The Impact of Computer Alienation on Information Technology Investment Decisions: An Exploratory Cross–National Analysis

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Abstract

Organizations in both developed and developing countries use information technology to support their operational, tactical, and strategic processes (cf., Bogod, 1979; Cooper and Zmud, 1990). Any strategic competitive advantage of information technology, however, is contingent on acquisition and assimilation of information technology products and applications into organizational processes. Using a value expectancy approach, this study proposes an expanded model to examine the variables that correlate with information technology investment decisions. The theory of alienation from social psychology is used as a basis to systematically define and measure decision makers' attitudes and internal beliefs toward information technology in an investment context. Detailed discussion of the development of a computer alienation measurement scale is presented. The scale was used to collect data from 97 decision makers in the United States, a developed country, and Saudi Arabia, a developing country. Results provide empirical evidence on the appropriateness of applying the computer alienation construct to computer purchase decisions. Computer–alienated decision makers were found to be more inclined to resist information technology adoption by refraining from buying computers. This resistance was evident in both the U.S. and the Saudi samples. The study findings also indicate that decision–maker computer knowledge, computer experience, and education level are closely associated with alienated beliefs and attitudes toward information technology. Alienated decision makers reported paying less attention to information technology information sources. Assuming technologies can provide advantages, these findings point to the need for change agents to minimize alienating beliefs and attitudes.

Keywords: Information technology assimilation, alienation, computer alienation, value expectancy theory, cross–culture studies, globalization of information technology

ISRL Categories: AA0701, AA1102, AF10, AF1301, BD05, BD06

Introduction

Information technology can have a profound impact on organizational success. With information technology (IT) assimilation, organiza-

tions can often be more efficient and effective. Of course, this comes at a cost. In manufacturing firms in developed countries like the United States, information technology can absorb over half of a firm's capital expenditures (Cooper and Zmud, 1990). Following the same trend, developing nations rely heavily on computerization to support their development efforts (Bogod, 1979). For example, with favorable financial resources, Saudi Arabia's microcomputer and minicomputer market exhibits growth rates similar to the American market (U.S. Department of Commerce, 1985). In both developed and developing countries, any strategic advantages of information technology, however, are contingent upon real assimilation of appropriate information technology products and applications into the organizational processes. If managers are alienated by technologies such as computers, they will not purchase them for their organization units. This paper investigates the computer alienation construct as related to the decision to purchase information technology. By drawing upon decision makers in both the United States and Saudi Arabia, it seeks to examine cross–national differences in the way the alienation construct operates. Purchase behavior models (Fishbein and Ajzen, 1975; Warshaw, 1980) provide the basis for exploring buying intention. The paper attempts to test the role of alienation and how it might add to or refine one aspect of the theoretical basis set out in these purchase models.

Studies of information technology assimilation have been limited primarily to information technology implementation issues that arise after purchasing and/or developing information technology products and applications (cf. Kwon and Zmud, 1987). Post–purchase or development implementation research has centered around two themes. A group of researchers have studied users' internal beliefs and attitudes that influence acceptance and usage behavior (Davis, et al., 1989; Robey, 1979). A second group has tried to develop an understanding of the impact of external factors such as the system's technical design attributes (Norman and Draper, 1986), systems developer values (Kumar and Welke, 1984), and the influence of organizational characteristics on users' attitudes and internal beliefs (Abdul–Gader, 1990). Both of these research streams have studied assimilation after an investment decision has been made. Since both of these streams are post–purchase or development, there is a need to step back and investigate what motivates a manager to purchase a computer for his or her organizational unit's use or request an information technology application.

Although it could be argued that computer use has become so prevalent that computer alienation on the part of a single decision maker may have little influence on actual purchase behavior, there are several counter arguments. By studying personal views of middle and upper managers in an organizational context, the key informants or decision makers' views of new technology are examined. By putting the investment decision in terms of buying computers for department use, the decision is put in an organizational, not personal context. It is a personal decision that affects the organizational unit. The managers' own belief structure and attitudes (alienation) affect the decision to invest in computers for their organizations. Personal beliefs/constructs influence organizational action. To carry this further, a decision maker exhibiting high computer alienation might be more reluctant to consider investing in or supporting newer, evolving technologies. Thus, understanding alienation will have continuing importance.

The purpose of this paper is to examine decision makers' attitudes and internal beliefs, especially the construct of alienation, with regard to the broader context of information technology investment decisions in both a mature and a developing country. Since information technology attitudes and beliefs such as alienation are psychological constructs that cannot be observed or measured directly, significant difficulties often plague measurement efforts. This measurement effort is advanced by development and testing of a computer alienation scale. Historically, information technology attitude research suffered from two major problems: (1) the lack of a reference theory, and (2) unclear conceptualizations of the constructs (Doll and Torkzadeh, 1989; Goodhue, 1986). Inconsistent and even conflicting findings in

information technology attitude research are a natural consequence of these problems.

For this research, the theory of alienation from social psychology offers a theoretical basis and a systematic means for classifying and measuring information technology attitudes and internal beliefs. Traditionally, social as well as work alienation have been linked to technology artifacts (Lystad, 1972; Seeman, 1975). But not until recently has an alienation construct about computers been suggested (Minch and Ray, 1986; Ray and Minch, 1990). The social psychology literature defines computer alienation as the socially and psychologically induced subjective state of separation from computers. To measure computer alienation, a psychometrically tested scale has been developed (Minch and Ray, 1986; Ray and Minch, 1990).

However, the application of the computer alienation construct as a framework to assess information technology users' beliefs and attitudes is not enough by itself. In the management information systems literature, there is an acknowledged lack of a theoretical link between users' beliefs and attitudes on the one hand and actual behaviors on the other (Goodhue, 1986). Theories and models are needed to provide the necessary links between the feelings of alienation (beliefs and attitudes) and the decision of managers to invest in information technology. This paper proposes such a model based on relevant reference disciplines and tests proposed relationships.

Traditionally, value expectancy models from social psychology have been suggested as a promising theoretical foundation to link beliefs and attitudes to information technology behaviors (Davis, et al., 1989; Hill, et al., 1987). One variation of a value expectancy model is Warshaw's (1980) purchase prediction model. Unlike the widely researched theory of reasoned action developed by Fishbein and Ajzen (1975), Warshaw's model is designed to predict purchase intention and behavior. The model fits with studying the variables that influence information technology investment as a special case. Warshaw's (1980) model and the computer alienation framework are integrated in this study to provide a computer purchase model.

This paper begins by describing the main characteristics of the computer purchase intention model. The following section reviews relevant value expectancy models and demonstrates the appropriateness of applying the computer alienation construct to computer investment decisions. Given this background, the impact of computer alienation on computer investment decisions in both a developing and a developed country is investigated. Hypotheses also are formulated, focusing on a number of individual–level variables that have been identified in the literature as correlates to computer alienation. The subsequent section describes sampling, data collection, measurement, and data analysis procedures. The final section presents the results, discussion, and conclusions.

Computer Purchase Model and Hypotheses

To understand the link between attitudes and resulting behavior, researchers have been using value expectancy models across a variety of areas including family planning, consumer behavior, voting, and persuasive communication (Ajzen and Fishbein, 1980). Information technology behavioral research has adopted variations of value expectancy models to predict decisions to use computers (DeSanctis, 1982; Hill, et al., 1987), to predict and explain technology acceptance (Davis, et al., 1989), and to study user satisfaction (Bailey and Pearson, 1983).

