
UNIVERSITI PUTRA MALAYSIA

# ORGANIZATIONAL LEARNING PROCESSES AND THE PERFORMANCE OF THE MALAYSIAN AVIATION INDUSTRY

NOORHISHAM BIN MOHD ALWI

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# ORGANIZATIONAL LEARNING PROCESSES AND THE PERFORMANCE OF THE MALAYSIAN AVIATION INDUSTRY

**By**

**NOORHISHAM BIN MOHD ALWI**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirement for the Degree of Doctor of Philosophy**

**January 2007**

**DEDICATION**

To

My Dear Wife

Pauziah Hanum Hj Abdul Ghani

And our one and only daughter

Nurkhairiyah

Abstract of thesis presented to the Senate of the Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

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**January 2007**

**Chairman : Khairuddin Idris, PhD**

**Faculty : Educational Studies**

The purpose of this study was to explore the link between organizational learning processes of knowledge acquisition, transfer and utilization and the performance of the Malaysian aviation industry. The study was guided by three research questions: 1) How was knowledge acquired in the manufacturing, maintenance, repair and overhaul of aircraft? 2) How was the acquired knowledge transferred and shared within the organizations? 3) In what ways were the knowledge utilized by the aeronautical engineers and technicians?

A qualitative research design employing the case study method was used in conducting the study. Three case sites made up of two aircraft manufacturing organizations and one maintenance, repair and overhaul of aircraft facility were chosen. Eleven respondents were selected in the study using the snowballing technique. The selection of the respondents was based on the following criteria: i) they have aeronautical engineering background; ii) they were recipients of the

knowledge and iii) they were involved in the transfer of the knowledge gained. Aeronautical engineers and technicians formed the core of the participating respondents.

The primary data collection technique used in this case study was the interviews. Observations were made during visits to the case sites, and documents which include company profiles, training manuals and process charts were reviewed to supplement the data collection. The within case and cross-case analysis using the constant comparative method generated the categories. Triangulation, peer examination and member check were used to ascertain trustworthiness of the study.

The findings suggested that knowledge has been acquired through four different processes: technology transfer; expert coaching; personal exploration and hands-on experience. The acquired knowledge was transferred and shared within the organizations through three different mechanics: in the form of documented operating procedures; mentoring; and in-house training activities. The respondents suggested that the knowledge gained was utilized to conform to customer requirements; for process integration and improvement; professional upgrading; and strengthening the organizational capability.

Four conclusions were drawn from the study. First, the thoroughness of technological know-how acquisition processes among the Malaysian aeronautical

engineers and technicians can be facilitated through the use of multiple experiential learning strategies. Second, in a complex high-tech learning system such as the Malaysian aviation industry, informal social interaction process of network mentoring and expert coaching at the workplace enhances tacit knowledge transfer. Third, knowledge transferred which is situated in nature, can lead to technological innovation and strengthen the Malaysian aviation organizational capability if the transfer process is complete. However, in a mature organization, if knowledge transfer is incomplete, the organization has a higher tendency of suffering from knowledge depletion through the departure of key personnels. Finally, organizational learning processes have contributed to the performance of the Malaysian aviation industry. The industry is being recognized as an aircraft service and structural parts provider by world class aircraft manufacturers.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

**PROSES-PROSES PEMBELAJARAN ORGANISASI DAN PRESTASI INDUSTRI PENERBANGAN MALAYSIA**

Oleh

**NOORHISHAM BIN MOHD ALWI**

**Januari 2007**

**Pengerusi : Khairuddin Idris, PhD**

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Kajian ini bertujuan meneroka perkaitan proses-proses pembelajaran organisasi merangkumi proses perolehan, perpindahan dan penggunaan ilmu dan prestasi memberangsangkan industri penerbangan Malaysia. Kajian ini berpandukan tiga soalan: 1) Bagaimana ilmu diperolehi di dalam pembuatan, penyelengaraan, pembaikan dan baikpulih kapalterbang? 2) Bagaimana ilmu yang diperolehi itu dipindah dan dikongsi di dalam organisasi? 3) Bagaimana ilmu tersebut telah digunakan oleh jurutera dan juruteknik aeronautik?

