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ON THE PREDISPOSITIONS TOWARD INFORMATION TECHNOLOGY: A THREE-WAY CROSS-CULTURAL STUDY

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Abstract – Governments in most countries have realized the critical importance of telecommunications for economic progress and are opening up to foreign investment in this sector. In order to achieve significant market share, U.S. firms need to understand attitudinal and lifestyle factors impacting information technology purchase and usage patterns across different cultures. This includes understanding the current infrastructure and economic conditions, but also familiarity and attitudes. A study was conducted to explore attitudes towards, and familiarity with, new information technologies in the United States, Germany and Croatia. Findings indicate that Americans are more familiar with technology than Germans and Croats, and tend to use information technology more. Respondents from all countries showed a predominantly positive attitude towards technology. Germans and Croats were particularly aware of environmental problems and, in general, the price society pays for technology, while Americans and Croats showed concern for the loss of essential human qualities. These and other findings from the study not only highlight the differences in these three markets, they also provide useful insights for strategists in information technology firms and public policy makers grappling with the complex issues arising from the rapid proliferation of new information technologies in an ever-shrinking world. © 1997 Elsevier Science Ltd

Keywords — Information technology, cross-cultural, telecommunications, familiarity, Germany, Croatia, regression, discriminant analysis.

INTRODUCTION

Information technologies have become the growth market of the 1990s. While the 1980s witnessed a technological revolution in factories and offices, the current decade is characterized by an infusion of these technologies in the home.

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Business technologies are typically driven by the need for competitiveness, while home technologies are subject to more diverse influences. Most private households can function well with a minimum of information technology (radio, TV and telephone). The addition of computers, fax machines, cable TV, VCRs and satellite dishes is largely a function of disposable income, but it is also influenced by culture (nationality), gender and age of users. Traditionally, the business target market has been middle-aged American males. Home technologies need to target more diverse groups in varied cultures. In particular, women and young adults have considerable influence on buying decisions. Besides, declining price levels make technologies affordable for somewhat lower socioeconomic strata, and for emerging markets such as former communist Eastern Europe. While business use of technologies is often affected by productivity and competitive considerations, adoption of technology in private homes is influenced largely by demographic and pricing variables (Dholakia, Mundorf & Dholakia, 1996).

The U.S. has been the leader in information technology (IT) adoption worldwide. Household penetration of personal computers, for instance, was estimated to be 37% (Pavlik, 1996). Growth is limited, however, and many new purchases are replacements or upgrades. A large percentage of U.S. families still cannot afford or do not see the need to acquire PCs or other home information technologies.

Much of the future growth in the home IT industries will thus derive from international markets, which currently have much lower levels of IT penetration in private homes (Table 1). Initially, high demand is expected from other industrialized countries, such as Germany (see Brenner & Kolbe, 1996) or Japan. Even in countries with high income levels, PC and other IT penetration is fairly low. Germany, for instance, is ranked high in personal income, but levels of IT penetration in private homes are relatively low (Mundorf, Meyer, Schulze & Zoche, 1994).

A third group of economies which are gaining importance as consumers of IT are the newly emerging markets of Eastern Europe. These countries find themselves in transition from planned economies to modern markets. In order to be competitive their business sector has already adopted computers, fax machines, cellular phones and satellite technology. To date, most private homes have televisions, sometimes with DBS hookup, and telephone penetration is increasing. Some of the wealthier, educated demographic segments have purchased computers for home office, education or other purposes. As disposable household incomes increase, many more families will be in a position to purchase a variety of goods and services. Whether these resources will be allocated to ITs, or to competing goods and services such as automobiles, furniture or travel, is uncertain.

While IT consumption will clearly increase around the globe in years to come, the speed and scope of adoption is unclear (Carey & Elton, 1996). Several authors have underscored the difficulty of predicting IT adoption (e.g. Carey & Elton, 1996; Pavlik, 1996). On the other hand, identifying critical variables in this adoption process across cultures could aid marketers and product developers in targeting consumers from different countries.

Table 1. Penetration rates (%) for selected home technologies by Country.