The theory of reasoned action (Fishbein and Ajzen, 1975) is one of the more established and popular of value expectancy models. This theory rests on the premise that psychological responses intervene between social forces and individual actions. Both attitudes (A) and social norms (SN) are hypothesized to be independent parallel causes of behavioral intention (BI). Behavioral intention, in turn, is assumed to be highly correlated with actual behavior (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975). The relationship between intention and behavior has been confirmed by field and experimental studies (Burnkrant and Page, 1982)

According to Fishbein and Ajzen's model, an intention to purchase a computer precedes the actual purchase. The intention to purchase can be expressed as a simple linear weighted sum of a person's attitudes toward computer purchase (A) and the individual subjective assessment of the social acceptance of investing in computers (SN). In essence, before a person would actually buy a computer, he/she would have some degree of intention to perform this behavior (BI), which is based on both how he/she feels personally (A) and how others see this intention to buy (SN). For example, even if a person had a strong personal desire (A) to buy a luxury, but environmentally unsound automobile, social pressure (SN) from environmentally active and respected colleagues might reduce the summative effects of buying intention (BI) that could result in no actual purchase. Likewise, social pressure (SN) could be so great that others could influence a buying decision even if the person had a low personal desire. Thus:

$$BI = (A) + (SN)$$

Where:

BI = Behavior Intention—the subjective probability of performing the behavior.

A = Personal Attitudes toward the behavior—the evaluative or affective dimension of performing.

SN = Subjective Norms toward the behavior—an indicator of the person's assessment of the beliefs of people who are important to him or her about performing the behavior.

The theory of reasoned action traces the causes of the behavior through a series of mediating processes to the individual's beliefs. The person's beliefs about the outcomes of behavior determine the attitudes (A), whereas beliefs about social acceptance of the behavior determine the subjective norms (SN). Attitudes (A) and subjective norms (SN) collectively determine behavior intention, which leads to the actual behavior. The conceptual framework relating the model constructs is depicted in Figure 1.

In spite of its wide and continued use, the theory of reasoned action has received criticisms concerning its causal structure (Liske, 1984), attitude determinants (Miniard and Page, 1984), and specific context applicability (Jamieson and Bass, 1989; Warshaw, 1980). Of particular relevance to this study are Warshaw's recommendations (1980) to improve the predictive power of the theory through developing more contextual models.

Because of its general nature with its original structure and beliefs based on measurement recommendations, the theory of reasoned action may not be specific enough to model certain behaviors such as purchase situations. The purchase intention model (Warshaw, 1980) proposes a more focused version of the reasoned action theory. It hypothesizes a relation between variables and a change in the way the variables are operationalized in purchase decisions. The purchase intention model has proven successful in predicting and explaining purchase decisions across many product types (Jamieson and Bass, 1989). When compared to the theory of reasoned action, Warshaw's model has shown lower multicollinearity between explanatory variables of the purchase decisions and higher reliability and stability in predicting these decisions (Warshaw, 1980).

Other theoretical frameworks have been proposed to predict and explain human behavior (Ajzen, 1991; Bagozzi and Warshaw, 1990). For these models, the theory of reasoned action (TRA) has been the starting point. Each alternative model was designed to extend, focus, and/or adopt the TRA to fit within a specific context. By focusing on behavioral controls, the theory of planned behavior (Ajzen, 1991) strives to increase the predictability of behavior by making TRA more context specific. The theory of trying (Bagozzi and Warshaw, 1990) emphasizes goal–directed behaviors using TRA as a foundation.

Similarly, Warshaw (1980) has challenged TRA usability in product purchase situations, noting its chronic limitation to predict and explain contextually specific behavior. Warshaw's model

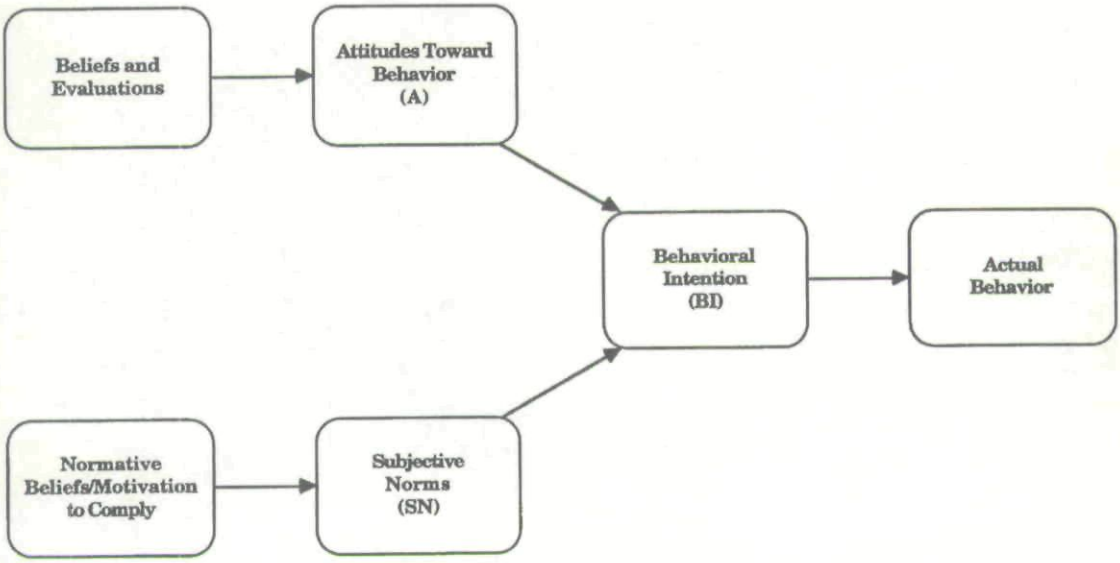

Figure 1. Fishbein and Ajzen Reasoned Action Theory

captures two factors that influence purchase decisions: motivational and non–motivational factors. The motivational factors are subsumed in the person's perceived need (X2), which indicates how willing he/she is to perform the behavior. The non–motivational factors, on the other hand, are the person's assessment of how affordable and how accessible the product is. Both affordability and accessibility determine the level of product purchasibility (X1). A person's motivational and non–motivational factors can collectively predict and explain purchase intention (Warshaw, 1980). The strength of Warshaw's model is in its focus on the purchase situation. Yet, neither the motivational nor non–motivational factors in the model capture an important determinant of computer purchase intention. In other words, the model is not specific enough when it comes to the computer purchase domain.

Based on Warshaw's model, a product purchase intention is postulated as a function of two underlying dimensions—purchasibility of the product and perceived need or desire:

Buying Intention (BI) = Purchasibility (X1) + Perceived Need (X2)

Figure 2 illustrates the determinants of purchase intention based on Warshaw's model. Purchasibility of the product (X1) denotes its degree of "affordability" and "accessibility" to the individual. "Affordability" refers to the resource capability factors that may influence the purchase, whereas "accessibility" points to the availability of the product (Warshaw, 1980). As a second determinant of purchase intention for the product, the perceived need or desire (X2) is dependent on first, the person's own desire and second, on the perceived pressure from others to buy.

Figure 3 depicts an adaptation of the purchase intention model specifically intended to explain computer purchase intentions in an organizational context. Building on the same context–specific argument as Ajzen's (1991) and Warshaw's (1980), the model in Figure 3 postulates that computers are not ordinary. Product fears, frustration, anxiety, alienation, and general negative attitudes often are associated with the computer (Gilroy and Desai, 1986; Howard and Smith, 1986; Ray and Minch, 1990).

