Research Council, 2014; Booth, 2003; Herer, 1985; Johnson, 2015; South Africa. Department of Agriculture, Forestry and Fisheries, 2012). How does a regulator cost-effectively distinguish between a cannabis plantation for the purposes of industrial hemp and for the purposes of the illicit drug trade?

There are many varieties of cannabis plant and, quite often, colloquial terminology broadly refers to cannabis used for its psychoactive (narcotic) properties as “marijuana” and to cannabis used for industrial purposes as “hemp”. Marijuana and hemp come from the same species of plant, *Cannabis sativa*, but from different varieties of this species (Booth, 2003; Johnson, 2015).

The primary distinction between the varieties of cannabis called hemp and marijuana is observable at the genetic level and can mainly be discerned by the plant’s chemical properties (Johnson, 2015). “Cannabis can be separated into psychoactive and non-psychoactive cultivars according to the ratio of Delta-9 tetrahydrocannabinol (THC), the primary psychoactive agent, and cannabidiol (CBD). Hemp plants have a relatively low THC:CBD ratio compared with marijuana” (Datwyler & Weiblen, 2006, p. 371). While differing at the genetic level, hemp and marijuana are identical in appearance (Booth, 2003; Fortenbery & Bennett, 2004; Herer, 1985; Johnson, 2015).
The only distinction between hemp and marijuana visible to the naked eye results from the cultivation practices (see Figure 2). Hemp is usually planted very densely so as to focus plant growth in the stalk, as this maximises fibre strength and content of the plant. By contrast, cannabis grown for its psychoactive properties is planted less densely, and the plants are encouraged to produce multiple branches that maximise flower production, as the psychoactive agent THC is most abundant in the flowers (Booth, 2003; Johnson, 2015).

Despite this distinction, definitively identifying cannabis grown for industrial purposes (hemp) and cannabis grown for its psychoactive properties, based on observation alone, can be extremely difficult – as demonstrated by the plantations shown in Figure 3. Wynn’s (1998) South African Hemp Feasibility Report proposes that narcotic cannabis-producing parts of South Africa need to be excluded as potential industrial hemp-growing sites for precisely this reason.
2.3 Industrial uses of cannabis

Hemp, also called ‘industrial hemp,’ refers to cannabis varieties that are primarily grown as an agricultural crop (such as seeds and fibre, and by-products such as oil, seed cake and hurds) and is characterized [sic] by plants that are low in THC. (Johnson, 2015, p. 1)

The parts of the cannabis plant that are relevant for industrial applications can be broadly divided into (a) the hemp seeds, which are found in the flowers of the plant, and (b) the plant stalks, which are made up of fibre and hemp hurd (Kraenzel et al., 1998). These components can be further processed in various ways to produce the vast array of industrial and consumer products, as identified by Fortenbery and Bennett (2004), Herer (1985) and Kraenzel et al. (1998), among others. Figure 4 highlights some of the major potential uses of industrial hemp.

Regardless of the plant’s varied uses, Fortenbery and Bennett (2004) found that while hemp can compete on margin with traditional row crops, it may be less profitable than other specialty crops. This observation may be related to the decline in industrial hemp that was observed in the US in the late 1800s (Fortenbery & Bennett, 2004; Herer, 1985). Fortenbery and Bennett (2004) suggest a major constraint to a viable commercial hemp industry in the US to be the high cost of harvesting and processing, as these are found to be very labour-intensive. As hemp farming is illegal in the United States (Johnson, 2015), it is likely that more cost-effective harvesting and processing technology has not been developed. This situation may be rectifiable over the longer term with the aid of appropriate investment.
As confirmed by Johnson (2015) and Kraenzel et al. (1998), the ARC (2014) identifies 25 000 consumer products that can be produced from hemp, with applications in many industries including but not limited to:

- automotive
- construction material
- food and beverage
- cosmetics
- agriculture
- paper
- textiles
While the above examples support the versatility argument for industrial hemp, it is important to note that:

With such a wide variety and large number of uses, there is a great amount and rather diverse group of competitive commodities, raw materials and products. Cotton, lumber, and fossil fuels are some of the biggest and more powerful of these competitors. There are also minor crops such as jute, flax, abaca, and kenaf that might compete with or substitute for industrial hemp based on certain similarities. (Kraenzel et al., 1998, p. 5)

More detail and supporting research on the potential applications of industrial hemp in various sectors of the economy are provided in Appendix A (section 8) of this report.

2.3.1 The agronomics of industrial hemp

In “A Profile of the South African Hemp Market Value Chain”, the DAFF (2012) refers to hemp trials that have been conducted in South Africa, suggesting that industrial hemp can be grown in several of the country’s provinces. The South African Agricultural Research Institute has hemp trials running in seven provinces (South Africa. Department of Agriculture, Forestry and Fisheries, 2012), implying that the South African climate is favourable for cultivation of industrial cannabis.

Kraenzel et al. (1998) conducted an assessment of the agronomics of hemp and found that optimal conditions for industrial hemp cultivation require a mild, humid climate, though they concede that because the plant is so resilient, it is able to grow in almost any kind of climate, provided there are four (fibre) to six (seed) months free of killing frosts.

Multiple studies cite hemp as having been found to be an extremely effective weedkiller that does not require chemicals in production (Fortenbery & Bennett, 2004; Kraenzel et al., 1998; Van der Werf & Turunen, 2008). Van der Werf and Turunen (2008) further argue that hemp needs less water than many other natural sources of fibre that are mass-cultivated globally.

Certain of its properties have revealed hemp to be an excellent rotational crop that maintains, and in some instances enhances, the quality of the soil in which it is planted, while helping to minimise weeds from farmers’ fields, if not eradicate them altogether (Fortenbery & Bennett, 2004; Johnson, 2015; Kraenzel et al., 1998).
2.3.2 The state of the industrial hemp market

As of 2015, there appear to be only 30 countries that allow hemp farming. This can to a large extent be explained by the international treaties discussed above, coupled with the difficulty that authorities may have in distinguishing between industrial and narcotic cannabis (Fortenbery & Bennett, 2004; Johnson, 2015; South Africa. Department of Agriculture, Forestry and Fisheries, 2012).

Johnson (2015) found that hemp cultivation measured in acerage has been stagnant at around 200 000 acres globally in 2011, but production has varied annually on an upward trend from 113 million kilograms in 1999 to more than 172 million kilograms in 2011, mostly driven by growth in hemp seed production.

Studies by Fortenbery and Bennett (2004), Johnson (2015) and Kraenzel et al. (1998) conclude that the current global hemp market is artificially constrained by the regulatory regimes that prevent production globally. Fortenbery and Bennett (2004) point out that hemp appears to be slightly more profitable than traditional row crops. But it is critical to keep in mind that countries unable to produce hemp locally must factor in a transport cost, which may very well negate the relative cost advantage that hemp may have over traditional alternatives. This could support the cited observations of the hemp market being artificially constrained.

Kraenzel et al. (1998) attempted to assess the market for hemp in the US by applying a strategic market management system (SMMS) framework which explores the internal and external factors shaping a market. The framework is outlined in Figure 5. The approach is not dissimilar to the use of Porter’s five forces analysis, but this SMMS framework requires a higher degree of granularity in its interpretation.
While the SMMS framework provides a robust assessment of the market, the level of detail (data and analysis) that is required to populate the framework’s components may render it inappropriate for this research report. Furthermore, as the research question focuses on the legalisation of the cannabis plant rather than industrial hemp alone, this framework may not be suitable due to the vastly differing markets for industrial hemp and cannabis that is used for its psychoactive properties. The SMMS framework also does not explicitly take into account social considerations, which is a key component of the research question.

2.4 Medical applications of cannabis

Despite evidence that cannabis has been used in medicine for over 2 000 years, the United Nations conventions treat it as a schedule I drug on the basis that it has no medicinal uses (Nutt, King, & Nichols, 2013; United Nations, 1972). A review of the pharmacological actions of cannabis and its components (cannabinoids) by Kumar, Chambers and Pertwee (2001) confirms that multiple studies have proven cannabis to have medicinal and/or therapeutic value, particularly with regard to multiple sclerosis, cerebral palsy, spinal cord injuries, chronic pain, nausea and vomiting associated with chemotherapy and other anti-cancer drugs, appetite stimulation (particularly with regard to AIDS-related illness or terminal cancer), epilepsy, glaucoma, bronchial asthma, and certain mood disorders and psychiatric
conditions. The report indicates that there is a need for further controlled studies, which historically have been lacking as a direct result of government and international policy with respect to cannabis (Kumar et al., 2001; Nutt et al., 2013).

An article in the *SAMJ* highlights the need for the South African government to be more supportive of research into medical uses of cannabinoids, particularly with regard to benefits for HIV/AIDS patients (Parry & Myers, 2014). Parry and Myers (2014) examine the harm associated with cannabis use. While noting that their prior studies suggest a link between cannabis use and road traffic accidents, property crime, sexual HIV-risk behaviours and murder, the authors concede that these studies fail to prove causality (Parry & Myers, 2014). Indeed, they caution that the harm associated with cannabis use “should not be overstated, as they do not affect all people who use cannabis. Certainly, at a community level the harms are a lot fewer than those associated with alcohol and tobacco use” (Parry & Myers, 2014, p. 400).

A more recent *SAMJ* article argues that the South African Government needs to go beyond exploring legalisation of cannabis for medical purposes:

> There is good evidence that decriminalisation of the use of drugs reduces the harms of drugs, reduces the power of the drug lords, and generates revenue for the government. Marijuana is much less harmful than the two legalised drugs, alcohol and tobacco, and has potential medical benefits. A good case can be made for its legalisation and regulation. This would also enable the longer and more complicated medical research to proceed legally, and for those who use marijuana for medical or social purposes to do so of their own accord and without persecution. Bold leadership and action, rather than further revisions of the NDMP [National Drug Master Plan], are required. (Van Niekerk, 2014, p. 387)

Sznitman and Bretteville-Jensen (2015, p. 6) conducted a robust regression analysis of two nationally representative samples of adults in Norway and Israel in order to explore “the relationship between support for medical cannabis legalization [sic] and three beliefs commonly underlying medical cannabis debates, namely that (1) cannabis has medical benefits, (2) cannabis is addictive and (3) medical cannabis legalization [sic] leads to spillover [sic] effects”. The researchers suggest that “public support for medical cannabis legalization [sic] is likely to continue to grow” (Sznitman & Bretteville-Jensen, 2015, p. 7). This suggestion is based on their observations that “the scientific evidence supporting medical
benefits of cannabis seems continuously to grow” and that “the belief in the medical benefits of cannabis is particularly important to public support for medical cannabis legalization [sic]” (Sznitman & Bretteville-Jensen, 2015, p. 8). The study also notes that public health, harm and crime (the spill-over effects) have less bearing on public support for medical cannabis legalisation (Sznitman & Bretteville-Jensen, 2015).

2.5 Cannabis as a drug

As discussed in section 2.1.3, the primary reason for cannabis prohibition being the norm globally is the real and perceived harm that is associated with consumption of the plant as a narcotic.

2.5.1 Laws, policies and enforcement in South Africa

As of November 2015, three pieces of local legislation support the prohibition of cannabis in South Africa:

1. The Drugs and Drug Trafficking Act, 1992 (Act No 140 of 1992), which prohibits the possession, processing, transportation and commercialisation of any part of the cannabis plant. This Act is enforced by the SAPS and is supplemented by Acts such as the Prevention and Treatment of Drugs Dependency Act (No 20 of 1992), the Prevention of Organised Crime Act (No 121 of 1998), the Financial Intelligence Centre Act (No 38 of 2001) and the Pharmacy Act (No 53 of 1974) (Marks & Howell, 2015).

2. The Medicines and Related Substances Act, 1965 (Act No 101 of 1965), which allows possession and cultivation of cannabis for research purposes only (South Africa. Department of Agriculture, Forestry and Fisheries, 2012). Section 22A (9) (a)(i) of this Act requires a permit to be obtained from the Department of Health.


The key piece of legislation is the Drugs and Drug Trafficking Act, 1992, which supports a punitive model of regulation focused on removing drugs and drug users from society through seizure and arrest (Marks & Howell, 2015).
The CDA [Central Drug Authority] was established as an advisory body in terms of the Prevention of and Treatment for Substance Abuse Act (Act No. 70 of 2008) and is mandated to assist in the fight against substance abuse in the country. (Central Drug Authority, 2015a)

In 2013 the CDA (2013) issued a new version of the National Drug Master Plan (NDMP). The most apparent difference between the 2013 NDMP and its 2006 predecessor is that the latter aimed to realise “a drug-free society” (Central Drug Authority, 2006, p. 13) while the former has the more grounded aspiration of realising “a society free of substance abuse” (Central Drug Authority, 2013, p. 71). The new NDMP supports continued supply reduction techniques which include “destroying cannabis (dagga) crops in the field” (Central Drug Authority, 2013, p. 29). Despite efforts by the SAPS to quell production, the UNODC (UNODC, 2007, 2009a, 2014, 2015b) has consistently reported increased supply of cannabis from southern Africa. The NDMP concedes, however, that given the shifting global stances on cannabis,

there is a need for an in-depth investigation of (1) the dynamics of cannabis use and related harm in South Africa, as well as (2) the relevance of current international/local policies regarding cannabis use, including measures such as legalisation and/or decriminalisation. (Central Drug Authority, 2013, p. 132)

Significantly, the CDA (2015b) emphasises that the level of government spending on drug-related issues is “difficult to estimate as expenditure is spread across national, provincial and local government departments, agencies and statutory organisations.”

