

BUSINESS PLAN FOR IMPROVING SOIL USING FLY ASH FOR CONSTRUCTION ACTIVITIES

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ABSTRACT

Sri Lanka has invested in large-scale infrastructure developments to meet the social demand in the country. Soil is the major raw material of aforesaid infrastructure developments. Hence, the demand for suitable soil is high due to these project requirements. The unavailability of suitable soils is considered as a burning issue for the construction projects. Hence, improving unsuitable soils with fly ash is an innovative solution for the construction industry. This paper will introduce a business plan for improving the unsuitable soils using fly ash mixing plants. Hence, high-quality soil product can be provided to target customers. This business plan gives the opportunity for the first mover to enter and acquire the entire market. The company can supply high quality soils to internal project usage and to retailers, by acting as a wholesaler. The business plan aims to add value to meet the demand for high quality soil products and strategically earn profits. This innovative soil product would be attracted by the stakeholders and company shall approach to meet the stakeholder's requirements by taking the competitive advantages. The success of the business will give two additional benefits, i.e., easy construction process and completing the project within the time frame. Further, the study discusses the target area relevant to the business such as business description, strategic goals, management and organization, product and services, market and competition, marketing, sales and finance.

Key words: Fly ash, Soil improvement, Business plan

1. Introduction

Sri Lanka is ambitiously pursuing many large-scale infrastructure developments more than any country in South Asia. Soil is the main raw material which is used in infrastructure development projects. Hence, Soil is a primary engineering material for road construction and maintenance (Biggs & Mahony, 2004). Most of these projects could not find suitable soil near their construction areas. Hence, contractors shall move to the alternative construction methods to fulfill the demand of suitable soil. Therefore, contractors would have to move, in order to deliver the suitable soil, as per the relevant the ICTAD 2009 by transporting for long distances. It is an additional cost for the particular project. On the other hand, soil stabilization methods can be used for improving the soil parameters. However,

Mechanical stabilization is a costly method. Therefore, the idea is to improve soil parameters by using chemical soil stabilization method. Materials such as Cement, Lime, bitumen, and calcium chloride can be used for soil stabilization, which is costly. Hence, an innovative solution shall be required for the soil improvement. Fly ash is suitable industrial waste for testing the soil improvements. Fly ash is available in the Norechhole coal power plant where it produces 75000 Mt per year. The fly ash is stocked in the surrounding area of the plant, which leads to significant environmental issues to communities living in the area. Therefore, this industrial waste can be used for the improvement of unsuitable soil. It is identified as improving the soil strength more than 4 times by considering all geotechnical areas. The basic research model is to improve the soil up to a commercial level by producing suitable soil by mixing unsuitable soil and the fly ash in relevant proportions. This paper proposes a business plan that could be implemented for improving unsuitable soil up to usage level in construction industry and commercialize the soil product in the construction market, at a cost beneficial to the customers.

2. Literature Review

Wirtz (2011) recommended that a business plan is created as the reflection of the business model and the aims to explain the key elements of the business in a structured way with detailed manner. This statement expresses the introduction of the business model is being in the beginning of a business plan.

Schwetje & Vaseghi (2007) reported that the educational and professional background supports to build a profile for each employee. Prominences should be put on the factors that are beneficial for the company. For creating a more individual profile of each worker, their names, age and marital status may be added.

Schwetje & Vaseghi 2007 discusses that the unique selling propositions, the products and services concepts are expressed throughout. Possible product portfolio and future product plan are represented here as well. Then, market growth can be affected by patterns from different fields such as economical, technological, social, or environmental. Revenue and sales volume should be quantified within different market segments.

The marketing strategy measures the market objectives for coming years such as targeted market share, product portfolio, pricing policies and marketing promotion and advertising costs. Sales strategy explains how the customers will be attracted, how frequently, who are the key customers, how the customer relationships will be handled and retained, etc.

3 Methodology

The research is to improve soil as an innovative solution for coming issue in Sri Lankan construction industry. Here, the mega construction project of Matara

Kataragama expressway extension has been selected for implementing to the business plan. The plant is expected to establish at Thissamaharama. The data were collected by interviewing the professional engineers as relevant to the construction industry. By analyzing the collected data, the issue is identified as could not find the suitable soil in construction area and requirement of soil mixing plant. The structure and content for the study is included from various sources, and it is combined in the theory section. SWOT analysis and a business model canvas were generated to produce a clear vision of the company's situation.