Technology	U.S.A.	Germany	Croatia
TV	98	96	96
Cable	62	38	4
Personal Computer	37	14	8
Satellite Dish	4	20	15

Sources: Pavlik (1996), OMNIBUS II and X (1994), Croatia Post & Telephone (12/94)

Much marketing of technology has been supply-side driven. It was automatically assumed that users would adopt the highest level of technology in order to be competitive. In a demand-side driven market factors explaining adoption are multidimensional and difficult to grasp; Dholakia et al. (1996) identify the availability of money, time, space and skill as constraints to the acquisition of IT in the home. Although any attempt at predicting adoption of information technologies is inherently flawed due to the technologically dynamic environment and the complexity of consumer behavior in this sector, failure to predict such trends can lead to lost market share or slim return on investment.

In order to help marketers understand attitudes of consumers in different cultures, a study was designed which measured familiarity with, and attitudes towards, technology in three countries representing different types of markets: the U.S., Germany and the new Republic of Croatia.

RESEARCH CONTEXT

As the world's largest economy and the world's biggest market for IT products and services, the U.S. is of interest not just to American companies but to IT firms worldwide. The attitudes and behaviours of American consumers with respect to technology are of interest to firms wishing to market technological goods and services in the U.S. Similarly, as Europe's largest and the world's third largest economy, Germany is of interest not just to German and European firms but to firms from other parts of the world which want to tap into the German and European information technology markets. Croatia is a prime example of the new market opportunities brought about by the fall of Communism. Independent since 1991, Croatia was one of six republics of the former Socialist Federate Republic of Yugoslavia. The nation is presently undergoing massive changes in its economic system. For the first time in Croatia, firms are having to compete in a global, capitalist economy.

This study was undertaken to explore attitudes towards, and familiarity with, new IT in the U.S., Germany and Croatia. The findings from the study not only highlight the differences in these three markets, they also provide useful insights for strategists in IT firms and public policy makers grappling with the complex issues arising from the rapid proliferation of new IT in an ever-shrinking world.

The three nations: relevant differences

Differences between German, Croatian and American consumers of information technology products and services could arise from a variety of sources. Primary among these are the differences in the patterns of availability of various information technologies and differences in culture. We now highlight some of the main differences in the availability and usage of information technologies in the three countries. Some of the relevant patterns observed in contemporary Germany are attributable to the unification of East and West Germany and the resultant merger of two very different economic and infrastructure systems. Similarly, many of the contextual patterns observed in Croatia stem from the recent dissolution of the former republic of six culturally and historically heterogeneous states. Responses to IT in different cultures are influenced by a number of complex factors. Familiarity with technologies can influence such responses, and it can be a function of attitudes towards technology. Political and social trends play an important role. Germany, for instance, is very heavily ecology-oriented. The ecological movement plays a significant role in politics and society. As a result,

Germans would be expected to be more sensitive towards the dangers of technologies. Also, the fear of "big brother" phenomena tends to be much greater for reasons of undue government interventions in the past. Croats would also be expected to be sensitive to issues of the environment. It is well known that Communist policies had little regard for matters of the ecology. The environmental scars from these policies are plainly evident in former Communist nations and they serve as daily reminders to the inhabitants. Issues of privacy, as well, would likely be sensitive to Croats in the light of their Communist history. This sensitivity could manifest as apprehension in adopting certain communication, database or related technologies.

Entertainment technologies: Germany

Virtually every household in Germany has at least one television set (96% in former East and West, see Beim Satellitenempfang..., 1993). Until the mid-1980s, viewing was limited to two major national networks and two to three often part-time regional services. The addition of two private broadcast networks, several cable services and the increase in cable subscription, satellite and home video has tremendously increased viewing options, although, some say, only in quantitative terms. Cable TV has been operated by the German Bundespost (now Telekom) since the early 1980s. In former West Germany, cable passes 66% of homes, and 38% of all households subscribe to cable (calculations based on Telekom data in Aktuell '93, p. 232). In former East Germany, cable passed only 4% of all homes in 1992; 60% of those are subscribers. Because of limited availability of cable TV in the East, many consumers (17% of households) opt for Direct Broadcast Satellite service after reunification. Even in the West, the new satellite services using only a small window-sill antenna achieve 11% household penetration (Beim Satellitenempfang..., 1993). Home Video (VCR) reaches 60% household penetration in the West. The corresponding figure for the East is 37% (Beim Satellitenempfang..., 1993). Compact disc players have also achieved mass market levels in the West (52% versus 29% in the East). Also, 26% are able to receive teletext services which sends text over the vertical blanking interval of the TV.

