

The background of the cover is a close-up photograph of a computer keyboard. In the lower-left foreground, a black pen with a silver-colored tip and clip is positioned diagonally. In the lower-right foreground, a spiral-bound notebook with lined pages is open, showing its binding and the texture of the paper. The title text is centered over the keyboard background.

Selected Essays on Inter Firm Technology Transfer and Organizational Performance

SAZALI ABDUL WAHAB

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SELECTED ESSAYS ON INTER FIRM
TECHNOLOGY TRANSFER AND
ORGANIZATIONAL
PERFORMANCE

By
SAZALI ABDUL WAHAB

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**SELECTED ESSAYS ON INTER FIRM TECHNOLOGY TRANSFER AND
ORGANIZATIONAL
PERFORMANCE**

Editor
SAZALI ABDUL WAHAB

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List of Abbreviations

ACAP	Absorptive Capacity
CEO	Chief Executive Officer
COMPLX	Complexity
CPERF	Corporate Performance
EDA	Exploratory Data Analysis
EXPK	Degree of Explicit Knowledge
FDI	Foreign Direct Investment
FMM	Federation of Malaysian Manufacturers
GM	General Manager
GSM	Graduate School of Management
HRM	Human Resource Management
HRPERF	Human Resource Performance
ICV	International Cooperative Venture
IJV	International Joint Venture
IMP	Industrial Master Plan
JV	Joint Venture
JVAGE	Age of Joint Venture
KBV	Knowledge-Based View
KCHAR	Knowledge Characteristics
KCHARQ	Knowledge Characteristics Questionnaire
KT	Knowledge Transfer
LFP	Local Firms' Performance

Part I :

Introduction and Background

- 1 - Technology and Technology Transfer: Defining the Concepts**
- 2 - Technology Transfer Mechanisms**
- 3 - Theoretical Perspectives Underpinning Technology Transfer**

1

Technology and Technology Transfer: Defining the Concepts

CHAPTER OUTLINE

The dynamic nature of technology has contributed to the existence of various definitions and concepts of technology by previous studies. Discussions on the concept of technology are crucial in getting a clear understanding on the nature of technology before examining what exactly the technology consists of. Building specifically on knowledge-based view (KBV) and organizational learning (OL) perspectives, this work follows a stream of literature which suggests that 1) knowledge as the critical element underlying technology, and 2) both technology and knowledge are inter-dependent and inseparable in nature.

INTRODUCTION

Reddy and Zhoa (1990) argue that defining the technology concept is not easy because technology has been defined from various perspectives. The term 'technology' is inherently an abstract concept; which is difficult to interpret, observe and evaluate (Blomstrom and Kokko, 1998). Regardless of the extensive research conducted on the subject, many of the literatures are fragmented along different specialties. Thus, there is no commonly accepted paradigm (Reddy and Zhoa, 1990). Due to this the concepts, variables and measures relevant to the study are different from one study to another (Kumar et al., 1999).

THE TECHNOLOGY CONCEPT

Past researchers have viewed and defined the term 'technology' from different perspectives; and this has influenced the research design and results, negotiations around a transfer and government policies in general (Reddy and Zhoa, 1990). From the cultural system perspective the researchers define technology as a cultural system, which is concerned with the relationships between humans and their environment (Tepstra and David, 1985). From the systems perspective, technology is referred to as encompassing 1) the basic knowledge sub-system, 2) the technical support system (software), and 3) the capital-embodied technology (hardware) (Afriyie, 1988). From the socio-technology perspective the researchers take a broader view by describing technology to be meaningful only when it becomes a social fact (Levin, 1996; Rogers and Shoemaker, 1971). Some researchers have even defined technology as the essential human attribute (Pitt, 1999).

The early concept of technology as information holds that technology is generally easy to apply, reproduce and reuse (Arrow, 1962). This view is inconsistent with the collection of literatures on international TT literature, which hold that technology is conceived as "firm-specific information concerning the characteristics and performance properties of the production process and product design" (Reddy and Zhoa, 1990). The production process or operation technology is embodied in the equipment or the means to produce a defined product. On the other hand, the product design or product technology is that which is manifested in the finished product (Reddy and Zhoa, 1990).

Technology is also viewed as a 'configuration' where the transfer object (the technology) must rely on a subjectively determined but specifiable set of processes and products (Sahal, 1981). Based on Sahal's (1981, 1982) concept, technology and knowledge are inseparable because when a technological product is transferred or diffused, the knowledge upon which its composition is based is also diffused. The physical entity cannot be put to use without the existence of a knowledge base, which is inherent and not ancillary (Bozeman, 2000). Technology

does not only relate to technology embodied in the product. It is also associated with the knowledge, information of its use, application and the process in developing the product (Lovell, 1998; Bozeman, 2000). Technology has always been connected with obtaining certain results, resolving certain problems, completing certain tasks using particular skills, employing knowledge, and exploiting assets and resources (Lan and Young, 1996).

Technology has been construed as "the firm's intangible assets and it is firm-specific" which forms the basis of a firm's competitiveness and generally is released under special condition (Caves, 1974; Dunning, 1981). Technology as the intangible assets of the firm is rooted in the firm's routines and is not easy to transfer due to the gradual learning process and higher cost associated with transferring tacit knowledge (Radosevic, 1999). Valuable technological knowledge, which is the intangible assets of the firm, is never easily transferred from one firm to another because technological learning process is needed to assimilate and internalize the transferred technology (Lin, 2003). Technology is mainly differentiated knowledge about a specific application, tacit, often uncoded and largely cumulative within firms (Pavitt, 1985). It can include information that is not easily reproducible and transferable (Tihanyi and Roath, 2002). Based on this argument, technology is seen as tacit knowledge, firm-specific secrets or knowledge known by one organization (Polanyi, 1967; Nonaka, 1994). Technology has also been referred to as "the integration of the physical objects or artifacts, the process of making the objects and the meaning associated with the physical objects" (MacKenzie and Wajcman, 1985). These elements are not distinctive and separable factors rather they form a 'seamless web' that constitutes technology (Woolgar, 1987). All the three elements should be understood as being connected to each other in which a change in one element will affect the other elements. Thus, technology is broadly defined as embodied in people, materials, cognitive and physical processes, facilities, machines and tools (Lin, 2003).

Kumar et al. (1999) categorize technology into two primary components: 1) a physical component which comprises items such as products,