Yonnique Goliath / Int.J.Arch. and Plan. 1(1) (2021) 19-23
https://doi.org/10.51483/IJARP.1.1.2021.19-23
ISSN: 2788-5046

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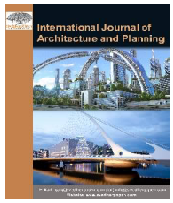

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Hemp building materials in the South African market

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Article Info

Volume 1, Issue 1, March 2021
Received : 09 December 2020
Accepted : 15 February 2021
Published : 05 March 2021
doi: 10.51483/IJARP.1.1.2021.19-23

Abstract

Using hemp as a building material can still be considered innovative in the South African construction industry. Research on the market for hemp building materials in South Africa is limited, as the focus has mainly been on the cannabidiol market which is the main driver for industrial hemp demand. Little research has been completed on the commercial environment, market, and competition in the hemp construction industry. The purpose of this paper is to highlight the constraints to market growth for hemp building materials as well as to indicate potential sources of demand and opportunities for price discrimination across the identified target segments.

Keywords: *Hemp, Construction, Industrial Hemp, Building Materials, Marketing*

1. Introduction

Using hemp as a building material can still be considered innovative in the South African construction industry. Hemp provides a variety of alternatives to traditional building materials. Hempcrete, made from a mixture of hemp fibres, lime, and water can be used in the construction of walls and floors, as well as for insulation and paint. What makes hemp environmentally friendly is that it is composed of renewable resources, has negative greenhouse emissions, is recyclable, and the production of hemp requires less energy than traditional building materials (Bedlivá and Isaacs, 2014).

There is increased awareness of the need for green buildings. In developed countries, global energy consumption by buildings has increased from 20% to 40%, largely attributable to population growth and the amount of time people spend inside buildings (Pérez-Lombard *et al*., 2008). Hemp is a suitable building material to address this, as it stabilizes the indoor temperature as well as humidity, proving to have thermal performance similar to that of a traditional house in warmer temperatures (Ahlberg *et al*., 2014).

For the year 2016, the European Union reported that 7,000 tons of hemp fiber was used for insulation material (Lowitt, 2020). To date, China is the world's biggest exporter of hemp. In South Africa, hemp cannot be grown commercially, but it may be imported duty free (Department: Agriculture, Forestry and Fisheries, 2013). Additional criteria apply if imported for commercial reasons, namely that "the stalk needs to be harvested and processed and the seeds sterilized" and a permit for imports of raw hemp materials are required to confirm that the THC levels have been checked (Coogan, 2016).

In South Africa, research on the market demand for hemp building materials has been limited. Hemp coverage mainly relates to the cannabidiol market which is the main driver for industrial hemp demand. Little research has been completed on the commercial environment, market, and competition in hemp material for the construction industry. Industries that could

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be affected by an increased demand for hempcrete in the long run, are cement, bricks, and insulation. The National Hemp Foundation launched a research incubator in 2010 to test the commercial viability of hemp crops. Instead, the results indicated a lack of knowledge, equipment, maintenance, and resources for the use of hemp materials (Coogan, 2016).

South Africa's first hemp house was built in 2011, and is owned by Tony Budden, co-owner of Hemporium, a hemp retailer in Cape Town and who is also an importer of hemp building materials (Matshwi and Kajimo-Shakantu, 2014). Since then, other hemp buildings have been constructed in South Africa, mainly for residential purposes, with the exception of a soup kitchen in a township in the Western Cape (Coogan, 2016). The market for hemp building materials remains niche experiencing slow growth. At this stage when choosing hemp building materials, prospective clients would be trend-setters or environmental champions for sustainable construction. This paper argues that marketing campaigns for hemp building materials should focus on those clients who are more "adventurous, the innovators, and environmentalists" (Preece, Pheng, Padfield and Papargyropoulou, 2011). These clients might form part of reference groups, which in turn will influence other targeted groups with "new behaviors and lifestyles…and create pressures for conformity that may affect product and brand choices" (Kotler *et al*., 2019).

2. Challenges or constraints to market growth for industrial hemp and specifically, hemp building materials

2.1. Legislation

Legislation creates certainty and boosts market confidence. Currently, the biggest challenge is that hemp is not accurately recognized or defined in South Africa legislation. Marijuana is classified as a narcotic, and the law does not differentiate it from hemp. The Medicines and Related Substances Act 101 of 1965 neither includes a definition for hemp, nor recognizes its uses. It is illegal to cultivate hemp in South Africa for commercial reasons. Small quantity cultivation is allowed for research purposed if a license is obtained from the Department of Health. In 2020, the South African government declared that current legislation on the production of hemp will be amended:

"The wide scale commercial production of hemp is prohibited in terms of the Drugs Act and the Medicines Act. The Department of Agriculture, Land Reform and Rural Development has requested that the Drugs Act and the Medicines Act, be amended to provide for the commercial production of hemp in South Africa" (Cannabis for Private Purposes Bill, 2020).

