

An Agenda for Research Linking Information Systems and International Business: Theory, Methodology and Application

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Recent trends in information systems research reflect the need to respond to the realities of an increasingly interdependent, international economy. In responding to this demand, a stream of research is currently developing that directly interfaces the information systems (IS) discipline with the field of international business (IB). Research addressing this interface places an added challenge on the IS researcher to broaden his knowledge base to encompass the theory and literature foundations of an often unfamiliar body of research.

This article addresses the need to define the current state of research in international business which is relevant to the IS academician in an effort to move toward a research agenda linking these two areas. Scholarly research addressing the interface of two very different streams of research (i.e., information systems and international business) requires a knowledge of theoretical foundations, methodological rigor and application trends from both academic disciplines. However, since both information systems and international business are interdisciplinary in nature and pull on

several reference disciplines for theory development, identifying the research bounds that define this interface is especially difficult. A framework is presented that provides structure for the development of a research agenda that defines this IS / IB interface.

Two very dynamic areas in business today are the impact of information technology (IT) on the operations of the firm and the corresponding globalization of markets. The combined effect of these two forces in today's business environment is no less than profound. Information technology is playing a significant role not only as a catalyst that is driving the global marketplace but also as a solution base from which to address international managerial challenges. The firm's information systems (IS) will provide the necessary communications infrastructure and essential links with buyers, suppliers, customers, competitors, and strategic alliances worldwide (Deans and Kane, 1992). Tomorrow's enterprise will demand increasingly integrated and coordinated information systems for the development of competitive

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globally oriented strategies and information technology applications.

The link among the various stakeholders both inside and outside the organization is information. We are currently living in an information age; power is in information. Peter Drucker (1988) refers to the organization of the future as an information-based organization. He believes that to remain competitive, possibly even to survive, the corporation of the future will have no choice but to become information-based. For some time, companies used information technology "only to do faster what they have always done before (Drucker, 1988)." As companies around the world take the first steps to move from data to information these efforts are resulting in transformations in data processes, management structure, and the way work gets done (Drucker, 1988). The information systems function, once viewed as peripheral to the operations of the firm is now becoming central to the coordination of activities across functions within the organization as well as between organizations. Information technology and telecommunications are without question playing a more significant role in shaping corporate business strategy.

Business executives today describe global telecommunications as one of the most important issues for the decade of the 1990's. Bill McGowan (1989) believes that the 1990's will be recognized as the period in history when telecommunications and international business finally get their act together. By the year 2000, our definition of the word "foreign" will probably not be what it is today (IBM Update, 1990). Our communications infrastructure will likely become as significant as our transportation infrastructure (Deans et. al., 1991). We are fast moving toward the reality of a single worldwide information network capable of communicating data, voice, text or image anywhere in the world. There will clearly be added complexities and unique concerns in an international context. The obstacles will be more pronounced in some parts of the world.

Today's corporation operates in an environment in which profound changes are taking place in the economic, political, social, and technological arenas worldwide (Hax, 1989). Managing change is a key challenge for the corporation of the future. Peter Drucker (1986) argues that the world economy "is not changing - it has already changed." Today, it is a world economy rather than a domestic economy that leads in policy decision making for successful companies. Without question, "the success or failure of the firm of the future will take place in a global setting (Hax, 1989)." Information

technology has the potential to play a significant part in shaping this outcome. Companies that strategically utilize information technology applications will likely thrive in this changing environment.

As business continues to become more global in focus, the firm's information systems and technology will provide the means for information exchange and communication. Transnational companies continue to require more cohesion, integration, efficiency and responsiveness in their international business operations (Bartlett and Ghoshal, 1989). In response, they are turning to the information systems function and telecommunications capabilities as a means for managing the complexity and rapid change in an international business environment. Reich (1991) describes large international firms and national economies as "global webs." He suggests that flows of knowledge, money and products across national borders will eventually become commonplace and distinctions between national economies will continue to fade. Business will increasingly be conducted through electronic means recognizing no geographical boundaries (McGowan, 1989). From the perspective of the business community, the relevance of this linkage between international business and information systems cannot be overemphasized. It is imperative that the IS research focus be broadened to incorporate the unique issues and added complexities posed by operating in an international business environment.

The Information Systems / International Business Linkage

Information systems and international business (IB) both have their roots in the field of management. International business is recognized by Robock and Simmonds (1983) as a component of management training that "deals with business transactions that cross national boundaries, whether they be movement of goods, services, capital or personnel; transfers of technology, information or data; or even the supervision of employees." In a similar manner, management information systems evolved as a distinct dimension of management study (Dickson, et. al., 1982) for the purpose of addressing unique issues associated with the development of information systems and the increased importance of information to the corporation.

The international business field is recognized as having both a unique core component as well as an international dimension of all the functional business areas. The eclectic nature of the field has been a source

of both strength and problems. The conceptual domain is still being debated by IB academicians (Boddewyn, 1992; Toyne, 1992; Wilkins, 1992). Although there is agreement on the existence of a separate domain, different perceptions exist as to the nature, scope and issues of relevance to the field. The construct of a well defined domain is necessary for evaluating the relevance of theory and empirical contributions to an established body of knowledge. It is believed, however, that the diversity of perspectives may represent a healthy development of the discipline (Schollhammer, 1992).