The CDA’s (2013) new NDMP appears to take a more progressive stance in terms of reform of drug policies and includes harm reduction as a third pillar, along with reductions in production and distribution of drugs. But the plan has been found to be:

riddled with internal inconsistencies and impractical resolutions. As a result, it will be extremely difficult to implement and unlikely to find utility in many South African cities and communities. The authors further argue that the plan has been designed in such a way that it absolves the government of any responsibility should it fail. It does so by subtly ensuring that blame for drug use can continue to be placed on the individual. This requires a punitive understanding of drug use, which is in direct contrast to the stated framework of the plan. (Howell & Couzyn, 2015, p. 1)
Echoing this view, a yet to be published ethnographic exploration of the policing of illegal substances in South Africa found that:

the plans [NDMPs] are, however, not well distributed, and are often completely unknown to the very officials (the police in particular) who are tasked with the regulation of illegal substances and users on a daily basis. No real guidelines for harm reduction programmes/strategies exist within the plans. (Marks & Howell, 2015)

South African crime statistics show that drug-related crimes have increased at a compound annual growth rate of 10.9% per annum over the last 10 years, as shown in Figure 6 (SAPS, 2015b). Thus, drug-related crime, as a share of total crimes, has increased from 4.2% in 2006 to 11.9% in 2015, suggesting that police resources (officers and time) are increasingly being allocated to drug-related crimes (SAPS, 2015b).

Perhaps the most concerning emerging trend pertains to the ratio of reported drug-related crimes to individuals incarcerated for narcotics charges in South Africa. The most recent available data for incarcerations given by the Department of Correctional Services (DCS) (2012) is for 2011/12: The official inmate count for narcotics-related charges stood at 4,645 individuals. This is a far cry from the 134,687 reported drug-related crimes for 2010/11, allowing a one-year lag for court processes (SAPS, 2015b). Comparing these two figures suggests a ratio of 1:29 in terms of incarcerations to recorded drug-related crime. This ratio is conservative – it does not take into account the possibility that some of the
4 645 inmates were serving long-term sentences for offences prior to 2010. Nonetheless, this gap implies that the vast majority of reported drug-related crimes either do not result in arrests (due to difficulty of apprehension or lack of evidence) or are not significant enough to warrant prison terms. This suggests that many reported drug-related crimes involve narcotics possession\(^1\) rather than distribution, which raises the question of whether police efforts could be better deployed to enforce/foster harm reduction with regard to drug-related crimes.

Figures on cannabis-related crimes are not publically available, but perhaps more worrying is the fact that the SAPS statistics do not distinguish between crimes related to distribution of drugs and possession of drugs. This is a particular concern given that the SAPS Annual Report provides a quantitative growth target of “13%” for the reporting of unlawful possession of and dealing in drugs for 2016 (SAPS, 2015a, p. 130). A report published by UCT’s Centre of Criminology discusses the concerns that emerge: “It is relatively easy to accelerate the arrest of users, while having very little impact on suppliers or the overall size or harm of the market” (De Kock, Kriegler, & Shaw, 2015, p. 41). The growth target clearly poses a direct challenge to police officers attempting to enact the NDMP’s harm-reduction goal.

The SAPS Air Wing had sprayed “529.2 hectares of cannabis fields in the Eastern Cape, valued at R685 314 000” (SAPS, 2015a, p. 183) in an effort to curb supply. Subsequently, the SAPS (2015c) issued a media brief commenting that their helicopters “sprayed over 500 hectares of these plantations which had the potential street value of billions of rands”, revealing inconsistency in reporting the rand value of cannabis destroyed.

The SAPS (2015c) states that the cannabis plantation-spraying operations have been taking place for the last 20 years, and that the chemical used to neutralise the cannabis plants is called Kilo Max, a glyphosate-based herbicide. A comprehensive review of studies pertaining to the safety of glyphosate-based herbicides concludes that these herbicides do not pose health risks to humans or other mammals (Williams, Kroes, & Munro, 2000).

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\(^1\) The Drugs and Drug Trafficking Act, 1992 stipulates that possession of less than 115 grams of cannabis may be considered a minor offence.
However, the SAPS (2015c) concedes that:

unfortunately, in these dagga-spraying exercises no arrests are made as one cannot identify who is actually responsible for the cultivation of these plantations. These plants are generally found in communal areas and therefore, it will be practically impossible to prove possession.

The SAPS approach, which is largely informed by the NDMP in terms of supply eradication, also appears to be misguided and suggests that the costs associated with the annual spraying of cannabis plantations in the Eastern Cape may be yielding very little by way of absolute supply reductions of cannabis. Research confirms that supply eradication, particularly of crop-based drugs, is ineffective and results in the balloon effect hypothesis, which proposes that eradication of plantations in one area simply displaces plantations to another area (Decorte & Potter, 2015; MacCoun & Reuter, 2001; Quah et al., 2014). This may be particularly true of South Africa’s rural dagga farmers, whose plantations tend to be in areas that are difficult for police to reach and where the small-scale nature of each plantation allows for easier dispersion (Kepe, 2003; Legget, 2001; Paterson, 2009).

Despite all of the SAPS efforts, it concedes that “cannabis remains the most prevalent illicit drug” on the local market (SAPS, 2015a, p. 155). This, coupled with the rising volume of cannabis seizures and drug-related crime, suggests that the enforcement-led approach appears to be failing to curtail demand or supply of cannabis in South Africa.

In 2013 Van Kerken (2013), of the Anti-Drug Alliance (South Africa), attempted to quantify the cost of drug law enforcement in Gauteng province based on publically available information. He determined that the cost of arrests and subsequent incarceration was in the region of R290 million in 2012, a substantial figure which needs to be explored further and expanded to national level in order for one to begin understanding the true cost of enforcing South Africa’s current policy on cannabis (Van Kerken, 2013). Van Kerken’s (2013) approach, while logically sound, suffers from a lack of data and therefore necessitates significant use of assumptions, which may raise questions about the validity of his findings. In order to account for this, Van Kerken (2013) suggests that the R290 million is a conservative estimate. Furthermore, the estimate does not include the full cost of policing as he was unable to determine the costs associated with information and intelligence gathering, as well as the above-discussed police efforts in sizable seizures and
destruction of cannabis (and other drugs) that did not result in any arrests (Van Kerken, 2013).

Nevertheless Van Kerken’s (2013) research can be used to determine that the cost of enforcement for each drug-related crime (cost of reporting, arrest and incarceration, if applicable) is in the region of R12 609 on average. If extrapolated to the national data on drug-related crimes for 2013, the cost of enforcement amounts to R2.61 billion (SAPS, 2015b). Notably, Van Kerken (2013) found that on average each arrest yielded just R565 worth of seized drugs. Comparing the extrapolated cost of enforcement to drugs seized yields a cost to seizure ratio of 223:10 (R2 607 m:R117 m).

In possible testament to the observation that the current globally accepted enforcement-led policies on cannabis are failing, the UNODC (2015b) estimates global cannabis use prevalence rates at between 3.9% (best estimate) and 4.9% of the global population, representing between 182 and 232 million people. The 2015 World Drug Report does not include prevalence rates for South Africa, although these have previously been reported at 8.9% by the UNODC (2009c; 2015b). However, the 2015 report does provide guidance on cannabis use prevalence rates for southern Africa:

2 between 5.0% (best estimate) and 9.1% (upper bound) (UNODC, 2015b). Applying this range of prevalence to the latest available South African population statistics indicates that the country has between 2.65 and 4.82 million cannabis users, all of whom are effectively considered to be criminals under the current prohibitionist/enforcement-led regime (The World Bank, 2014; UNODC, 2015b).

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2 As defined by the UNODC (2015b), southern Africa includes South Africa, Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, Swaziland, Zambia and Zimbabwe.
2.5.2 Crime and cannabis

The argument that access to cannabis leads to increased crime rates, which pose a greater threat to public health and safety, has been used to justify the enforcement-led approach that many jurisdictions still adopt today (Joffe & Yancy, 2004; Quah et al., 2014). Yet very little empirical evidence has been provided to support these claims (Morris, TenEyck, Barnes, & Kovandzic, 2014).

Sznitman and Zolotov (2015) conducted the most recent and comprehensive literature review study currently available on the effects of cannabis for therapeutic purposes (CTP) on public health and safety. Their research subjected 28 prior studies to a robust set of exclusion criteria which included peer review status, empirical evidence and publication/journal reputation (Sznitman & Zolotov, 2015). The results of their study can be viewed through three lenses:

1. **CTP and illegal cannabis use.** Only two out of the 28 studies suggest that relaxations in CTP policy led to increased illegal cannabis use. This implies that most of the currently available literature sees no link between easing CTP policy and illegal cannabis use (Sznitman & Zolotov, 2015).

2. **CTP and other public health issues.** This area has had much less attention from researchers, and as a result Sznitman and Zolotov (2015) were able to identify only five qualifying studies for their review. Nevertheless, “collectively, findings suggest that CTP legalization [sic] may on one hand reduce alcohol use and suicide rates, while on the other hand increase unintentional digestion by children” (Sznitman & Zolotov, 2015, p. 25). Some geographic variability is noted, and further research may be required.

3. **CTP, crime and neighbourhood disadvantage.** Sznitman and Zolotov (2015) identified four qualifying studies for this content theme. Only one of the studies confirmed a positive relationship between cannabis dispensaries and higher localised rates of crime (Sznitman & Zolotov, 2015). However, this study explains the finding by observing that dispensaries tend to be disproportionately established in communities already experiencing high crime rates (Sznitman & Zolotov, 2015). Two studies identified by the authors confirm no or a negative relationship between dispensaries and crime rates, while the final study proved inconclusive (Sznitman & Zolotov, 2015).
Sznitman and Zolotov (2015) hesitate to make conclusive statements regarding their findings because, as they note, the current literature – which supports the notion that CTP does not pose a threat to public health and safety – is insufficient. They postulate that because CTP policies are changing and incorporating greater commercialisation, CTP’s full effect on public health and safety is yet to be fully experienced (Sznitman & Zolotov, 2015). Ongoing research supported by scientific data on this subject is clearly required.

Morris et al. (2014) conducted a study relying on US state panel data, for the period 1990 to 2006, to analyse the association between state medical marijuana laws and state crime rates for homicide, rape, robbery, assault, burglary, larceny and motor vehicle theft. Their findings show no evidence that crime rates increased as a result of changes to medical marijuana laws; in fact, their research suggests that slight reduction in personal crimes may be expected as a result of more relaxed medical marijuana laws (Morris et al., 2014).

The findings of the above study are echoed by a 2010 Norwegian longitudinal study spanning 14 years, which proposes that “the use of cannabis does not seem to represent a risk factor for a general criminal involvement but that it may be associated with a considerable risk of receiving a drug-specific criminal charge” (Pedersen & Skardhamar, 2010, p. 116). Furthermore, this study demonstrates that the associated cannabis-related criminal charges may have “a real, detrimental impact” on the lives of youths charged with these crimes (Pedersen & Skardhamar, 2010, p. 116). This is not counter-intuitive, particularly as finding employment with a criminal record may be challenging and could lead youths to seek alternative methods of earning a living, often through illicit activities.

Pedersen and Skardhamar’s (2010) study also suggests that socio-demographic, family and personal factors may have greater influence in driving criminal behaviour than cannabis use alone.

2.5.3 Harm caused by cannabis as a narcotic

In 2010 the United Kingdom’s Independent Scientific Committee on Drugs published a report that sought to assess the harm caused by the misuse of different licit and illicit drugs, with a view to informing policymakers of potential intervention focus areas (Nutt, King, & Phillips, 2010). The authors conducted a multi-criteria decision analysis in which 20 drugs were scored according to 16 criteria that were divided into nine sets of sub-criteria – one relating to harm caused to the individual consuming the respective drug, and the other eight criteria being associated with the effect or harm on others (Nutt et al.,
2010). Appropriately weighted to indicate their relative importance, the 16 criteria were further clustered into types of effect (physical, psychological and social), as indicated in Figure 7. The criteria were developed by the Advisory Council on the Misuse of Drugs, and the relative scores assigned to each respective drug and criterion were informed by a panel of drug-harm experts. While the criteria were sufficiently broad, the approach adopted for the research left room for subjectivity on the experts’ part. However, the fact that the panel included independent experts may have minimised subjectivity.