Entertainment technologies: Croatia

As is the case in Germany, television has penetrated almost every household in Croatia. Of the more than 1.5 million households, at least 96% have one or more television sets. Only 19% of the households, however, have the ability to receive foreign satellite signals such as Eurosport, MTV, SAT1 (German) and CNN (OMNIBUS X.94, 1994). These signals are delivered through cable TV (4% of all households), or through small private or shared satellite antennae (15%). Traditionally, television broadcasting within Croatia has been under government control which has led to limited program offerings. Broadcasting has a national, as opposed to a local or regional, character. Demand for satellite technology is most likely a manifestation of this. Only recently has the government begun to encourage increased competition and offerings in television. This move has resulted in several small, but very aggressive, private television stations. These have tended to appear in the larger metropolitan areas and their broadcasts are limited to the local region. The programming on these stations caters more to the interests of the local community. Croatian television sets are also used for receiving teletext. It is estimated that 35–40% of the TV owners use teletext services which are provided by HRT, the government controlled television network. The teletext service provides world and national news, weather forecasts, traffic information

and the like. In addition to television, Croats are heavy users of radio. It is probably the most developed mass communication medium in the country, enjoying a 98% penetration of households (OMNIBUS II.94, 1994). Croatia has several large radio stations which cover the whole country. Beyond this, every city and town has at least one radio station. These private stations are very popular because they provide local programming. Ownership of home video devices in Croatia lags behind that of Germany and the U.S. About 45% of the households own this type of equipment. Compact disk players are also less prevalent, having a presence in only about 5% of the households (OMNIBUS II.94, 1994).

Information and communication technologies: Germany

The market for information and communication technologies in Germany has increased by about 50% over the past four years as a result of reunification to a volume of about $125 billion (Ertragsdruck..., 1993). Telephone penetration has doubled since the 1970s to almost 100% in the West. All telephone service is metered, which means phone customers pay for each local call. Meyer and Schulze (1993) report that 13% of all Germans and 31.5% of German middle class households (white collar) owned personal computers in 1990. PC penetration is 39% in households with college-bound high-school students.

Information and communication technologies: Croatia

In Croatia, reliance on telephone technology, as well as the size and complexity of the telephone network itself, are growing rapidly. This increasing demand is for both personal and business use. According to the state-owned HPT (Croatian Post and Telephone), the nation had about 32 lines per 100 inhabitants by the start of 1995. In terms of business telephones, fax technology is used heavily. It is estimated that fax technology has an 80% penetration rate in Croatian firms (estimate made by author). Mobile telephone is also popular, and a car phone is becoming an important status symbol for Croatian executives. By the start of 1995, there were 21,664 registered users, according to HPT. In addition the teletext services provided by the government-owned television network, HRT, the Croatian Post and Telephone also provides videotex. This communication medium is not very popular as there were fewer than 600 users by 1995. The popularity and use of personal computer technology is growing in Croatia at a rapid pace. This is especially true in the business sector where penetration is judged to be close to 100%. While figures on the penetration of personal computers in the home were not available, it is known that these figures are low relative to Germany and the U.S. Electronic banking systems (ATM networks) are less developed in Croatia than in other Western countries. The systems of different banks are not interconnected, and ATMs, called bankomats, are relatively few and far between. The largest bank, Zagrebacka Banka, has only 40 such devices in the whole of Croatia.