The IS field has, likewise, overcome much adversity in the achievement of respectability as a separate academic discipline (Culnan, 1986). According to Dickson (1981), the period between the late 60's and 1975 is identified as the "take-off" period for the field. Since 1975 the field has been maturing, but this phase is far from complete. As with IB, there are varying perspectives as to the conceptual domain that defines the field (Nolan & Wetherbe, 1980; Culnan & Swanson, 1986). Based on a recent analysis of IS research, Cheon, et.al. (1992) conclude that the IS field is increasingly being recognized as distinct with its own cumulative tradition.

The historical development of both the IS and IB fields of inquiry have followed similar paths. Both are interdisciplinary and integral parts of the functional business areas. Both are eclectic in nature and pull on several reference disciplines making it difficult to define the specific domain boundaries. Differences in perspectives of the two fields are also quite clear. The linkage between these two fields, however, is no longer debatable. Continued trends toward a more interdependent world economy place added demands on the IS function to both facilitate and provide solutions for business activity on an international scale. The firm's information systems "provides the glue that ties it all together (Emery, 1990)." Advancements in information technology and strategic applications provide a means for obtaining competitive advantage in an international setting. Research that links these two domains of inquiry will clearly make a contribution to both fields and provide deeper insights and a better understanding of relevant international IS issues.

The discussions that follow assume familiarity with the IS academic literature foundations. The focus is from the perspective of providing the IS academician with relevant background from international business in an effort to promote a better understanding of the interface that defines the relationship between these two fields. The interface research will be derived from definitions

and policies that have evolved over time from both fields. The intent here is to provide background definitions and established norms that represent the international business field of study.

International Business Research

Any attempt to identify the research bounds that define the interface between international business and information systems must necessarily provide a well established definition for international business research. According to Nehrt, Truitt, and Wright (1970), international business research involves scholarly investigation that meets the following criteria:

1. It is concerned with firm-level business activity that crosses national boundaries or is conducted in a location other than the firm's home country.
2. It is concerned with the interrelationship between the operations of the business firm and international or foreign environments in which the firm operates.
3. It does not include studies devoted to economic development, development planning, foreign trade, and the international monetary system, which belong to development and international economics. Excluded also are studies of foreign legal, political, economic, and social environments. These belong to the fields of law, political science, economics and behavioral science unless the study itself relates the environment directly to the organizational, operational, or decision-making problems of international business firms.
4. It does not include studies of business activities in given foreign countries. A study of marketing channels in Turkey, whether it be done by a U.S., French, or Turkish professor, is still a study about domestic business in Turkey.
5. As an exception to point 4, however, comparative business studies are included within this definition. For example, a study of pharmaceutical marketing channels in Germany, Italy, Brazil, and Japan, which makes comparisons and analyzes the causes and effects of similarities and differences, would be considered international business research even though it is not concerned with the relationship between the marketing channels within each country and international business firms. This definition explicitly recognizes the multinational enterprise (MNE) as the primary focus of IB research in the context of operating within multiple environments.

This definition also recognizes that the study of an international environment excluding the MNE, is not within the IB research domain. Although studies which describe how business is conducted in one country are not considered IB research, comparative studies are. This definition is reflected in the most recent policies of the Academy of International Business (AIB), the main organization for international business academicians. For more than twenty years, IB research has been guided by this foundation definition.

Miller & Bhatt (1979) describe international business research as having unique characteristics which may be interpreted as both strengths and constraints for the field. As a field, IB attracts scholars from other functional areas as well as other disciplines. This has been both an asset in terms of enrichment as well as a source of difficulty in terms of systematic integration of research findings. The diversity of methodologies and theoretical frameworks constrain the development of a well defined IB research domain. As the field continues to mature, however, research efforts have become more integrated, guided by theoretical constructs/underpinnings, and more analytical, quantifiable and testable.

As noted by Schollhammer (1992), different research questions and conceptualizations have evolved over time and established dominance in terms of guiding the development of a stream of analyses of international business phenomena. Research issues of the 60's centered around differences between firms operating in a single nation and those involved in international business transactions. The question of the 70's shifted to concerns that focused on the reasons that firms establish international operations or expand their existing international business activity. A dominant focus of international business studies since the mid-80's has shifted to the strategic choices of firms involved in international operations and the resulting effect on firm performance and competitive position. As stressed by Schollhammer (1992), each of these questions has provided the impetus for competing theory and a wide array of empirical studies. Clearly, the dominant IB research themes today have particular relevance for IS research. Information technology applications cannot be overlooked as an integral component of the firm's strategic planning and measure of performance.