Figure 7: Division of the evaluation criteria used in multi-criteria decision analysis of drug harm (Nutt et al., 2010, p. 1559)

Nutt, King and Phillips’ (2010) report encompasses social and economic costs associated with the use of various drugs, which may contribute some insight to the research question in that it quantifies the cost component of the cost–benefit analysis, albeit only relative to other drugs. While the validity of this study may be difficult to dispute, its methodology alone does not sufficiently lend itself to answering the research question.
The results of Nutt, King and Phillips’ (2010) study determine that the harm of cannabis use on a relative basis are fewer than those of both tobacco and alcohol (see Figure 8). This study is specific to the United Kingdom, but the harm associated with drug use should be transferable geographically, and therefore inferences based on this study can be made for the South African context. In a US-based study Macleod et al. (2004, p. 1586) echo the sentiment that the harm of cannabis use has been exaggerated in the public domain, concluding that “despite widespread concern, we have found no strong evidence that use of cannabis in itself has important consequences for psychological or social health”.

A previous article by Nutt, King, Saulsbury and Blakemore (2007) conclusively determines that the current classification of drugs appears to be arbitrary. This finding is not surprising when one considers the historical context of cannabis prohibition, which does not appear to be rooted in scientific principles (as discussed in section 2.1.2 with regard to the South African context).

A Harvard Medical School study by Proal, Fleming, Galvez-Buccollini and DeLisi (2014)sought to definitively assess the well-publicised and widely upheld causality link between cannabis use and schizophrenia, which has often been cited as a major risk of cannabis consumption (Central Drug Authority, 2013; Macleod et al., 2004; Peltzer & Ramlagan, 2007). The research found that the majority of prior studies identifying an
association between cannabis use and schizophrenia consistently fail to demonstrate causality – cannabis was rather viewed as a catalyst (Proal et al., 2014). Proal et al. (2014, p. 287) conclude that “cannabis does not cause psychosis by itself. In genetically vulnerable individuals, while cannabis may modify the illness onset, severity and outcome, there is no evidence from this study that it can cause the psychosis”. Perhaps the persistent rhetoric surrounding cannabis-induced schizophrenia by the mass media and prohibitionists is a result of confirmation bias?

Kumar, Chambers and Pertwee (2001), citing multiple prior studies, confirm that acute toxicity of cannabis and/or cannabinoid consumption is very low and that no deaths have ever been recorded globally as a direct result of therapeutic or recreational use of cannabis. This is in stark contrast to alcohol consumption, which in 2004 was found to be responsible for 3.8% of global deaths (Rehm et al., 2009). This problem appears to be even more severe in South Africa – the Medical Research Council found that in the year 2000 alcohol was responsible for just under 37 000 deaths, or 7.1% (95% confidence interval 6.6 to 7.5%) of deaths recorded in the country (Peltzer, Davids, & Njuho, 2011; Schneider, Norman, Parry, Bradshaw, & Plüddemann, 2007).

2.5.4 The gateway drug hypothesis

With regard to cannabis, the “gateway drug” argument has played an important role in developing drug-use policy globally (Kleinig, 2015). Yet studies have consistently failed to distinguish whether cannabis use and the subsequent progression to more dangerous drugs is as a result of causality or mere correlation (Kleinig, 2015; Secades-Villa, Garcia-Rodríguez, Jin, Wang, & Blanco, 2015; Trautmann, Kilmer, & Thurnbull, 2013). A robust study of the available literature on the topic by Kleinig (2015, p. 1) concludes that “drug use policies that have drawn on versions of the [gateway drug] hypothesis have involved an unjustified oversimplification of the dynamics of drug use, reflecting the interests of certain stakeholders rather than wise social policy. The hypothesis should be retired”.

2.5.5 Cannabis use in a post-prohibition world

A major argument for maintaining the status quo of cannabis prohibition is related to the perception that decriminalisation or legalisation would lead to increased use and abuse, by minors in particular (Quah et al., 2014; UNODC, 2014). The motivation for this argument seems to be predicated on the fact that more permissive cannabis legislation reduces the perceived risk of use, which is deemed a predictor of future use. But a 2015 nationally representative longitudinal study of adolescent attitudes to cannabis spanning 2002 to 2013 (a period of significant easing of cannabis legislation in the US) found that in fact reported marijuana use in adolescents was lower in 2013 than in 2002, and that disapproval had actually increased in this group (Salas-Wright, Vaughn, Todic, Córdova, & Perron, 2015). Salas-Wright et al. (2015) believe that the changing cannabis policies may have had a normative effect on adolescents, but that this has not necessarily influenced their use of the substance. The findings of this study are supported by studies which have sought to assess the ex-post impact on minor consumption of easing cannabis legislation in the US (Ammerman, Ryan, & Adelman, 2015; Choo et al., 2014; MacCOUN & Reuter, 2001). These fact-based studies put pressure on prohibitionists to prove that legalisation would lead to increased harmful use, failing which the arguments for prohibitionist policies carry little weight, if any.

A comprehensive study of 11 703 100 students’ marijuana usage trends over 20 years shows definitively that changes in state medical marijuana laws did not increase adolescent marijuana usage (Choo et al., 2014). While this study is limited to medical marijuana laws, MacCoun and Reuter (2001) reached a similar conclusion by analysing general cannabis prevalence rates in the US, the Netherlands, Denmark and Germany. MacCoun and Reuter (2001, p. 127) suggest “that removal of the prohibition against possession itself (decriminalisation) does not increase cannabis use”. However, these authors caution against commercialisation of cannabis, which they argue would result in active promotion by legal suppliers and may lead to more material increase in marijuana use and abuse (MacCoun & Reuter, 2001). This suggests that tight (regulatory) controls need to be in place to balance promotion of marijuana with any commercial interests, in order to limit significant increases in prevalence rates post prohibition.
Quah et al. (2014, p. 77) also propose that current cannabis-related policies need to be changed, while explicitly warning against commercialisation because:

commercial interest in promoting heavy use will prove difficult to control through taxes and regulations. Not-for-profit-only production and sale on the one hand, and state monopoly on the other, are options to consider before rushing headlong into a replication for cannabis of something resembling the existing alcohol industry.

Quah et al. (2014) go so far as to suggest that cannabis commercialisation may be the second-worst policy option to consider, next only to continued prohibition on a potential socio-economic outcome basis.

Bearing in mind the outputs of the two studies discussed above, interestingly the Youth Risk Behavior Survey\(^3\) of the US Centers for Disease Control and Prevention (CDC) (2015) indicates that in Colorado youth prevalence rates dissociated from the national cannabis usage trends in 2009. This separation coincided with the period when medical marijuana was first commercialised in Colorado, and further relaxation of marijuana policy (recreational use) appears to have had no effect in terms of driving increases in adolescent usage rates. Figure 9 demonstrates the separation.

\(\text{Figure 9: The dissociation of Colorado youth prevalence rates from national cannabis usage trends} \) (Centers for Disease Control and Prevention, 2015)

\(^3\)This is a US school-based survey conducted by the CDC (2015) which monitors six types of health-risk behaviour that contribute to the leading causes of death and disability among youth and adults.
While the survey relies on self-submissions, Raghupathy and Hahn-Smith (2011) found the reliability of the data collected in it to be robust. Furthermore, Brener, Billy and Grady (2003) determined that there was strong evidence to support the validity of the survey’s outputs with specific regard to marijuana usage.

The above studies all suggest that increasing availability of cannabis in de-penalised regulatory environments is not necessarily a key factor that drives youth use and abuse.

A 2003 California-based *Pediatrics* study found a powerful link between illicit drug use and “adverse childhood experiences [that] transcend secular changes such as increased availability of drugs, social attitudes toward drugs and recent massive expenditures and public information campaigns to prevent drug use” (Dube et al., 2003, p. 564). This suggests that availability of drugs alone does not lead to increased drug use in adolescents, but rather that adverse childhood experiences are a strong precursor to potential drug abuse problems.

Adult use and abuse in a post-prohibition world paints a slightly different picture. Hasin et al. (2015) studied the changes in US marijuana prevalence and marijuana-related disorder rates nationally before (2001 to 2002) and after (2012 to 2013) the significant easing of medical marijuana laws as well as legalisation of recreational use in four American states. They found a significant increase in cannabis use prevalence rates – from 4.1% for the period 2001/2 to 9.5% in 2012/13 (Hasin et al., 2015). Part of the increase in prevalence rates may have to do with the fact that as laws were relaxed, individuals became more comfortable admitting to using marijuana, but the extent to which easing marijuana laws has driven increases in use must not be discounted (Hasin et al., 2015). Furthermore, they note that while marijuana use prevalence rates more than doubled over the period, they did not observe a proportional increase in marijuana-related disorders (primarily abuse) (Hasin et al., 2015). That is, absolute numbers of marijuana-related disorders increased, but not proportionately to the observed increases in usage (Hasin et al., 2015). It may be plausible to assume that individuals with a tendency to abuse cannabis are less likely to have been deterred by prohibition in the first place compared to more restrained (existing and potential) users.
Hasin et al. (2015, p. E1) conclude that “given changing laws and attitudes toward marijuana, a balanced presentation of the likelihood of adverse consequences of marijuana use to policy makers, professionals, and the public is needed”. For the time being, the literature suggests that as prohibition of cannabis is abandoned, cannabis use prevalence rates will increase among adults, but users are less likely to abuse cannabis.

2.5.6 The effects of the war on drugs

In its review of a century of international drug control, the UNODC (2009a, p. 81) concedes that “global production and consumption of cannabis was lower a century ago” (than in 2008). The UNODC (2009a) largely lays blame for this phenomenon on the fact that historically governments have had to prioritise scarce resources to deal with drug issues based on the evaluation of the respective drugs’ health risks and broader social costs. These statements may partly indicate why “some countries have seen the de-facto de-criminalization of cannabis” (UNODC, 2009a, p. 82).

A report of the London School of Economics (LSE) Expert Group on the Economics of Drug Policy argues that:

the United Nations has for too long tried to enforce a repressive, ‘one-size-fits-all’ approach. It must now take the lead in advocating a new cooperative international framework based on the fundamental acceptance that different policies will work for different countries and regions.

This new global drug strategy should be based on principles of public health, harm reduction, illicit market impact reduction, expanded access to essential medicines, minimization [sic] of problematic consumption, rigorously monitored regulatory experimentation and an unwavering commitment to principles of human rights. (Quah et al., 2014, p. 3)

The report cites evidence that drug prices have been declining while purity and potency have been increasing. The drastic recent increased potency of cannabis cultivated for its psychoactive properties is very well documented (Brenneisen, 2007).
Some of the main (and relevant) criticisms of the current enforcement-led approach to drug prohibition that are discussed by Quah et al. (2014) are as follows:

- The strategic logic of a drug-free world ideology is misguided and has had a counterproductive effect which can be quantified in costs to human security and socio-economic development. States need to redirect resources from focusing on enforcement to focusing on public health-based policies that promote harm reduction.

- The current global system has transferred the costs of prohibition from wealthier consumer countries to poorer producer countries, which has led to increased drug-related violence and corruption in these economies.

- Preconceived and often simplistic ideologies should not drive policy; countries should rather focus on developing policies that can be judged on their results. This has not been the case in the global war on drugs.

- Political factors have favoured incarceration as punishment for illicit drug possession/use, but evidence suggests that this has caused more harm in the long run.

Quah et al. (2014) also provide analysis with regard to cannabis legalisation, arguing that policy experimentation with close government monitoring and flexibility is critical to ensuring optimal outcomes of any cannabis legalisation efforts. The analysis concludes that it is not possible to make any dogmatic statements about the effect of cannabis legalisation without carefully considering the country-specific socio-economic context, as well as potential local post-prohibition regulatory regimes. This finding confirms the need for a South Africa-specific study on the subject.
2.5.7 The potential effect of legalisation on public budgets

Perhaps the most famous paper to be issued on the subject is the Miron (2005) report, the hypothesis of which is as follows:

Prohibition entails direct enforcement costs, and prohibition prevents taxation of marijuana production and sale. If marijuana were legal, enforcement costs would be negligible and governments could levy taxes on the production and sale of marijuana. Thus, government expenditure would decline and tax revenue would increase. (Miron, 2005, p. 2)

Miron’s (2005) approach was firstly to quantify state and local authority expenditure on marijuana (cannabis) prohibition, followed by an assessment of federal expenditure on enforcing prohibition. He went on to estimate the potential tax revenues that may be generated from legalised marijuana sales (Miron, 2005).

Miron’s (2005) approach necessitated certain assumptions to be in place as exact data was not available, particularly with regard to state and federal budgets for marijuana prohibition enforcement. Miron (2005) relied on state and federal prosecution and incarceration data to estimate these budgets and costs. This approach is somewhat similar to that adopted by Van Kerken (2013) for his South African study, and is probably the second-best possible approach to having the actual data from authorities.