According to the model in Figure 3, computer alienation, together with felt need and purchasibility, can be used directly to predict purchase

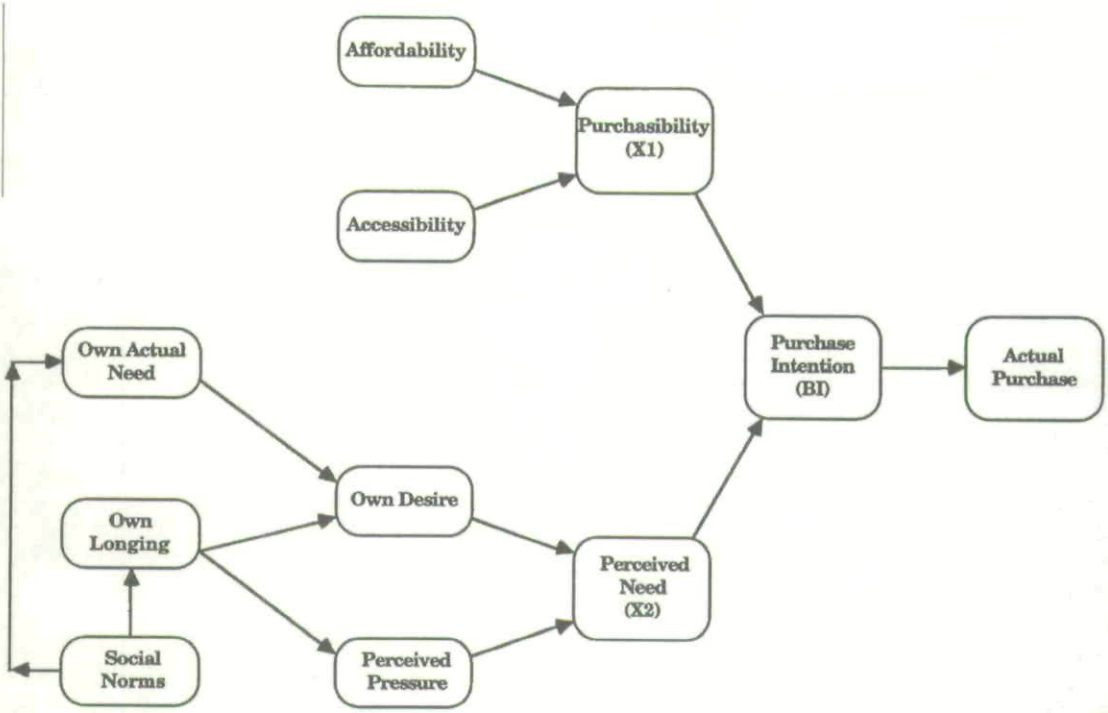

Figure 2. Warshaw's Purchase Intention Model

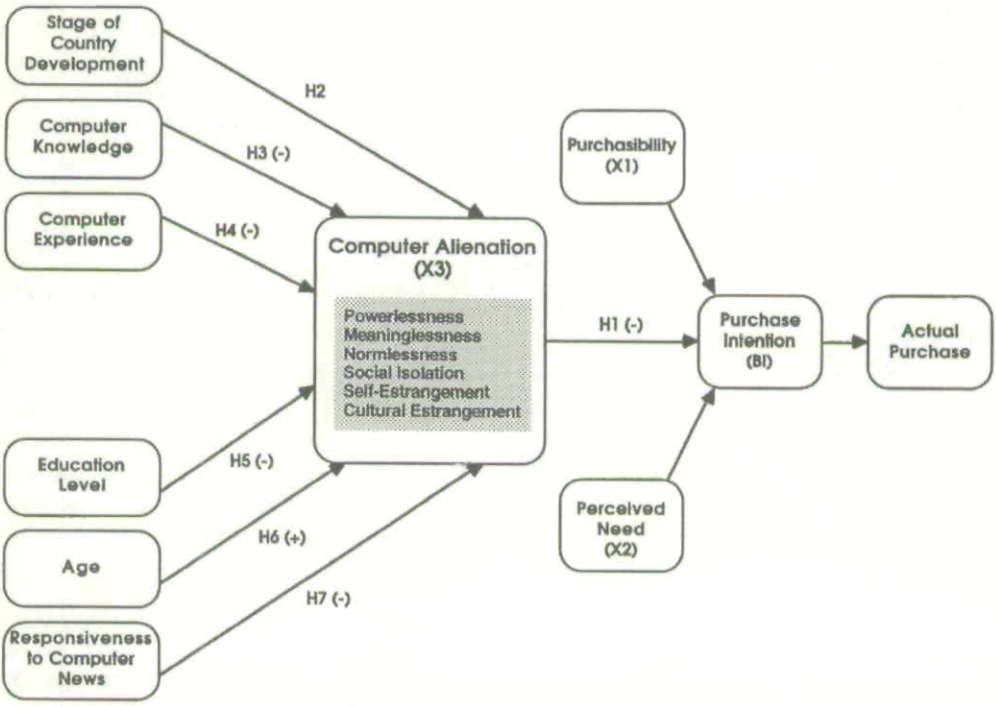

Figure 3. Computer Purchase Intention Model

intention. At least three reasons can be offered for this belief. First, a number of researchers have established a significant inverse relationship between negative attitudes toward computers and computer ownership (Morrow, et al., 1986; Ray and Minch, 1990).

Second, the intention to purchase computers is likely to be stronger with lower computer alienation while holding purchasibility and felt need constant. As will be explained below, computer alienation encompasses a notion of powerlessness or lack of control. Perceived control is a very important factor determining behavior (Ajzen, 1991). For example, if two managers equally think that (1) computers are needed in their departments and (2) computers are within their departments' budgets (affordable) and are accessible, the manager who is confident that computers are not going to challenge hisher control is more likely to purchase than the one who perceives threats from computers. Another related reason for hypothesizing the link is the concept of perceived self–efficacy (Bandura, 1982). Self–efficacy reflects one's confidence in his/her ability to perform a behavior. Through its meaninglessness dimension, computer alienation manifests the person's judgment of how well he/she can comprehend computer jargon, inputs, and outputs. Using the above example, the manager who feels confident with computers is less likely to avert from investing in computers.

A manager's (the decision maker's) own belief structure and attitudes (alienation) affect the decision to invest in computers for his/her organization. The purchasibility variable refers to the manager's judgment of his or her department budget and financial capability. Similarly, the perceived need pertains to the manager's assessment of the department's need for a computer. In essence, personal beliefs/constructs influence organizational action. In addition to the "purchasibility" (X1) and "perceived need" (X2) variables, "computer alienation" (X3) has been included as a third determinant of behavior intention and hence, behavior. The model in Figure 3 is believed to be a more complete and comprehensive model with respect to computer purchasing. Unlike many commodities (e.g., soft drinks, cars), computers have been perceived as extraordinary, threatening, and fearful technological artifacts (Schraml, 1981). Consequently, people's fears and emotions about computers should receive consideration in evaluating the decision to buy computers.

With wide and established acceptance, the alienation construct from social psychology can be helpful as a theoretical framework to formulate and measure people's fears and negative attitudes toward computers. According to Schraml (1981), computer alienation provides a psychological explanation of the fear that many people experience with the introduction of automation into their work environment. Computer alienation has also been suggested as a possible explanation for the tendency of some users to sidestep direct involvement with computing or even to aggressively attack computers (Minch and Ray, 1986; Ray and Minch, 1990; Schraml, 1981).

Computer alienation is defined as the socially and psychologically induced subjective state of separation from computers. It refers to a spectrum of mental states that include, among others, a feeling of lack of power when interacting (or considering interacting) with computers, a sense of lack of comprehensibility of computer concepts, distrust in computer suppliers, and a sense of isolation from computer professionals and suppliers.

Computer alienation is believed to create a schism between information technology and its potential adopters (buyers and/or users). This study investigates one aspect of computer–related behaviors—the decision to invest in information technology. It is hypothesized that decision makers with high levels of computer alienation are more inclined to resist purchasing information technology. Computer alienation can be responsible for information technology resistance and avoidance. This leads to the first hypothesis:

H1: An inverse relationship exists between the intention to buy computers (BI) and computer alienation (X3).

Adoption of information technology may be influenced by three major dimensions: characteristics of the environment, characteristics of the information technology, and characteristics

of the decision maker (Zmud, 1979). As shown in Figure 3, this study examines one environment characteristic—Stage of Country Development (Hypothesis 2), and five demographic/situation characteristics—Computer Knowledge (Hypothesis 3), Computer Experience (Hypothesis 4), Education Level (Hypothesis 5), Age (Hypothesis 6), and Responsiveness to Computer News (Hypothesis 7). These characteristics were chosen because other alienation and information systems researchers (Allison, 1978; Kirsch and Lengermann, 1972; Minch and Ray, 1986; Ray, 1985; and Ray and Minch, 1990) have identified these variables as being related to alienation. It should be noted that in Figure 3, the arrows between computer alienation and these variables do not indicate that causal inferences are hypothesized, but that there is an association. Given the exploratory nature of this study, the objective is to confirm or challenge the association, and thus, no causal inferences are claimed at this stage of the investigation.

