Original Article

An Exploration of Families Use of Information and Communications Technology: The Case of Korea and the United States

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International Journal

of Human Ecology

Abstract

As information and communications technology (ICT) becomes increasingly integrated into the daily lives of people around the world, it is important to know how the technology is influencing the behaviors of individuals and families. This study looked at the ecology of families as it is related to ICT and the changes to processes that occur as ICT devices and services are integrated into the family. A survey of 1084 families was conducted. Five hundred of the families were from the United States and 584 families were from Korea. Significant differences were found in the use of ICT by Korean and American families although the source of this difference was not clearly identified in this study. Three clusters of families were identified based on their use of devices and services. These were labeled as; 'The Tech Savvy', 'The Wireless Users', 'The In-betweeners', 'The Wired', and 'The Just Mobile'. 'The Tech Savvy' used the greatest variety of ICT technologies and 'The Wired' used the fewest. Other clusters fell in the middle with families seemingly using the devices which met their particular needs. Two factors related to ICT integration into the family were identified. These were related to family intimacy and family relationship maintenance. The family cluster identified as 'Tech Savvy' made significantly greater use of ICT in these relationships and 'The Wired' made the least use of ICT in these areas. The other clusters tended to be between the two ends and tended not to be significantly different from each other in their use of ICT. Finally, models for ICT use by families showed that demographics, nation of origin, types of devices and services used, and attitude and interest in ICT all had a significant impact.

Keywords

Introduction

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Information and communications technology (ICT) has become an essential part of many peoples' lives, particularly in the developed nations. There have been a fair number of papers that have looked at the adoption and uses families make of ICT. For example, Mensch (2003, 2006), Lee and Chae (2007), and Williams and Mertens (2011) looked at the impact of ICT on family relations. Murray and Campbell (2015) and Devitt and Roker (2009) examined the quality of family and interpersonal communications related to ICT use. Stern and Messer (2009) and Senyurekli and Detzner (2009) looked at the role of ICT in maintaining contact between family members over distance. Yet, there

are still missing pieces in our understanding of the comprehensive role that ICT plays in the family communications and how that dynamic differs between cultures.

DeGusta (2012) points out that the first true smart phone was introduced in the United States in 2002. Now, 50 percent of all American cell phone users are smart phone users. It took smart phones only four years to go from 5 percent to 40 percent market penetration. New devices, such as smart watches and smart glasses, are available now and new devices are being developed all the time.

This paper will examine the impact that information and communications technology has had on family communications. In particular, it will examine the devices families in the United States and Korea use and how they incorporate those devices into specific communication processes.

Literature Review

There is a growing body of literature concerning ICT and its place in family life. There is also a fair amount of ambiguity in the literature. It is almost universally accepted that ICT has an impact on the family, both in terms of roles within the family and means and quality of communication that occurs. The confusion centers around the overall evaluation of ICT; is it a benefit or hindrance to families and communication within the family?

Gustavo Mesch (2003) used data from the Israeli National Youth Survey to examine the relationship between internet use and the quality of family relationships. He found that the greater the frequency of internet use, the more negative were the perceptions of family relationships. In a subsequent study, also using data from the Israeli National Youth Survey, Mesch (2006) found that the frequency of internet use was negatively related to family time and positively related to family conflicts. Williams and Mertens (2011) found that when internet use was frequent or when there were many devices in the home, family time and family closeness tended to suffer. A study of 222 Korean children by Lee and Chae (2007) found that increases in total time using the internet did reduce the perceived time spent with families but did not impact family communications. Further, Lee and Chae found that parents' attempts to control internet use by their children were largely ineffective. Kennedy et al. (2008) found that families with multiple

communications devices were less likely to eat dinner together. However, contrary to Stoll's speculation about loneliness and isolation being the result of increased technology use, Kennedy and her coauthors found that internet users socialize as much as non-internet users and cell technology has probably had a positive impact on communications within the family.

Carlson et al. (1999) examined the influence of technology on families in Taiwan, Singapore, Hong Kong, and Japan. They found that technology had increased the pace of life but had not necessarily improved the quality of life or family relations. Murray and Campbell (2015) gathered data from 225 individuals on-line about their experience with ICT in their personal and family relationships. Among the negative aspects of ICT they identified were; compromised communication, superficial or inauthentic communications, privacy infringements, increases in gossip and drama, jealousy, pornography and infidelity, and distraction from the relationship.