Much more uncertainty was introduced in Miron’s (2005) work when he attempted to quantify the potential tax revenues of legalised marijuana sales. Miron (2005) made assumptions related to:

- potential legalised marijuana demand based on previous studies that determined the elasticity of demand; marijuana, like most other illicit drugs, appears to have a steep demand curve, that is, demand for recreational marijuana tends to be price inelastic

- the potential tax rate for companies involved in sales, assumed at 30%

- the sin tax for marijuana being assumed to be equivalent to that of alcohol in the US.

Any adjustments to the above assumptions were found to have profound implications for potential government revenues (Miron, 2005). Therefore, Miron (2005) biased his calculations to more conservative figures. Nonetheless he determined that based on the above assumptions the government would save US$7.7 billion and potentially earn US$6.2 billion through taxes, a potential net gain of US$13.9 billion per annum if cannabis were
legalised nationally (Miron, 2005). Despite the assumptions underlying Miron’s (2005) calculations, over 500 economists, including Milton Friedman, endorsed his report (Hardy, 2005), thereby confirming the robustness of his approach.

Miron’s (2005) approach may be replicated for South Africa, but there is very little reliable data available on current prevalence rates of cannabis consumption and prices of marijuana which vary wildly depending on locality, strain type, strength (THC concentration) and method of growth (indoor vs outdoor) (Paterson, 2009). These uncertainties significantly complicate any attempt at quantifying potential tax revenues for South Africa. Nonetheless, Miron’s (2005) approach to quantifying the costs of prohibition can play a critical role in answering the research question.

As of August 2015, over a year since Colorado legalised cannabis for recreational use, the state has collected more than US$117 million in marijuana-related taxes (US$70 million alone for the 2014/15 fiscal year), suggesting that the upsides identified by Miron (2005) are real (Colorado Department of Revenue, 2015). The figure of US$70 million is particularly impressive when one considers that as of 2014 Colorado’s marijuana-using population comprised 558,681 people, implying government revenues in the region of US$125.30 per marijuana user per annum (Colorado Department of Public Health & Environment, 2015; Colorado Department of Revenue, 2015).

Kilmer et al. (2010) conducted a study similar to Miron’s (2005), but with a focus on quantifying the potential impact on the state of California alone. This report acknowledges the multi-faceted complexity associated with the question in a more robust manner than Miron’s (2005) report, but it also relied on much more granular data that was available as a result of California’s well-established medical marijuana industry (Kilmer et al., 2010). Notably, California’s medical marijuana has exhibited trends of diversion to recreational use (Reinarman, Nunberg, Lanthier, & Heddleston, 2011; Thurstone, Lieberman, & Schmiege, 2011), which provided Kilmer et al. (2010) with more robust data for determining potential demand and tax regimes. The approach of Kilmer et al. (2010) relied on a logic model, depicted in Figure 10, to determine how legalisation may influence demand for legal marijuana and public budgets.
This approach, while more robust than Miron’s (2005), may be less applicable to the current South African context, as a result of the different starting points for analysis: California had a well-established and well-documented medical marijuana market, while South Africa does not. Nonetheless, the logic model adopted by Kilmer et al. (2010) can provide guidance in terms of the dynamics of a legalised marijuana market.

The two reports reviewed in this section both sought to quantify the cost associated with enforcement of prohibition only and the potential tax benefits of legalised recreational cannabis use. While concepts discussed in these reports can go some way to answering the research question, it is not feasible to adopt either of the approaches in its entirety due to significant differences in data availability, as well as the time and effort required to quantify the costs and potential benefits.

On 30 October 2015, Uruguay’s National Drug Board chief, Milton Romani, announced that Uruguay, the first country to nationally legalise marijuana, is aiming to produce between six and 10 metric tons of marijuana for the 160 000 Uruguayans that frequently or occasionally consume it (AFP, 2015). The Uruguayan model is one of a state-controlled recreational and medicinal marijuana industry whereby all cultivation, distribution, sales and consumption require registration with the government (Walsh & Ramsey, 2015). Romani explained that marijuana will be sold to registered users at a government-regulated
price of US$1.40 per gram (AFP, 2015). Using Romani’s figures one is able to determine that average annual consumption is expected to be between 37.5 and 62.5 grams of marijuana per customer per annum – well below the government-stipulated cap of 40 grams per person per month (AFP, 2015). These figures suggest that the gross gain from retail sales of marijuana in Uruguay is anticipated to be between US$8.4 million and US$14 million for 2016. This range may appear small when compared to Colorado’s marijuana tax collections of over US$70 million, but the Uruguayan market is also significantly smaller (Colorado Department of Revenue, 2015).

The government-regulated price of cannabis in Uruguay will be US$1.40 per gram in 2016. This is particularly interesting because the 2008 World Drug Report states that the average price for one gram of cannabis was between US$0.90 and US$1.50 (UNODC, 2009b). The import of these prices becomes clear when one considers the argument of Quah et al. (2014) that the pricing of legal cannabis must remain as close as possible to prohibition prices. The reasoning is intuitive in that pricing significantly above the incumbent black market pricing would not reduce demand for the black market materially (if at all), and pricing significantly below black market prices would effectively encourage use and may lead to higher incidence of abuse. A more permissive regime on cannabis production could result in greater economies of scale for farmers, which could allow them to produce cannabis at lower costs (Decorte & Potter, 2015; Hall & Weier, 2015; Keliman, 2015; Kilmer et al., 2010; Quah et al., 2014) (see Figure 11). As Hall and Weier (2015, p. 611) point out, cannabis farmers in a post-prohibition world would “no longer include a black market premium to cover the risk of arrest or drug market violence”. Price regulation alone (introduction of floors to be at or near existing black market prices) would drive suppliers to increase production, and if demand at regulated prices is below supply, the likelihood of parallel market formation would increase. This contradicts the logic behind the legalisation.

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4 The last year for which average cannabis prices per country were provided.
Regulation clearly has a critical role to play here, and the method by which price maintenance is achieved is probably best suited to an excise (or sin) tax. Studies of excise tax as a tool for increasing prices and therefore limiting consumption of alcohol and tobacco are plentiful, and there is consensus that this is an effective mechanism for deterring demand for these substances, especially among adolescent populations (Chaloupka, Straif, & Leon, 2011; Cook & Moore, 2002; Wagenaar, Salois, & Komro, 2009). But caution is required: While cannabis may resemble tobacco in terms of its mode of consumption, excise taxes that tax cannabis on weight may elicit unintended consequences. Hall and Weier (2015) argue that taxation of cannabis needs to focus on gross weight but also (and perhaps more importantly) on THC content. In this sense, any excise tax that is introduced as a mechanism to control demand of cannabis must resemble the alcohol excise tax (rather than tobacco) regimes that incorporate alcohol content in the tax calculation (Hall & Weier, 2015; Wagenaar et al., 2009).

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Different strains of cannabis contain varying amounts of THC, the active psychoactive ingredient. Farmers can develop more potent strains of cannabis by selective breeding to increase THC content (Booth, 2003; Datwyler & Weiblen, 2006).
The high likelihood that cannabis farmers would realise cost savings through lower cost distribution channels and economies of scale under more liberal cannabis policy is at odds with the need to maintain prices at levels that are not seen to incentivise increased demand. This dichotomy is not a particular concern and may in fact strengthen the case for cannabis. As farmers benefit from economies of scale cost of production would drop, but retail prices would be maintained through excise tax. This would make room for additional excise revenues over time. These government revenues could then be used, as Quah et al. (2014) suggest, to cover the costs of regulating the market, and to finance NGOs or public agencies whose mandate is to provide consumer education and reduce harm associated with cannabis (and potentially other drug) abuse through enhanced prevention and treatment efforts.

2.5.8 The South African context of suppliers of cannabis

For what appears to be the most comprehensive piece of academic literature on cannabis in southern Africa, Rhodes University-based historian Craig Paterson (2009) interviewed a variety of cannabis growers, smugglers and dealers in order to begin to comprehend the complex and ever-changing socio-political dynamics of the cannabis trade. The historical context for cannabis prohibition in South Africa to some extent influenced global prohibition (as discussed in section 2.1.2). According to Paterson (2009), this context has very much shaped the current sources of cannabis supply. He notes that “by forcing large numbers of people into these Bantustans with very little opportunity for economic growth or farming potential, the apartheid government created the perfect environment to ‘drive’ people towards cannabis cultivation” (Paterson, 2009, p. 82). Furthermore, the fact that the migrant labour system effectively saw Bantustans as labour force reservoirs from which the apartheid government occasionally forced people to urban centres for work facilitated an efficient distribution channel for cannabis to these centres (Paterson, 2009). Kepe (2003, p. 607) believes that cannabis farming persists in rural parts of the Eastern Cape precisely because “broken countryside – gorges, enclaves and ravines – makes it difficult for the police to gain access to the cannabis plantations”.

Legget (2001) notes that the cannabis plantations of the Transkei are not commercial farms by any stretch of the imagination, but rather are the crops of an army of poor, rural subsistence farmers who supplement their agriculture with “dagga” as an easy-to-grow cash crop. Paterson’s (2009) study of the region confirms that this observation remained
true in 2009 (see Figure 12), having been the case since the early 1970s. In support, Kepe (2003, p. 614) suggests that cannabis farming in the former eastern Pondoland region is key to the livelihoods of many villagers, but that it makes only “a steady contribution to the livelihood of a household”, rather than leading to any genuine wealth creation.

![Figure 12: Cannabis (dagga) grown around a rural homestead in the Eastern Cape (Paterson, 2009, p. 82)](image)

The explanation for cannabis farming as simply a supplementary source of income is summarised in this way by Kepe (2003, p. 613): “Cannabis growers from the village seem to be content with getting the smallest share of the revenue, as they feel they have less amandla, or strength, to survive the fines and jail terms”. To an extent, the current supply chain of cannabis from the Eastern Cape can be interpreted as exploiting some of South Africa’s poorest rural communities (Kepe, 2003; Paterson, 2009). As Alcock (2015, p. 18) observes, “the distribution chain in informal markets is long and expensive – the dagga garden ladies, the ferryman, the bakkie distributor, the urban dagga wholesaler and on to the street seller”. A change in policy with regard to cannabis could generate efficiencies within this distribution chain and provide farmers with a more equitable outcome for their efforts.

Around 2001/2, indoor growing of specialised strains of cannabis emerged in South Africa, though it was limited to South Africans that Paterson (2009, p. 107) describes as “westernised” and wealthier – production tended to occur in urban centres, and the cannabis typically carried a much higher price tag than cannabis strains grown outdoors. The SAPS Annual Report (2015a, p. 218) notes that 31 hydroponic cannabis-growing sites
(referred to as “labs”) have been dismantled in 2015. Furthermore, the NDMP confirms that “the latest vogue is hydroponic cannabis” (Central Drug Authority, 2013, p. 42), suggesting that local demand for higher potency and more expensive cannabis strains is increasing. This development has affected the rural cannabis farmers thus: “The former Transkei in particular has seen an increase in production and a decrease in value of trade, due to a reduction in the quality of the cannabis being produced there, and a demand for higher quality in the market” (Paterson, 2009, p. 115). Paterson (2009) further notes that while cannabis trade in South Africa traditionally existed independently of supply chains of other drugs, the advent of urban cannabis growing has dramatically increased the involvement of organised crime in the cannabis trade, leading to wider overlaps between cannabis trade and trade of other illicit substances.

Turning to the international scene, with reference to the small-scale domestic cultivation of cannabis, Decorte and Potter (2015, p. 222) argue that “the diversity of reasons why people grow cannabis goes way beyond the usual motivations for criminal involvement, and includes avoiding contacts with drug dealers and other criminal elements”. Yet by virtue of growing the plants domestically, these individuals are committing a crime. Furthermore, the UNODC (2002) proposes that the high degree of violence, income inequality, widespread decline in traditional social relationships, and poor educational and employment prospects in South Africa contribute significantly to both prevalence of drug use and production in the country.
2.6 Conclusion of the literature review

It is clear from the literature review that answering the research question requires unbundling relatively complicated relationships, motives and potential (uncertain) outcomes. The broad nature of the research question – in that it pertains to the cannabis plant rather than industrial hemp or marijuana (cannabis) as a narcotic or medicine – further complicates the research. However, it is the author’s opinion that such an approach is required, particularly given the on-going debate in the South African parliament about the Medical Innovation Bill, which in its current form seeks to legalise cannabis for medicinal, commercial and industrial purposes (South Africa, 2014).

Previous research on the topic is quite fragmented and not directly applicable to answering the research question, but key issues/themes that need to be considered have been availed through the literature review process.

As the literature suggests, cannabis has many uses, ranging from industrial purposes across a wide array of sectors to recreational and potential medicinal uses. But countries that take a prohibitionist stance towards the plant have limited its positive potential. The original motivations for cannabis prohibition were not rooted in scientific fact, as confirmed by recent studies such as those conducted by Nutt et al. (2007; 2010). The war on drugs has been widely criticised for its enforcement-led approach, which has often yielded counter-productive results, particularly with regard to cannabis. Many countries are rethinking their stance on the issue. The UNODC frequently refers to these effects as unintended consequences of the war on drugs. However, it should be increasingly difficult for the UNODC to continue arguing that these effects are unforeseen, more than 50 years after the initiation of the global war on drugs.