As illustrated in Figure 3, these variables have indirect influence on computer investment intention (BI) through their influence on computer alienation. An assessment of these correlates is helpful in understanding and combating some of the negative consequences of computer alienation, which could lead to computer investment avoidance. Of course, the realization is made that in certain cases avoidance could have positive consequences. To test each of the variable's influence on computer alienation, and hence on purchase intention, several hypotheses are postulated. Development of these hypotheses follow in the next section.

Different social settings may stimulate different computer alienation levels. With a broad and sophisticated technological base, developed nations (e.g., United States, France) have a higher level of computer literacy. Developing nations, on the other hand, suffer from a lack of technical infrastructure and computer literacy (Matta and Boutros, 1989). These two different environments may result in different computer alienation levels. The question is: would computer alienation be different in a technologically mature culture such as the United States and a technologically immature culture such as Saudi Arabia? To examine this question, Hypothesis 2 states that computer alienation is not distributed evenly across developed and developing countries. Since the relationship between alienation and the stage of country development has not been tested before, no sign direction is postulated. This leads to:

H2: Computer alienation levels are different in developed countries than in developing countries.

Hypotheses 3 and 4 capture the inverse associations between computer alienation, and computer knowledge and computer experience, respectively. Computer alienation is expected to diminish as the individual learns more about computers or as he or she gains more experience working with computers (Ray and Minch, 1990). Computer knowledge and experience can alleviate negative beliefs and attitudes toward computers, which contribute to alienation. This leads to the third and fourth hypotheses:

H3: An inverse relationship exists between computer knowledge and computer alienation.

H4: An inverse relationship exists between computer experience and computer alienation.

Many investigators have pointed to the effect of education level and age on alienation (Allison, 1978; Kirsch and Lengermann, 1972; Ray, 1985; Seeman, 1975). In the work environment, Kirsch and Lengermann (1972) have found level of education to be negatively related to alienation level. They found age to be positively related to alienation. This leads to the fifth and sixth hypotheses:

H5: An inverse relationship exists between education level and computer alienation.

H6: A direct relationship exists between age and computer alienation.

Bickford and Neal (1969) have reported a negative association between alienated individuals and the amount of attention paid to information regarding the source of their alienation. More

recently, Ray and Minch (1990) have shown that a low receptiveness to information sources about computers is associated with a high level of computer alienation. To substantiate this finding, Hypothesis 7 is postulated:

H7: An inverse relationship exists between computer alienation and the respondent's receptiveness to information about computers.

The next section describes how these hypotheses were tested.

Methodology

Sample

In order to assess the computer purchase model, a convenience sample of American and Saudi Arabian organizations was chosen. A convenient and purposeful sampling procedure is more effective than random sampling in cross–cultural studies (Brislin and Baumgarden, 1971). In the developing world, random sampling is irrelevant because of the lack of complete and representative enumeration of populations (Brislin and Baumgarden, 1971). To draw cross–cultural inferences, compatibility of the two samples is of paramount importance (Brislin and Baumgarden, 1971; Sekaran, 1983). In this study, both the American and the Saudi organizations have compatible organizational profiles: industry type, organization size, and organization product mix. The sample organizations were small and medium–size organizations in the petroleum or printing industries. These industries were selected because both are prevalent in the two selected countries.

In order to insure the comparability and homogeneity of the sample, a consistent selection of the respondents' job functions was maintained. The respondents were high– and middle–level decision makers who reported directly to the chief executive officer with responsibility over the accounting, operations, purchasing, and/or marketing departments. In small organizations, it is common to find a single decision maker (i.e., owner) who handles all of the above functions. The separation of these functions is more common in large organizations. Since current availability of computers could affect a decision to purchase, an inquiry also was made to assure that availability did not exert undue influence on any of the comparison groups.

A total of 30 organizations were contacted. Eight American organizations operating in Colorado and Wyoming and nine Saudi organizations in the Eastern and Central Provinces agreed to participate in the study. Data was collected from a total of 97 (48 American, 49 Saudi) respondents. Mean respondent age was 39.4 years, mean job tenure, 7.8 years, mean organization tenure, 10.6 years, and mean computer job experience, 1.8 years. Table 1 groups the survey organizations and respondents by nationality, by industry, by organizational position, and by computer availability.

Measures

Purchase Intention, Purchasibility, and Felt Need

The definition and measurement of the purchase intention (BI), purchasibility (X1), and perceived need (X2) variables (Figure 3) correspond to a specific behavior (purchase), target (computers), time (two months), and context element (organizational use). The specificity of the behavior, target, time, and context is critical so that the wording of the variable definitions and measurements is consistent (Ajzen and Fishbein, 1980; Warshaw, 1980).

Adopting Warshaw's (1980) operationalization recommendation, each of BI, X1, and X2 was measured using a single–item question with a scale from 0–6. The theory of reasoned action (TRA) has an extensive procedure to elicit beliefs and attitudes that usually conclude by identifying items to measure model variables. Warshaw's approach, however, is a special case of the general TRA. The model as well as its approach to measure the variables (in this case, single–item measures) have been justified for purchase context based on tests by

Table 1. Sample Distribution

	Number of Organizations (%)	Respondents #	Respondents %
Nationality			
American	8 (47.1%)	48	49.5%
Saudi	9 (52.9%)	49	50.5%
Industry			
Oil Refineries	2 (11.8%)	25	25.8%
Industrial Gas Mfgs	4 (23.5%)	22	22.7%
Newspapers	3 (17.6%)	16	16.5%
Printing Houses	8 (47.1%)	34	35.1%
Position			
Owner/Top Mgt		33	34.0%
Dept Head		25	25.8%
Asst Dept Head		39	40.2%
Computer Availability			
Available	7 (41.2%)	41	42.3%
Not Available	10 (58.8%)	56	57.7%
Total	**17**	**97**	100%

Warshaw (1980) in several experiments. The results show better reliability and predictability than TRA multiple–item measures. This led us to believe that using single–item measures is appropriate and even desirable.

The respondents were asked to indicate "the likelihood of buying a computer sometime during the next two months" (BI), with the scale value of 0 for "definitely won't buy" to 6 for "definitely will buy." Scores greater than 3 were used to indicate an intention to buy. Similarly, the level of purchasibility of computers (X1) was measured using the statement: "During the next two months, in terms of 'affordability' and 'accessibility' of retail outlets, computers probably will be very easy for you to purchase." Perceived need (X2) was tapped by the questions: "Because of your desire (resulting from your actual needs and longings) and/or because of pressure you feel from others, do you think you will feel a very strong desire to buy computers sometime during the next two months?" A high score (6) on these measures reflects a strong desire (intention) to buy computers (BI), high level of purchasibility (X1), and high perceived level of need (X2). The operationalization of the study variables is depicted in Table 2.