A proposed conceptual model

The unidimensionalist view of attitude as a Cognition-Affect-Conation flow (Lutz, 1991) provides a framework relating attitudes and behavioral intentions. This theoretical framework serves as a background for exploring IT attitudes in the current research. The model implies that attitudes (cognitive and affective) impact behavioral intentions (conative) which in turn influence behavior (conation). In adoption of new

technologies, researchers and marketers often have to rely on behavioral intentions because consumers lack actual experience with the product or service in question. The current study applies the model to the adoption of information technologies across culture, gender and age. Attitudes are operationalized as "technology seeking" (affective), a group of behavioral choices, half of which are pro-technology. Age and sex are also considered to be antecedents of desire to use technology along with familiarity (cognitive) with technology; desire to use technology (conative) is the most immediate step before actual behavior as evidenced by Ajzen and Fishbein (1980). As per the model, these factors were expected to be predictors of actual behavior but the latter was not measured specifically in this study. Figure 1 illustrates the proposed model.

METHOD

An instrument was developed to investigate familiarity with, desire for and attitudes towards IT. A series of measures as developed to assess cognitive, affective and conative dimensions of IT use. The primary cognitive measure was familiarity with technology (see below). The affective measures were designed to assess attitudes both towards using technology in everyday life ("technology seeking") and towards technology in society. Finally, since it was assumed that many respondents had no direct experience with some of the technologies, desire to use was measured rather than actual usage behavior. A resulting "Familiarity and Lifestyle Survey" was initially administered to 458 individuals living in the northeastern U.S. The questionnaire was then translated into German by a bilingual native speaker of German and verified by two scholars of German. It was then administered by one of the investigators to 135 German subjects of all age groups living in the former West Germany. The original instrument was subsequently translated into the Croatian language by a colleague who is a bilingual Croatian native. The revised instrument was then administered to 1000 randomly selected Croats.

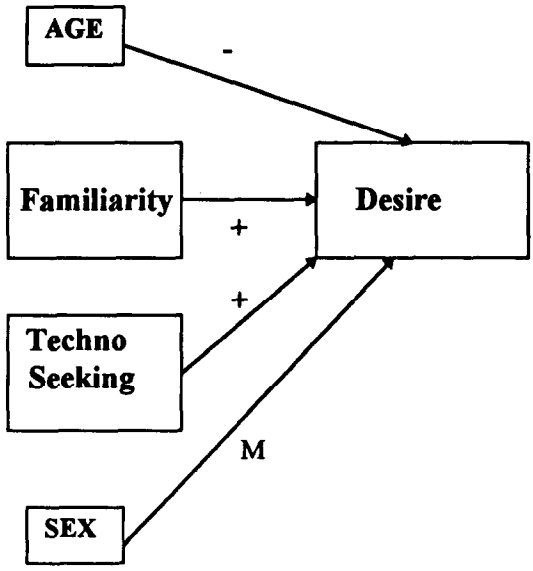


Figure 1. Proposed model relating desire to familiarity

Measures of familiarity and desire to use

Respondents were given a randomly ordered list of information technologies, representing four categories (variable names are shown in parentheses): (1) *TV-based technologies* (FMTV and DUTV): cable TV, CD player, VCR, camcorder, video games, multiple window TV and programmable remote control; (2) *Personal computing and office technologies* (FMPC and DUPC): personal computer, PC with modem, FAX machines; (3) *Phone-based technologies* (FMPH and DUPH): cellular phone, answering machine; and (4) *New communication technologies* (FMNW and DUNW): caller ID, ISDN telephone, CD-interactive and videophone. Respondents were then asked to indicate on a series of five-point scales familiarity with and desire to use each of the technologies. An overall sum scale (DUSCALE) of the four sub-scales was created to approximate a general measure of desire to use technology.

Measures of technology seeking

Respondents were given 19 pairs of forced-choice questions, each of which contained a pro-technology statement (e.g. "I like the convenience of automatic teller machines") and a corresponding anti-technology statement ("I go to a bank only when it is open so I can deal with a teller"). They were asked to circle the letter (A or B) which described their feelings best. Care was taken to randomly sequence pro- and anti-technology statements.

Technology in society

A final set of 16 statements was developed to investigate attitudes towards the role of technology in society. They represent a mixture of statements sceptical of technology ("computerized databases invade people's privacy"), and those in favor of technology ("technology improves our quality of life"). On a five-point scale, respondents check the extent to which they agree or disagree with each statement.