Information and communications technology also brought the possibility of intrusion into the family by outsiders. Williams and Merten (2011) found that parents often took steps to protect their children from strangers on-line, but were not effective at eliminated cyberbullying. Davis (2012) found that parents expressed concern about the digital safety of their children and engaged in information seeking to find solutions. However, she also concluded that there was an increased risk to children the more connected devices they were exposed to and that parents' concern did not always translate into effective action.

There are a significant number of articles what highlight the positive aspects of information and communications technology as well. Wajcman, Bittman and Brown (2008) in a survey of 1358 individuals from 845 Australian households followed by time diaries and phone logs from some families found that ICT use did not significantly impact the quality of home life or reduce the work/home balance of people. Further, a majority said that ICT improved their family life in that it allowed them to maintain contact throughout the day and coordinate activities outside of work. In fact they hint that ICT may increase the amount of time spent with families because tasks that would have required time away from home could now be accomplished from home using technology.

Devitt and Roker (2009) in their study of 60 British families found that young people often preferred communicating through ICT and many favored using text messages when communicating about difficult subjects with their parents. In the Devitt and Roker study it was pointed out that both children and their parents appreciate the feeling of security that comes with ICT. Young people reported that they were willing to do more because cell phones could be used to call for help if needed. Likewise, parents appreciated the ability to check in on their children and monitor their location and activities. This tended to reduce the concerns that parents had for the welfare of their children.

Murray and Campbell (2015) in their study mentioned earlier also identified a number of benefits that come from ICT use in the family, including; maintaining contact with family at a distance, sharing news and information, providing alternative means of communications, facilitating long-distance relationships, management and planning, increasing intimacy and affection, a means of leisure and relaxation, finding out about others, and connections to social support. Several studies (e.g. Stern and Messer, 2009; Tee, Brush, and Inkpen, 2008) have identified the importance of ICT in maintaining family contacts, particularly with distant and extended family members. Senyurekli and Detzner (2009) found that ICT was particularly important for Turkish families in maintain contact with relatives in Turkey when working overseas. Telecommunications and e-mails were particularly valuable tools for maintaining contact.

Several studies (e.g. Williams and Merten, 2011; Padilla-Walker, Coyne and Fraser, 2012) have found that ICT can serve as a catalyst to improve family relationships. In a survey of 453 adolescents and their parents, Padilla-Walker and her coauthors found that time spend together using cell phones, watching TV or movies, or playing video games increased family connections. Using data from the Pew Internet and American Life Project, Williams and Merten found that ICT could increase family connectedness, but at the cost of increased risk of exposure to harm from outside the family.

Conceptual Model and Research Questions

Hertlein (2012) proposed a model of family integration of information and communication technology based on three theories of the family. First, the family ecology theory focuses on the environment and its impact on the family. In Hertlein's model, the ICT environment includes factors such as access to technology, affordability, acceptance, ambiguity and accommodation of the technology. The family's access and acceptance of ICT provides the environment in which changes occur and are made possible.

Second, in this model, the structural-functional perspective is used to examine how technology may impact the nature of family relationships. The structural-functional perspective examines how families are organized and how that organization is adapted to meet the needs of the family. Issues related to changes in structure that occur because of changes in ICT include; changes in rules and
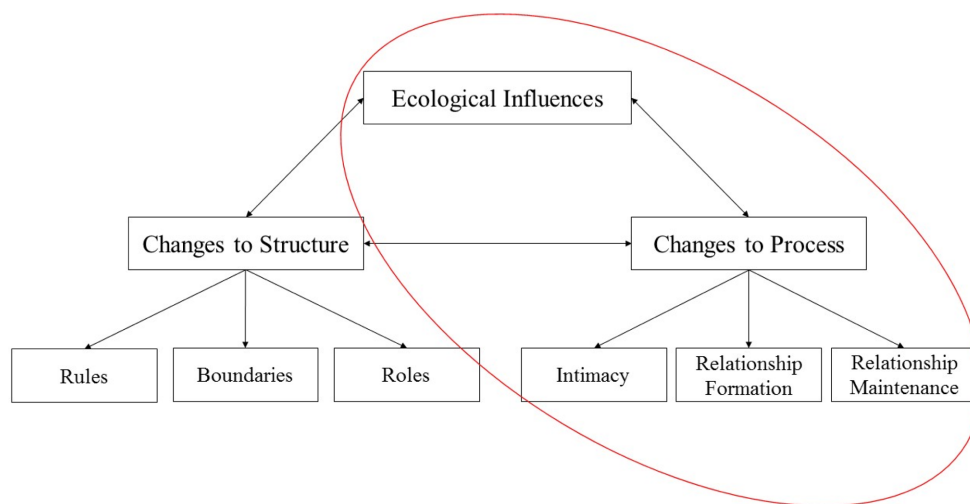