Rekabentuk kajian kualitatif menggunakan kaedah kajian kes telah digunapakai di dalam penyelidikan ini. Tiga lokasi kes yang terdiri dari dua orgnisasi pembuatan kapalterbang dan satu organisasi penyelengaraan, pembaikan dan baikpulih kapalterbang telah dipilih. Sebelas responden telah dipilih menggunakan teknik “snowballing“. Mereka telah dipilih berdasarkan kriteria

berikut: i) mempunyai latarbelakang kejuruteraan aeronautik; ii) mereka adalah penerima ilmu dan iii) mereka terlibat di dalam perpindahan ilmu yang diperolehi. Jurutera dan juruteknik aeronautik merupakan tunjang responden yang telah turut serta.

Teknik pengutipan utama data dalam kajian kes ini adalah melalui temubual. Pemerhatian juga telah dibuat ketika melawat lokasi kes, serta semakan dokumen yang merangkumi profil syarikat, buku panduan latihan serta carta alir proses sebagai menyokong pengutipan data. Analisa dalaman kes serta kajian silang kes menggunakan kaedah perbandingan sekata telah berjaya menghasilkan kategori berkaitan. Untuk tujuan kesahihan kajian, teknik pemeriksaan rakan, triangulasi dan semakan ahli telah digunakan.

Penemuan dari kajian mencadangkan ilmu boleh diperolehi melalui empat proses berasingan: perpindahan teknologi; bimbingan pakar; penerokaan peribadi dan pengalaman melakukan tugas. Ilmu yang diperolehi telah dipindah dan dikongsi di dalam organisasi melalui tiga kaedah: dalam bentuk dokumen, mentor dan aktiviti latihan dalaman. Responden mencadangkan bahawa ilmu yang diperolehi telah digunakan untuk memenuhi keperluan pelanggan; penambahbaikan dan integrasi proses; peningkatan profesional dan pengukuhan kebolehan organisasi.

Empat kesimpulan dapat dirumus dari kajian ini. Pertama, keterperinican perolehan pengetahuan teknologi di kalangan jurutera dan juruteknik aeronautik Malaysia boleh dimudahcarakan dengan penggunaan strategi pembelajaran melalui pengalaman yang pelbagai. Kedua, di dalam sistem pembelajaran berteknologi tinggi yang kompleks seumpama industri penerbangan Malaysia, proses interaksi sosial yang tidak rasmi melalui rangkaian mentor dan bimbingan pakar mempercepatkan perpindahan ilmu "tacit". Ketiga, naluri ilmu yang dipindahkan adalah mengikut keadaan boleh menyumbang kepada innovasi teknologi dalam memantapkan keupayaan organisasi penerbangan Malaysia sekiranya proses perpindahan itu lengkap. Walau bagaimanapun, di dalam organisasi yang telah matang, seandainya proses perpindahan ilmu itu tidak lengkap, besar kemungkinan organisasi tersebut akan mengalami kepupusan ilmu berikutan pemergian warga kerja yang utama. Akhirnya, proses-proses pembelajaran organisasi telah menyumbang kepada prestasi industri penerbangan Malaysia semasa. Kini, industri ini telah diiktiraf sebagai pembekal perkhidmatan dan bahagian struktur oleh pembuat kapalterbang bertaraf dunia.

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My deepest appreciation goes to my wife, Pauziah Hanum and our daughter, Nurkhairiyah, who had made a lot of sacrifices and had been very understanding and supportive throughout my studies.

Finally, to the Almighty Allah for the blessings, strength, health, will power and abilities showered on me to finally arrive to this stage of life.

I certify that an Examination Committee met on 4th January 2007 to conduct the final examination of Noorhisham bin Hj Mohd Alwi on his Doctor of Philosophy thesis entitled "Organizational Learning Processes and the Performance of the Malaysian Aviation Industry" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends the candidate be awarded with the relevant degree. Members of the Examination Committee are as follows:

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## DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any degree at UPM and other institutions.