Computer Alienation Construct

A major asset to computer alienation measurement was the conceptual clarity of the alienation construct (Seeman, 1959; 1975). This construct is the basis of most of the empirical research on alienation (Geyer,1980). Six alienation dimensions have been identified: powerlessness, meaninglessness, normlessness, social isolation, self–estrangement, and cultural estrangement (Seeman, 1975). To operationalize these dimensions for this study, the items used in prior alienation scales were examined. Of most relevance to this study is Allison's (1978) consumer alienation scale, Ray's (1985) channel of distribution alienation scale, and Ray and Minch's (1990) computer alienation scale. Because of the relation between computer alienation and anxiety from computers, Raub's (1981) and Simonson, et al.'s (1987) computer anxiety scales also were consulted. For example, the concept of lack of control is also evi-

Table 2. Operationalization of Variables

Variable	Questionnaire Item(s)
1. Buying intention (BI)	The likelihood of buying a computer sometime during the next two months: 0=definitely won't buy .... 6=definitely will buy
2. Purchasibility (X1)	During the next two months, in terms of "affordability" and "accessibility" of retail outlets, computers probably will be: 0=very difficult for you to purchase .... 6=very easy for you to purchase
3. Perceived need (X2)	Because of your desire (resulting from your actual needs and longings) and/or because of pressure you feel from others, do you think you will feel a very strong desire to buy computers sometime during the next two months? 0=will feel absolutely no desire to buy computers during the next two months .... 6=will feel a very strong desire to buy computers during the next two months
4. Computer alienation	Computer alienation 21-statement instrument (see Table 3)
5. Computer knowledge	How many programming languages are you familiar with (e.g. BASIC, COBOL, etc.)? _____ Check the software packages you are familiar with: A. Spreadsheets B. Databases C. Technical software D. Accounting software E. Statistical software F. Word processing G. Desktop publishing
6. Computer experience	Years of computer-related job experience? _____ years
7. Education	Educational level: A. Secondary school or less B. University graduate C. Masters or doctorate
8. Age	Respondent's age in years
9. Responsiveness to computer news	I always like to hear news concerning computers. 1=Strongly agree .... 5=Strongly disagree
10. Satisfaction	In general, I am satisfied with the computer experiences I have had. 1=Strongly agree .... 5=Strongly disagree

dent in some items developed by Raub (1981) to measure computer anxiety. "Computers don't have the potential to control our lives" and "Computers dehumanize society by treating everyone as a number" (Raub, 1981) imply a sense of lack of control. In alienation literature, alienation has been related conceptually to anxiety. McClosky and Schaar (1965) and more recently Sexton (1983) and Heaven and Bester (1986) have found a significant association between the two constructs. Some researchers (Howard and Smith, 1986) have suggested that "technological alienation" is a manifestation of computer anxiety. Ray and Minch (1990) pointed to the similarities of computer alienation and computer anxiety as described by Raub (1981). They even imply that computer alienation subsumes computer anxiety. Differentiating between psychological (general) alienation and context–specific sociological alienation, Ray and Minch (1990) basically equate anxiety with sociological alienation. One important realization is that unlike psychological alienation, computer anxiety and sociological alienation can be changed by corrective strategies. Again, we have attempted to build on constructs and items used to measure the constructs that already exist in the literature. Table 3 depicts the statements that were used to tap computer alienation categorized by Seeman's (1975) six alienation dimensions.

Each item of the instrument developed for this study is related to Seeman's six dimensions of alienation. A discussion of powerlessness, meaninglessness, normlessness, social isolation, self–estrangement, and cultural estrangement and their applicability in a computer context is warranted at this point. An attempt is made to define each dimension and to explain why it is relevant and how it was operationalized in a computer context.

Computer *powerlessness* refers to the respondents' feeling of computer dominance. This is expressed as computer control over individuals, their work processes, or their work outcomes. It is basically an application of Seeman's powerlessness definition to the perceived relation between the respondent and the computer. Powerlessness is defined as "the expectancy or probability held by the individual that his own behavior cannot determine the occurrence of the outcomes, or reinforcements, he seeks" (Seeman, 1959, p.784). In essence, a powerlessness situation would exist if the person believed that his/her actions would be subservient to the computer. Powerlessness relates a high expectancy of one's helplessness toward computers. Computer literature is saturated with terms like "Direct Manipulation Interface" and "User Friendly." Among many others, these terms symbolize attempts to directly or indirectly return control to computer users (Norman and Draper, 1986). To operationalize the computer powerlessness construct, Minch and Ray (1986) proposed items such as "I don't feel helpless when using the computer," "I feel that I control computers rather than computers control me," and "I usually have to make my work fit the computer rather than the computer fit my work." The concept of lack of control is also evident in some items developed by Raub (1981) to measure computer anxiety. "Computers don't have the potential to control our lives" and "Computers dehumanize society by treating everyone as a number" (Raub, 1981) imply a sense of lack of control.

Meaninglessness denotes a lack of comprehension of computer concepts, systems, and applications. Information technology jargon often is a discomforting factor to non–computer experts that may constitute a potential barrier between information technology and people. To tap the meaninglessness construct, this study uses items recommended by Minch and Ray (1986) and Raub (1981) that convey understanding or lack of understanding of computer inputs, computer outputs, computer terminology, and interaction with computers. These items include "I clearly understand what input computers want," "I don't understand computer output," "Working with computers is so complicated it is difficult to understand what is going on," and "Computer terminology sounds like confusing jargon to me."

Compared to the other dimensions, operationalizing a measure of the *normlessness* dimension was the most challenging. Normlessness is defined as "high expectancies for (or commitment) to socially unapproved means vs. conventional means for the achievement of given

Table 3. Contrasts of Nationality Means on Computer Alienation Scale Items

Statement	U. S. (n=48)	Saudi (n=49)	T-statistic (p-value)
Powerlessness			
1. I feel that I control computers rather than computers control me.	1.729	2.408	2.870 (0.005)**
2. Computers dehumanize society by treating everyone as a number.*	2.125	1.980	-0.655 (0.510)
3. I don't feel helpless when using the computer.	1.458	2.082	3.550 (0.000)**
4. Computers don't have the potential to control our lives.	1.562	2.653	4.806 (0.000)**
5. I usually have to make my work fit the computer rather than computer fit my work.*	2.521	2.632	0.469 (0.640)
Meaninglessness			
6. I clearly understand what input computers want.	2.312	1.857	-1.914 (0.059)
7. Working with computers is so complicated it is difficult to understand what is going on.*	2.483	2.184	-1.31 (0.193)
8. Computer terminology sounds like confusing jargon to me.*	2.937	2.408	-2.439 (0.017)
9. I understand computer output.	1.917	2.102	0.890 (0.376)
Normlessness			
10. Computers encourage unethical practices.*	1.896	2.143	1.031 (0.305)
11. I trust computer suppliers.	1.729	2.326	3.252 (0.002)**
12. There is a big discrepancy between computer and software qualities claimed by computer elite and the real qualities.*	2.292	2.816	2.181 (0.032)
Social Isolation			
13. I get along well with computer professionals.	2.104	1.388	-3.697 (0.000)**
14. Computer professionals are just naturally friendly and helpful.	2.667	2.204	-3.191 (0.002)**
15. I do not like to be associated with any computer department.*	1.854	1.510	-1.907 (0.060)
Self-Estrangement			
16. Using a computer is an enjoyable experience.	1.500	1.510	0.058 (0.954)
17. If I had to use a computer, it would probably be more trouble than it's worth.*	2.188	1.918	-1.262 (0.210)
18. I sometimes get nervous just thinking about computers.*	2.479	1.980	-2.096 (0.039)
Cultural Estrangement			
19. I would use computers even if it were not expected of me.	2.167	2.571	1.717 (0.089)
20. I don't care what other people say, computers are not for me.*	2.042	1.898	-0.640 (0.524)
21. Society values computers too highly.*	2.188	2.388	0.320 (0.345)
Computer Alienation Scale (Sum of All Items)	44.13	44.96	0.948 (0.750)

* Reverse score—higher score indicates higher computer alienation.

** Significant at the 0.01 level.

goals" (Seeman, 1975, pp. 93–94). In discussing the operationalization of normlessness, investigators including Seeman endorse tapping the construct through the notions of trust and expectation of unethical practices (Allison, 1978; Minch and Ray, 1986; Ray, 1985; Ray and Minch, 1990; Seeman, 1975). The notion of trust should be put into the societal norms context, which is tapped through a human–to–human(s) relationship. Therefore, statements that denote trust in computer suppliers and computer professionals are used. Our study used statements such as, "I do not trust computers suppliers," "There is a big discrepancy between computers and software qualities claimed by computer elite and the real qualities," and "Computers encourage unethical practices."

