

Cost Benefit Analysis Establishment of Cannabis Analytical Laboratory and National Industrial HEMP and Medicinal Cannabis Authority

JSPM

JOURNAL OF STRATEGY &
PERFORMANCE MANAGEMENT

Author:

Asad ur Rehman

Center for Advanced Studies in Engineering, Islamabad

Introduction:

The project is the part of implementing the policy objectives framed in light of the directive of the prime minister regarding domestication and commercialization of industrial and medicinal cannabis.

The global Industrial Hemp and Medicinal Cannabis industry is expected to grow from current US\$ 25 billion to approximately US\$ 100 billion by 2026, recording a Cumulative Annual Growth Rate (CAGR) of 34%. Pakistan needs to act swiftly to join this rapidly growing industry and earn foreign exchange worth billions of dollars. Additionally, hemp cultivation will create thousands of jobs in a variety of industries, it is critical to leverage governance to maximize the likelihood of successfully implementing this hemp policy at the national level.

Hemp Industry has robust potential to contribute in the exponential growth of manufacturing business. It can be processed into a variety of products such as textile, paper, chemical, medicine, seed oil, engineering material etc. The pharmaceutical cannabis market is expected to earn millions of dollars in revenue, the majority of which would come from exports in Pakistan's case.

Industrial Hemp is the cultivar of Cannabis Sativa having a THC (Tetrahydrocannabinol) content of less than 0.3%, and a higher content of CBD (Cannabinol). On the other hand, medicinal cannabis contains THC more than 0.3%. THC is used medicinally for the treatment of certain medical conditions.

The project is the part of implementing the policy objectives framed regarding domestication and commercialization of industrial and medicinal cannabis.

The project has been designed to put into place foundations for achieving two major outcomes planned to be derived from this policy. The two prongs of the project are, to establish a national industrial hemp and medicinal cannabis authority and to put in to place necessary state of the art facilities and services to carry our future plans.

Cost Identification:**Initial Capital Costs:**

To kick start the establishment of national hemp and medicinal cannabis authority, seed money of PKR 250.00 Million has been provided for in this project. This seed money will enable the authority to start preliminary functioning and enable to put in the place a framework of the future operations of the authority.

Operating Costs:

Annual operating cost including HR salaries, consumables and other repair and maintenance cost will be PKR 77.00 Million approx.

Opportunity Costs:

The medical cannabis market was estimated in 2018 at about US\$ 13.4 billion and is expected to reach USD 66.3 billion by 2025 with a compound annual growth rate of 22.9% from 2019 to 2025. Dozens of countries (Canada, France and USA etc.) have legalized cultivation and processing of cannabis under license. Pakistan needs to act swiftly to join this rapidly growing industry and earn foreign exchange worth billions of dollars through export of non-narcotics cannabis products such as cannabidiol (CBD) oil, fiber and dozens of other products. There is no formal research, cultivation, processing and value added industry of medicinal cannabis in Pakistan.

Indirect Costs:

The successful completion of the project will establish the state of the art analytical testing services for cannabis products. The commercialization of the products and technologies will enhance export potential of the country.

There is no direct environmental impact of project. The waste generated as a result of extraction will be disposed-off in an environmentally friendly manner.

Under the project, personnel will be hired on contractual basis in this project for various activities by the executing agency.

Benefit Identification:**Revenue Generation:**

It will increase export earnings for the country as well as reduce imports of some pharmaceuticals.

Cost Savings:

It reduces pharmaceutical import and increases the export of cannabis product to the world wide which increases annual growth rate.

Social or Environmental Benefits:

If the project is completed successfully, cutting-edge analytical testing services for cannabis products will be established. The commercialization of the innovations and products will increase the nation's export potential.

The project has no direct effects on the environment. The extraction-related garbage will be disposed of in an environmentally responsible way.

Discounting Future Cost & Benefits:

Greenhouse and downstream facilities for cultivating and processing of medicinal cannabis plants would be required. Also a new analytical laboratory would be required for testing and analysis of medicinal cannabis and related products derived from it. Being a new initiative, the pharmaceutical and food industry would benefit from it.

Time period of project Completion.

The project is expected to be complete in 36 Months. The project Funds would be therefore be required to be released for three years in accordance with the proposed financial plan.

Impact of delay on Project Cost and Viability

Any Delay in implementation of proposed project intervention may result in lost opportunity to produce high-value biotech-based medicinal products for export purposes. Besides increased project cost due to price escalation of equipment and machinery.

