December 1998

International Technology Transfer: A Theoretical Development for Firm Level Analysis

Peter Johnson  
*California State University Sacramento*

Amin Elmallah  
*California State University Sacramento*

Stephen Crow  
*California State University Sacramento*

Kalil Gezi  
*California State University Sacramento*

Follow this and additional works at: [http://aisel.aisnet.org/amcis1998](http://aisel.aisnet.org/amcis1998)

Recommended Citation


[http://aisel.aisnet.org/amcis1998/143](http://aisel.aisnet.org/amcis1998/143)

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 1998 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.
International Technology Transfer: A Theoretical Development
for Firm Level Analysis

Peter C. Johnson
Amin A. Elmallah
Stephen R. Crow
Kalil Gezi
California State University, Sacramento

Introduction
Previous studies have looked at factors that affect the transfer of technology across national borders. Those studies have developed and examined cultural, social, and resource considerations as contributing factors. Generally, previous studies have looked at the problem from a macro level. This paper provides two contributions. It expands the sets of factors to include international tax considerations, and posits a firm level study to examine specific organizational and decision model effects. The paper draws heavily on a previous paper by Gezi and Elmallah (1995) which provides extensive preliminary evidence of the impact of cultural factors in the Middle East. It also draws upon a study of the technology growth oriented Indian economy to administer and interpret the firm level examination that will extend this work. The first section sets forth an analysis of the existing literature from which the authors derive the specific factors that they will propose for firm level examination. The second section gives some examples of such factors. The final section presents conclusions and implications for the extension of this theoretical development.

Factor Development
As stated earlier, there have been several studies that have addressed the identification of factors that affect technology transfers. Those studies have looked at cultural, economic, and organizational factors, but have done so with an insular focus (i.e., looking at the effect of factors within a particular category). In this paper, the authors’ objective is to develop an analytical model that incorporates a set of factors that draws crossectionally from factors discussed in those previous studies and enhance the coverage of the model by adding a tax and regulatory element.

In Gezi and Elmallah (1995) and Kedia and Bhagat (1988), the focus is on the impact of cultural differences across nations and across organizations. Gezi and Elmallah focus on the impact of these factors on technology transfers in the Middle East. Their information was gathered through a combination of personal interviews and questionnaires. They conclude, among other things, that in transferring technology in the Middle East, cultural and social values must be observed if companies are to reach a successful result. Further, and consistent with that conclusion, when making a technology transfer decision, the more compatible the cultures, the less is the resource commitment required to achieve the transfer successfully.

Specifically, the factors identified by Gezi and Elmallah as impact considerations include religion, communication forms and media, cultural, political, and economic climates. Religion and cultural factors may, for example, be product, service, or gender sensitive. Communication forms and media may include language or technologically sensitive specifications. The political climate would certainly include the level of current relations, but could also include historical relationships (e.g., provincial relationships between the two countries).

Kedia and Bhagat (1988) looked at cultural constraints and offered, among other things, one perspective that provides a look at the importance of cultural factors based upon the economic status of a country. This particular perspective, one vein of their research, looks at the importance of societal culture, organizational culture, and management processes in the transfer of technologies between industrialized, moderately industrialized, and developing nations. They found that when the transfer included a developing nation, the most important factors were those that could be categorized under societal culture factors. When the transfer was between two industrialized countries, the most important factor was management processes. There could be many inferences drawn from those results, but one, specifically, leads to or is consistent with the proposition that taxes or regulatory environments are important. That is, while restrictions in a legal or environmental context are flexible enough to encourage transfers, technology and otherwise, their importance is not the deciding factor. It is, as always, and here supremely important to consider differences in societal culture.

Tsang (1997) looks at technology transfer from a resource commitment perspective. Tsang categorizes technologies as either “Tacit” or “Explicit.” The former has been referred to as human, personnel-process embodied or soft technology in other studies. The latter has been referred to as physical, product, or hard technology. One of the results of Tsang’s work is that tacit technology transfers require a greater overall “resource commitment” but requires less capital investment than explicit technology transfers. In explicit technology transfers the relationship of resource commitment and capital investment are reversed.