Intercultural issues: translation

An effort was made to translate items on the scales literally, as far as possible. However, in several cases, literal translation into the German or Croatian language did not seem meaningful. For instance, the phrase "shopping at the mall" in the U.S. version was replaced by "shopping and window-shopping downtown", considering different shopping habits of Europeans.

RESULTS

All variable and composite scale distributions were examined for normality violations. Skewness and kurtosis levels were within acceptable ranges and no data transformations were required.

Step 1. Univariate analysis of country differences

In order to verify the presence of country effects, a set of one-way ANOVAs was performed on the following dependent variables.

Familiarity

Each of the four technology groups were subjected to ANOVA, using Country (U.S., Germany and Croatia) as the independent variable. A Scheffe procedure was also used to determine robust significant differences between each pair of possible countries. For all four technology groups, ANOVA for Country was significant at the 0.001 level: FMTV (TV technologies) [F (2, 1587) = 62.59, $p < 0.001$]; FMPC (computing technologies) [F (2, 1587) = 8.48, $p < 0.001$]; FMPH (phone technologies) [F (2, 1587) = 65.49, $p < 0.001$] and FMNW (new technologies) [F (2, 1587) = 18.22, $p < 0.001$]. Table 2 displays the means and Scheffe results for the four technology groups. Findings indicate that Americans were most familiar with all four technology sub-groups versus Germany and Croatia. However, except for PC technologies, Croatia displayed higher familiarity levels than Germany for all remaining technologies although exposure to media and western lifestyle has been typically more pronounced in Germany. A greater sensitization of Croats who view technology as a springboard to an enhanced quality of life is a possible explanation. Also, the more common technologies (phone and TV), as expected, showed higher levels of familiarity compared to computing and new technologies.

Desire to use

The same four technology groups were used to measure desire to use in the near future. As in the familiarity measures, all ANOVAs for Country were significant at the 0.001 level: DUTV (TV technologies) [F (2,1585) = 48.62, $p < 0.001$]; DUPC (computing technologies) [F (2, 1584) = 35.82, $p < 0.001$]; DUPH (phone technologies) [F (2, 1585) = 39.85, $p < 0.001$] and DUNW (new technologies) [F (2, 1580) = 45.41, $p < 0.001$]. The same country pattern applies for desire to use. In all cases, the scores for desire to use are higher than the familiarity measures which suggests that individuals may have generally low levels of cognition about specific technologies and their features but do have the desire to use them in the future for their benefits. Results are also shown in Table 2.

Technology seeking

A technology-seeking score (between 0.00 and 1.00) was computed for each subject by adding the number of pro-technology statements checked and dividing the resulting score by the total number of statements. This technology seeking scale (TKSCALE) served as the dependent variable in an analysis of variance, using Country (U.S., Germany and Croatia) as the independent variable. ANOVA was significant at the 0.001-level for Country [F (2, 1587) = 33.85, $p < 0.001$]. Americans displayed a greater degree of Technology Seeking ($M = 0.51$) compared to German respondents ($M = 0.42$) and Croats ($M = 0.42$). Table 2 displays the means and results of the Scheffe test for this scale.

Technology in society

All 16 statements were combined to create a technology in society scale (TSSCALE) which is an assessment of attitudes concerning the role of technology in society (the score ranges from 1:negative to 5:positive). As shown in Table 2, Croats are slightly less positive about technology's role in society than their German and American counterparts.

