EFFECTIVENESS OF EXTERNAL TECHNOLOGY TRANSFER TO CEPP, UTM

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Dedicated to my beloved father, mother, friends, lecturers, and relatives

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ABSTRACT

External technology transfer becomes more important as the increase of interdependent of the world due to globalization. Therefore linkage between research centre and industry is critical for both institutes to survival in this competitive landscape. The industry required advance technology to compete in global market while the research centre needs industry knowledge to sustain the continuous developing applicable technology. As a result, how effective the transfer of those technologies was concerned by scholar. Hence the study is carried out to investigate the factors that influence technology transfer from the industry to the research centre of UTM-Chemical Engineering Pilot Plant (CEPP) in Skudai, Johor. The objective of research is investigate the factor that influence the CEPP technology transfer project and clarify how the factor influence the effectiveness of CEPP technology transfer project. Factors that studied included: prior experience of transferor and transferee, inter-organizational interaction, nature of technology and culture difference. Set of interview questions were derived to conduct interview with 4 key personnel from the CEPP technology transfer project. The qualitative data gathered was analyzed by Miles and Hurberman (1994) to identify the pattern and themes. According to the findings, all of the factors show positive effective on the technology transfer performance except culture difference. This may due to the culture embedded by both parties is not significant different. It was recommended that embedded ‘open’ culture and cross functional interaction could improve efficiency during technology transfer.

ABSTRAK

Pemindahan teknologi secara luaran semakin penting sementara dunia terjejas daripada kesan-kesan era globalisasi. Demikian, perhubungan antara industri dan pusat penyelidikan semakin kritikal untuk memanfaatkan kedua-dua pihak. Industri memerlukan teknologi tambahan untuk bersaing di era globalisasi manakala pusat penyelidikan memerlukan ilmu teknologi daripada industry untuk penyelidikan dalam bidang aplikasi teknologi. Oleh sebab itu, keberkesanan permindahan teknologi dapat menarik perhatian daripada penyelidik. Dengan itu, penyelidikan dijalankan untuk mengkaji faktor-faktor yang mempengaruhi keberkesanan permindahan teknoogi dari industri ke pusat penyelidikan UTM, iaitu Loji Pandu Kejuruteraan Kimia (CEPP) di Skudai, Johor. Objektif bagi penyelidikan ini adalah menentukan faktor-faktor yang mempengaruhi keberkesanan projek pemindahan teknologi CEPP dan menjelaskan bagaimana faktor-faktor yang mempengaruhi keberkesanan projek pemindahan teknologi CEPP. Faktor-faktor yang dikaji termasuk: pengalaman pemindah dan penerima, interaksi antara organisasi, jenis teknologi dan perbezaan budaya. Persoalan temuhramah telah disediakan untuk mengutip data daripada 4 orang penting dalam projek pemindahan teknologi CEPP. Qualitatif data yang dikumpul telah dianalisasi dengan mengunakan Miles and Hubermna (1994) method. Keputusan menunjukan semua factok memberi kesan kepada prestasi teknologi pemindahan CEPP kecuali prebezaan budaya. Ini disebab oleh berbezaan budaya pemidah dan penerima tidak ketara. Akhirnya, praktik budaya ‘buka’ dan interaksi antara kumpulan fungsi boleh memperbaiki kebersanan pemindahan teknologi.

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NOMENCLATURE

CEPP	Chemical Engineering Pilot Plant
ECH	Energieconsulting Heidelberg
ETI	External Technology Integration
GMP	Good Manufacturing Practice
IBM	International Business Machines Corporation
MIS	Management Information System
R &D	Research and Development
S & T	Science and Technology
TT	Technology Transfer
UTM	Universiti Teknologi Malaysia

CHAPTER I

INTRODUCTION

1.0 Introduction

This study addresses key theme in external technology transfer, particularly in research centre in UTM- Chemical Engineering Pilot Plant (CEPP). This chapter provide a brief scenario to the research, beginning with the general background to the study area and the problems of statement of the research. This is followed by an explanation of the research objectives and research questions. The significance of the research and the scope that guided the research are highlighted briefly in the subsequent section.

1.1 Research Background

Technology is widely accepted as the essential factor for economic growth in a nation which have attached important in ability to manage and generating technological change as technology capability that serve as decisive factor of a country's global competitiveness and capacity to grow. The world becomes increasingly interdependent due to globalization, therefore firms in developing countries are seeking for global R&D partnership and Science and Technology (S &T) collaboration to strengthen their capability and enhance their core competencies for maintaining market shares in global marketplace (Jian and Chiu et. al., 2006).