Although an attempt has been made to define the bounds for IB research and in turn exclude particular domains, it is clear that many topics are important to the field of international business. It has recently been reported in the *Journal of International Business Studies*

(Ricks, 1991) that "the core of international business research deals with the multinational enterprise, the exporting or importing firm, and the problems which are encountered by these firms." Topic areas that were identified as having particular significance include: the theory of the MNE; the role of the MNE; MNE versus domestic corporation issues; government-MNE issues; the problems of managing international trade; and functionally oriented topics such as international marketing management. Interface research that addresses one or more of these problem areas was also recognized as relevant and strongly encouraged.

The Information Systems / International Business Research Interface

Several research frameworks have been developed to define the research bounds and provide direction for IS research endeavors (Dickson, Senn, & Chervany, 1977; Mason & Mitroff, 1973; Nolan & Wetherbe, 1980; Ives, Hamilton, & Davis, 1980; Culnan & Swanson, 1986). These models vary in scope and orientation. Although external variables are recognized (Nolan & Wetherbe, 1980; Ives, Hamilton, & Davis, 1980), none of these models distinguish variables specific to the international business operating environment. A model developed by Deans & Ricks (1991) extends the traditional domestically oriented IS research frameworks to include variables specific to the international environment. In their model, the authors distinguish between foreign, international and domestic components of the firm's external environment. The domestic (e.g., U.S.) environment denotes operations within the firm's home country. The foreign environment represents business activity in each host country in which the firm operates. It may be necessary to coordinate business activities across many foreign environments. The international environment represents the *interaction* of environmental forces between the home and host country. An array of political, economic, cultural, legal and technological variables may complicate business activity in the context of these environmental constraints.

The IS / IB research interface is depicted graphically in Figure 1. Both the IS and IB fields of study have developed their own unique core identities (represented in Figure 1 as domains I and II). The intersection of these areas, represented by domain III, denotes the interface of the two fields. It should be recognized that the IS / IB interface represents the same boundary for both IS and

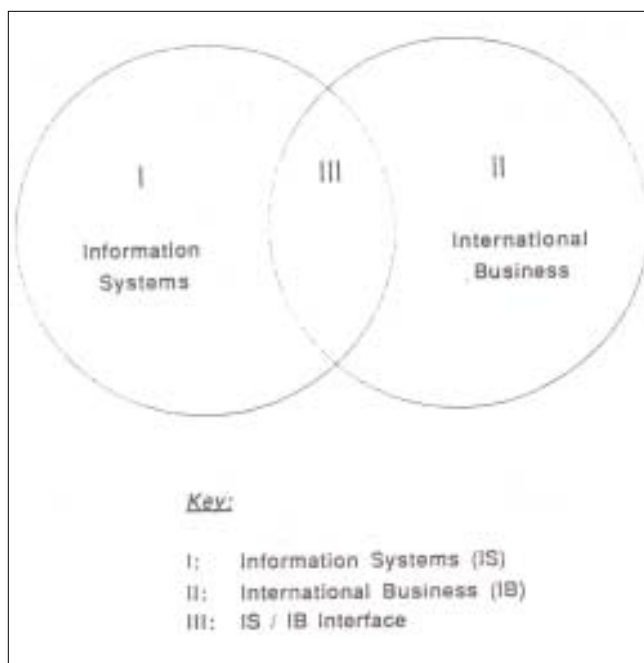


Figure 1: Information Systems/International Business Research Interface

IB academicians. The interpretation of this interface, however, will depend on the research perspective. Differences in academic orientation for IS and IB researchers will likely result in two varying perspectives on the definition of this interface. Rather than be a hindrance, this should add richness to the established body of research as it develops. This international component is only now being developed and defined. Its domain will evolve over time as more attention is devoted to relevant research issues and refinement by both IS and IB academicians. Input from the business community will be necessary in this evolutionary process.

The IS / IB interface represents the international dimensions defined for the IS functional area of business. In a broad sense, the international dimension of IS will encompass all domains in which information systems and technology affect or could affect international business operations. From an IB perspective, the role of IS may be viewed as a facilitator of information flows across national borders. The IS function provides the technological infrastructure for the processing and dissemination of information. In addition, information technology provides the means for obtaining competitive advantage in an international business setting. For the MNE, the IS domain may play a potentially significant part in solving many of today's international managerial challenges.

In an effort to move toward a better defined international IS component, it is necessary to identify the theoretical, methodological and application linkages

from the international business domain that will contribute to the development of this stream of research as it matures. These aspects will be discussed in the following sections.

Theory

International business and information systems are maturing as fields of study in a similar manner. Although the IB field has developed a stronger theoretical base than IS, not all theory has stood the test of time. The IS field is only now beginning to focus efforts toward theory building and testing. The paucity of IS oriented theory was recently recognized in a study of IS publications (Alavi & Carlson, 1992) by the small number of theoretically oriented articles. As theory development progresses for both fields, stronger theoretical frameworks may evolve for the interface of these two areas.

IB offers theoretical underpinnings that may be relevant for international IS research. The IB field has developed its own set of core theories that have evolved over time to explain foreign direct investment (FDI) and the behavior of the MNE. These theories help give the field its own individual identity. A summary of the dominant IB theoretical traditions is provided in the following paragraphs. This discussion will provide the IS academician with some background knowledge of the development process and current thought patterns in IB theory development. More detailed explanations and criticisms of these theories can be found in (Calvert, 1981; Buckley, 1985; Itaki, 1991).