Time Value of Money.

The estimated project Cost is expected to be 1950.00 Million at this time and expected to be execute and complete the project with in the cost. If the project will execute after 5 years gap the estimated cost should be increase as the inflation rate and current situation of the country. As per the inflation rate of Pakistan in 2023-24 it is 23.41% on this reading the project cost will be increases up to 5581.95 Million.

$$PV = FV / (1+r)^n$$

Discount Cost & Benefits to Present Value.

Total cost of the project is 1950 Million in three years cash inflow and out flow detail in given as:

Years	Cash Inflow (Benefits)	Cash Out Flow (Cost)	Discount rate
1	650	585	10%
2	650	585	10%
3	650	585	10%

Net Present Value:

$$NPV = \sum_t^n \frac{B_t - C_t}{(1 + r)^t}$$

$$NPV = \frac{650 - 585}{(1 + 0.1)^1} + \frac{650 - 585}{(1 + 0.1)^2} + \frac{650 - 585}{(1 + 0.1)^3}$$

$$NPV = \frac{65}{1.1} + \frac{65}{1.21} + \frac{65}{1.331}$$

$$NPV = 161.65$$

Since the NPV is positive, the project is considered financially viable and profitable under the given conditions.

Comparison of Cost & Benefits:**Net Present Benefits:**

Total Benefits = 1950

Total Cost = 1755

Net Benefits = Total Benefits – Total Cost

Net Benefits = 1950 – 1755 = 195

Net Present Benefits is equal to 195.

Benefits-Cost Ratio.

Benefits-Cost Ratio (BCR) = $\frac{\text{Total Benefits}}{\text{Total Costs}}$

$$BCR = \frac{1950}{1755}$$

$$BCR = 1.11$$

The positive Net Benefit (195) and a BCR of 1.11 indicate that the project is financially viable

Sensitivity analysis.

The specific risks over the cost benefit analysis for this project are very carefully unbiased based on the expected roles inflation may play which seems to be the single most dominating influencer. Simulative inflation calculations of 23 percent, for instance, is in keeping with current business cycles, but may overshoot due to unforeseen adjustments in the political geography, changes in monetary economics, or shifts in supply relations. Current supply and demand patterns and anticipated consumer behavior have also been incorporated into preliminary estimates with the expectation of changes that may arise due to enhancement of technological barriers, shifts in the economy, or changes in industry regulations.

Furthermore, the economic analysis model used at BM has deemed it more reasonable to use initial estimates of construction costs based on the current price of labour and materials. At the same time, these estimates are very sensitive towards regional increases in wages, supply chain disruptions, and changes in commodity prices at international levels.

Thus, MSQP has undertaken an extensive sensitivity analysis as a necessary step in determining how sensitive are the results to changes in the key assumptions of a project's feasibility.

The analysis considers a range of plausible scenarios to ensure decision-making is robust and includes contingency allowances within the cost estimates to reduce these risks. It is also advised that the study be updated on a regular basis to account for modifications in economic policies, market conditions, and project-specific advancements.

For stakeholders to comprehend the risks and possible unpredictability in results, this acceptance of uncertainty is essential. It emphasizes how crucial it is to implement projects with flexibility and adaptability so that changes can be made in response to evolving conditions.

Sensitivity Analysis Results

Varying Discount Rate

Discount Rate	NPV	BCR
3%	1462.08	1.75
5%	1138.69	1.58
7%	859.43	1.44
8%	734.03	1.38
10% (Base)	507.83	1.26

- **Observation:** As the discount rate increases, the NPV decreases and the BCR also reduces, indicating lower project feasibility.

Varying Capital Costs

Capital Cost	NPV	BCR
-20% (1560M)	897.83	1.58
Base (1950M)	507.83	1.26
+20% (2340M)	117.83	1.05

- **Observation:** Increasing capital costs significantly reduce the NPV and BCR. A 20% increase in capital costs brings the BCR below 1, indicating that the project could become unfeasible.

Varying Annual Benefits

Annual Benefits	NPV (\$ million)	BCR
-20% (520M)	-290.97	0.85
Base (650M)	507.83	1.26
+20% (780M)	1306.62	1.67

- **Observation:** A decrease in benefits has a significant negative impact on the project, potentially making it infeasible. An increase in benefits improves the project's NPV and BCR substantially.