The production of industrial hemp is catered for, to an extent, in legislation in 30 countries and 34 US states (Lowitt, 2020). The niche market for industrial hemp is largely attributable to hemp building material not being easily accessible. Importing material makes it more expensive, and therefore only affordable by a few.

The following stakeholders are important in advocating for, and formalizing the industry:

- Commercial farmers have experience in responding to market forces in the agricultural sector as well as the operational requirements around setting up processing plants.
- Hemp companies understand the demand for hemp products, import costs, and what drives consumer behavior.
- Research institutions, like the Council of Scientific and Industrial Research, which gather and test data, and provide training.
- Communities that will benefit from job creation.
- Building associations or consumer groups who want access to the sustainable material, and who have to be educated to increase the demand for the materials.

2.2. Access to finance

Government funding could lower the entry barrier, making it more accessible to new market entrants who could be considered high risk by traditional financial institutions. In addition, investments and subsidies for industrial hemp crop rotation from large agricultural companies could also provide the industry with the credibility boost it requires (Brownlee, 2018).

Lack of access to finance can largely be attributable to the slow progress in legalising the commercial production of hemp. In the United States, regulatory agencies issued joint guidance on the status of hemp as well as the requirements for commercial access to finance for hemp businesses. The guidance note highlights that banks no longer have to file a Suspicious Activity Report when a customer is engaged in hemp cultivation. However, banks have discretion in the products they offer these customers (Board of Governors of the Federal Reserve System, 2019).

2.3. Operational experience

Start-up production and processing costs are high, as well as ongoing maintenance and operational costs to ensure the high quality required for hemp fibre (Coogan, 2016). From a commercial perspective, consideration will have to be given to whether South Africa (already on the back foot in terms of experience and access to markets) will be able to compete with the China. Cultivation without processing will fail to promote industrial hemp beyond a niche market (Lowitt, 2020).

The intention to uplift small-scale farmers will further be challenged by commercial farmers who already have access to markets in relation to other crops. Commercial farmers are experienced in building processing and delivery capability to effectively service the market. Many of the hemp properties that make it appealing also make it difficult to process in which case manual labour is required. This may lead to decreased productivity, making small-scale farmers less competitive.

2.4. Consumer education

Consumers have different levels of education and priorities in relation to sustainability and what to look out for when choosing alternative sustainable products. These differing underlying assumptions affect their purchasing decisions. In addition, sustainable products are often believed to be of less-efficient quality when measured in the product strength category (Herédia-Colaço and Coelho do Vale, 2016). This is not the case for hempcrete, which despite being lighter than concrete, is significantly stronger with lower likelihood to crack. The construction industry as well as the end users will need to be educated on product properties, uses, and market analytics. Being a new market, there will be job creation opportunities and workers will require training to expand their skillset.

Following a case study of the first hemp house built in South Africa, Matshwi and Kajimo-Shakantu conducted a survey to understand the awareness of hemp as a building material amongst building contractors and architects (2014). The results of the survey showed that the majority of the respondents knew what hemp was, however they were not aware of the construction techniques required when using it. In addition, while the majority were not sure whether the low demand for hemp building materials were due to hemp not being locally cultivated, they believed that the government should legalize the cultivation of hemp so that it can be used as a building material (Matshwi and Kajimo-Shakantu, 2014).

3. Demand for the product and price discrimination across target markets

Currently, there is insufficient data available to accurately understand the market demand for hemp building materials in South Africa, and therefore the economic feasibility of hemp is not well understood in the South African context (Coogan, 2016).

Demand for building construction can be divided into the following categories (Pettinger, 1998):

- Derived: Demand is generated from political, social, and community demand for facilities.
- Creative: Facilities are commissioned for new development or regeneration programs to encourage economic activity.
- Progressive: Refurbishment and upgrading
- Innovative: Transform a location from one form to another, for example from rural to urban.

Hemp is increasingly being used as an alternative building material by a niche market and lobbying for the commercial production of hemp has already been done to the Western Cape Standing Committee on Human Settlements (Budden, n.d.). Following from this, the two main identifiable target markets for hemp building materials are the niche market for high-end customers and the government, specifically the Department of Human Settlements (DHS).