The Hymer (1960)-Kindleberger (1969) tradition represents the core theoretical explanation of FDI. This theory is based on the premise that in order to compete in local markets and engage in FDI, foreign entrants must possess some compensating advantage. The rationale, therefore, rests on two prerequisite conditions: 1) foreign firms must have an advantage over local firms and 2) markets for these advantages are imperfect (i.e., imperfections in the goods market, imperfections in the market for factors of production, existence of internal and external economies of scale, and government imposed disruptions). FDI could not exist in a perfect market because local firms would always be able to out compete foreign competitors. Company specific advantages might be exploited through technology, information, economies of scale or management skills. FDI is usually the preferred means for exploiting the advantage.

Several additional theories have emerged over time that represent a variety of perspectives. Aliber's (1970-

71) Currency Area Phenomena represents a variation of the Hymer-Kinderberger view. This theory is based on the premise that MNEs have an advantage over host country firms in international financial markets. When risk of change in the foreign exchange rate exists, firms with the strong currency are at an advantage and are stimulated to invest in the weaker currency area. The assumption is that the foreign investment is in the same currency as the parent investments. Firms holding varied currencies must be aware and manage the risk associated with exchange rate fluctuations.

Aharoni (1971) takes a Behavioral Approach to explaining the presence of FDI. This theory explains investment by dependence on chance stimuli and the resulting management decision process. Oligopolistic Reaction (Knickerbocker, 1974) is based on the view that a business will expand its operation to a foreign location when it faces the threat of its product being eroded. It engages in FDI to expand its market and increase its power base. Diversification is still another means by which FDI is explained. Diversification of Products (Caves, 1971) is based on the premise that firms should diversify production output in order to gain market control. Portfolio Theory (Stevens 1974; Lessard, 1979) contends that the multinational firm holds a diversified portfolio to protect its business risk. There are two prerequisites to portfolio theory: 1) barriers to portfolio capital flows must exceed FDI flows and 2) investors must recognize that MNEs provide a diversified vehicle which would otherwise not be available. Vernon's Product Life Cycle (1966, 1979) suggests that firms become multinational as a result of "globalization" of their products. As a product moves through stages of its life cycle (i.e., growth, maturity, standardization) it is associated with a corresponding international trade and investment cycle. This theory has lost some of its explanatory power in recent years, but is still useful in explaining some categories of FDI. Finally, Magee's Appropriability Theory (1976) attempts to explain FDI through the ability of originators of ideas to collect rent from their development or research. The focus is on the creation and control of valuable information {technology}. Since sophisticated technologies are less prone to imitation, MNCs are more successful in appropriating the returns from these technologies than from simple ones.

Although no comprehensive generally accepted theory of the MNE has evolved, two contenders for a general theory are debated in the literature. One of these two theories is the theory of internalization (Williams, 1975; Coase, 1937; Buckley & Casson,

1976, 1981, 1982, 1983, 1985). Internalization recognizes that the firm engages in other activities besides the production of final goods and services (i.e., developing labor skills, marketing, research and development). Markets for these intermediate products are difficult to organize and suffer from imperfections. Hence, the firm might benefit by internalizing these intermediate products and use them where profitable. Dunning (1977, 1979, 1980) expands the internalization theory in his well recognized Eclectic Theory. Three strands of economic theory are integrated in an effort to explain the firm's mode of entry into foreign markets: 1) ownership advantage 2) internalization advantage and 3) location specific advantage. Dunning argues that the firm will engage in FDI if all three advantages are present. If only ownership and internalization are present, the firm will export its product. Licensing or franchising will be the feasible alternative if the firm only has ownership advantage.

Differences in views of the domain of international business have resulted in this diversity of theories (Schollhammer, 1992). Each theory has its limitations and critical assessments are debated in the literature (e.g., Itaki, 1991; Dunning, 1988). As theory development progresses, there is a need to examine the role of information technology and the processing and control of information in the context of these theoretical foundations. Egelhoff (1991) calls for a macro approach to building theory with an information processing perspective that relates organizational design to environmental and strategic conditions facing MNCs. Advantages that accrue to the MNE as a result of internalization may be a direct or indirect result of IT applications. Buckley (1985) recognizes information as an internal product and important synthesizing element. Information technology continues to gain increased recognition as a means by which the firm can gain competitive advantage. Little work has focused on the role of IT and information processing and control advantages from the perspective of explaining behaviors of the MNE and the impact on FDI decisions.

Methodology

It is generally recognized that IB research is more complex than research conducted in a strictly domestic setting. Douglas and Craig (1983) attribute a number of factors to the increased difficulty of international business research:

1. involves a diversity of modes of operation

2. wide variety of environmental contexts
3. linguistic heterogeneity and translation problems
4. diversity in cultural values that result in differences in perception and sensitivity to disclosure of information
5. lack of available secondary data in some countries
6. high cost of collecting primary data
7. collecting and coordinating research in different countries
8. difficulty of establishing comparability and equivalence of data collected in different contexts
9. compatibility of data

From a methodological perspective, differences between domestic and international research emerge in the area of data collection rather than in data analysis. In general, the techniques and tools available for data analysis are basically the same for both. The available options may be more limited and the challenge of interpreting the data may be more difficult in international studies. The core problems, however, involve the task of obtaining honest, complete and reliable data in many national settings.