One implication is that the financial position of the company and the type of technology being transferred are inexorably linked in terms of predicting the success of the transfer. A company with a severe liquidity problem will be stretched to engage in significant explicit technology transfers.
Another implication is that tacit technology transfers are decidedly more intimate. That is, there is a much greater degree of contact among individuals and the success of the transfer depends upon the success of those relationships to a much greater degree. In those cases, the resolution of differences in cultural and societal values is much more critical. That does not require the level of capital investment that product oriented transfers do, on a relative scale, but it does require a much greater commitment of “resources” in terms of education, training, and support for personnel facilitating the transfer.

Recent investigations by one of the authors shows that the level of sophistication or complexity of the tax structure and regulation in a provider or acquirer country can have an impact on the degree to which the transfer environment is user friendly (Crow, 1996). The correlations between the tax environment for transfers and the economic status of the countries involved are consistent with the conclusions drawn from the Kedia and Bhagat (1988) study. The rigorous statutory regime and management processes are much less important in developing countries than in industrialized countries. This is further reflected when one looks at studies that compare tax treaties across countries. Lokken (1995) compared treaties between industrialized countries and found clear evidence of strict adherence to the terms of model treaties that had been developed by a group of industrialized countries. In a subsequent study, Crow (1997) compared specific treaty provisions (provisions which were included in the Lokken study) between developing or moderately industrialized countries and found evidence showing a much different picture. There was a significant degree of variability in the terms of the provisions, across treaties, and a significant degree of deviation from the model provisions.

As in Kedia and Bhagat, the fact that the developing countries are emphasizing growth and globalization, the processes and tax schemes are more flexible, more easily complied with, and are less resource intensive. Therefore, in a situation where financial resources are more limited, but knowledge and other human resources are more plentiful, the emphasis is on utilization of these “tacit” resources. The implication is that the technology transfer is more intimate, more personal contact intensive, so the assimilation of different cultural and societal values becomes more complex and more important to the success of the transaction.

Factor Selection and Examples

The theoretical development of a set of factors to be considered in a technology transfer decision model is the preliminary step that will culminate in the investigation of firm effects. The objective, therefore, of specifying the factors is to do so in a manner that will provide a robust source of data upon which firm behavior can be identified and distinguished at a level sufficient to provide a basis for comparative analysis. Accordingly, the following examples reflect the direction in which the authors intend to go in establishing a final specification of the analytical model.

Based on the results of Gezi and Elmallah, and Kedia and Bhagat, we can derive the following points of distinction upon which to examine firm effects: language differences, religion, gender roles, and customs and traditions. Further, it is important to look at the economic status of the countries between which the transfer is taking place. Clearly, a company’s previous experience in similar transfers will shape its expectations and processes. It is important to derive the analytical model in such a way that we are able to disaggregate learned behavior from first blush experiences, and use one to build on the other.

Looking at Tsang’s work, firms would be distinguished on the basis of the nature of the technology transfers that they engage in and some measure of financial condition and firm size, to investigate the impact that has on the form of the transfer.

Tax effects should be considered with the effects of economic status, although for related but different reasons. The existence of treaty provisions, the variability of those provisions, the tax status of the transferring entities, and comparative tax rates would provide some measure of inquiry as to the effect of taxes on technology transfers, and the prioritization of nontax factors.

Conclusions

The historical evidence is clear that non-economic and non-financial factors play a significant role in the shaping of technology transfers. This paper looks at the covariance of economic or financial, cultural, societal, and tax factors at the firm level. One of the authors has visited and conducted personal interviews with executives and managers of Egyptian corporations, and discussed the role of cultural and societal factors in the inability, in certain instances, to integrate fully western technology in their operations. These discussions reinforce the view that the problems associated with transfers of both hard and soft technologies across national boundaries and across different cultures are far from being resolved. To the extent that the extension of this work, the firm level examination of the effects of these factors, can add incremental evidence to the more general inquiry, the gap between the problem and the resolution will be narrowed.

Furthermore, the authors intend to expand the discussion of the globalization of technology transfer by examining cross-cultural and cross-boundary effects on soft and hard technology transfer and provide examples of successful and unsuccessful transfers. In addition, the authors intend to further investigate a comparison of technology transfer across global cultures (e.g., American, European, Middle East, Latin, South East Asian, African) and the common hindrances and facilitators of transferring technology.

References

References available upon request.