Table 2. Variable means (and standard deviations) by Country

Variable	Sample	U.S.A.	Germany	Croatia	F-test[a] $p<0.01$	Scheffe test $p<0.05$
Sample N	1,593 (100%)	458 (28.7%)	135 (8.4%)	1,000 (62.9%)	—	—
TKSCALE (techno seeking)	0.445 (0.201)	0.510 (0.199)	0.420 (0.161)	0.419 (0.201)	33.85[a]	U.S.–Germany, U.S.–Croatia
FMSCALE (familiarity)	2.867 (0.812)	3.132 (0.819)	2.613 (0.573)	2.779 (0.806)	38.55[a]	U.S.–Germany, U.S.–Croatia
Subscales						
FMTV	3.365 (0.940)	3.751 (0.949)	2.984 (0.700)	3.241 (0.911)	62.59[a]	U.S.–Germany, U.S.–Croatia, Germany–Croatia
FMPH	3.532 (1.039)	3.956 (0.997)	3.039 (1.018)	3.405 (0.999)	65.49[a]	U.S.–Germany, U.S.–Croatia, Germany–Croatia
FMPC	2.860 (1.108)	3.022 (1.171)	2.957 (0.946)	2.774 (1.089)	8.48[a]	U.S.–Croatia
FMNW	1.906 (0.796)	2.062 (0.896)	1.629 (0.655)	1.872 (0.751)	18.22[a]	U.S.–Germany, U.S.–Croatia, Germany–Croatia
DUSCALE (Desire to use)	3.312 (0.987)	3.621 (0.897)	2.845 (0.686)	3.233 (1.021)	42.84[a]	U.S.–Germany, U.S.–Croatia, Germany–Croatia
Subscales						
DUTV	3.683 (1.025)	3.946 (0.897)	2.992 (0.766)	3.656 (1.062)	48.62[a]	U.S.–Germany, U.S.–Croatia, Germany–Croatia
DUPH	3.685 (1.174)	4.039 (1.027)	3.134 (1.079)	3.598 (1.205)	39.85[a]	U.S.–Germany, U.S.–Croatia, Germany–Croatia
DUPC	3.143 (1.306)	3.551 (1.190)	3.233 (1.009)	2.943 (1.348)	35.82[a]	U.S.–Germany, U.S.–Croatia, Germany–Croatia
DUNW	2.711 (1.145)	3.073 (1.068)	2.118 (0.928)	2.625 (1.156)	45.41[a]	U.S.–Germany, U.S.–Croatia, Germany–Croatia
TSSCALE (techno in society)	2.927 (0.359)	3.020 (0.369)	3.056 (0.352)	2.867 (0.332)	3.66[a]	none

[a] $p>0.05$.

Step 2. Multivariate analysis of country differences

Univariate statistics reveal significant country effects but fail to indicate the intensity of the differentiating effect. In order to evaluate these, a stepwise discriminant function analysis was performed using the Mahalanobis procedure as recommended by Hair, Anderson and Tatham (1987). Prediction of membership in the three country groups was assessed by 10 predictor variables which include the TKSCALE, the TSSCALE scales and the eight familiarity and desire subscales. On that basis, there was reliable

Table 3. Results of the discriminant analysis for Country (U.S., Germany, Croatia): statistics for the two discriminant functions.

Function	Eigenvalue	% Variance	Wilks' Lambda	Canonical	
				R	R^2
1	0.17	52%	0.745	0.377	0.142
2	0.15	48%	0.868	0.363	0.132
Total variance explained =					0.274

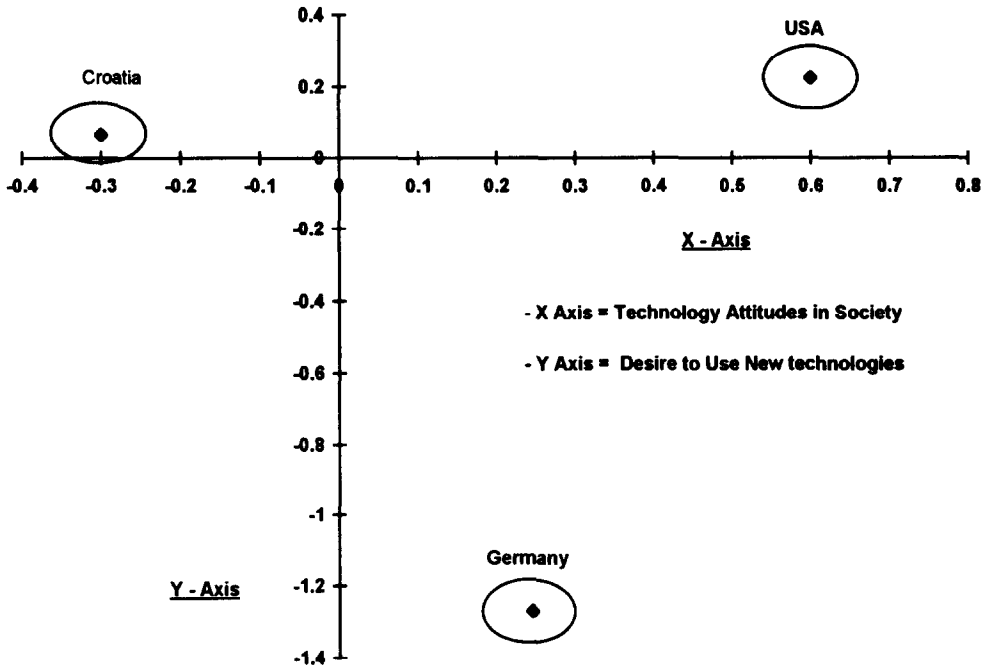
association between groups and predictors, χ^2 (20) = 459.44, $p < 0.01$. Two discriminant functions accounted for 52 and 48%, respectively, of the between-group variability in discriminating among groups. Overall, the two functions accounted for 27.4% of the variance in the dependent variable Country as shown in Table 3.

