THE FACTORS INFLUENCING NANOTECHNOLOGY STRATEGY IN MALAYSIAN INDUSTRIES

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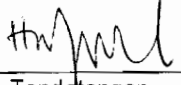
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ABSTRAK

Pelaburan di dalam Penyelidikan dan Pembangunan (R&D) nanoteknologi di serata dunia melalui organisasi berkaitan semakin meningkat. Sekurang-kurangnya, sebanyak 30 buah Negara di peringkat permulaan ataupun sudah mempunyai inisiasi peringkat nasional dalam bidang nanoteknologi. Sektor industry yakin nanoteknologi pasti akan memberikan kelebihan dalam bidang persaingan. Dianggarkan dari 10 hingga ke 15 tahun akan datang, perusahaan industry akan meningkat melebihi $ 1 trilion dan memerlukan sebanyak 2 million pekerja dalam bidang nanoteknologi. Semenjak ledakan nanteknologi, Malaysia telah melancarkan 'Malaysian Nanotechnology Initiatives' yang mempunyai misi seperti berkaitan: nanoteknologi dalam memastikan kemapanan pembangunan nasional dalam bidang sains, teknologi, industry dan ekonomi. Untuk itu, usaha untuk meluaskan lagi nanoteknologi di Malaysia, kajian ini adalah untuk bertujuan untuk mengenalpasti keadaan semasa pembangunan nanoteknologi dan faktor sokongan mekanisma infrastruktur yang terdapat di Malaysia. Terdapat 7 kunci utama dalam menentukan Strategi Malaysia melalui tempoh masa panjang dan pendek. faktor itu adalah pengaruh luar, sumber manusia, isu teknikal, isu dalaman, usahasama teknologi, pengetahuan dan budaya. Hasil kajian juga menunjukkan infrastruktur dan kemudahan utama dalam bidang nanoteknologi adalah tidak cukup untuk memulakan aktiviti nanoteknologi di Malaysia. Hanya 59.5% makmal nanoteknologi, 16.75% alatan nanoteknologi dan pusat kecermerlangan nanoteknologi adalah sebanyak 9.5%. Didalam jangka masa pendek, faktor yang memberikan .nilai paling signifikan adalah usahasama teknologi (73.6%), diikuti dengan isu dalaman (64.4%), pengetahuan (61.5%), sumber manusia (28.9%), pengaruh luar (27.8%), isu teknikal (22.6%) dan budaya (11.6%). Hasil kajian dalam tempoh jangka masa panjang pula memberikan keputusan berikut; pengetahuan (52.1%), usahasama teknologi (46.7%), pengaruh luar (41.8%), sumber manusia (30.5%)

ABSTRACT

The worldwide nanotechnology research and development (R&D) investment reported by organizations has increased. At least 30 countries have initiated, or are beginning national activities in this field. Industry has gained confidence that nanotechnology will bring competitive advantage. The worldwide annual industrial production is estimated to exceed $1 trillion in 10-15 years from now, which would require about 2 million nanotechnology workers. Since the emergence of this new technology, Malaysia has succeeded in officially launching the Malaysian Nanotechnology Initiatives with the mission: nanotechnology for sustainable national development of science, technology, industry and economy. To further engage in nanotechnology, this research aims to identify the current state of nanotechnology development and the current support mechanism availability in Malaysia. There are 7 key factors in determining the Malaysian Strategy in both short-term and long-term periods in this field. These are external forces, human resource, technical issues, internal issues, technology partnership, knowledge and culture. The findings in this research revealed that the infrastructure and central facilities for nanotechnology is not adequate for the technology to thrive in. There are 59.5% dedicated laboratories, specialized equipment only 16.75% with nanotechnology center of excellent only 9.5%. The most significant variables that shows strongest relationship in short-term strategy is technology partnership (73.6%), followed by internal issue (64.4%), knowledge (61.5%), human resource (28.9%), external forces (27.8%), technical issue (22.6%) and finally culture (11.6%). The result on long-term strategy shows that Technology partnership (46.7%), Knowledge (52.1%), external forces (41.8%), human resource (30.5%), technology partnership (27.1%), internal issue (26.1%) and culture (6.1%). The multiple regression result on both short-term and long-term strategy shows that technology partnership shows a significant strong relationship with 73.5%, followed by internal issue (55.3%) and knowledge (55.3%), external forces 39.7%, human resource (35.2%), technology partnership (29.2%) and culture (10.9%). Since this research is

iv

more comprehensive in terms of identifying all the key factors for managing nanotechnology in Malaysian industries, hopefully the findings will benefits all stakeholders and for future direction in this technology.

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TABLE OF CONTENTS

TITLE	PAGE

CHAPTER 3: RESEARCH METHODOLOGY

CHAPTER FOUR: RESEARCH FINDINGS

LIST OF TABLES

CHAPTER ONE

BACKGROUND OF THE STUDY

1.0 Introduction

Technology in many countries like developing countries needs a good management in order to develop a sustainable competitive advantage. The effective management of technology, which examining the benefits and challenges will ensure a successful implementation of any attempts related to know-how in business organization. Kearns, Taylor and Hulls (2005) have identified important elements for consideration in technology management are: a) technology evaluation; b) integration; c) planning; d) implementation; e) training; and f) change. First, technology evaluation involves technology selection, as well as implementation and post-implementation evaluation. In order to ensure the effectiveness of new technology, continuous improvement is a must in this. Planning deals with incorporating the necessary personnel and resources into a sound project plan. Implementation stage is crucial for the plans to be fulfilled and observed all the changes. Next, proper training are very important to ensure all the planned implementation function effectively. Finally, making changes in achieving organizational fitness, as this is the core competency in terms of competitive strategies.

Thus in line with Putranto, Steward, Moore and Diatmoko (2003) which concurred on integrating and technologies strategies are useful for young industries in developing countries. Technology strategy as described by Zahra and Bogner (2000) as a decision to choose between developing technical capabilities internally

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