

Transferring Technology to the Developing World

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INTRODUCTION

The potential for technology growth in lesser developed countries (LDCs), particularly within the Arab World, is enormous (Loch, Straub, & Kamel, 2003). Within the Middle East, the projected demand for information technology hardware and services will be \$8.9 billion by 2005 (Pyramid Research, 2001). Yet, in spite of this significant promise, information technology transfer (ITT) has been slow in this region. Clearly, there is more than money at issue in diffusing computing and the Internet throughout the Arab world, and the less developed world in general.

What are the reasons for this? As with most LDCs, resources for purchasing systems may be scarce, both for businesses and individuals. The public infrastructure for electricity and telecommunications may be lacking. Political instability, disease, and warfare may limit the ability of a people to absorb and effectively utilize technology, especially in many African countries.

Yet these reasons are not sufficient to explain the slow growth of IT in developing and least developed countries. There must be something more at stake. The scientific literature, although not as extensive as work in the developed countries, suggests several explanations for this phenomenon.

First, it is clear that much of the research related to IT has taken place in developed countries, primarily in North America. But as the business environment becomes more global, it becomes increasingly important to examine the influence of IT in other contexts and cultures (Checchi, Hsieh, & Straub, 2003). Naturally, countries that are less developed economically do not invest heavily in information infrastructure, limiting a country's ability to make efficient use of resources and effective choices for investments opportunities (Checchi, Sevcik, Loch, & Straub, 2002). Evidence is mounting, however, that other reasons may affect ITT in developing countries (Straub, Loch, & Hill, 2001). Loch, Straub, and Sevcik (2000) offer two

reasons why the transfer of IT is difficult in the developing countries and in the Arab world:

- Cultural differences affecting system development and implementation
- Government policies influencing ITT

BACKGROUND

Before examining the transfer of IT to the Arab world, it is important to understand the impact of culture on IT. Identifying the culture of a nation is difficult; therefore, culture is often defined by national boundaries. However, the distinction between cultures is more sophisticated than geography. Researchers have defined culture based on shared values, problem solving and outcomes, and general, all-encompassing definitions, but culture is a complex, multi-layered phenomenon (Straub, Loch, Evaristo, Karahanna, & Srite, 2002). To classify culture, Ein-Dor, Segev, and Orgad (1992) identified factors, or "constants", that influence the culture and are consistent over time. Examples of constants identified by Ein-Dor et al. (1992) include geography, language, social norms, and traditions. Factors that change over time, "changeables", include technology, GDP, and level of education. Understanding the impact of the constants on IT solutions is critical for system architects as technology becomes implemented worldwide.

The Arab world consists of over twenty countries and 200 million people; therefore, it is difficult to definitively define the culture of such a large population. Within the Arab world, there are many subcultures; however, there are several characteristics that span across sub-cultural boundaries (Hill, Loch, Straub, & El-Sheshai, 1998). Barakat (1993) found several social characteristics that traverse the entire Arab culture, such as patriarchal family structures, pyramidal class structures, and expressive social

interactions. Yet, he also found conflicting values within groups of the Arab world. He acknowledges that the dominant values of the Arab world include conformity, collectivism, and obedience, among others, but subgroups within the culture are emphasizing creativity, individualism, and rebellion. The social characteristics, dominant values, and emerging contradictory values are critical in shaping the Arab culture as we know it today (Barakat, 1993). According to Hofstede's (1980) work, Arabs have a strongly collectivist culture compared to the individualist North American culture. In addition, the Arab world is characterized by large power distance and high uncertainty avoidance. Regarding the position of the Arab culture on the masculine/femininity scale, the culture is considered moderately masculine. Examining the Arab world using the works of Barakat (1993) and Hofstede (1980) yield insight into the Arab organizational culture and the response towards technology transfer.

Research has shown that culture impacts the acceptance of technology. By understanding the effect of cultural beliefs and attitudes toward technology, it can be adapted to a group's behavioral patterns (Loch et al., 2000). Kransberg and Davenport (1972) argue that "an advance in technology not only must be congruent with the surrounding technology but *must also be compatible with...existing economic and other cultural and social institutions* [italics added]."

Although culture is considered to be a powerful force in ITT, much of the research on factors affecting ITT is related to economic issues and characteristics of the organizations implementing the system (Hill, Straub, Loch, Cotterman & El-Sheshai, 1998). While the economic state of a country does affect ITT, for many countries within the Arab world, cost is not an issue. For economically developed countries, such as Saudi Arabia and Kuwait, the adoption of IT has still been slow (Straub, 2003), suggesting that other factors, such as culture, are important.

DEVELOPMENT AND IMPLEMENTATION OF SYSTEMS

System implementations are difficult across cultural boundaries. Technology designed and created in developed countries has cultural-biases embedded within the system (Escobar, 1994). Cultural-specific beliefs can inhibit ITT in developing countries and within the Arab world. Typically, when implementing systems, the national culture is not taken into account and no adaptation occurs (Hill, Straub, Loch, Cotterman, & El-Sheshai, 1994). Two examples of cultural differences that impede system implementation in the Arab world include differences in leadership style and perception of time.

Cross-cultural conflicts between the styles of western and Arab leadership affect the system development process (Straub et al., 2001). Within the Arab culture, there is a preference within organizations for face-to-face meetings and family-like environments (Straub et al., 2001). These cultural preferences lessen the impact of groupware and e-mail technology within these countries. Practical implications of these cultural-specific beliefs of ITT within the Arab world suggest that managers should ensure top management support, even more so than in developed countries, before introducing new technology (Rose & Straub, 1998). In addition, technology such as e-mail or groupware should not be used to replace face-to-face meetings, but rather serve as a supplement to information exchange (Straub et al., 2001).

Another difference between cultures that affects the implementation of systems within the Arab world is the perception of time. The task-oriented, linear view of time that is found in Western culture is monochronic. The polychronic view of time found in Latin America and in the Arab world suggests that events unfold in parallel (Straub, 2003). These differences have strong practical implications. First, the Arab culture focuses less on long-term planning and forecasting than in western cultures (Straub et al., 2001); therefore, planning systems may be less accepted within the Arab world as compared to their western counterparts (Loch et al., 2000). Second, those in monochronic cultures tend to focus on one task at a time; however, people that are part of polychronic cultures often perform several tasks in parallel (Rose, Evaristo, & Straub, 2003).

With the explosive growth of the Internet and the supporting infrastructures, companies that are marketing globally must take into account other factors than language and currency. Research by Rose et al. (2003) has found that in monochronic cultures, long download times of a Web site lead to a negative attitude about the delay in viewing the content. But they also found that polychronic Web users, such as most Arabs, had more tolerance for long download times. For Web-based companies that are targeting people from polychronic cultures, it is not as important as in monochronic cultures to have an infrastructure and Web site design that reduces download time. Lower cost servers can be installed in these countries without having a negative effect on the attitude toward the website.

Although cultural factors can influence the ability to implement systems across national and cultural boundaries, technological acculturation can offset this effect (Loch et al., 2000). Acculturation is an anthropological concept in which characteristics of one culture are assimilated into another culture. People in less developed countries may implement IT systems with cultural bias

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