Table 4 displays the discriminant loadings obtained for each of the 10 predictors and these can be used to label the functions according to their weight. A potency index (Perreault, Behrman & Armstrong, 1979) is provided to estimate the relative discriminating potency of each variable. Group centroids for each of the three groups in the form of z-scores are reported and plotted in Fig. 2. These scores represent the number of standard deviations for each group from the average of all groups on each function.

Function 1, technology attitudes in society, appears to segregate the three groups where Croatia scores the lowest. Interpretation of Function 2 is linked to desire to use TV and new technologies; in this case, Germany has the weakest score. This would suggest that although Croats have a less positive view of the impact of technology on society, they are still more willing to leapfrog ahead in terms of future adoption. The discriminant classification procedure properly classifies 71% of the survey participants, which is a significant improvement versus the proportional chance criterion (PCC) estimated at 48% based on sample size probabilities ($\text{PCC} = \sum p^2 = 0.287^2 + 0.084^2 + 0.629^2$). Hair et al. (1987) report that any improvement over 25% of the PCC suggests that the discriminant classification is acceptable; in this case, the function is acceptable since 71% is greater than (48% × 1.25) or 60%. We conclude that Country effects are present and that they can be explained by the 10 predictor variables measured in this study.

Table 4. Discriminant analysis statistics for the predictor variables of Country.

	Standardized coefficients		Discriminant loadings		Potency
Predictors	Function 1	Function 2	Function 1	Function 2	Index
1 FMTV	0.86	0.03	0.55	0.45	0.26
2 TSSCALE	0.43	–0.20	0.53	–0.19	0.17
3 FMPH	0.34	0.52	0.53	0.49	0.26
4 DUPC	0.71	–0.71	0.52	0.04	0.15
5 TKSCALE	0.23	–0.07	0.47	0.19	0.13
6 FMPC	–0.64	–0.53	0.27	–0.03	0.04
7 DUTV	–0.93	0.67	0.21	0.62	0.20
8 DUNW	0.23	0.34	0.35	0.48	0.18
9 DUPH	–0.05	0.20	0.34	0.47	0.17
10 FMNW	–0.23	0.13	0.22	0.32	0.07



Canonical Discriminant Functions at Group Means (Group Centroids)

Group	Function 1	Function 2
U.S.	0.599	0.226
Germany	0.245	-1.268
Croatia	-0.303	0.066

Figure 2. Graphic representation of discriminant function solution for U.S., Germany and Croatia (X and Y axis represent functions 1 and 2). These scores represent the number of standard deviations for each group from the average of all groups on each function.

Step 3. Explaining desire to use technology

Using multiple regression, the model of prediction for desire to use technology presented in Fig. 1 was examined using the following independent variables: age, sex, familiarity subscales, technology seeking and technology in society scales. The discrete Country variable was recoded as two dummy variables for entry in the procedure. In this coding procedure one dummy variable is associated with Germany while the other is associated with Croatia. The U.S. thus represents the benchmark against which the other country effects are measured.