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**NOORHISHAM BIN MOHD ALWI**

Date: 24 JANUARY 2007

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| | |
|---|---|
| AP | Assembly Proficiency |
| BAE | British Aerospace |
| CEO | Chief Executive Officer |
| LPP | Legitimate Peripheral Participation |
| LRU | Line Repair Utilities |
| MAS | Malaysia Airlines System |
| MIGHT | Malaysian Industry-Government Group for High Technology |
| MITI | Ministry for International Trade and Industry |
| MRO | Maintenance, Repair and Overhaul |
| NDT | Non-destructive Testing |
| O&M | Overhaul and Maintenance |
| OEM | Original Equipment Manufacturer |
| OL | Organizational Learning |
| R&D | Research and Development |
| RMAF | Royal Malaysia Air Force |
| TOT | Transfer of Technology |

# CHAPTER I

# INTRODUCTION

This chapter presents the background of the study, statement of the problem, purpose and research questions, significance of the study, and definitions used in the study.

## Background of the Study

Organizational performance as an outcome of organizational learning processes has been discussed by earlier organizational theorists. Huber (1998) asserts that an organization learns through processing of information and increases the probability that its future actions will lead to its improved performance. DiBella and Nevis (1998) stress that the key objective in building organizational learning capability is to maintain or improve organizational performance. The organizational learning process is specifically concerned with the growth and change of organizational knowledge, sustainability of competitive advantage leading to superior business outcomes (Leon, Peon and Ordas, 2005).

Organizational learning and growth of the general aviation industry in Malaysia are relatively two new areas. Although numerous studies in organizational learning has been conducted in other parts of the globe, no citation has been

written linking organizational learning processes and the successful performance of the Malaysian aviation industry.

There are earlier studies on organizational learning in the aviation industry elsewhere. Hwang (2000) notes that though there have been many studies about the catching up of developing countries in mass production, there have been few in complex systems, such as the aircraft industry. In his study, Hwang examines the diversification path of four Korean aircraft firms, how these firms have built up their capabilities through major projects, and how they have reached their current position and performance levels. The study by Hwang reveals the Korean aircraft firms have built up their capabilities by moving from parts manufacturing through subassembly to system integration. In another study, Cassiolato, Bernardes and Lastres (2002) examine the success of Embraer, an aircraft manufacturer in the Brazilian aircraft industry in technology transfer.

Other earlier organizational learning studies elsewhere in the aviation industry were by Garvin (1998). Garvin's study discusses learning in the manufacture of Boeing 737 and Boeing 747, and to how prior knowledge has helped to improvise the development of later Boeing models. In another study, Benkard (2000) researched on the learning curve in the aircraft manufacturing that is confined to the model equilibrium which being economic in nature helped in the costing and the pricing of the Lockheed commercial jet L-011. A case study by Marques (2001) showed how the Brazilian civil aircraft technological systems of innovation

function. Marques notes there was little understanding on the dynamics of the integration between the knowledge acquired and the production system in the aviation industry. Samaranayake, Lewis, Woxvold and Toncich (2003) studied the development of engineering structures for scheduling and control of aircraft maintenance in the Australian aviation industry, while Kort and Kluiter (2003) reviewed the reformation of the Russian aviation industry.

The concept of organizational learning, lifelong learning and workplace learning was emphasized in the Malaysian Third Outline Perspective Plan (OPP3) from year 2001 – 2010. Learning plays a useful part in the OPP3's strategic thrusts at enhancing competitiveness to meet the challenges of globalization and liberalization, developing a knowledge-based economy and strengthening human resource development to produce competent, productive and knowledge workforce. The Malaysian aviation industry has been classified as a high-tech industry that has been earmarked to be competitive in the global stage.

Different organizational theorists view organizational learning differently. Cavaleri (2004) describes organizational learning as a social process of inquiry that is largely focused on improving interpretations of past experiences. He assumes that knowledge is an inevitable product of learning activities. However, Gupta and Thomas (2001) look at organizational learning as an organizational ability in projecting technological innovation, improvement in efficiency, increased reliability and increase adaptability, all of which should contribute to higher levels

of competitiveness. Dogsdon (1993) views organizational learning as ways the firms build, supplement and organize knowledge, and developing organizational efficiency by improving the broad skills of the workforce. To him, organizational learning includes direct learning activities such as research and development and formal education of the employees. Transfer of learning after knowledge acquisition is important in ensuring the learning benefited the individuals and the organization, stored in the form of organizational memory. Transfer of learning can influence subsequent learning and performance. The learning and performing of one task might facilitate the learning of the second task (Duane, 1995 and Weigelt et al, 2000).