Figure 1. Hertlein's Multitheoretical Model of ICT Integration in the Family

procedures, redefined boundaries including changes in the work/family dynamic, and redefined roles in the family with the younger generation possibly becoming the family "expert" on ICT issues. Hence in this model, Hertlein suggests that following from changes in the technology environment are changes that occur in the family itself.

Third, following from the changes in the environment are changes in process that occur as the result of the introduction of ICT into the family environment. Hertlein examines the changes in processes from an interaction-constructionist perspective. The interaction-constructionist perspective examines the relationships within the family based on how they communicate, behave, and patterns that they follow. Hertlein suggests that ICT will influence factors such as the definition of intimate behavior, relationship formation, and relationship maintenance. This study examines the ecological and process aspects of the Hertlein model of ICT use and the family. A graphic representation of Hertlein's model is given in Figure 1 below with the topics of interest circled.

The Carlson et al. (1999) study found that the impact of ICT on Asian family life varied from country to country. For example, studies cited in the paper found that increased ICT use decreased the importance of the traditional patrilineal ties in Taiwan but increased ties with extended kin. In Singapore, studies indicate that heavy internet use is associated with less TV watching, less exercise, and less time spent with families. They suggest that ICT in Singapore is associated with increased stress and reduction of the work/home boundaries. In Japan, they say that technology, including ICT, has generally benefited families and society. However the benefits have come at the cost of higher debt and an erosion of the traditional values system.

A report published by the European Union (2014) as part of their Eurobarometer series found considerable divergence in ICT use within Europe. For example, home access to broadband internet was over 80 percent in the Netherlands, Sweden and Denmark but below 50 percent in Eastern Europe, Spain, Portugal, Italy and Greece. Home broadband access declined in Italy and Ireland (11 percent and 5 percent respectively) between 2013 and 2014. Access to a cell phone in the household varied from a high of 98 percent in Latvia to 86 percent in Portugal. Some interesting patterns of ICT use emerge in the study. For example, in Greece

where home broadband use is relatively uncommon, cell phone use in the home is high (95 percent having access to at least one cell phone in the home vs 49 percent having broadband access in the home). Northern European countries have access to a large number of ICT services in the home while penetration rates in Southern and Eastern Europe, particularly for internet services, is much lower.

These studies suggest that geography and culture matter in ICT use. To better understand the access and uses of ICT in an international context this study will examine differences which may exist between the United States and Korea. The United States and Korea are both economically developed, technologically advanced nations. Both countries are leaders in ICT development with Samsung, a Korean company, being the largest mobile phone producer in the world and LG a significant producer of ICT devices. The United States is home to a number of leading ICT firms, including Apple, Microsoft, and ATT.

Culturally, Korea and the United States differ dramatically. According to The Hofstede Centre's website (http://geert-hofstede.com/), the United States and Korea are on opposite ends of the scale with regard to individualism, masculinity, uncertainty avoidance, long-term orientation, and indulgence. The two nations are only somewhat similar with respect to power distance. Based on the above issues, we have identified three main research questions and two sub-questions regarding ICT use by families and the role ICT plays in family process.

RQ1: Do families differ in their use of ICT devices and services?

RQ1a: Are there differences in family use of ICT between Korea and the United State?

RQ2: Are there underlying dimensions to the use of ICT by families?

RQ2a: How does ownership of ICT devices and use of ICT services by families impact the family communications process?

RQ3: What factors influence ICT usage and changes in family process?

Methods

Following a literature review and using the concepts of the Hertline Model, a questionnaire was designed to examine how much access families have to information and communications

technology and how families use, and sometimes abuse, the technologies. While the survey was fairly long, this project will focus only on the parts related to access and processes that occur within the family. The survey instrument was pilot tested with 32 respondents recruited from Amazon's Mechanical Turk website. The questions were found to be acceptably reliable.