The *social isolation* dimension is defined as "the sense of exclusion or rejection vs social acceptance" (Seeman, 1975, pp. 93–94). Our study applied the social isolation construct to the relation between the individual and computers or entities that the individual sees as representing computers. An isolation from computers exists if the individual feels rejected or excluded by computer professionals and does not like to be associated with a computer department. The association can imply: (1) unwillingness to work with computer professionals to develop systems for his/her department, (2) reluctance to interact with computer suppliers by listening to their product demonstrations or marketing promotions, or even (3) refusal to cooperate with the computer department to introduce or promote computer usage in his/her department. Statements including "I get along well with computer professionals," "Computer professionals are just naturally friendly and helpful," and "I do not like to be associated with any computer department" align with the social isolation dimension, have face validity, and were used as indicators of social isolation in an organizational computer context.

Self–estrangement addresses the individual's motives for using computers. Many people want to use computers since they are perceived as a means toward individual (prestige, enjoyment) or organizational goals (productivity). Computer self–estrangement occurs when the respondent thinks of computers only as an organizational tool that he or she *has* to use. A self–estranged person does not associate intrinsic rewards (i.e., enjoyment) with computing and may get nervous by just thinking about computers. Therefore, the following statements tap this construct: "Having to use a computer could make my life less enjoyable" (Simonson, et al., 1987), "If I had to use a computer, it would probably be more trouble than it's worth" (Simonson, et al., 1987), and "I sometimes get nervous just thinking about computers" (Simonson, et al., 1987).

Cultural estrangement refers to "the individual's rejection of commonly held values in the society (or subsector) versus commitment to the going group standard" (Seeman, 1975, pp. 93–94). When the respondent believes that others think he or she should buy or use a computer, yet does not, he or she is culturally estranged. Information technology cultural estrangement also occurs from rejecting commonly held values in the society about information technology, such as appreciation of the computer's role in society. In buying decisions, this dimension is captured in Warshaw's (1980) model under the heading "subjective norm," as will be explained later. However, in other computer–related behavior, such as computer use, additional statements are needed. Minch and Ray (1986) proposed three statements to measure this construct: "I don't care what other people say, computers are not for me," "I would use computers even if it were not expected of me," and "Society values computers too highly."

To measure the above factors, respondents were asked to indicate their degree of agreement on a scale ranging from 1 to 5 for each of the 21 statements in Table 3. One designates strong agreement with the statement, whereas 5 indicates strong disagreement. To control response bias, 11 items were keyed in a negative mode and 10 items were keyed in a positive mode. Negative statements scores were reversed so that higher scores indicate higher computer alienation levels for all questionnaire items. An overall score was calculated as the summation of the 21 statement scores. Thus, the composite computer alienation score could range from 21 (1 * 21) to 105 (5 * 21).

Measures Translation and Pretesting

Since a major thrust of this study is to draw some cross–cultural inferences, stringent precautions were observed to ensure the compatibility of Arabic and English measures. Instrument translation to the Arabic language presented a great challenge to this compatibility. Evidence from cross–cultural studies shows that without accounting for the cultural differences, the research instrument loses its psychometric rigor (Parameswaran and Yaprak, 1987). The psychometric qualities are of great importance in considering the findings as trustworthy (Davis, et al., 1981; Sekaran, 1983).

The back translation technique (Brislin, 1986) was used to enhance instrument compatibility. In this technique, the instrument is translated back and forth from the original language to the target language by several bilinguals. The process is repeated until both versions converge. For our research, the English version of the instrument was translated and back translated by native Arabic speakers who had finished doctoral programs in the United States.

Because of the novelty of the Arabic version, an in–depth pretesting was also essential. Seven Saudi respondents were interviewed before the final distribution of the questionnaire. These seven responses provided insights into the wording and sequencing of the questions. A similar but less stringent pretesting was also performed with two American respondents, since most of the English statements were developed and were part of past studies (Minch and Ray, 1986; Ray and Minch, 1990; Ray, 1985; Warshaw, 1980).

Data analysis

Data Screening

Before applying statistical procedures, data abnormalities were investigated (Tabachnick and Fidell, 1983). Missing data, outliers (extreme cases), and violation of statistical assumptions were also investigated. Checking for missing data revealed no need for a corrective treatment since the very few missing units did not exhibit a non–random pattern. Thus, deletion of cases or estimation of missing values was not necessary (Tabachnick and Fidell, 1983).

Outliers were another source of concern. Variables with standardized scores of more than +3 or less than –3 are classified as outliers (Tabachnick and Fidell, 1983, p. 74). None of the research variables were classified as outliers when tested individually. For the composite variables, such as computer and alienation scores, inspection of Mahalanobis distance showed no multivariate outliers. Univariate and multivariate outlier analysis was performed for the whole sample as well as within the American and Saudi samples.

Data also were checked for violation of statistical assumptions such as normality, homoscedasticity, and linearity. Variables with severe skewness may distort hypothesis testing since they are not normally distributed. However, with a sufficiently large sample size, normality and homoscedasticity are usually assumed (Kerlinger, 1973, p. 287), as was the case in our analysis. Linearity assumption, on the other hand, was examined rigorously, since correlation coefficients between variables are only responsive to a linear relationship. A test of the nature of the associations between the variables was performed. Examination of the bivariate scattergrams (computer alienation composite score against every research variable) revealed no major deviation from linearity.

Reliability of Computer Alienation Scale

To measure the internal validity of the computer alienation scale, an alpha coefficient or Cronbach's reliability index was calculated. Alpha coefficient for the 21 statements was 0.92, which means that these statements have shared a common factor (measurement of computer alienation that has explained 92 percent of the variance of their weighted linear composite). This high level of alpha enhances the creditability of the computer alienation scale (Nunnally and Durham, 1975). Because of the

use of two different languages in the scale, separate alpha coefficients were also calculated for both the English and the Arabic instruments. Among the Saudis, the computer alienation scale alpha was 0.93, whereas among the Americans it was 0.91. Within both samples, the scale has proved to be internally consistent and reliable. Table 4 shows the correlation coefficient for the Computer Alienation Scale with Cronbach's Alphas on the diagonal. Alpha coefficients for computer alienation and the underlying six dimensions of computer alienation as defined by Seeman (1975) are depicted in the diagonal of Table 4. The off–diagonal entries are correlation coefficients for the indices.

It is worth noting that the highest alpha coefficient was obtained when the 21 statements were considered as one computer alienation scale. Subdividing the scale to Seeman's six dimensions yields lower alpha coefficients. The alphas for the six dimensions of alienation (Table 4) ranged from 0.62 to 0.79, substantially lower than the overall alpha (0.92). Since the number of items in the scale influences the level of alpha, an adjustment is necessary to have comparable alphas. Lower alpha may result from using fewer items in the scale. A formula has been proposed to compensate for the loss of the number of items (Nunnally and Durham, 1975, p. 343). Even after adjustment, it was clear that internal consistency would be lower when the scale is subdivided.

Moreover, factor analysis was performed and failed to show multidimensionality of the computer alienation construct. Becasue of sample size considerations, data from both samples was used in factor analysis. If computer alienation is a multidimensional construct, six significant factors should emerge from the data. These factors should correspond to Seeman's six alienation varieties. The results in Table 5 provide partial support to this proposition. A varimax rotation yields five factors with eigenvalues greater than one, suggesting that these factors should be retained (Tabachnick and Fidell, 1983). A loading coefficient of more than 0.4 or less than –0.4 is considered high. Only one item of the 21 had a loading coefficient less than 0.4 and greater than –0.4. This item can be eliminated from the scale. Table 5 shows that the loading of the items in the five factors corresponds to five of the six varieties of alienation. All self–estrangement, social isolation, and cultural estrangement items come from factors 1, 2, and 3, respectively. Factor 4 absorbed items (1, 3, 4, and 5) of the powerlessness dimension. Only item 2 failed to load with the powerlessness items. It can be reclassified as self–estrangement since it loaded in factor 1.