4 Analysis and Discussion

4.1 Business introduction

The KDA Weerasinghe CO; (PVT) ltd is a leading construction company in Sri Lanka and carrying out many mega construction projects an island wide. They have seriously faced the issue of not being able to find suitable soil in construction area and searched for delivering suitable soil, but; quantity is not meet the demand of project requirement. Hence, KDAW expects an alternative method for the issue. Hence, the research will be supported to establish a soil improvement plant as based in mega construction projects. KDAW will be a wholesaler of supplying soil product on the Sri Lankan market. The primary focus of the business will be to sell products to the public and private sector construction companies.

As Sri Lanka is a country with a substantial amount of construction industries, there is a high potential for the sales of improved soil.

4.1.1 Business model CANVAS

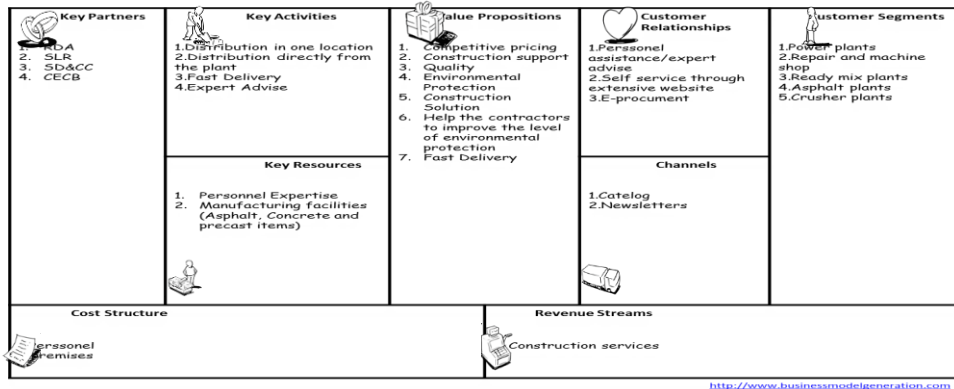


Figure 1: KDAW Business model Canvas

4.1.2 SWOT Analysis

Strength

- Registered Construction Company in Sri Lanka
- 30 years road construction experiences
- Experience of handling ready-mix plants

- Government support for soil improvement process
- Financial stability of the company

Weaknesses

- Unknown soil product to Sri Lankan market
- Initial Investment is high

Opportunities

- Unavailability of suitable soil in the Sri Lanka
- No others move for soil improvements
- Movement for Public and private sector
- Strong advertising procedure shall be implemented for achieving the sales targets

Threats

- Competitors can move than first mover
- Maintaining the compaction of suitable soil with closed supervision
- Client disagreement for the new soil improvement procedure

Based on the SWOT analysis, the strength and the opportunities outweigh the weaknesses and threats and therefore the business idea seems viable.

4.1.3 Customer

The customers will mainly consist of public and private sector construction companies. The customer base will consist of road, railway, expressway and earth filling companies.

The majority of the customers do not have a contract with their supplier for environmental protection. Key accounts usually have frame contracts which essentially are price agreements. Some of the companies have contracts that basically outsource the entire soil operations to a sub-contractor. The way to be able to sell to companies is to sell to customers by supplying the sub-contracting companies with improved soil product.

The reason the customers would switch their current supplier to KDAW are a combination of the following key elements: selection of product (Various strength of soil products), product support, price and delivery time.

4.1.4 Customer Segment

The customer segment is identified as supported to the business and buy the product mainly for their construction activities.

Table 1. Identification of Customer segment

Customer segment	Examples
Clients of road/railway projects	RDA,SLR,CECB,SD&CC
Construction companies	CATIC ENG, CMC, AVIC
Resellers	
Sub-contractors	MAGA,ICC,NAWALOKA,NEM

4.1.5 Product and Services

KDAW develops and manufactures soil products for fulfilling their own soil requirement, operational environmental protection and customer demand. Modern production facilities in Sri Lanka shall be high quality.