The sample was restricted to those 18 years of age or over sharing a residence with a person or persons they are related to by blood, marriage, adoption, or as part of a long-term, committed relationship. It was believed that this definition of a family, similar to that used by the US Census Bureau, would allow for the inclusion of a variety of traditional and non-traditional family types but would exclude those living alone or sharing a residence as part of casual relationship (e.g. room-mates, foster families, institutional residence sharing, etc.). Since the focus of the study is on family relationships and technology, it was important to include as many family types as possible.

Following some refinement and additions to the survey instrument, an independent survey firm in the United States and another in Korea were hired to collect the data. This study used the SPSS 20 program to manipulate and analyze data.

First, to examine the demographic characteristics of respondents, this study used frequencies, percentages, means, and standard deviations. Second, to confirm differences in usage of ICT devices and services by nationality, this study conducted Chi-square analysis, and to find out how repondents can be classified by their ICT usage, this study conducted K-means clustering analysis. Third, to find out underlying dimensions to the use of ICT by families, this study conducted exploratory factor analysis. Fourth, to compare family usage between cluters, this study used ANOVA, and to confirm the influence of each independent variables, multiple regression analysis is conducted.

The characteristics of the two samples are given in Table 1.

The American sample had more female than male respondents with a ratio of about two female respondents for each male. The Korean sample was more balance in terms of gender. The median ages for both samples was higher than the median ages for the population in general in both countries (44 years for the sample v 37 years for the population in the United States; 44 years for the sample v 41 years for the population in Korea), however this difference was expected as the samples excluded those under 18 years of age. The respondents in both nations were well educated with over 70 percent having some college education or more. The respondents from both nations were likely to be from an urban or suburban environment with the proportions quite high in Korea (79 percent in the United States v 94 percent in Korea).

Findings

Consumer Typology Based on ICT Usage

A cluster analysis of device and service ownership using combined data sets from the United States and Korea produced five distinct clusters. The first cluster were those who used the most devices and services, with high use of computers, smart phones or tablets, a home network, high speed internet access at home, e-mail, social networking membership, web cams and video chatting software, and internet access on their television. We

Table 1. Sample Characteristics

Characteristic	America	Korea
Sample Size	500	584
Gender	33 percent male 67 percent female	52 percent male 48 percent female
Median Age	44.2 years	44 years
Education	H.S. or less – 24 percent Some college or college degree – 64 percent Graduate or professional degree – 12 percent	H.S. or less – 28 percent Some college or college degree – 63 percent Graduate or professional degree – 9 percent
Marital Status	Not married – 25 percent Married – 66 percent Widowed/divorced – 9 percent	Not married – 29 percent Married – 66 percent Widowed/divorced/cohabiting – 5 percent
Location	Urban or suburban – 79 percent	Urban or suburban – 94 percent

labeled this cluster as 'Tech-Savvy.' The first cluster was composed of 45 percent Americans and 55 percent Koreans.

The second cluster had high use of the same devices and services (computers, smart phones or tablets, home network, high speed internet access, e-mail, and social networks) but had lower use of web cams and video chatting and internet access through their TVs. There were 325 members of this cluster of whom 61 percent were Korean and 39 percent were American. We labeled the second cluster as 'Wireless Users'.

The third cluster identified by the analysis was similar to the second in terms of devices and services used, but was more likely to have a wired phone as well. This cluster had 237 members and was 45 percent American and 55 percent Korean. We labeled the third cluster as 'In-Betweeners' as they made extensive use of new technologies but also continued to use the older wired technology as well.

The fourth cluster was like the third except that they were less likely to have a smart phone/tablet or to have a social networking

account. This group was heavily American with 80 percent being from the United States and 20 percent being from Korea. We labeled this group as 'Wired' and believe they represent a group just beginning to transition to the newer technologies.

The last cluster were heavy users of computers, smart phones or tablets, and e-mail accounts, but less likely to have all of the other devices or services asked about in the survey. This cluster had 98 members and was heavily Korean, with 76 percent being from Korea and 24 percent being from the United States.