University research centre become one of the most attractive sources of technology acquisition for the industry. Established strong link between industry and research centre can facilitate the exchange of technology between research centre and industry. Some of the exchange program had launched to transfer expertise and information from industry to laboratory or from laboratory to industry. The industry realizes the urgent needs to keep up with the global competitive market whereas research centre needs the industry's knowledge to develop more advance and applicable successful technology development. Cooperation with private firm provides an insight into today's international technology market to university and institutions (Lee and Win, 2004).

Technology transfer (TT) has long been studied extensively by many academic areas. Cusumano and Elenkov (1994) cited that recent literature on technology transfer have concern with the development of technology at corporate from the point view of transferee. As suggested by Chen and Sun (2000), there are three major issues concerns by researchers in technology transfer. First, the reason to acquire the technology; second, the effectiveness of the acquired technology; and third, lessons from the process and further opportunity for technology transfer between transferor and transferee.

Keller and Chinta (1990) cited that a critical factor to success in a competitive environment is the ability of a company to transfer technology effectively and quickly. Therefore, required strategic planning and implementation geared to effective technology transfer by clarifying the factors that influence the peformance of technology transfer. Kedia and Bhagat (1988) had suggested, in the field of international management, effective transfer of technology has been concern as the central to the international management's mission and this field has emphasized a lot of factors that affect technology transfer.

1.2 Statements of Problem

As cited by Keller and Chinta (1990), technology transfer is difficult enough due transfers of technology generally involve two parties located in two different cultures that could be the barriers of technology transfer. Kedia and Bhagat (1988) had reported that culture different between transferor and transferee is the major causes in effect the buillding up a good communication that hinder technology transfer as two parties might practice different habit and behavior in workplace which can lead to conflict happen during technology transfer process. Same condition for the CEPP technology transfer project, CEPP representative's embedded with Malaysia's culture while Energieconsulting Heidelberg (ECH) is engineering based consultancy company from Germany. Both parties embedded with difference culture which may lead to difference in pespective, norm and understanding. Therefore, the influence of culture difference should be carifying in considered a feasibility of a technology transfer project.

As stated by Stock and Tatikonda (2000) technology transfer is usual deal with the integration of new technology in a new situation, such as installation of an advanced logistics information system or a flexible manufacturing system sourced from transferor. As a result, organization must be able to asses the characteristics of

the technology relative to the oganization's own capabilities and experience. The new technology from ECH to CEPP might not be able to fit in the new situation due to the present situation and capability of CEPP; therefore, the assesment of the capability, pior experience of the representative need to be considered before acquired the technology, so that able to ensure they are able to handling the complexity of the technology.

As stated by Stock and Tatikonda (2000), inter-organizational relationship is emphasized to improve the effectiveness from external sources. However effective joint between transferor and transferee is not always achieved. CEPP's representatives had to comprehend with the information about the performance of the new technology and ECH have to understand the current capability and situation so that able to propose the suitable technology for CEPP. Therefore interaction between both parties is playing a main role to establish a channel about the information on existing operations, equipment and process modifications. Creating linkages between these areas can also moves the locus of decision-making closer to the source of relevant information. Lack of interaction between both parties might cause the missing part of relavant information.

To address the afforementioned problems, two research questions were indentify and formulated to reflect the effectiveness of external technology transfer that is pictured Chemical Engineering Pilot Plant (CEPP) in Universiti Teknologi Malaysia (UTM).:

i. What are the factors that influence the effectiveness of CEPP technology transfer project?

ii. Based on the above question, how the factors influence the effectiveness of CEPP technology transfer project?

1.3 Purposes of Research

This study is an attempt to identify the factors that influenced the effectiveness of CEPP technology transfer project and clarify how the factors influenced the effectiveness of CEPP technology transfer project.

1.4 Scope of Research

The research scope is constraint within the Chemical Engineering Pilot Plant (CEPP). The aim of research is to investigate the factors that influence technology transfer at project level. The phenomenon of technology transfer in corporate level would be neglected as study on this level requires more exploration. The research will be discussed based on the case study on technology transfer project of CEPP. However the mode of cooperation between industry and university centre will not be examined.

Previous literature on technology transfer included: examine the effect of culture difference to technology transfer (Lin and Berg, 2001; Kedia and Bhagat, 1988), effectiveness of technology transfer and innovation performance in China (Jian et. al., 2006).However, none of these studies are directly investigate and examine the circumstances in Malaysia's research centre. This understanding is required in order to give a better picture of technology transfer in Malaysia scenario. Therefore the direction of the study is oriented to the CEPP, UTM.

1.5 Significant of Research

This research is expected to expand the existing knowledge on factor that influenced external technology transfer in project level. The research addresses the effectiveness of external technology transfer. The study identifies the factors that influence effectiveness of external technology transfer. These can give impact in assessment of efficiency in technology transfer process within a technology transfer project. Therefore, the study has important implications for address problems solving at project level and assisting in development a more appropriate for transfer of management knowledge. Besides, the study can be served as a reference for other researcher in field of technology innovation.

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