Of concern is the fact that the war on drugs appears to have undermined human rights, particularly those of cannabis users, who are routinely criminalised by the current enforcement-led approach. This approach is not conducive to principles of harm reduction that much of the literature refers to, and that the CDA appears to support, at least on paper.
The literature provides compelling evidence that significant policing resources (globally and in South Africa) are spent on enforcing a policy based on moral principles/intentions rather than on its outcomes. Moreover, an assault on supply does not appear to function as desired, because all that eradication of supply in one area seems to achieve is a displacement of the supply to another area, rather than an absolute reduction in supply of cannabis – demand will continue to drive the market.

Industrial hemp’s applications face competition from now well-established raw materials and industries. Understanding the technology and associated investment that are required to develop an industrial hemp industry in South Africa is key to assessing such an industry’s viability and competitiveness in incumbent sectors. Nonetheless, the labour-intensive process that Fortenbery and Bennett (2004) cite may serve as a positive incentive for the industry from the government’s perspective, as it has the potential to create employment. Measuring local demand for industrial hemp may be difficult given the observation that the market has been artificially stifled by the prohibitionist stance on cannabis taken by the South African government. It is apparent that further research of this topic is required. And outputs from the government-supported hemp pilot programmes, once completed, may provide further guidance on this issue.

While the literature presents multiple approaches to assessing the potential economic impact of legalisation of cannabis for recreational use, it is important to keep in mind the South Africa-specific data availability constraints in this regard. Future efforts to quantify the potential tax revenues as a result of legalisation can rely on approaches similar to those of Kilmer et al. (2010) and Miron (2005), but the value of this analysis will depend heavily on availability of data and the willingness of government entities to supply relevant data to researchers. In lieu of obtaining hard data, informed approximations and assumptions can be made akin to Miron’s (2005) approach, which yields strong support from prominent economists. Miron (2005) was able to source well-documented data on the developed medical marijuana markets in the US. By contrast, a South African approach to a quantitative cost–benefit analysis must rely on scenario analysis, given the high degree of uncertainty resulting from the lack of local market data.
The literature on post-prohibition cannabis usage trends reveals some interesting findings, chief of which is that increased availability of cannabis as a standalone factor does not necessarily contribute to increased youth/adolescent use. The literature provides compelling evidence that socio-economic circumstances of youth are a stronger causal factor of substance abuse than availability alone. This is particularly relevant in South African society, given prevalent degrees of economic inequality, crime and unemployment rates (UNODC, 2002).

Furthermore, and interestingly, the literature suggests that youth tend to be more price-sensitive than adults to the cost of drugs, including alcohol. Price controls through taxation may prove to be an additional effective tool for discouraging underage consumption in a regulated market. As yet the gateway drug hypothesis, as applied to cannabis, is found to be valid only in a world where cannabis remains an illegal substance, traded in black markets with strong criminal elements.

From a policy perspective, the literature may appear to be a little less forthcoming, but the overarching theme suggests that cannabis policy needs to be location specific, taking into account the particular context of the local cannabis market. This once again relates closely to South Africa and its high number of rural cannabis farmers, as well as to how they may be affected in a post-prohibition world. While these farmers may not be considered criminals in a post-prohibition South Africa, thereby raising their potential share of the cannabis supply chain, their cannabis crops may have to compete with those of much more sophisticated (and wealthier) commercial cannabis farmers that would emerge. Much of the literature cautions against the effects that commercialisation of cannabis could have on cannabis consumption (similar to the alcohol and tobacco markets). This highlights the need for policy to be carefully considered, and puts forward not-for-profit markets and state monopoly markets as policy considerations.

The research question is topical both globally and locally. The author hopes that this research report will go some way to providing initial guidance with regard to informing policy on the issue of cannabis legalisation in the context of optimal socio-economic outcomes, and may yield inputs that lead to the establishment (and/or formalisation) of new industries in the South African economy.
3. RESEARCH METHODOLOGY

The concluding paragraph of the Introduction of this report (section 1) suggested the need for a cost–benefit analysis of legalising cannabis. Quah et al. (2014, p. 78) point out that “doing so in practice would require one to predict the extent of changes in variables that cannot even be accurately measured in the present, and to perform implausible feats of relative valuation”. This, coupled with the lack of reliable and accurate data for South Africa with regard to cannabis, implied that the research report had to seek to form an objective view of the potential benefits and costs of cannabis legalisation from a primarily qualitative perspective, supported by appropriate quantitative research.

The analysis drew on international research, literature and case studies which were supported by South African socio-economic data (where available) to test the working hypothesis. Fink (2014, p. 3) defines a literature review as “a systematic, explicit, and reproducible design for identifying, evaluating, and interpreting the existing body of recorded documents”. As such the literature review played an important role in the research and informed the adopted analytical approach.

3.1 Research approach and strategy

The research approach was primarily deductive – hypotheses and theories put forward by previous researchers in the field were examined in the South African context in order to develop specific and logical conclusions and test the author’s working hypothesis (Hyde, 2000).

The working hypothesis of this report states that a net socio-economic gain for South Africa would result from lifting cannabis prohibition.Confirming or refuting this hypothesis answers the primary research question as stated in section 1.1 of this report.

The research has been supported by elements of inductive reasoning, because there was a need to assess previous researchers’ observations in order to establish generalisations about the phenomenon under investigation (Hyde, 2000). These generalisations were then used as part of the deductive process of testing the working hypothesis (Arthur, 1994). Arthur (1994) argues that this mixed approach – whereby inductive reasoning leads to theory formation that is then used to carry out localised deductions based on current hypotheses – lends itself to addressing problems in complex adaptive systems. Concomitantly, the research question
aimed to assess the potential impact of cannabis legalisation on South African society and the economy, both of which are complex adaptive systems (Beinhocker, 2006).

As Hyde (2000, p. 88) furthermore argues:

A balance of induction and deduction is required in all research. Extreme induction could deprive the researcher of useful theoretical perspectives and concepts which can help guide exploration of a phenomenon; extreme deduction could preclude the researcher from developing new theory.

The approach, coupled with the lack of accurate and reliable South Africa-specific data on the topic, implied that the research had to consist of a combination of qualitative and quantitative analysis.

Hyde (2000) points out that for the purposes of a qualitative-deductive study, two circumstances need to be in place:

1. The concepts to be studied are clear from the outset.
2. Hypothesised relationships between concepts can be stated before data gathering commences.

Both circumstances were satisfied for the purpose of testing the working hypothesis.

### 3.2 Sampling

For quantitative aspects of the analysis, sampling sought to ensure nationally representative data based on publically available information and/or prior research conducted in a relevant field. There were however instances where provincial-level or state-level data was necessarily utilised.

Sampling of literature containing international research done in the field for the purpose of qualitative analysis relied primarily on prior journal articles, dissertations, books, proceedings and industry reports, which were selected based on their quality and on their respective impact factors (with regard to journal articles) as stated in the Social Sciences edition of the Journal Citation Reports.

While prior literature/research may not necessarily have been directly representative or transferable to the South African context, the author – in a process akin to a multi-case comparative study – took care to evaluate the similarity of the external conditions in South Africa and the market where the original research had been conducted. This implied the need
for theory testing through pattern-matching, which Hyde (2000, p. 88) defines as “a deductive procedure which actively employs rival explanations and exposes case evidence and conclusions to independent peer review”.

### 3.3 Data collection

Data was necessarily collected from multiple sources:

a. The UNODC (2002; 2007; 2009a; 2009b; 2009c; 2014; 2015a; 2015b) reports and databases contained perhaps the most comprehensive data in terms of nationally and regionally comparable cannabis consumption trends, cultivation and seizures. Therefore the UNODC represented an important source of data for the purpose of this research report. Assumptions related to this data have been discussed in section 1.3.

b. SAPS crime statistics were critical to indicating the economic and social costs related to enforcing cannabis prohibition policies. This data was available on the SAPS website, and through prior research that had been conducted on crime statistics in South Africa. The collected data has been discussed in the literature review section.

c. Data on industrial hemp in South Africa was sourced from the DAFF and the ARC, as these are the only entities tasked with running the hemp pilot programmes in South Africa. Given that the pilot programmes are yet to be completed at the time of writing this report, the author’s ability to quantify the opportunity cost of cannabis prohibition with regard to industrial hemp production has been somewhat limited.

d. The CDA, which in partnership with South Africa’s Department of Social Development, is responsible for the current NDMP, provided the most comprehensive view of the South African government’s stance on cannabis policy.

e. The report of the LSE Expert Group on Economics of Drug Policy (Quah et al., 2014) contained insights into and analysis of the effects of the current enforcement-led approach to drug and, more specifically, cannabis prohibition.

f. Relevant journal articles fitting the criteria discussed in section 3.2 were sourced from the EBSCOhost, Emerald, Google Scholar and Science Direct databases.
3.4 The conceptual framework for analysis

The primary point of analysis constituted the comprehensive literature review (section 2). This provided a broad context of the socio-economic dynamics and impact of cannabis, and associated policies and underlying enforcement practices, globally and in South Africa.

The contents of the literature review were then systematically reviewed according to the themes of the conceptual framework, discussed below.

Ostrowski (1990) provides a conceptual framework that proved suitable for the purpose of testing the working hypothesis (section 3). The conceptual framework comprised four mutually exclusive and collectively exhaustive themes, as follows:

1. **Harm caused by prohibition** – the unintended effects of prohibition caused directly or indirectly by enforcement of prohibitionist policies.

2. **Harm prevented by prohibition** – harm to users and society that is prevented by virtue of cannabis being illegal or less available.

3. **Harm not prevented by prohibition** – the failure of prohibition to prevent drug use and abuse, drug-related crime and harm to society.

4. **Harm related to, but not caused by, cannabis use** – the association of illegal drug use with various social and criminal problems such as violence, sexual abuse, unemployment (complacency), theft, etc.

While the conceptual framework appeared to be focused on harm (or rather cost), the nature of the various themes was such that socio-economic benefits were implicit in each component of the framework. For example, the first theme (“harm caused by prohibition”) implicitly highlighted the socio-economic benefits of legalisation, and the second theme (“harm prevented by prohibition”) directly related to the socio-economic benefits that had been realised through prohibition of cannabis.

Once analysis of each of the four framework’s themes was completed, an objective assessment of the current landscape against the proposed landscape was carried out in order to determine which scenario has the most potential to provide optimal socio-economic outcomes for South Africa. For the purpose of this objective assessment, the author sought to objectively falsify his working hypothesis because, as Hyde (2000) indicates, the deductive process remains intact only if new data could be used to confirm the initial hypothesis.
4. RESEARCH ANALYSIS, DISCUSSION AND FINDINGS

While the literature review provides a comprehensive breakdown and analysis of the global and South African cannabis landscapes, this section of the report systematically categorises the literature into the four themes of the conceptual framework (as discussed in section 3.4), with a view to testing the working hypothesis and answering the stated research question and sub-questions (section 1.1).

4.1 Research analysis and discussion

This section provides a summary of how the research presented in the literature review relates to the themes of the conceptual framework. The relevant findings relating to each theme are drawn out, and where the literature presents conflicting findings a discussion follows. All of the findings that are presented below have been drawn directly from the comprehensive literature review (section 2).

4.1.1 Harm caused by prohibition

As discussed, this theme relates primarily to the unintended effects of the enforcement-led approach to prohibition. The literature overwhelmingly relates the costs/harm of prohibition directly or indirectly to law enforcement. The direct costs concern policing/enforcement, prevention, incarceration and corruption. The indirect costs entail the opportunity costs to law enforcement due to diversion of scarce resources to enforcing drug law rather than to fighting other, potentially more harmful, crimes. These indirect costs are important, as the implication of resource diversion to cannabis prohibition enforcement is that there is a cost to non-consumers as well as consumers of cannabis.

Economic costs of enforcement

Kilmer et al. (2010) and Miron (2005) demonstrate that significant law enforcement costs need to be allocated in order to enforce prohibition. Van Kerken’s (2013) research, coupled with SAPS (2015b) national crime statistics data, confirms that the cost of prohibition associated with law-enforcement is material. Quah et al. (2014) suggest that there is significant evidence to support transferability of these findings globally.

Despite notable efforts by the SAPS to eradicate the supply of cannabis in South Africa, the UNODC and other researchers report that South Africa remains one of the largest producers of cannabis in the world (Peltzer & Ramlagan, 2007; UNODC, 2009c). This suggests that the supply eradication approach is not effective (Quah et al., 2014). These
observations are made at global level, implying that both credibility and transferability requirements are being met.