Douglas and Craig (1983) describe the problems associated with international data collection in terms of credibility, generalizability, and comparability. Credibility concerns focus on how the data is collected, the reliability of data record keeping and interpretation, and the timeliness of the data collected. Respondent bias may be more pronounced in international studies due to a variety of cultural constraints. In some environments there may be different legitimization as to who can express opinions. There may also be different perspectives on the disclosure of sensitive information. Obtaining reliable respondents and administrators is more difficult in some settings. Generalizability beyond the test sample may be difficult due to differences in demographic characteristics. Comparability in terms of equivalence of sampling units, instrumentation, variables, and the data collection situation may be more pronounced in international studies. Some of these problems have become less pronounced in recent years with the advent of more sophisticated data bases and the availability of technological advances to aid in these areas. Efforts are being made to improve the availability and quality of international data.

It is necessary to be aware of data collection obstacles that may arise in international research studies that do not exist in domestic studies. The cost of data collection may be considerably higher depending on the

data collection conditions. Survey research may necessitate questionnaire translation. International postage is more expensive and the time lag for collection is much longer. Return postage for replies, second mailings, and respondent incentives may pose particular concerns that are not problems for domestic studies. Interviews either by phone or travel to the site are clearly more costly. The need for collaboration of data collection across countries requires reliable contacts in these locations.

Research design considerations are also more complex for multi-country, cross-cultural studies. In nearly all dimensions (i.e., data identification, data location, data collection and data interpretation) the task is more difficult. It may, for example, be more difficult to operationalize the variables under consideration. The benefits, however, of carefully planned, well managed collaborative research projects can be substantial. Recognizing the potential pitfalls and added complexities in the initial planning phase may save time, cost and effort in the long run.

As is true of the IS field, IB research has shifted over time to stronger and sounder methodologies and to more quantitative methods. Methodological pluralism is encouraged by both IS and IB academicians (Behrman, 1992; Orlikowski & Baroudi, 1991; Alavi & Carlson, 1992). Behrman (1992) argues that IB is a holistic field and can, therefore, borrow appropriate methodologies from any discipline. Alavi & Carlson (1992) also recognize the need for a variety of research methodologies that may provide new avenues for gaining insights. The complexity of both the IS and IB research domains may lead to new methodological approaches for addressing the issues that comprise the interface of the two fields.

Application

Trends in both international business and information systems research have tended toward practical applications to explain an array of business phenomena. A recent study of IS research trends (Alavi & Carlson, 1992) substantiates close association of IS research with practice. IB research has, likewise, tended toward real world "problem driven" studies. Hennart (1992) suggests that this responsiveness of IB research efforts to changing circumstances represents an advantage for the development of the field.

Alavi and Carlson (1992) report results analyzing the coverage of IS topic areas between the period 1968-88. The results show a scarcity of publications on "the topics of external environment (economic, legal, social,

and political environments), technological environment (hardware and software) and organizational environment (organization dynamics, structure and task characteristics).” The authors suggest that more contributions are needed to address issues pertinent to these domains. Any of these areas might be extended to incorporate issues relevant to the international business environment.

Interdisciplinary research is strongly advocated by academic leaders in international business (Dunning, 1989; Daniels, 1991). Dunning (1992) stresses the need for “the assets of a core discipline to be combined with the complementary assets of related disciplines.” Only through these efforts can a holistic explanation of international business be achieved. Daniels (1991), likewise, recognizes the importance of interdisciplinary research to address many of the cross-functional issues and problems encountered in IB research. In particular, he advocates linkages through 1) basic and developmental research; 2) connections between past and present research; 3) cooperation among international and non-international specialists and 4) collaboration among scholars in other countries. The value of collaboration between IB scholars and those of other functional areas is strongly encouraged. Cooperation with scholars in other countries may add particular richness to research endeavors.

Academicians from both IS and IB are calling for a balance between research rigor and relevance for the future (Daniels, 1991; Alavi & Carlson, 1992). It is necessary that this relevance be extended to the business school curriculum. Behrman (1992) emphasizes the importance of responding to the potential audience which includes students, the business community, and government. A stream of research that merges IS and IB will clearly make a contribution toward the attainment of many of the objectives currently being expressed by both the IS and IB academic communities.

International Moderating Variables

A discussion of interface research between the IS and IB fields is not complete without some explanation of international variables that may play a part in this work. A number of variables are important for international business research that may not be relevant for domestically oriented studies. Several international moderating variables have been identified through previous international IS research (Deans et. al., 1991) that suggest inclusion in future studies. Relevant examples are described in the following paragraphs.

