

MASTER

Shell PET-fix project : the designing of a venture :

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Shell PET-fix project:

The designing of a venture

Guido Pans, May 2002

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The abstract and management summary in this paper are belonging to the report "Shell PET-fix project: The designing of a venture" that has been categorized confidential at the moment of writing (May 2002). To obtain a full copy of the report please contact the author or the Shell CTEOD/2 department. Contact information is included on the last page of this paper.

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Abstract

The objective of this research project is to design a venture for the production of PET-fix products* in Mexico. This paper reports product development, market study, production process development, production facility design and the impact of external factors on the venture design. It concludes with a financial evaluation of the design and the identification of the factors that have a major impact on the feasibility of the project.

* PET-fix products are composition building products in which Poly-Ethylene-Terephthalate (PET) serves as the binding component ("fixates" all components)

Management summary*

The research project that this paper is reporting about is part of the larger Shell PET-fix project. In the Shell PET-fix project, the possibilities to contribute to a solution of the PET waste problem at the end of the Mexican PET value chain by setting up a new business for the application of waste PET as a binding material in composite building products are investigated. The part of the PET-fix project that this paper deals with is the design of a small-scale venture for the production of PET-fix products in Mexico. The objective of this venture is to prove that it is technically and economically feasible to set up a business for PET-fix products so that in a later phase of the PET-fix project the business can be expanded to increase the impact on the PET waste problem (chapter 1). For this research the following objective has been defined:

“Develop a design for a commercial venture for the production of PET-fix products in Mexico that will serve as a mean of communication for future stakeholders and developers. Include an analysis of expected performance of the venture.” (Chapter 2)

The venture design is split up into five elements. For each of these elements, the research approach and the most important results are discussed below:

Product and market (chapter 3): The research starts with investigating the market for PET-fix products in Mexico. Based on a market characteristics study, the PET-fix product properties and information from a number of competitor products, PET-fix market positioning takes place. The conclusion is that the market for PET-fix products in Mexico looks promising, although some market entrance complications have to be taken into account. Further, expected sales volume and price are determined.

Process design (chapter 4): The process design starts with defining a process model by using information from PET-fix production laboratory tests and modeling theory. Based on the process model, processing theory and a large number of interviews with industry experts, different technologies and types of equipment for production of PET-fix are compared. The result is the choice for a number of preferred technologies and equipment suppliers, including detailed information on this equipment and process control knowledge.

Production facility design (chapter 5): The production facility design is developed based on the results from the process design, a theoretical framework and information from a number of potential suppliers of (parts of) the facility. The results are a visualization of the facility layout and detailed estimation of the needed investments.

External factors (chapter 6): The external factors that play a role when setting up a venture are analyzed by studying theory and the practical information that is available. The results are the development of raw materials supply strategies, an analysis of future distribution networks and the introduction of a theoretical framework to determine the optimal production location.

Financial analyses (chapter 7): The financial performance of the future venture is calculated based on financial theory, the combined results from chapter 3 to 6, the modeling technique of the spreadsheet program Capelite and competitor products cost price information. The results are the performance of the venture on traditional financial indicators, the identification of the most important sensitivities on those indicators, a competitor cost price comparison and an advice on how to integrate the “intangible” benefits of solving the PET waste problem into the financial performance analyses.

* Due to the confidential nature of the report, in this (public) management summary only qualitative research results are mentioned

The main conclusion that is drawn based on the results in this report is that enough research has been performed to conclude that setting up a PET-fix venture in Mexico is feasible and will be highly profitable. The PET-fix product offers many opportunities and can be produced for a relatively low price. As a result of the limited availability of business information from Mexico, some uncertainties that can have a high impact on the feasibility of a PET-fix venture exist about the Mexican market for PET-fix products and the future product distribution network. When taking this into account by calculating higher risk into the financial evaluation, a PET-fix venture is still expected to have a high performance. The attractiveness of the project even increases when taking into account the intangible benefit that it potentially contributes to a solution for the PET waste problem in Mexico. (Chapter 8)

Referring to the objective of setting up a small scale venture as a first step to a larger venture that can have a considerable impact on the PET waste problem in Mexico three conclusions can be drawn: First, to have a considerable impact on the PET waste problem, the size of the venture as presented in this report will have to be multiplied several times. Second, no technical barriers have been identified that can pose limitations to this growth. Finally, from a commercial point of view, to keep the impact on the future markets for PET-fix products relatively low, other markets than the wall cladding market will have to be explored.

Finally a number of recommendations for the remainder of the PET-fix project are given (chapter 8). These recommendations are summarized below:

- Develop more knowledge about the Mexican market for PET-fix building products by contacting local experts or by finding a partner in the Mexican building industry, as the inaccuracy of the market information is the main sensitivity on the expected financial results. Start with developing a marketing strategy and plan, so that the size and impact of the marketing expenses can be estimated in greater detail.
- For the mixing and forming part of the production facility, focus on the three identified most-promising equipment solutions (custom-made extrusion, asphalt mixing and shell sand coating) and execute the additional research needed to make a final choice for these technologies as this fundamental choice is the last major uncertainty on the process design.
- Now the process design is almost finished, start with investigating process control issues in further detail. Especially the development of KPI's, the investigating of reliability issues in the production and the optimizing of the stock management deserve further research.
- Define the (elements of the) facility layout in further detail when new and more detailed information comes available. The approach from Konz that is used in this report as well as tools from e.g. Sule, Meyers and Stephens can be helpful in the further development of the facility layout.
- Now the contours of the facility start to become visible, it will be increasingly important to broaden the design focus from a process oriented approach to an approach that covers important aspects as e.g. ergonomics, organizational structure and staff strategy in more detail.
- Develop more knowledge on securing the supply of raw materials, the design of a distribution network and the determining of the production location. It is highly advisable to contact local experts to obtain more and more accurate Mexican local business information.
- Try to involve other parties with interests in the PET business in Mexico to increase the chance of success of the project. Investigate the possibilities to value the – up till now – intangible added value of the PET-fix project for the involved parties in the PET industry. It is advisable to contact external experts e.g. for the application of real option pricing theory to quantify this extra value, as this can be a crucial point in convincing future investors.

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