The linkage between organizational learning (OL) and performance studies was discussed by Crossan, Lane, White et al (1995) in their review of fourteen previous researches. They include three key dimensions that differentiate perspectives of OL and performance: (1) unit of analysis – individual, group, organizational and inter-organizational; (2) cognitive/behavioral emphasis; and (3) the learning-performance relationship. They discovered that OL results in management innovation, increased competitiveness and concluded that over the long term superior performance depends on superior learning.

The different perspectives of organizational learning though differ in terminologies refer to the same meaning are summarized by Bukowitz and Williams (2000) as the process as people gather the information they need for their daily work, use

knowledge to create value, learn from what they create and, ultimately feed this new knowledge back to the system for others to use.

Duncan and Weiss (1979) view the organizational learning processes in the growth and change of organizational knowledge. These processes occur in three ways: (1) knowledge about new action-outcome relationships or new conditions which effect previously known action-outcome relationships; (2) existing knowledge may itself be changed by replacing a given action-outcome relationship with a new one; and (3) organizational knowledge can increase in the sense that additional support or validity is associated with a given action-outcome relationship.

The landscape of research on organizational learning is intellectually attractive and its practical importance has aroused a great deal of interest among researchers and management practitioners. The importance and the direction in the study of organizational learning and knowledge management were highlighted by Vince, Sutcliffe and Olivera (2002). They stated that these are important areas of inquiry and their investigation has pragmatic implications in an age when so many corporate resources are being devoted to knowledge encoding, transfer and dissemination. The research by Lopez, Peon and Ordas (2005) reveals that most of the literature tends to examine the outcomes of learning, rather than delve into what learning actually is and how these outcomes

are achieved. Different constructs of organizational learning in different research settings have been presented in the literatures.

Earlier discussions by Duncan and Weiss (1979) on organizational learning concept deals with the identification process by which the organization learns and deals with the environment. Organizational learning becomes the process where the organization members of the dominant coalition develop, over time, the ability to discover when organizational changes are required and what changes can be made. Their review on the work of Cyert and March (1963), Terreberry (1967) and March and Olsen (1976) reveals that these organizational theorists have not offered much insight as to how this learning takes place, what specific the outcomes of learning are (except the changes in organizational activity), who in the organization learn, or how the dominant coalition can utilise this learning process.

According to Argote (1999) agreement has not emerged exactly as to what is meant by the concept of organizational learning. What is critical for advancing the understanding of organizational learning issues is for researchers and practitioners to be precise about the approaches they take and to develop the theoretical and practical implications that can be derived from those approaches. Further research describing the patterns of knowledge sharing and conditions under which various modes of knowledge sharing will be most effective is needed.

Hong (1999) claims that the question on how organizations learn remains unsolved. He notes that previous studies have centered on the perspective of the collective process of cognitive change for the whole organization, and the spread of learning to different levels of organizational members. Lahteenmaki (2001) in his critical analysis of organizational learning research informs the lack of conceptualization of the true nature of the organizational learning process or descriptions of how the learning of individuals could be transferred into the learning of organization.

Huber's (1991) organizational learning constructs provides the theoretical framework for this study describes the four different stages in organizational learning: knowledge acquisition, information distribution, information interpretation and organizational memory. Huber discovers that there are gaps in the voluminous literature written on organizational learning constructs. It is the intention of this present study to enrich Huber's organizational learning constructs based on the arguments he forwarded. He argues not enough work on organizational learning that can lead to research-based guidelines for increasing the effectiveness of organizational learning. Although Huber (1991) has presented his knowledge acquisition constructs, he felt continuing empirical work should strengthen his acquisition constructs to be integrated and synthesized from the work of different research groups. He discovers the ambiguities in vicarious learning or learning through borrowing from others particularly when mimicry learning occurs as a result of technologies are poorly understood,