The firm’s *strategy for managing foreign operations* (i.e., multinational, international, global) has been recognized as an important moderating variable in international IS studies (Ives and Jarvenpaa, 1992). These strategies can be described along a continuum from multi-domestic, in which companies compete independently by country, to global, in which competition takes place on a truly worldwide basis (Deans & Kane, 1992).

Level of International Involvement has been represented in various ways in the literature. Saudagaran (1988) operationalizes this variable in terms of total foreign sales / total worldwide sales, foreign assets / total assets, and foreign employment / total employment. Kogut and Singh (1988) utilize multinationality (number of countries in which the firm operates) and U.S. asset size and non -U.S. asset size. The variable chosen to represent international business activity will depend on the study to be undertaken and its appropriateness to the issue being studied.

The *number of foreign subsidiaries* has also been suggested as an important moderating variable. Foreign direct investment requires direct participation in the management of the foreign enterprise and, therefore, becomes a contributing factor in the consideration of international IS issues. A firm may be involved in international business activity (i.e., exporting and importing) and not have a direct foreign investment. Many service firms fall in the category of having considerable international business activity, but not having a foreign direct investment.

The *location of foreign subsidiaries* may be a more significant variable than the number of subsidiaries. The specific location and distribution of foreign investments worldwide will influence the degree to which various concerns will be important. *Multinationality* is defined as the number of countries in which the firm has subsidiaries. Operations in many countries result in a multiplicity of regulations, cultures, and economic and political environments. This factor complicates the effective implementation of global information systems. The variables or combination of variables to be considered will depend on the nature of the work under study.

International experience has also been determined to warrant consideration (Terpstra and Yu, 1988). The firm’s previous international business experience may influence its approach and reaction to various issues. Likewise, the company’s experience with the implementation of information systems and technology internationally deserves consideration in some studies. Previous work (Deans et. al., 1991) suggests that technology transfer internationally lags that of the domestic counter-

part. There is further evidence (Cash, et. al., 1988) that managerial factors and control become more significant as the firm moves through various phases of technological learning.

Variables that are specific to the company including (e.g., *size, type of industry, business strategy*) may also be significant in international IS research. In particular, the interrelationships of these variables to other international variables may warrant examination. Organizational characteristics specific to the firm's international operations have been identified that should be considered in future studies. Previous work (Deans et. al., 1991) suggests that the tradeoffs for the firm's *data processing* (i.e., centralized, decentralized, distributed) may be different for domestic versus international operations. Other characteristics such as *international organization structure* (i.e., international division, geographic area, functional area, product area, matrix) and the *strategic impact of information technology* to the firm may be affected by the available IT support that is available.

International IS research must of necessity take into consideration an array of country-specific variables that may not be encountered in comparable domestic (U.S.) studies. Each country of operation has a unique set of legal, political, economic and cultural dimensions that may vary considerably from other countries in the firm's portfolio of foreign operations. From a technological perspective, variables such as the existing technological infrastructure, price and quality of telecommunications support in the country, and the availability of qualified IS personnel will play a role in assessing the alternative global IS and networking options available to companies.

A Research Agenda

There is a need for an international IS research agenda that builds on relevant past foundations and reflects the realities of a new and evolving business environment. It is imperative that this research have value for academicians who are advancing knowledge while at the same time be extended to a practical level that addresses the real world challenges of IS managers. It is also necessary that relevant work be incorporated into the curriculum.

A basic framework that provides structure for this agenda is presented in Figure 2. This framework recognizes four levels of research activity generally addressed in a business context. Research on all levels requires

Research Level	Information Systems / International Business Interface
Theory	Relevant Theory
Theory / Application	Dominant Research Themes
Practical	Relevant Issues
Curriculum	Infusion of research into the curriculum

Figure 2: A Framework for an Information Systems (IS) / International Business (IB) Research Agenda

theoretical underpinnings that provide focus for the work that is undertaken. Theoretical research is aimed primarily for the academician. The second level denotes research that is empirically based and may be directed toward both the academic and practitioner audience. There is also a need for work that builds stronger ties with the business community and addresses issues from the purely practitioner perspective. Work on the curriculum level is based on the premise that research provides the foundation and input for curriculum development. There is clearly a need to better define the international component for the information systems field and the most appropriate means by which to incorporate this dimension into the curriculum.

This framework can be used to identify theoretical foundations, dominant research themes, and relevant practical issues for research activity. The framework represents an iterative process. As relevant theory is tested in empirically based studies, specific issues may be uncovered that have practical relevance. Finally, it is appropriate that the accumulation of knowledge through research efforts be filtered back into the curriculum. A research project might be identified that lends itself to movement through each of these levels. Alternatively, projects that address one level in this overall scheme are appropriate if the link to other levels can be demonstrated. This structure provides a means for research efforts that reflect integration and build on previous work.

The nature of both the IS and IB fields of study reflect diversity and encompass a wide spectrum of research topics. This diversity will be reflected in the research opportunities identified for the interface of these two areas.