Table 4. Correlation Coefficients for Computer Alienation Scale With Cronbach's Alphas on Diagonal

	Computer Alienation	Powerlessness	Meaninglessness	Normlessness	Social Isolation	Self-Estrangement	Cultural Estrangement
Computer Alienation	0.92*						
Powerlessness	0.85	0.65*					
Meaninglessness	0.89	0.67	0.79*				
Normlessness	0.69	0.56	0.59	0.62*			
Social Isolation	0.78	0.54	0.68	0.54	0.63*		
Self-Estrangement	0.90	0.65	0.80	0.56	0.72	0.72*	
Cultural Estrangement	0.89	0.68	0.70	0.62	0.66	0.82	0.73*

* Cronbach's alpha (internal consistency coefficient). All Pearson correlation coefficients are significant at 0.001 level.

Table 5. Varimax Rotation Factors' Loading Coefficents

Statement	Factor 1 25%*	Factor 2 21.91%	Factor 3 20.06%	Factor 4 19.06%	Factor 5 13.73%
Powerlessness					
1.	0.41	—	—	0.64**	—
2.	0.55**	—	—	—	—
3.	—	—	—	0.67**	—
4.	—	—	—	0.61**	—
5.	0.40	—	—	0.59**	—
Meaninglessness					
6.	—	—	0.63**	—	—
7.	—	0.61**	—	—	—
8.	—	0.68**	—	—	—
9.	0.37**	—	—	—	—
Normlessness					
10.	—	—	—	—	0.69**
11.	—	—	—	0.59**	0.47
12.	—	—	—	—	0.78**
Social Isolation					
13.	—	0.70**	—	—	—
14.	—	0.46**	—	—	—
15.	—	0.72**	—	—	—
Self-Estrangement					
16.	0.77**	—	—	—	—
17.	0.73**	—	—	—	—
18.	0.75**	—	—	—	—
Cultural Estrangement					
19.	—	—	0.73**	—	—
20.	0.47	—	0.53**	—	—
21.	—	—	0.68**	—	—

* Explained variance.
** Highest loading for each of 21 items.
— Loading less than 0.4 or greater than -0.4.

The last factor represents the normlessness dimension because all of the three normlessness items had more than a 0.4 coefficient loading. Item 11, however, also had high load into factor 4. Meaninglessness items (6,7, 8, and 9) scattered over the first three factors. Unlike the other items, they failed to emerge as a distinct dimension by themselves. This resulted in reducing the number of factors from six to five.

The pattern of item loading suggests that computer alienation is actually a multidimensional construct. However, only five of the six hypothesized dimensions emerged. This finding contradicts the thought of a group of empiricists who have challenged Seeman's argument for six discrete measurable varieties of alienation (Allison, 1978; Ray and Minch, 1990). Further investigation of the issue is warranted.

Finally, the correlation of each item to the scale was calculated so that the items with low and insignificant contribution to the measurement of computer alienation were identified (Nunnally and Durham, 1975). The items to total correlations

were all positive, ranging from +0.36 to +0.81 and statistically significant at the 0.001 level.

Validity of Computer Alienation Scale

An important component of construct validity is convergent validity, which refers to "the extent to which [the measure] correlates highly with other methods designed to measure the same construct" (Churchill, 1979, p. 70). This type of validity is concerned with how two or more theoretically related measures are empirically associated. Despite their basic differences, computer alienation and satisfaction have an intuitively and empirically established relationship (Abdul–Gader, 1990; Lefkowitz, 1980; Minch and Ray, 1986; Naik, 1978; Ray, 1985). Consequently, if computer alienation scores are found to correlate negatively with satisfactory computer experience (Table 2–#10), then this provides initial evidence of convergent validity. The Pearson correlation coefficient between computer alienation and the general satisfaction with computer experience was –0.59. This negative relationship was statistically significant at the 0.01 level.

Results and Discussion

The major questions addressed by this study can be stated as follows:

1. **What is the relationship between computer alienation and the decision to invest in information technology? Will the relationship be different across nations at different levels of development? Will the social context relate to the information technology investment decision through its relation to computer alienation? (Hypotheses 1–2.)**

2. **What are the relationships between some individual characteristics and computer alienation? (Hypotheses 3–7.)**

To test the hypotheses, Pearson product–moment correlations are shown in Table 6.

Investment decision and computer alienation (H1–H2)

The research model introduces computer alienation as one of the determinants of the purchase intention behavior (BI) for computers.

Table 6. Correlation Coefficients of the Research Variables With Computer Alienation (n=97)

	Hypothesis	r	p-value
Purchase Intention	H1	-0.23	0.002*
American (n=48)		-0.226	0.002*
Saudis (n=49)		-0.235	0.003*
Computer knowledge	H3	-0.45	<0.001**
Computer experience	H4	-0.39	<0.001**
Education level	H5	-0.26	0.004*
Age	H6	+0.13	0.110
Responsiveness to computer news	H7	-0.70	<0.001**

* Significant at 0.01 level.

** Significant at 0.001 level.

Along with the level of purchasibility of computers (X1) and the perceived need (X2) for computers as defined by Warshaw (1980), computer alienation (X3) is postulated to be related to purchase intention. As shown in Table 6, the correlation coefficient between computer alienation and the intention to buy computers is –0.23 and statistically significant at 0.01 level. Therefore, it appears that computer alienated decision makers are less likely to have an intention to buy computers.

In order to evaluate the relative importance of computer alienation in determining purchase intention, the other purchase intention determinants in the model (purchasibility and felt need) must be included. A discriminant analysis was performed where purchasibility (X1), perceived need (X2), and alienation (X3) were the independent variables. The dependent variable was the purchase intention (BI) of computers. The sample was classified into two groups: those who expressed no intention to buy (group 1); and those who did (group 2). The results are shown in Table 7.

As presented in Table 7, the first discriminant function (for purchasibility) is significant at 0.001 level and explained almost 70 percent of the variation in the purchase intention. Although purchasibility (X1) was the dominant variable in discriminating between the respondents who intended to buy computers and the respondents who did not, computer alienation (X3) also emerged as a significant variable. The loading coefficient of computer alienation in the discriminating function agrees both in magnitude and sign with the correlation analysis above. Hypothesis 1 was supported given that computer alienation was negatively related to the intention to buy computers.

It is also evident from the descriptive statistics in Table 8 that regardless of nationality, computer alienation means were almost the same. Among the 48 American respondents, the computer alienation mean was 44.13, while Saudi respondents averaged 44.96.

Table 8 groups computer alienation means by the intention to purchase response. Out of the 97 respondents, 66 indicated an intention to

Table 7. Discriminant Analysis for Purchase Intention

	Loading Weights of the First Discriminant Function*
Purchasibility (X1)	0.9558*
Perceived need (X2)	0.1870**
Computer alienation (X3)	-0.2215**

* Significant at 0.001 level. Explained variance 69.8%.

** Significant at 0.01 level.

Table 8. Computer Alienation Means by Nationalities and by Intention to Purchase

		A (n=66)	B (n=31)	Row Means (n=97)
American	(n=48)	35.63 (33.9%)	52.63 (50.1%)	44.13 (42.0%)
Saudi	(n=49)	38.73 (36.9%)	51.19 (48.8%)	44.96 (42.8%)
Column Means	(n=97)	37.18 (35.4%)	51.91 (49.4%)	44.55 (42.4%)

A - Respondents who have expressed an intention to buy a computer.
B - Respondents who have expressed no intention to buy a computer.

buy a computer. The rest of the sample (31 persons) was classified as unwilling to buy a computer. As descriptive statistics support to Hypothesis 1, the computer alienation mean among the respondents who expressed an intention to buy (mean = 37.18) was far less than the mean of the respondents who expressed no intention to buy a computer (mean = 51.91).