**Social costs of enforcement**

The exponential growth in drug-related crimes reported in South Africa, exacerbated by growth target-setting by the SAPS, suggests that users of cannabis (as well as other drugs) are potentially being increasingly targeted by law enforcement officials (De Kock et al., 2015; SAPS, 2015b). As more users of cannabis are apprehended in law enforcement efforts, social spillover effects can be expected. Rehm and Fischer (2015, p. 543), citing multiple empirical studies, believe that “in many countries, cannabis constitutes the primary focus of drug law enforcement, and arrests disproportionately involve marginalized [sic] individuals”. The issue of criminal records has been found to be detrimental to obtaining employment, which may in turn compel individuals to seek revenue-making opportunities in illicit activities (Pedersen & Skardhamar, 2010; Rehm & Fischer, 2015). Corruption is another emerging issue. Individuals who are apprehended with cannabis (users and distributors) and face getting a criminal record or being incarcerated have high incentives to offer law enforcement officers bribes, and indeed are inclined to do so (Howell & Couzyn, 2015; Quah et al., 2014).

Ostrowski (1990) and Quah et al. (2014) propose that criminalising drug users inadvertently creates disrespect for the law, which has a spillover effect into other forms of illicit behaviour.

Prohibition implies that individuals who use the illicit substance are fundamentally immoral, as such individuals who develop drug problems tend to be stigmatised by society (Kleinig, 2015; UNODC, 2015b; Van Niekerk, 2011). According to Bernholz (2000), Trautmann et al. (2013) and Van Niekerk (2011), stigma – already a major barrier for people in need of recovery from substance abuse – is amplified if the substance in question is regarded as illegal.

**Economic opportunity costs of prohibition**

The literature suggests that three distinct opportunities may emerge from cannabis legalisation. At present the law in South Africa prevents these industries from existing legally.
1. **Industrial cannabis (hemp).** The ARC (2014) has identified 25,000 consumer products that can be produced from industrial cannabis (hemp), a proposal confirmed by Johnson (2015) and Kraenzel et al. (1998). Furthermore, indications are that many parts of South Africa provide a favourable environment for hemp cultivation (South Africa. Department of Agriculture, Forestry and Fisheries, 2012). At present no indications of the total market potential in South Africa exist, but the DAFF (2012), working together with the ARC, has recognised the potential opportunity that industrial cannabis could generate, and as a result multiple hemp plantation trials are currently underway in South Africa.

Studies have confirmed that hemp is as competitive, if not more so (once environmental considerations are taken into account), than many incumbent raw materials used in paper production, textiles and petrochemicals (De Bruijn, Jeppsson, Sandin, & Nilsson, 2009; Li, Stuart, Li, & Parnas, 2010; United States. Department of Agriculture, 1916; Van der Werf & Turunen, 2008). Still, it is important to bear in mind that industrial hemp would need to compete with well-established incumbent raw materials such as cotton, lumber and petrochemicals, which would pose challenges in terms of the commercial viability of industrial hemp as an alternative feedstock to existing industry (Kraenzel et al., 1998). South Africa-specific opportunities need to be explored further.

Local commercial production of hemp is not allowed by law, and therefore can be viewed as a direct cost of prohibition to the South African economy.

2. **Medical and therapeutic cannabis.** Cannabis is classified as a schedule I drug by the United Nations, implying that the plant has no medical uses. This is at odds with emerging medical research which recognises the promise cannabinoid use has in treating/alleviating, among others, HIV/AIDS-related weight loss, multiple sclerosis, cerebral palsy, spinal cord injuries, chronic pain and glaucoma, as well as showing potential for new anti-cancer drug development (Kumar et al., 2001; Nutt et al., 2013; Ostrowski, 1990; Parry & Myers, 2014; Van Niekerk, 2014). Developing and researching lower cost, plant-based treatment for some of these ailments (particularly HIV/AIDS-related weight loss and cancer treatment) should be a priority for the South African government, a sentiment echoed in certain SAMJ articles (Parry & Myers, 2014; Van Niekerk, 2014).
Sznitman and Bretteville-Jensen’s (2015) studies suggest that public support for medical cannabis legalisation is likely to grow as the body of research into the field expands. South Africa may already be experiencing this, through the Medical Innovation Bill that is being discussed in parliament (South Africa, 2014).

Evidence from jurisdictions where medical cannabis has been legalised observes a high degree of diversion (beyond real medical use of marijuana), proposing that easing of medical marijuana laws tends to be a precursor to the broader relaxation of cannabis regulations (Reinarman et al., 2011; Sznitman & Bretteville-Jensen, 2015; Thurstone et al., 2011).

3. **Recreational/responsible adult use of cannabis.** Miron (2005) argues that legalisation of marijuana would lead to lower government expenditure on enforcement coupled with higher tax revenues. In Colorado tax revenues of US$70 million for the financial year 2014/15 suggest that Miron’s (2005) view is correct (Colorado Department of Revenue, 2015). Uruguay’s official projected sales revenue from marijuana sales for 2016 is anticipated to be between US$8.4 million and US$14 million (AFP, 2015).

While making inferences about the South African market may be premature, it is worth noting that in Colorado an estimated 558,681 people or 10.4% of the total state population consume marijuana (Colorado Department of Public Health & Environment, 2015), and in Uruguay the official estimate is 160,000 consumers or 4.7% of total population (AFP, 2015). The UNODC (2015b) estimates that between 2.65 and 4.82 million people (between 5.0% and 9.1% of total population) smoke marijuana in South Africa, suggesting a much larger opportunity cost in terms of taxes.

Furthermore, and significantly, while legalisation would yield lower production costs through economies of scale and value chains that need not be concerned with avoiding law enforcement, the retail price of cannabis would need to remain as close to the current black market rate as possible (Decorte & Potter, 2015; Hall & Weier, 2015; Keliman, 2015; Kilmer et al., 2010; Quah et al., 2014). This would further drive revenues of the government, which would necessarily maintain prices through the use of taxes, taking into account both the weight of cannabis sold and its THC content (Chaloupka et al., 2011; Cook & Moore, 2002; Quah et al., 2014; Wagenaar et al., 2009).
These three applications of the cannabis plant demonstrate potential to generate socio-economic value to South African society through unlocking higher government budgets for social welfare and development programmes, formal employment opportunities as well as potentially providing affordable medication to patients over the longer term.

Exploitation and victimisation of Eastern Cape dagga farmers

The historical context of cannabis legalisation in South Africa, coupled with the SAPS enforcement-led and supply eradication approaches to prohibition of cannabis, has resulted in a situation in which the vulnerable subsistence farmers of the Eastern Cape are routinely victimised or exploited by both the SAPS and players in the cannabis supply chain (Decorte & Potter, 2015; Kepe, 2003; Paterson, 2009; SAPS, 2015c).

4.1.2 Harm prevented by prohibition

This theme refers to harm of users and society that is prevented by virtue of cannabis being illegal or less available, that is, a success of prohibition. For Ostrowski (1990), this is the main practical argument for prohibition, but at the same time it is a category that is immeasurable due to the uncertainty associated with potential human behaviour – a view that is implicitly supported by Rothbard (1977). Nonetheless, this very uncertainty may be seen as an argument in support of prohibition because, when viewed in isolation, it favours the status quo. A weak argument such as this would need to be challenged.

Youth use and abuse of cannabis

A major argument for maintaining the status quo of cannabis prohibition relates to the fear that decriminalisation or legalisation would lead to increased use and abuse by minors (Quah et al., 2014; UNODC, 2014). But there is no evidence in the reviewed literature to support this notion. Nationally representative studies of adolescent attitudes to cannabis over periods of relaxing cannabis legislation consistently demonstrate lower rates of use by minors (Ammerman et al., 2015; Choo et al., 2014; MacCoun & Reuter, 2001; Salas-Wright et al., 2015). Perhaps the strongest evidence disputing the notion relates to the fact that since recreational sales of cannabis began in 2012, youth cannabis prevalence rates have been on the decline and are below the national average in the US (Centers for Disease Control and Prevention, 2015). The reviewed literature considers a variety of countries, including the US, the Netherlands, Denmark, Germany, Norway and Isreal, suggesting
some degree of transferability. Unfortunately no studies from developing markets are available at the time of writing.

**Adult use and abuse of cannabis**

With regard to adult populations, there appears to be somewhat stronger evidence that prohibition has been successful in curbing cannabis use prevalence rates. Hasin et al. (2015) conducted a nationally representative study of adult prevalence rates in the US between 2001/2 and 2012/13. They found that as prohibition of cannabis was abandoned in certain states, cannabis use prevalence rates more than doubled to 9.5% among adults, though users were also less likely to abuse cannabis, as indicated by a less than proportionate increase in reported incidents of abuse (Hasin et al., 2015). As postulated by Hasin et al. (2015), supported by Quah et al. (2014), individuals inclined to abuse cannabis are also less inclined to be deterred by prohibition. This suggests that while prohibition may be effective in limiting adult use of cannabis, it is less effective in limiting abuse.

**The push factor**

Prohibition provides an efficient solution to preventing mass marketing of cannabis to promote consumption. The literature proposes that commercialisation of cannabis, like the commercialisation of alcohol and tobacco prior to the 1990s, would lead to increased incidence of use and abuse by both youths and adults (Hasin et al., 2015; MacCoun & Reuter, 2001; Quah et al., 2014).

With regard to the gateway drug hypothesis, the literature overwhelmingly suggests that the hypothesis is an oversimplification of drug use dynamics, particularly as the literature consistently fails to demonstrate causality above mere correlation (Kleinig, 2015; Secades-Villa et al., 2015; Trautmann et al., 2013).

**Challenges measuring harm reduction through prohibition**

The argument that prohibition of cannabis prevents harm to society requires some degree of evidence that potential harm is caused to society by cannabis in the absence of prohibition. Critically, multiple pieces of research found that legal drugs such as alcohol and tobacco cause more harm to the consumer and the broader society than consumption of cannabis (Kumar et al., 2001; Macleod et al., 2004; Nutt et al., 2010; Parry & Myers, 2014; Van Niekerk, 2014). In fact, Kumar et al. (2001) failed to identify a single death directly associated with cannabis consumption globally, while alcohol has been found to be
responsible for 7.1%, or 37,000, deaths in South Africa alone (Peltzer et al., 2011; Schneider et al., 2007).

The South African NDMP speaks the language of harm reduction as a pillar of policy enforcement, but has yet to manifest in practice within the SAPS (Central Drug Authority, 2013; Marks & Howell, 2015; SAPS, 2015a). No guidelines for harm-reduction programmes exist within the SAPS, suggesting that harm reduction is still equated with supply reduction through arrests and seizures (Marks & Howell, 2015; SAPS, 2015a).

### 4.1.3 Harm not prevented by prohibition

This theme concerns the failure of prohibition to prevent drug-related crime and harm. It also includes the fact that illicit drug markets (particularly for cannabis) thrive even under prohibition (UNODC, 2014), but are not regulated and therefore expose participants to potential harm.

Any harm resulting from the use of illegal drugs falls into the category of either harm caused by prohibition or harm not prevented by prohibition. From this, we can further conclude that no evidence of the harm caused by current illegal drug use, by itself, can be utilized [sic] as evidence in support of prohibition. Without additional data showing that the repeal of prohibition would increase the level of harmful drug use, evidence of current harm from illegal drug use—even excluding harm caused by prohibition—is of no use to the prohibitionist argument. (Ostrowski, 1990, p. 14)

*Organised crime and violence under prohibition*

Organised crime activities tend to be funded by drug profits. Given the prevalence of cannabis globally and in South Africa, it stands to reason that cannabis contributes to the social costs incurred by organised crime. A concerning trend emerging from the literature is that South Africa’s cannabis market is currently experiencing increasing organised crime elements (Paterson, 2009). This typically results in overlaps between cannabis trade and trade of other illicit substances as well as activities. The implication is that a growing proportion of the 2.65 to 4.82 million South African cannabis consumers is being exposed to increasingly sinister criminal elements (Ostrowski, 1990; Paterson, 2009; Pedersen & Skardhamar, 2010; Quah et al., 2014).

Quah et al. (2014) argue that a major gain of legalising cannabis would be a reduction in the risks of cannabis consumption, as consumers would have access to labelled and
regulated products. This view is supported by Decorte and Potter (2015), as well as Rehm and Fischer (2015).

Cannabis and other forms of crime (excluding organised and drug-related crime)

The prohibitionist hypothesis is that access to cannabis leads to increased levels of crime. Evidence to support this hypothesis has been found to be severely lacking. Studies that look for causality between easier access to legal cannabis and crime suggest that there has been no increase in crime rates that can be associated with increased access to legal cannabis (Morris et al., 2014; Pedersen & Skardhamar, 2010; Sznitman & Zolotov, 2015). Pedersen and Skardhamar (2010) further believe that socio-demographic, family and personal factors may exert stronger influence in driving criminal behavior than cannabis use alone. This interesting observation is implicitly consistent with the UNODC’s (2002) argument that the high degree of violence, income inequality, widespread decline in traditional social relationships, and poor educational and employment prospects in South Africa contribute significantly to both the prevalence of drug use and the drug’s production in the country. These views imply that cannabis prohibition alone has had little influence on crime levels experienced in South African society, although the UNODC’s (2002) view suggests that the relatively high use prevalence rate in South Africa is a result of broader socio-economic issues which prohibition does not address in any way.