3.1. Primary market

The niche market is a profitable segment and should be the primary target market. Following the above classifications, demand for hemp building materials by the niche market can be classified as creative and progressive. This market segment is building new houses, renovating or upgrading existing houses. Consumers in this segment are willing to pay a premium for simple products that have ethical incentives, compared to sophisticated products (Herédia-Colaço and Coelho do Vale, 2016). However, despite consumers having a general concern for the environment, purchasing behaviour is primarily driven by self-interest. Therefore, if marketing is centred around the interests and the direct benefits to the consumer, the consumer is more likely to be motivated toward the alternative sustainable product (Herédia-Colaço and Coelho do Vale, 2016).

However, convenience, price, quality, performance, and availability are categories that are less likely to be compromised on. Therefore, at a minimum, it is necessary for alternative sustainable building materials to meet these attributes (Ginsberg and Bloom, 2004). The higher price of hemp building material can be attributed to the import costs, despite hemp having the potential to be a cost-effective building material. Studies conducted in Europe show that using hemp

to construct a wall could be up to 55% cheaper per square meter than using traditional materials (Lawrence, 2018). Even so, this target market can follow a mark-up pricing strategy, because they are willing to pay higher prices, and therefore producers can attract higher margins. This is due to the market having specific, more demanding needs to be met (Kotler *et al*., 2019). Given the lower volumes from this market segment, producers will be under less pressure and scrutiny while further developing market packages and improving cultivation practices. When setting the price, the following factors should be considered:

- Customer-perceived value: The customer wants an environmentally-friendly and durable building that is more cost-effective in the long run, while still being aesthetically desirable, placing the customer in an elite position.
- Small volume, once-off orders will be placed for new houses or renovations.

The results of industry surveys can be used to measure the demand curve (Kotler *et al*., 2019). Surveys can also provide insight on the extent to which the consumer is motivated by having a more sustainable, environmentally friendly building.

3.2. Secondary market

The secondary target market is the South African government, specifically the DHS which has a vision to have a "nation housed in sustainable human settlements" (Department of Human Settlements, n.d.). For this segment, demand is classified as derived because the government has a duty to provide housing and public facilities like schools. However, developing countries without the regulatory framework in place to promote sustainable buildings will only transform on a voluntary basis. This often leads to slower awareness of environmentally friendly building materials and the skills required to understand how to use them. South Africa signed the Paris Agreement on climate change and has included energy efficiency as an investment priority (Department: Environment, Forestry and Fisheries, 2016). Increasing the use of hemp building materials, will support the energy efficiency objective as hemp has negative greenhouse emissions.

In South Africa, Coogan explains that hemp is seen as a "savior crop", specifically in the construction industry, because using hemp building materials could prove to be more cost-effective in alleviating the backlog and achieving the DHS objectives for the provision of housing (Coogan, 2016). To date, 4.8 million housing opportunities have been created by the government in support of this vision (Department of Human Settlements, 2020). Given the volumes required to meet the demand and the time frames, the government would benefit from decreased transport costs from local hemp production, which also decreases the carbon footprint.

The DHS is likely to qualify for a discounted price due to higher volume purchases. This is called second degree price discrimination (Kotler *et al*., 2019). When negotiating the price, the following factors should be considered:

- High volume orders that will likely be split across a few producers.
- The DHS is price sensitive to an extent, because procurement policies have to complied with. South Africa is in a unique procurement position. The DHS will seek to support a Supplier Development Beneficiary in accordance with the Broad-Based Black Economic Empowerment Act. In addition, contracts entered into between parties as well as the producer will be under heightened scrutiny with governance procedures and government audits. This is due to government contracts following a tender process.

4. Conclusion

For centuries industrial hemp has proved to be a durable and environmentally friendly alternative to traditional building materials. While there has been movement in the industry, the lack of awareness, education, and access to finance are constraints restricting the demand for hemp building materials. Public policy is required to remove the constraints to the industry, which will also enable the commercial production of industrial hemp beyond research trials. As awareness increases, so too will demand for hemp building materials by the niche market. However, government demand could significantly increase market growth if hemp building materials are used to meet the housing targets set out by the DHS. Given the different requirements by the two market segments, price discrimination can be implemented.

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Cite this article as: Yonnique Goliath (2021). Hemp building materials in the South African market. *International Journal of Architecture and Planning.* 1 (1), 19-23. doi: 10.51483 / IJARP.1.1.2021.19-23.