To formally assess the significance of the mean differences of the groups in Table 9, two orthogonal a priori–focused contrasts were performed using one–factor between–groups analysis of variance (ANOVA). A conservative test of contrasts significance (the Scheffe test) was adopted to enhance creditability of the tests (Rosenthal and Rosnow, 1985). Table 9 depicts these contrasts.

The results presented in Table 9 augment the findings of Table 7 concerning the association between computer alienation and intention to buy computers. In support of Hypothesis 1, the first contrast in Table 9 indicates that the computer alienation mean among the respondents who intended to buy a computer was significantly different from the mean of those who did not.

No significant inequality of the means was found between the Saudi and the American decision makers, as suggested by the second contrast. This is more evidence to refute Hypothesis 2, which suggested that computer alienation was different across cultures. A plausible explanation of this finding is the level of education. As citizens of a developing nation, Saudis are expected to have a higher computer alienation mean. This might be true for the mass of Saudis. The study sample, however, consists of middle and upper–level managers. More than 50 percent of these decision makers had graduate and post–graduate degrees. Their level of information technology awareness and knowledge was comparable to their American counterparts.

Moreover, the Saudi economy is closely tied to the American economy, especially in the manufacturing sector where the study sample was drawn. According to a Saudi trade report (1988), there were almost 300 joint projects between Saudi Arabia and the United States. This high degree of interaction between the two economies may have lessened their differences. The subjects might be viewed as transnational business people with national borders having less effect on where business may be conducted.

To investigate the cross–cultural aspect further, scores on each of the 21 items shown in Table 3 for the U.S. group were compared with those of the Saudi group. A t–test was also performed for each comparison to test the difference between the group means. The groups differed significantly on six out of the 21 items. Three of these came in the powerlessness dimension: "I felt that I control computers rather than computers control me," "I don't feel helpless when using the computer," and "Computers don't have the potential to control lives." The direction of the comparison for these statements shows that the American group had less computer alienation when it comes to the notion of control. This finding is quite understandable since computers are more widely spread and have longer use history in the U.S. than in Saudi Arabia. This may contribute to easing fears of computer control and in developing self–confidence in controlling computers. The Saudi sample was less trustful of computer suppliers and more socially isolated from com-

Table 9. Scheffe Tests for Nationalities and Intention Means Contrasts

	p-value
1. Intenders vs. Non-Intenders (both nations)	0.003*
2. American Sample vs. Saudi Sample	0.75

* Significant at 0.01 level.

puter professionals. The Saudis have significantly lower means than the U.S. group in the items: "I trust computer suppliers," I get along well with computer professionals," and "Computer professionals are just naturally friendly and helpful." This may be due to the existence of a more established computer industry in terms of supplier–customer relationships and in terms of the development of computer professionalism.

Individual characteristics and computer alienation (H3–H7)

It was hypothesized that computer knowledge (Hypothesis 3) and computer experience (Hypothesis 4) are inversely related to computer alienation. The results in Table 6 support both of these hypotheses. The correlation coefficient between computer alienation and computer knowledge was –0.45. The computer experience correlation was –0.39. Both correlations were statistically significant at the 0.001 level. Higher levels of computer knowledge and experience are associated with lower levels of computer alienation. This finding is congruent with those of previous studies (Ray and Minch, 1990).

Hypothesis 5, which postulated that an alienated individual tended to be less educated was supported. Computer alienation and educational level were significantly correlated ($r = -0.26$, $p<0.01$). This aligns with the previous findings on the inverse relationship between computer knowledge and computer alienation. Highly educated individuals are more likely to know more about information technology and thus exhibit less alienation.

Contrary to Hypothesis 6, older respondents were not found to have more computer alienation. As shown in Table 6, no significant relation was found between age and computer alienation at 0.01 level. This could be related to the homogeneity of the sample since standard deviation of age was only 2.53. There was not enough variation in age among respondents to allow a rigorous analysis of the relation between alienation and age.

Table 6 shows a negative and significant association between computer alienation and receptiveness to information about computers. In accord with Bickford and Neal (1969) and Minch and Ray (1986; Ray and Minch, 1990), Hypothesis 7 is supported. This could present a challenge to those hoping to introduce new technologies. Alienated individuals tend to ignore information about computers, yet having more information could lead to more computer knowledge, which could reduce alienation (H3). In a longitudinal study, Zeller, et al. (1980) emphasizes that without appropriate external reductive strategies, alienation tends to remain stable over time.

Summary, Discussion, and Conclusions

Information technology purchasing, a key step in the information technology assimilation process, has received little research attention. Using a value expectancy approach, this study has provided empirical evidence on the appropriateness of relating the computer alienation construct to computer purchase decisions. Based on data collected from 97 decision makers in the United States and Saudi Arabia, alienated decision makers were found to be more inclined to resist information technology adoption by refraining from buying computers. No differences were observed between the computer alienation level in the two cultures.

Five individual variables were hypothesized to correlate with computer alienation. Only age failed to demonstrate a significant association with computer alienation. Decision makers with more computer knowledge, more computer experience, and higher education levels were found to be less likely to exhibit computer alienation. Propensity to pay attention to information sources about computers was also significantly correlated with computer alienation. This finding highlights the need to recognize the potential for information technology avoidance among computer–alienated decision makers, a tendency that has been shown to be stable over time

(Zeller, et al., 1980). However, with intervention, alienation can be reduced.

Managers should pay particular attention to this work since it demonstrates that alienation is both measurable and reducible. Fortunately, alienation is an acquired subjective state that is structurally inherent in the individual (Geyer, 1980). Alienation is reducible and escapable if its causes are recognized and isolated and corrective measures are employed to ameliorate these causes. This study has pointed out several underlying dimensions of alienation (e.g., perceived lack of control) and has substantiated a number of forces that correlate with alienation (e.g., lack of knowledge). Information technology assimilation can be facilitated if the negative attitude structure of alienation is understood and conscious efforts are made to reduce it. Assuming technologies can provide advantages, attempts should be made to reduce alienation.

Educational programs can be developed to enhance decision makers' information technology awareness and knowledge and to reduce their alienating feelings such as a fear of lack of control. A change in feelings of alienation can also be brought about by sending messages that are directed at altering the six alienation dimensions of powerlessness, meaningfulness, normlessness, social isolation, self–estrangement, and cultural estrangement. For example, if decision makers fear computer dominance (powerlessness), do not comprehend computer concepts (meaninglessness), or distrust computer professionals (normlessness), behavioral change messages can be formulated to alter these dimensions. Behavioral change strategies and means to implement the strategies in different domains are discussed in more detail in Hunter, et al. (1984).

Development of the alienation scale should also be mentioned. The scale was based on past work and exhibited reliability and validity. Tapping individual constructs through single–item measures gives researchers and organizational practitioners a compact and usable tool. Researchers embarking on cross–national survey instruments should note the efforts needed such as back–translation to develop reliable instruments. Further efforts in developing and testing alienation scales could prove valuable for all who study organizations.

Although used in much social science research, single–item measures of individual constructs can be viewed with skepticism and limitation by many researchers. We caution readers of this work to examine the single–item measures used in this study—the tests for reliability and validity—and then determine their own degree of comfort in the measures. Although Warshaw (1980) recommended use of single–item measures for BI, X1, and X2, care should be taken in the use of these measures, which could be viewed as a limitation of this study.

This study was limited to middle/upper management in two countries. The focus of the study was computers. The work could be extended in many directions. The constituency studied, the factors affecting alienation (H3–H7), the level of country development (H2), and the focus beyond just computers could all be areas where further investigation is warranted. Further study could explore other countries that do not exhibit predominantly western education among managers. This paper focused on the computer, but further work could explore more specific purchase decisions. More predictive power might be gained if specific objects such as image–processing or EDI capabilities were examined. As "computers" become more prevalent, managers might become alienated from other new technologies and thus refuse to support investment when investment is warranted.

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