UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

STUDY OF THE SOUTH AFRICAN NANOTECHNOLOGY SYSTEM

DERRICK LOUIS VAN DER MERWE

99159032

A research project submitted in partial fulfilment of the requirements for the degree of

MASTER OF TECHNOLOGY MANAGEMENT

in the

FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

UNIVERSITY OF PRETORIA

October 2004

© University of Pretoria

The financial assistance of the Department of Labour (DoL) towards this research is hereby acknowledged. Opinions expressed and conclusions arrived at, are those of the author and are not necessarily to be attributed to the DoL

PROJECT REPORT SUMMARY

STUDY OF THE SOUTH AFRICAN NANOTECHNOLOGY SYSTEM

DERRICK LOUIS VAN DER MERWE

99159032

Supervisor : Prof. A.J. Buys

Department : Department of Engineering and Technology Management
UNIVERSITY OF PRETORIA

Degree : MEng (Technology Management)

Abstract

The study of the nanotechnology system in South Africa is an analysis of the South African nanotechnology innovation system, with a discussion of background information regarding nanotechnology awareness, involvement, funding, personnel, education, networking and equipment, and illustration of the level of nanotechnology activities for each product life cycle and per institution. The document contains a classification of nanotechnology industries regarding time to market, market potential, disruptiveness and complexity, identifies innovation hampers for the South African nanotechnology community and ranks nanotechnology national and international nanotechnology buyers, suppliers, competitors and relationships. Lastly, innovative strategies are formulated from information gathered on internal South African nanotechnology strengths and weaknesses, and external nanotechnology opportunities and threats.

Acknowledgements

The author of the research project was fortunate enough to meet Mr. Manfred Scriba, the convenor and project coordinator of the South African Nanotechnology Initiative (SANi). Without him, the research project would not have been a success. Mr. Manfred Scriba is an invaluable asset to any South African nanotechnology-related study. He possesses a great deal of knowledge regarding the South African nanotechnology national system of innovation, technical knowledge on a number of nanotechnology fields and collaborations with many of the South African nanotechnology community members. In January 2004, the research project author and the author of the CSIR baseline questionnaire, Mr. Manfred Scriba, reached an agreement regarding the bidirectional usage of data gathered, analysed and discussed in both studies.

The author especially would like to thank all the South African nanotechnology participants who took part in the research project and CSIR baseline studies for their time and effort. The research project is a huge success because of them, in supplementing the current South African nanotechnology strategy, providing new information on, new perspectives of and strategies for the South African nanotechnology community regarding future nanotechnology industries, innovation hampers and nanotechnology actors.

The author is grateful for all the research guidance from Prof. A.J. Buys and Prof. M.W. Pretorius, who inspired the bold research project on the South African nanotechnology system of innovation, and Prof. L.A.G Oerlemans for helping in the statistical analysis. Finally yet importantly, the author would like to thank his family, girlfriend and friends for supporting him through long hours in front of the laptop, amongst other things supplying him with a lot of biltong and coffee…

"All of the information which all of mankind has ever recorded in books can be carried in a pamphlet in your hand–and not written in code, but a simple reproduction of the original pictures, engravings and everything else on a small scale without loss of resolution."

Richard Feynman 1959, the father of nanotechnology.

Abstract

The study of the nanotechnology system in South Africa is an analysis of the South African nanotechnology innovation system, with a discussion of background information regarding nanotechnology awareness, involvement, funding, personnel, education, networking and equipment, and illustration of the level of nanotechnology activities for each product life cycle and per institution. The document contains a classification of nanotechnology industries regarding time to market, market potential, disruptiveness and complexity, identifies innovation hampers for the South African nanotechnology community and ranks nanotechnology national and international nanotechnology buyers, suppliers, competitors and relationships. Lastly, innovative strategies are formulated from information gathered on internal South African nanotechnology strengths and weaknesses, and external nanotechnology opportunities and threats.

"Nature already operates at a nano scale level and, by being able to operate ourselves at that level, we will get a greater understanding of the things that nature can do."

Dr. Peter Doyle, Unilever

Table of contents

List of figures

List of tables