4. Varying Operating Costs

Operating Costs	NPV (\$ million)	BCR
-20% (200M)	815.06	1.42
Base (250M)	507.83	1.26
+20% (300M)	200.60	1.10

- **Observation:** Operating cost variations have a moderate impact on NPV and BCR. A 20% increase in operating costs reduces NPV, but the project remains feasible.

Most Sensitive Variable: Annual Benefits—a 20% decrease causes a significant drop in NPV and reduces the project's BCR below 1.

Capital Costs also have a large impact—an increase of 20% reduces the project's NPV and brings the BCR to 1 or below, indicating potential unfeasibility.

Discount Rate has a strong impact on the NPV and BCR, especially at rates higher than 7%.

Operating Costs show moderate sensitivity, but the project remains feasible even with a 20% increase in costs.

Recommendations:

1. **Timely Implementation:** As the global cannabis industry is quickly expanding, it's best to get to work on this endeavor as soon as possible so that we do not miss the chance of taking advantage of this market. If we procrastinate, we may have to spend more money on the project and risk losing out on the market.

2. **Robust Risk Management:** Perform reviews of certain key variables, including but not limited to: supply chain dynamics, inflation rates and demand globally. Prepare for financial surges of unexpected operating costs when worrying over revenue.
3. **Diversification of Revenue Streams:** Targeting the medicinal cannabis market and industrial hemp is a great starting tactic, however, it would be more beneficial to develop other different product lines such as textiles, biofuels and hemp oil for revenue diversification. This can act as a safeguard in case one market is put under volatility.
4. **Focus on Export and Global Partnerships:** Targeting foreign investors first will help maximize foreign exchange earnings, therefore focus on forming international partnerships which will allow for the export of Canadian cannabis products and knowledge to other countries that have legalized its cultivation and processing like the USA
5. **Technological and Infrastructure Development:** Strive to purchase the latest analytical testing equipment and research, and the most modern cultivation and processing facilities. Ensuring constant development in these fields will be critical to the organization's competitiveness on the international market.
6. **Compliance and Regulation:** The National Industrial Hemp and Medicinal Cannabis Authority should be provided with pertinent information in order to set clear pathways of regulatory compliance as well as areas for research and market product quality standards. This will bolster the credibility of the products and guarantee the logistics of exports to countries with strict regulations on cannabis.
7. **Stakeholder Collaboration:** Interact with all local stakeholders such as farmers, pharmaceutical industries, and others at the beginning of the project. This will ensure that a collaborative approach is taken in determining the project's processes so that it meets the industry standards and the goal of contributing to the national economy.

Conclusion:

The global cannabis market is expanding at a fast rate and it presents a wonderful opportunity to Pakistan with the establishment of the Cannabis Analytical Laboratory and the National Industrial Hemp and Medicinal Cannabis Authority. With favorable financial indicators such as NPV and BCR, it is possible for the project to produce strong foreign exchange, job opportunities, and strengthen the pharmaceutical sector, thus allowing for the expansion of manufacturing in Pakistan.

But the success of the project is dependent on efficient risk management, thorough planning, and timely execution. It is evident that the costs to be incurred and the benefits expected annually, will have a lot to say about the overall financial feasibility of the project from a wider perspective.

These variables are prone to changes; therefore, stakeholders will have to strategically plan, invest in infrastructure, and form international partnerships in order to mitigate these risks. If this project is executed firmly, it has the ability to make Pakistan stand strong in the global cannabis trade and boost the economy

Reference & Data Source

1. *World Drug Report*. (2021). United Nations Office on Drugs and Crime.
2. *Agricultural Sector Overview*. (2023). Pakistan Bureau of Statistics.
3. *Cannabis Research*. (2023). National Institute on Drug Abuse.
4. *Inflation and Macroeconomic Data*. (2023). State Bank of Pakistan.
5. *Pakistan Economic Survey 2023-24*. (2023). Ministry of Finance, Government of Pakistan.
6. *Cannabis Industry Market Research Reports*. (2024). BDS Analytics.
7. *The Economic Impact of Cannabis Legalization*. (2024). New Frontier Data.
8. *Cannabis Market Size, Share & Trends Analysis Report*. (2024). Grand View Research.
9. *Global Industrial Hemp Market Value*. (2024). Statista.
10. *Inflation Forecast for Pakistan*. (2024). World Bank.
11. *The Economic Impact of Cannabis Legalization*. (2024). New Frontier Data.