An Example Using the Framework

The framework presented in the previous section may be used as a basis for planning a research project that maximizes available resources and long term benefits. The high cost of international research in terms of dollars, time and effort requires careful up-front planning. For descriptive purposes, a broad-based empirical research project (Deans, et.al., 1991) designed to identify key international IS issues for U.S.-based multinational corporations will be used to illustrate the use of this framework. This example is referenced in the following sections.

Theory. Theoretical constructs for the Deans et. al. (1991) study were derived from the international business literature. A theoretical model was developed (Deans & Ricks, 1991) to drive the research study. This model is based on four categories of environmental constraints - educational, social-cultural, legal-political, and economic (Farmer & Richman, 1970). These dimensions represent the foundational base for the international business discipline. A technological dimension introduced by Skinner (1964) was also deemed appropriate and is included in the model. International IS issues identified from this study are then categorized based on the identified dimensions of the model.

An empirically-based research project may be designed in such a way that the results may be positioned both toward theory enhancement and/or testing as well as incorporate an application component. Theory development may also be accomplished as an individual focused task. Identification of relevant theoretical constructs to drive a research project may be appropriately derived from various reference disciplines.

Theory / Application. Theoretically driven research extended to an application level is typically aimed toward an academic audience. This is primarily a consequence of sophisticated methodological rigor and quantitative statistical techniques required of many academic journals. The Deans et. al. (1991) study identified a number of unique international IS issues and recognized several statistical relationships among the issues and variables under investigation (e.g., level of international involvement, industry type). This study was guided by the following research questions:

1. What are the important international IS issues for U.S.-based multinational corporations?
2. What is the relative importance of these identified issues?
3. Does the importance of the issues vary for multinational service and manufacturing firms?

4. Does the relative importance of the issues vary depending on the firm's level of international involvement (defined as foreign sales / total corporate sales)?

The results of a study of this nature may uncover new avenues to be explored on all levels represented by the framework. In particular, these results may lead to further examination of issues that flow to the practitioner and curriculum levels.

Practical. Issues identified through the Deans et. al. (1991) work might be studied from a purely practitioner perspective. For example, MNCs face additional obstacles as a result of dealing with the Postal, Telephone, and Telegraph (PTT) companies in other countries. This issue is one that would not be encountered by a firm operating only in the United States. It is also an issue that varies considerably from one country to another. The PTT issue can be studied in greater depth to provide insights and specific recommendations for practitioners. A focused study of this issue might be approached as an extension of the previous broad based research using the results of that study as initial input.

Appropriate research questions to address this issue might include the following:

1. What is the role of the PTTs in other countries?
2. What are the significant concerns / obstacles for U.S.-based MNCs operating in PTT regulated countries?
3. What are companies doing to address these concerns?
4. What are the implications for the U.S.-based MNC?

This study might be extended to include foreign-based firms operating in the United States as well as foreign multinationals. Research that represents several levels of analysis is recognized as a richer study. As a second example, International IS Planning was also identified as an issue having particular relevance for the practitioner. IS executives expressed an interest in learning more about what other companies are doing in this realm of business activity. Considerable literature has accumulated on IS planning from a domestic (U.S.) perspective. Research addressing this issue is intended to extend the literature base to incorporate the international dimension.

Appropriate research questions to address this issue might include:

1. What is international IS planning? What are the international dimensions that must be considered in planning for global information systems?

2. What are the barriers to an international IS plan?
3. Do MNCs have separate planning arrangements for their global IS as opposed to domestic planning?
4. Does international IS planning become more important with increased international involvement? From a practical perspective, a number of other relevant issues might be investigated in a similar manner.

Curriculum. On the curriculum level it is necessary to determine the most appropriate means for incorporating research findings into curriculum design. Currently, a majority of IS curriculum resources are void of an international component. International IS issues have only recently been incorporated into the traditional IS texts (Zwass, 1992). Supplementary texts devoted to international IS issues have only become available

within the past year (Deans and Kane, 1992; Palvia, Palvia and Zigli, 1992; and Roche, 1992). Until very recently (1991) there was a complete void in the available literature and, therefore, resources for curriculum enhancement were not available. The objective of work conducted on the curriculum level is primarily for the purpose of taking the research and information that has accumulated and filter it back into the curriculum. The supplementary international IS text by Deans & Kane (1992), for example, is based on information obtained from research described for previously discussed levels of the framework. It is imperative that research proceed through this process in an iterative manner. As more research and information becomes available it will provide the input for further curriculum development.