Social harm not prevented by prohibition

The high growth in drug-related arrests in South Africa, coupled with quantitative growth targets for the future, poses serious concerns related to the tendency for law enforcement to more frequently target drug (cannabis) users (De Kock et al., 2015). Cannabis users who have been arrested and charged receive a criminal record, which has been found to impede employment opportunities and as a consequence may fuel further substance abuse or illicit activity to substitute for the lack of a formal income (Pedersen & Skardhamar, 2010).

In order to prove that absolute harm reduction has resulted from prohibition one needs to demonstrate that cannabis consumption (assuming that it is harmful) has not been merely displaced by abuse of other legal substances such as alcohol or tobacco, or other harmful and addictive behaviour. Interestingly, while none of the literature assesses the substitution effect of this approach, there is evidence in multiple studies that as marijuana consumption
increased with the relaxation of relevant laws, the consumption of alcohol decreased, confirming the substitution hypothesis (Hall & Weier, 2015; Sznitman & Zolotov, 2015). Joffe and Yancy (2004), however, identify an Australian study which found that cannabis and alcohol were complementary goods. It appears that research on this hypothesis remains equivocal, a view confirmed by Quah et al. (2014).

*Prohibition fails to address drivers of cannabis use and abuse by children*

Assuming that prohibition is able to limit availability of cannabis, according to multiple studies increased availability of cannabis through relaxed laws does not in itself lead to increased incidence of child use and abuse of cannabis (Ammerman et al., 2015; Dube et al., 2003; Salas-Wright et al., 2015). Researchers have rather been able to determine that adverse childhood experiences are a much more significant predetermining factor influencing potential future substance abuse in children (Dube et al., 2003). This relates to much broader challenges than those that prohibition seeks to alleviate; in this instance it appears that prohibition is seeking to alleviate a symptom of the harm, but failing to address its true cause.

**4.1.4 Harm related to but not caused by cannabis use**

Supporters of prohibition tend to be significantly influenced by confirmation biases, which results in scapegoatism (Ostrowski, 1990).

*The association of increased violent crime with easing cannabis legislation*

Relating various criminal problems – such as violence, sexual abuse, unemployment (complacency), theft, and so on – to the use of illegal drugs, with very little or no evidence of actual causality, is common in the literature (Joffe & Yancy, 2004; Morris et al., 2014; Quah et al., 2014).

Most profound is that the underlying motivation for cannabis prohibition in South Africa is based on the premise that cannabis consumption leads to labourer indolence, crime and insanity, yet only minimal and (sparse) anectodal evidence is provided in support of these claims (Crampton, 2015; Natal (Colony). Indian Immigrants Commission, 1987; Paterson, 2009).

More recently, in a South African study on cannabis usage trends Peltzer and Ramlagan (2007) conclude that cannabis is often associated with crime, but they give no further insight into whether this is a causal or correllational phenomenon. Parry and Myers (2014)
also claim an association between cannabis and crime, but admit that causality has not been demonstrated. Perhaps it is no surprise that cannabis use is associated with crime, since merely possessing the plant is considered a crime in many countries.

Studies that sought to prove causality between easing cannabis laws and crime have consistently failed to do so, suggesting that the current reality negates the hypothesis of legal access to cannabis leading to exacerbated levels of violent and property crime (Keliman, 2015; Macleod et al., 2004; Morris et al., 2014; Pedersen & Skardhamar, 2010; Sznitman & Zolotov, 2015).

Adding credibility to these findings is the fact that Sznitman and Bretteville-Jensen’s (2015) nationally representative study demonstrates that public health, harm and crime have less bearing on public support for medical cannabis legalisation. While the study focuses on medical cannabis legalisation, its findings implicitly apply to general cannabis law relaxation, as multiple studies confirm that medical cannabis legalisation tends to be a stepping stone towards de facto decriminalisation or legalisation of cannabis (Reinarman et al., 2011; Thurstone et al., 2011).

In instances where an increase in crime is noted, the crime is identified as being drug-related, suggesting that these studies’ findings relate to the “harm caused by prohibition” theme of the framework (section 4.1.1).

Mental health

Multiple pieces of literature associate cannabis use with mental health disorders, yet they fail to conclusively demonstrate causality (Central Drug Authority, 2013; Hall & Weier, 2015; Hasin et al., 2015; Macleod et al., 2004; Peltzer & Ramlagan, 2007; Proal et al., 2014). Proal et al. (2014, p. 287) conducted a comprehensive review of the available literature and conclude that “cannabis does not cause psychosis by itself. In genetically vulnerable individuals, while cannabis may modify the illness onset, severity and outcome, there is no evidence from this study that it can cause the psychosis”.

Based on the observations provided in this section of the analysis, there is a notable tendency to attribute antisocial behaviour to drugs rather than individuals.
4.2 Research findings and implications for policy

This section seeks to tie the outputs of the theoretical framework to the working hypothesis and research question and sub-questions.

The above analysis definitively demonstrates that there is a need to reassess the prohibitionist approach to harm reduction with regard to cannabis. While individual studies may not always meet the requirement of transferability to the South African context, collectively the global studies confirm that greater cost is borne by society and the economy through prohibition than through a more progressive stance on cannabis.

The research suggests that cannabis prohibition has had similar effects globally and in South Africa. Prohibition:

- consumes significant police resources (time and money) that may be better allocated to reducing overall harm in society
- promotes stigma and discrimination of cannabis users
- undermines public perceptions of the police force
- enriches crime organisations
- compels cannabis users to interact with criminal elements, exposing them to potential harm
- ignores potential upsides of legitimate industrial and medicinal applications of the cannabis plant.

Unfortunately, there is very little evidence provided by prohibitionists to confirm the extent to which their policies have been effective in reducing overall social harm globally and in South Africa. In fact, the UNODC’s (2007, 2009a, 2012, 2014) reports repeatedly imply that efforts to control large-scale production and trafficking of cannabis have not yielded the expected results. Furthermore the UNODC reports do not quantify the economic and social costs that have been avoided as a result of prohibition enforcement. The measurement of seized cannabis, numbers of arrests and use prevalence rates do not equate to harm-reduction measurement. This confirms the observation, first made in the literature review, that cannabis prohibition and the enforcement-led approach are rooted in moral principles rather than in the intended genuine harm-minimisation goals.
Most of the well-intended hypotheses that underline the prohibitionist agenda have consistently been disproved by empirical evidence. In instances where prohibitionist hypotheses have been shown to carry some validity, cheaper and more effective policy options than prohibition may be better suited to minimising the net social and economic costs.

The economic implications of easing cannabis legislation for South Africa cannot be quantified due to a lack of local data, but international studies confirm that the potential benefits to the economy are multiple and may be significant.

Table 1 summarises the findings of the analysis by listing the potential gains, losses and uncertainties of lifting cannabis prohibition in South Africa, based on the available data, literature and analyses.

Table 1: Potential gains, losses and uncertainties of cannabis legalisation in South Africa

<table>
<thead>
<tr>
<th>Potential gains</th>
<th>Potential losses</th>
<th>Uncertainties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formalisation of illicit cannabis industry revenues, leading to increased government revenues, somewhat less drug-related crime and increased formal employment</td>
<td>Increased absolute incidence of cannabis abuse as adult prevalence rates increase with eased legislation, leading to higher strain and cost on the healthcare system</td>
<td>The magnitude of the demand-side response to legalisation through removal of stigma and penalties for cannabis use cannot be estimated reliably</td>
</tr>
<tr>
<td>Police resources can be better deployed to focus on greater social ills (some of which have been found to be stronger drivers of substance abuse than availability alone)</td>
<td>Commercialisation and subsequent marketing efforts may lead to increased prevalence through aggressive encouragement campaigns</td>
<td>It remains uncertain whether cannabis and alcohol are alternatives or complementary goods</td>
</tr>
<tr>
<td>Less indirect harm caused by arrests and incarceration for possession of cannabis</td>
<td>Regulation is not perfect, and some leakage to minors may be observed as general access to cannabis increases</td>
<td>Commercial viability of hemp in South Africa is still under investigation through the hemp pilot programmes</td>
</tr>
</tbody>
</table>

*Quah et al. (2014, p. 77) suggest restraint regarding claims that legalisation of cannabis would materially reduce drug-related violence, observing that other illicit (and some licit) drugs dominate drug-related violence and that many of these “costs of the war on drugs would remain in place after cannabis legalisation”.*
<table>
<thead>
<tr>
<th>A regulated cannabis market is safer for the 2.65 to 4.82 million South African cannabis users, through less contact with organised crime and more certainty regarding product contamination by other illicit substances</th>
<th>In the short run, the cost (financial and human capital) of enforcing a regulated market may be high, but as the market matures less enforcement would be required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low youth cannabis use prevalence rates. Formalised industry would have greater incentive not to market or sell cannabis to minors – current illicit markets have no such incentive</td>
<td>Incumbent industries whose raw materials compete with industrial hemp may suffer over the longer term if hemp proves to be a more attractive alternative feedstock</td>
</tr>
<tr>
<td>Higher potential to earn income for impoverished subsistence farmers in the rural Eastern Cape, which could be further supported by policy</td>
<td>Generating an industrial hemp value chain locally could create new industries and encourage innovation, resulting in further economic gains, including employment opportunities</td>
</tr>
<tr>
<td>Research and development into medical marijuana locally could lead to innovation with economic advantages, and provide low-cost alternative medication</td>
<td>The SAPS and the CDA could put their espoused policies of harm reduction into practice</td>
</tr>
</tbody>
</table>
Interestingly, the potential losses stated in the table can to a large extent be addressed through effective policy design that is informed by the research provided in this report. For example, the fact that prices of cannabis in a formalised industry would need to be maintained at black market prices through tax mechanisms suggests that government would continue to reap disproportionate revenues as the market matures. These revenues could be used to fund education and prevention campaigns as well as healthcare facilities related to general substance abuse (as opposed to cannabis abuse alone). Commercialisation may not be the only option to consider as a policy – alternatives that negate the potential for aggressive marketing and encouragement must also be explored. These alternative policies include but are not limited to:

- production of cannabis for recreational use with free distribution, while regulating industrial hemp separately
- government monopoly of the entire supply chain, or parts of it (the approach adopted by Uruguay)
- non-profit models through the use of cooperatives, which may be well suited to empowering rural Eastern Cape dagga farmers and increasing their earnings.

The uncertainties associated with cannabis legalisation suggest that policy formulation would need to be carefully considered. Government would be well placed to enact an evolutionary approach to cannabis policy that is responsive to market dynamics, at least in the early days of market maturity. In order to achieve this, a robust tracking mechanism for the end-to-end cannabis supply chain may need to be developed. Policy design needs to ensure that the costs associated with regulation of a legalised cannabis industry can be fully borne by the cannabis industry itself. This may not be a tall ask if one considers the “disproportionate tax revenues” that are likely to accrue as a result of the need to maintain prices of recreational cannabis at pre-legalisation levels (discussed above).

Internationally, it is apparent that incremental changes to policy have been preferred to support the learning process of policymakers. This requires a reduction in penalties for possession of cannabis, coupled with increased access to medical marijuana. Once policymakers have learned from this experience, the next step could be decriminalisation of small amounts, to be followed up later by larger scale legalisation.
While the case for cannabis legalisation (as opposed to other options such as decriminalisation) has not been explored explicitly, it is important to note that decriminalisation or any other forms of de-penalisation are normatively flawed, particularly since they do not address the issues associated with illicit markets nor the bulk of the “harm caused by prohibition” as discussed in section 4.1.1 of this report.

Use-specific legalisation of *Cannabis sativa* for industrial and/or medical purposes also does not present an optimal long term socio-economic alternative to prohibition as it does not comprehensively address the identified “harm caused by prohibition” or the “harm not prevented by prohibition.” Internationally, regimes that have permitted access to medical marijuana have recorded notable diversion to recreational use; there is no reason that alternative outcomes should be expected in South Africa. While few countries such as France and Ukraine do have industrial cannabis industries without legalisation of cannabis for human consumption, this approach may prove challenging in the South African context (South Africa. Department of Agriculture Forestry & Fisheries, 2012). The dagga farmers of the Eastern Cape might wish to build on their established knowledge of *Cannabis sativa* and begin developing cottage industries from hemp production, but distinguishing between industrial and recreational cannabis plantations is challenging; this will raise costs of enforcement and allow room for diversion to illicit recreational cannabis production (Booth, 2003; Fortenbery & Bennett, 2004; Herer, 1985; Johnson, 2015; Wynn, 1998).

Overall, the research findings of this report confirm that South Africa’s prohibitionist policy on cannabis requires revision in order for socio-economic outcomes to be optimised. To this end, the working hypothesis has been shown to be valid: The research suggests that a net socio-economic gain could be realised for South Africa by lifting cannabis prohibition.