The customers of KDAW can be sure that they meet all the regulations and standards. KDAW can advise, plan and manufacture in accordance with country specific legal regulations. In the national marketplace, environmental protection and legal requirements go hand in hand.

KDAW are able to look at the customer's actual situation when analyzing their needs. The cost-efficient solution will have been found from the natural low strength soil.

4.1.6 Market and competition

The market segment to be served by KDAW is a special niche market, within the geographic segmentation of Sri Lanka, driven by the demand of the infrastructure development drive by the governments. The proposed engagement is a business-to-business (B2B) service providing function.

Target market is limited and the product characteristics are closely controlled and by the government regulatory body RDA. KDAW will be mainly serving as a supplier of the road and railway construction companies value chains.

The segment size is approximately Rs. 20 Billion annually and displays an immense potential to a disruptive alternative for market penetration. Annual growth is estimated at an impressive 9%. At present market is served by individual soil suppliers on subcontracting basis. KDAW shall position the product as a low cost and high quality alternative. The perception strategy shall be as given in Figure 2.

4.2 Competitive Advantages

KDAW has a very good competitive advantage by pioneering in to this new industry segment in Sri Lanka as an early mover. Although there is a risk associated in introducing a completely new product, an early market entry generally leads to have a high market share, longer survival and to become the market leader in the product category.

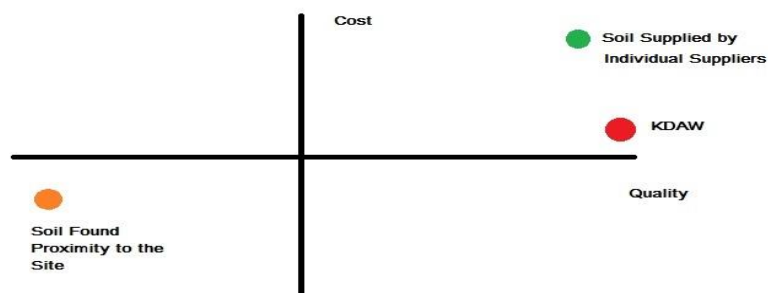


Figure 2. Perception Strategy

On the other hand, improvement of soil is a destructive technology which replaces soil hauling from long distance locations, drastically reducing the costs incurred for logistics.

4.3 Cash-flow forecasting

Initial investment and the operational cost of the plant for a period of 36 months is forecasted below.

Table 2. Cash flow forecasting for operation of plant

No	Subject	Unit	Rate	Quantity	Total
1	Cost for plant	Item			13,300,000.00
2	Land (Rent)	Per month	50000	36	1,800,000.00
3	Electricity	Item			785,000.00
4	Water	Item			75,000.00
5	For machines	Per month	65000	36	2,340,000.00
6	Electricity bill for monthly	Per month	125000	36	4,500,000.00
7	Water bill for monthly	Per month	75000	36	2,700,000.00
8	Maintanace	Per month	50000	36	1,800,000.00
9	For soil	m ³	1440.87	300000000	432,261,000,000.00
					432,288,300,000.00

5 Conclusion

The objective of this study was to build a business plan for KDAW to set-up a soil improving plant in Thissamaharamaya. The products and services of KDAW would be aimed mainly at public and private sector companies that handle and sell the improved soil. The Road construction industry segment, which is the main target segment in the beginning. In addition, with legislation, quality standards and RDA demanding more of a focus on environmental protection and low-cost, high-quality product to the customers, opening a plant in Thissamaharamaya would be a viable option both in the short and long term.

From a SWOT point of view, the key opportunities (high level of market knowledge, contacts, employee motivation) and strengths outweigh the threats and

weaknesses thus enforcing this argument. KDAW employees will have a good mix of sales and marketing expertise, market knowledge and contacts as well as motivation to successfully implement the business plan.

Competitive pricing, product support and fast delivery times, which are enabled by in-house production and product support, streamlined logistics and the largest product portfolio on the market, will ensure that KDAW would be a very competitive company.

The study has provided essential tools, information and methods for KDAW to be successful on the construction industry market. In result, the authors' findings lead them to believe that by executing this plan, KDAW has the opportunity to take a substantial part of the market share while providing a relatively quick return on investment timeframe.

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