Research Level	Information Systems (IS) / International Business (IB) Interface
Theory	<i>Relevant Theory:</i> Internalization Theory Eclectic Theory Information Processing Theory
Theory / Application	<i>Dominant Research Themes:</i> Transfer and Management of Information Technology (IT) In MNCs Impact of IT on Organizational Change in the MNE Planning for Global Information Systems End-User Computing in a Global Setting Global Strategic Implications of IT Telecommunications and Global Connectivity Transnational Flows of Data and Information International Integration of Technology International Applications for Decision Support / Expert Systems Global Information Management Global Competition and the Role of IT The Role of the CIO in a Global Environment International Data Security and Utilization International Interorganizational Systems International Quality Management and the Role of IT International IS Ethical Perspectives
Practical	<i>Relevant Issues:</i> Transborder Data Flow Restrictions International Implications of Electronic Data Interchange (EDI) Postal, Telephone and Telegraph (PTT) Regulations International Implications for ISDN Trends in International Telecommunications Standards Software Development for International Applications Recruiting and Training Expatriate IS Personnel Legal Restrictions on Hardware / Software Acquisition International Tradeoffs for Centralized versus Decentralized Systems The Impact of IT on Organization Structure International Disaster Recovery Plans
Curriculum	Industry and Academic Consensus on an International IS Component Identification of Relevant IS / IB Topics for Infusion into IS Courses Teaching Methodologies for Internationalizing the IS Curriculum IS Curriculum Trends in International MBA Programs Trends toward Internationalization of IS Ph.D. Programs International Emphasis in IS Curriculum Guidelines Studies of IS Curriculum in Foreign Schools of Business Trends Toward Internationalizing the IS Curriculum in U.S. Schools of Business

Figure 3: A Framework for an Information Systems/International Business Research Agenda

Given the rapid changes in the international operating environment and with information technology, this process will provide for continual update in this dimension of the curriculum.

Curriculum research can be enriched through studies that include foreign schools of business. It is also necessary that curriculum research incorporate input and feedback from the business community. There is clearly a need for IS curriculum research that addresses all these dimensions.

Relevance of the Framework for Identifying Research Topics

The framework just presented may be used as a means for identifying relevant research themes and issues for research. It should be recognized that this framework only provides structure for identification of research topics. The list of research topics presented in Figure 3 is not intended to be complete, but to represent current issues of significance as indicated by recent research and interviews with IS executives and academicians. Dominant themes and issues will change over

time. Figure 3 provides a starting point from which to establish a stream of research that draws from previous work and recognizes the value of integrative research efforts.

Implications for Interdisciplinary Linkages

The framework presented and discussed in the preceding sections may be extended to incorporate work that links the IS / IB interface with the firm's major functional business areas. Considerable research and curriculum development in international business have been done within a functional business area (e.g., international marketing, international finance). Likewise, research and curriculum development in IS have been extended to incorporate issues relevant to the firm's functional areas (e.g., accounting information systems, marketing information systems). As depicted in Figure 4, it follows that IS issues relevant to marketing, finance, accounting, etc. also have international components that may be unique and require investigation in this context. Currently, the literature is practically void of research efforts represented by domain VII in Figure 4. As research addressing the IS / IB interface progresses, studies that incorporate these additional domains will be necessary.

Conclusions

This article has provided the IS reader with a structured framework from which to proceed in developing a research focus that interfaces the IS and IB research traditions. A research agenda that provides a starting point from which to build through future research efforts is presented. Interdisciplinary work will be necessary to adequately address the complex issues that characterize the IS / IB interface. Collaboration among academicians from both IS and IB will add a richness to the research under study. The IS / IB interface offers the researcher a challenging and intellectually stimulating area of academic investigation. Clearly, the opportunities for research are immense.

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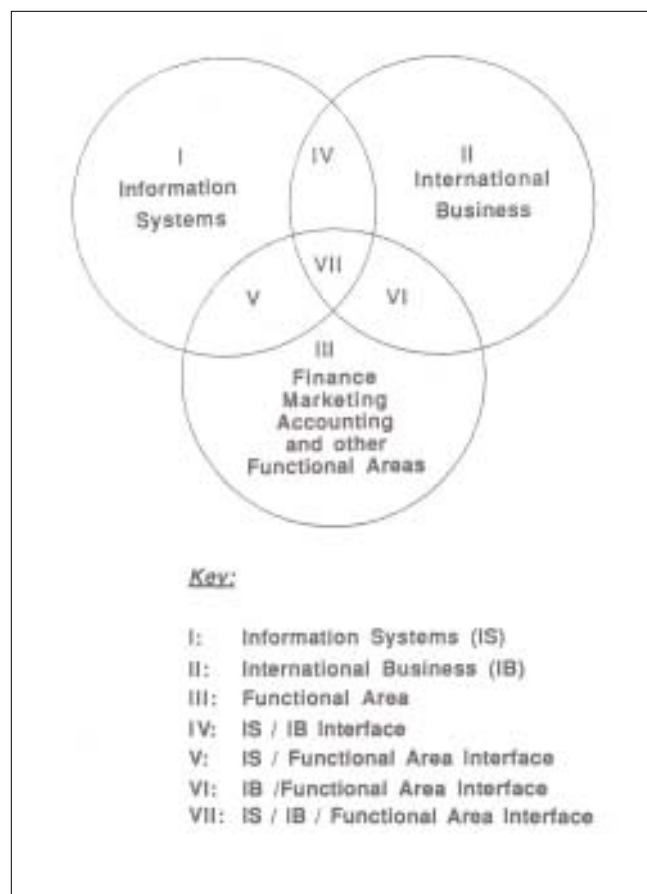


Figure 4: Extended Information Systems/International Business Research Interface

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