### 4.3 Research limitations

As Rothbard (1977) explains, the challenge of conducting a cost–benefit analysis (or any form of utilitarian analysis) is that social costs and benefits are exceedingly difficult to measure and weight objectively. Ostrowski (1990) confirms this view, noting that the notions of harm, value, cost and happiness are by their very nature subjective and would differ greatly.

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7 Under a decriminalised or de-penalised regime, cannabis possession for personal use would not be considered a criminal offence but sale of cannabis would. No tax revenues would accrue to government under this regime
from region to region and person to person. This suggests that conducting a definitive and completely objective socio-economic cost–benefit analysis may be impossible.

The research has not assessed the political motivations for maintaining the status quo of cannabis prohibition in South Africa. Government may very well be aware of the potential advantages of abolishing cannabis prohibition, but incumbent political factors (such as general public perceptions) could be hindering progress in policy change.

The lack of reliable, accurate, South Africa-specific data has limited the ability to make definitive and quantifiable claims regarding current and potential costs and benefits to the country of prohibition versus legalisation of cannabis. Nonetheless, the research has highlighted the potential sources of these costs and benefits, which are able to directionally suggest the net effect of prohibition versus legalisation.

A few researchers suggest that prohibitionist drug (particularly cannabis) policies constitute a violation of basic human rights. This notion is based on the premise of self-determination, which implies “a right to engage in any action which is peaceful; which does not deprive others of their right to free action” (Ostrowski, 1990, p. 19). This issue is intentionally excluded from the research as it is better suited to legal, sociological and philosophical debates, but this does not undermine the validity of its role in future policy considerations.

Spill-over effects in terms of potential economic impact of new (cannabis-related) industries relative to incumbents are not explored, as this constitutes a substantial piece of work in its own right (on a per-industry basis), which is thus beyond the scope of the current research. However, it is recommended for future research.

While the research presented in this report has incorporated the most robust literature available, cannabis re-legalisation is at an early stage globally, and the socio-economic implications presented in this report may change. Increased global commercialisation and legalisation trends may uncover as yet unforeseen costs and/or benefits to societies and economies that abolish prohibition.

Given the broad nature of the research question, none of these limitations poses a serious threat to the credibility of the research outputs. However, any future researcher who builds on this research report would be well advised to consider incorporating the above in their respective research.
5. RESEARCH CONCLUSIONS

This report set out to answer the primary research question: Is there a socio-economic business case to be made for cannabis legalisation in South Africa? In order to support the deductive research approach and strategy a working hypothesis was formulated, it stated that: A net socio-economic gain for South Africa would result from lifting cannabis prohibition.

Despite its deceptively simple nature, the research question uncovers significant sources of complexity. This leads one to conclude that while the research findings confirm the validity of the working hypothesis, South African policymakers would be well advised to tread with caution when developing much needed new cannabis-related legislation.

Research sub-question 1: What are the socio-economic costs and benefits of the current policies on cannabis?

The current enforcement-led approach to cannabis prohibition in South Africa demonstrates very little evidence of having reduced overall harm to society when viewed through the lens of the chosen conceptual framework. In fact, internationally the evidence overwhelmingly suggests that the current state of cannabis prohibition results in more costs than benefits to the economy and society; these observations have been found to be transferable to the South African context. The UNODC routinely refers to these effects as unintended consequences of the war on drugs. However, it will be increasingly difficult for the UNODC and member states to continue arguing that these effects are unforeseen, more than 50 years after the initiation of the global war on drugs. The need for a change in policy is clear.

Research sub-question 2: What are the potential socio-economic implications of legalisation in South Africa?

The case for legalisation, however, is not clear-cut, chiefly because of the high degree of uncertainty associated with the effects of legalisation. Globally, cannabis re-legalisation remains in its infancy and care must be taken when making inferences from the few studies that are available on this topic. Nonetheless, the available research and literature highlight multiple potential sources of both social and economic gains that could be realised through lifting prohibition on cannabis.

The potential socio-economic gains that could be realised through cannabis legalisation in South Africa are broad and do require further quantification. Nevertheless the formalisation
and regulation of illicit markets, opportunity for new industries and medical innovation coupled with better allocation of police resources all serve as strong incentives in support of legalisation.

For the most part the potential socio-economic costs appear to be manageable through careful cannabis policy design. While not all costs would be mitigated through policy and regulation, the research suggests that on balance the socio-economic gains would outweigh potential losses. The ensuring of adequate health services for substance abuse (beyond cannabis alone) could be funded from cannabis-related taxes. This is an example of how policy could revise the negative aspects of lifting cannabis prohibition. This example also demonstrates how legalisation of cannabis can be consistent with the NDMP’s stated goal of harm reduction.

The potential harm and uncertainties associated with the effects of legalisation cannot themselves be used as justifications for continued prohibition. Particularly given the lack of evidence that cannabis prohibition has resulted in reduced levels of harm; in fact the bulk of the evidence suggests the contrary.

Research sub-question 3: How could the socio-economic costs of cannabis legalisation be minimised through potential policy interventions?

With cannabis re-legalisation being so new globally, the uncertainties related to potential outcomes of legalisation cannot be planned for or negated based on past experiences of other countries, chiefly because these uncertainties are not necessarily transferable and little research has been done to fully understand them. They must not be interpreted as a reason for continued prohibition, which has been found to incur more costs to society and the economy. Instead, the identified uncertainties should serve as motivation for innovative approaches to policy design, implementation and enforcement.

The research undertaken in this report, suggests that commercialization of cannabis along the lines of alcohol or tobacco is not supportive of overall harm reduction; although it may still be better than continued prohibition. Alternatives need to be explored.

Ensuring optimal socio-economic outcomes with regard to cannabis-related policy design requires some degree of policy experimentation. Policymakers must have vigorous oversight, and policy outcomes must be measured systematically and assessed regularly. Policymakers
need to be prepared to change policies quickly if and when challenges emerge. Optimising socio-economic outcomes through changes in cannabis policy would have to be an iterative, learning process that assesses policy efficacy on measured outcomes.

While this research report does not deliver a definitive and quantifiable socio-economic business case for cannabis legalisation in South Africa, it does highlight that there is a case to be made. By identifying the shortcomings of cannabis prohibition as well as the potential challenges of legalisation, this research report lays the groundwork for future researchers to begin building the quantitative business case for cannabis legalisation in South Africa.
6. FUTURE RESEARCH DIRECTIONS

This report represents just the first step in developing a robust business case for cannabis legalisation in South Africa. Future research needs to build on the themes discussed herein with a view to quantifying the costs and benefits of cannabis legalisation and comparing them with those of continued prohibition.

With regard to industrial hemp, future research will be well placed to capitalise on the outputs of the South African government’s hemp pilot programmes. At the time of writing this report, the programmes are on-going and no interim results are available for public consumption. Research may need to focus on specific applications, geographies or industries. Industry-specific analysis is probably warranted given that hemp would effectively be seen as an alternative feedstock that either complements or competes with incumbent feedstocks in industry.

In order to understand the potential revenue-generating opportunity of recreational cannabis sales, future research would be well placed to assess the robustness of published cannabis use prevalence rates in South Africa. The researcher will also need to develop a view on current black market prices of cannabis in the country, which may prove to be challenging in the near term, given the lack of research in this field and the plant’s current legal status. No meaningful quantification of the potential recreational cannabis market can be conducted without this data. This research will also provide guidance in terms of quantifying the potential tax revenues that could accrue to government from legalisation, and would allow the researcher to truly develop South Africa’s version of the Miron (2005) report.

There is at present no definitive understanding of the financial costs of cannabis abuse in South Africa. Research into this issue will require the unpacking of public health costs associated with cannabis abuse, law enforcement and so on, and insurance costs that are borne by individuals and employers. The matter is further complicated by the fact that government spending on drug-related issues is distributed across national, provincial and local government departments, as well as state-owned agencies and statutory organisations. An incremental approach may need to be adopted in attempting to understand these costs.
Future researchers in this field would be well placed to assess public perceptions of cannabis and cannabis-related harm in South Africa, as no such studies are currently available. This research could help ascertain the political appetite to drive change in the Government’s stance on cannabis. International cases suggest that public opinion is a major catalyst to lifting cannabis prohibition policies.
7. REFERENCES


8. APPENDIX A: FURTHER DETAIL ON INDUSTRIAL APPLICATIONS OF CANNABIS (HEMP)

As mentioned, and confirmed by Johnson (2015) and Kraenzel et al. (1998), the ARC (2014) identifies 25 000 consumer products that can be produced from hemp, with applications across multiple industries including but not limited to the following:

- **Automotive.** A 2004 study of the hemp industry found that 15% of European hemp fibre was used in the automotive industry in 2002, a substantial increase from the 1% observed in 1996 (Karus & Vogt, 2004). The study discovered that this increased demand was due to an increased push by European automotive manufacturers to use more environmentally sustainable materials in vehicle interiors, which historically were made using plastics from fossil fuel resources. Karus and Vogt (2004) propose that as production techniques incorporating more use of natural fibre with petrochemical plastics are developed, demand for hemp fibre in the automotive industry will continue on its current growth trend.

Furthermore, and perhaps commercially more profound, Li, Stuart, Li and Parnas (2010) found that industrial hemp seed has strong potential as a new crop source for biodiesel, which is both attractive due to its flow properties and competitive due to hemp seeds’ high seed yield and oil content. Their study found that hemp biodiesel meets the international standards for biodiesel fuel (ASTM 6751-09) (Li, Stuart, Li, & Parnas 2010).

- **Construction material.** As part of the South African hemp pilot programme (discussed earlier) and the City of Cape Town’s World Design Capital project initiatives, a house constructed almost entirely of hemp was built in Cape Town. Construction materials included hempcrete (fibre board), hemp insulation, hemp chipboard and hemp carpets, and furnishings included hemp textiles (“The house that hemp built”, 2014) (see Figure 13).
Hempcrete, comprising hemp fibre-reinforced composite concrete blocks, is a much more sustainable building material than other conventional building materials (Eires, Nunes, Fangueiro, Jalali, & Camões, 2008). But it has limitations: As De Bruijn, Jeppsson, Sandin and Nilsson (2009) point out, hempcrete products must be used in combination with an existing load-bearing structure. Nonetheless hempcrete has the additional benefits of good thermal insulation, sound insulation, air tightness, fire and moisture protection, and light weight, as a result of which it could reduce construction costs (De Bruijn et al., 2009; Eires et al., 2008).

- **Food and beverage.** Hemp seed oil has been shown to have “numerous benefits [for] health, including but not limited to greater resistance to cancer, inflammation, and blood clotting. A general increase in metabolism and lowering of overall blood cholesterol levels has also been observed” (Leizer, Ribnicky, Poulev, Dushenkov, & Rskin, 2000, p. 51). Callaway (2004) found that subjective concerns regarding the presence of psychoactive THC in hemp foods are not supported by scientific evidence.
Figure 14: Imported hemp seeds for sale in South Africa at R103 for 200 grams
(Author’s collection, 2015)

- **Cosmetics.** Akin to the benefits of hemp seed oil as a food supplement, the very high (approx. 30%) essential fatty acids content in hemp seeds (see Figure 14) makes hemp seed oil an attractive input in skin and hair care products (Callaway, 2004; Herer, 1985; Leizer et al., 2000).

- **Agriculture.** Karus and Vogt (2004, p. 11) found that:

  more than 95% of hemp seeds produced in Europe are sold for animal feed, mainly as bird feed, with smaller amounts used by anglers as bait. The attractiveness of this sector strongly depends on the dollar exchange rate and its impact on the competitiveness with imports from China.

Callaway (2004) supports the case for hemp seed as a valuable animal food source in referring to multiple feeding trials which demonstrate the quality of essential fatty acids and the easily digested protein that comprises the hemp seed.
- **Paper.** In 1916 a US Department of Agriculture (1916) report found that hemp hurs from one acre of hemp plants were able to produce over four times as much pulp (for paper) than from one acre of trees on a sustained yield basis. Karus and Vogt (2004) found that 70 to 80% of hemp fibre produced in Europe is used as specialty pulp for cigarette papers and technical applications. However, they also observe that only a very small portion of fibre used for pulping is traded in the open markets, as the majority of fibre enters integrated process chains in the form of raw material (Karus & Vogt, 2004).

- **Textiles.** Van der Werf and Turunen (2008) note that while cotton and synthetic fibre meet most of the world’s textile demand, they are associated with major environmental problems. Cotton cultivation requires significant water, pesticide and fertiliser use (Chapagain, Hoekstra, Savenije, & Gautam, 2008; Soth, Grasser, Salreno, & Kiefer & Partners AG, 1999), much more so than hemp cultivation for textiles (Van der Werf & Turunen, 2008) (see Figure 15). “Synthetic fibres deplete fossil energy resources” (van der Werf & Turunen, 2008, p. 1).

![Figure 15: Adidas shoes made from hemp canvas (organtica.com, 2015)](image-url)