The model is examined by a regression analysis on the general desire to use technology (DUSCALE) which includes all four subcomponents. Results are shown in Table 5. All familiarity subscales are significant predictors of desire, which supports our model. There is a negative Germany effect and a positive Croat effect which is consistent with previous findings. The analysis captures 57% of the variance of the "desire to use" variable. These results suggest that familiarity is a powerful predictor of

Table 5. Results of stepwise regression analysis on desire to use technology (DUSCALE).

Variables	B*	B (unique)	sr^2 (cum)	R^2 (chg)	R^2
1-FMTV	0.317[a]	0.299	0.025	0.475	0.475
2-TKSCALE	1.061[a]	0.214	0.031	0.526	0.051
3-FMNW	0.132[a]	0.105	0.006	0.539	0.013
4-FMPH	0.188[a]	0.123	0.005	0.547	0.008
5-FMPC	0.093[a]	0.103	0.005	0.551	0.004
6-GERM	−0.229[a]	−0.065	0.003	0.556	0.005
7-AGE	−0.060[a]	−0.107	0.007	0.561	0.005
8-SEX	0.104[a]	0.052	0.003	0.563	0.002
9-CRO	0.114[a]	0.055	0.002	0.565	0.002
Intercept	0.934				
$R^2 = 0.565$[b]					
Adjusted $R^2 = 0.562$					
$R = 0.752$**					

[a] $p < .01$
[b] *Unique variability* = 0.087; *shared variability* = 0.478.

desire as per our model. However, Age, Sex and Country effects, although significant, do not contribute much predictive power as evidenced by a less than 1% increase in the value of R^2. Implications of these findings for technological corporations wanting to penetrate the Eastern bloc countries are quite explicit.

DISCUSSION

The results presented in this paper indicate considerable differences in technology orientation, familiarity and desire to use across the three cultures. A series of ANOVA procedures and a multivariate discriminant analysis reveal clear Country effects with respect to these data. In addition, the proposed predictive model for desire to use technology (Figure 1) is validated using multiple regression. In these analyses Germany exhibits a significantly lower familiarity with and desire to use technology (versus U.S.), while Croatia exhibits a significantly greater desire to use technology than Germany.

After the fall of the socialist economies, businesses in Eastern Europe have relied on bypass technology to compensate for a hopelessly antiquated telephone infrastructure. Such bypass technologies (e.g. cellular phones) are too costly for most private users, however. Many households without telephones do have access to television where they learn of new technological developments in fictional as well as news programs. Also, many consumers in Croatia have access to satellite broadcasts of western programs which increase their awareness of recent trends.

Governments in most countries have realized the critical importance of telecommunications for economic progress and are opening up to foreign investment in this sector. In order to achieve significant market share, U.S. firms need to understand attitudinal and lifestyle factors impacting IT purchase and usage patterns among different cultures. This includes understanding the current infrastructure and economic conditions, but also familiarity and attitudes. While Americans have been conditioned to see media and technology as essential commodities, Europeans tend to be more detached. However, for Croats, technology is often associated with the wealth and lifestyle of western countries, and thus holds great promise.

Fear of "big brother" phenomena has been fostered by a history of tight government control; ecological concerns are dominant as a result of population density and past ecological disasters. Because of the time lag in the introduction of technologies, age effects are more pronounced in Europe. Finally, women in the U.S. have joined the workforce earlier compared to Europe, and are therefore more familiar with some technologies.

As observed in western countries, firms wanting to enter emerging technological markets should consider targeting young males as primary targets. Since familiarity appears to be driving desire to use and ultimately purchase behavior, firms in the technological domain should strive to maximize exposure of their new technology to that particular group by strategically using product/service demos, trial offers, shareware, beta testing, school initiation programs, etc. A key finding in this study has to do with the importance of familiarity in facilitating adoption of technology. This finding is particularly germane for companies hoping to penetrate the new Eastern bloc markets.

Limits of the study

While this study indicates considerable differences and similarities among varied cultures, it only represents a limited snapshot of three countries. Due to the intricacies of collecting data from diverse geographical areas, the three samples used in this research showed slight deviations in their distribution of age, gender and income levels. Further research is needed to better understand the factors impacting technology use. In particular, expanding the sample to a broader range of countries will deepen our understanding and provide an important marketing tool for a global information society.

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