Values for the cluster analysis are presented in Table 2. With respect to Research Question 1, it would seem that families can be classified based on their use of ICT devices and services.

A Chi-Square analysis of the clusters based on nationality produced a value of 94.85 which was significant at the .05 level. This would provide an answer to Research Question 1a, that yes there is a significant difference in device ownership and service usage based on nation of origin. Koreans are over represented in clusters 1, 2, 3 and particularly 5. Americans are over represented

Table 2. Results of Cluster Analysis for Families by use of ICT Devices and Services

Type	Device or Service	Cluster				
		1 n=276	2 n=325	3 n=237	4 n=148	5 n=98
Device	Desktop or notebook computer	**3.85**	**3.57**	**3.69**	**3.64**	**3.21**
	Smart phone or tablet	**3.86**	**3.87**	**3.93**	1.17	**3.55**
	Cell phone without advanced features	1.87	1.36	1.58	2.94	1.57
	Wired phone	2.54	1.19	**3.60**	**3.10**	1.93
Network	Home network (wired or wireless)	**3.76**	**3.61**	**3.65**	**3.20**	2.94
	High speed internet access	**3.91**	**3.93**	**3.95**	**3.86**	1.20
	Slow speed internet access	1.46	1.04	1.11	1.19	2.76
Service	E-mail account	**3.94**	**3.90**	**3.90**	**3.91**	**3.59**
	Social networking account (Facebook or other)	**3.86**	**3.26**	**3.07**	2.84	2.86
	A web camera and video chatting account	**3.20**	1.56	1.57	1.56	1.51
	A television with internet access; either built in or through a device	**3.65**	1.81	1.89	1.53	1.43

Table 3. Comparison of Family Types by Country

Country	Cluster					Total	Chi-Square
	Tech-Savvy	Wireless	In-Between	Wired	Just Mobile		
U.S.	123(44.6)	128(39.4)	106(44.7)	119(80.4)	24(24.5)	500(46.1)	
Korea	153(55.4)	197(60.6)	131(55.3)	29(19.6)	74(75.5)	584(53.9)	94.85***
Total	276(100)	325(100)	237(100)	148(100)	98(100)	1084(100)	

***p<.001, **p<.01, *p<.05

in cluster 4. Comparisons of the cluster membership based on nation of origin are presented in Table 3.

Underlying Dimensions of ICT Usage Purposes and Comparison by Consumer Groups

A factor analysis of uses of information and communications technology produced two factors which were similar to those predicted by the Hertlein Model. The first factor, associated with intimacy in the Model, involving using ICT to; stay connected with family members who were away from home, stay connected with extended family, as a means of staying emotionally connect to family members during the day, and as a way of updating friends about the family. The second factor, associated with relationship maintenance in the Hertlein Model, included using ICT to; "spice up" sex life, work out family issues or reach a family decision, find information about family finances, as something the family can do together, get help or advice about family problems, and as a way for tracking the location of family members. We did not find a factor related to relationship formation as suggested by the Hertlein Model, but this was expected as we only looked at established families in the study. The questions regarding the family uses of ICT and their factor loadings are given in Table 4. The findings suggested that there is an underlying dimension to the use of ICT by families, and so would provide a response to Research Question 2.

There was a third factor, but these items could be classified as more individual use of ICT rather than as family related. This factor included; using ICT for entertainment, for shopping, as something to do when bored, or as a source of news or information.

The mean scores for each factor were compared to explore whether the different types of families make use of the technologies they have for different purposes. Individual usage was highest among the 'Tech Savvy' families and was significantly different from the 'In-Betweeners,' the 'Wired,' and the 'Just Mobiles.' The 'Wireless,' In-Betweeners,' and 'Just Mobiles' were significantly higher than the 'Wired' in their individuals uses of ICT devices and services as well.

With respect to family intimacy uses of ICT, the 'Tech-Savvy' were significantly higher than any of the other groups. The 'Wireless,' 'In-Betweeners,' and 'Just Mobiles' were similar to each other in their use of ICT technology for family intimacy purposes. The 'Wired' families were significantly lower in their use of ICT for family intimacy than any of the other groups.

Finally, with respect to the use of ICT for family relationship purposes, again the 'Tech-Savvy' were significantly higher than any of the other family clusters. The 'Wireless,' the 'In-Betweeners,' and the 'Just Mobile' were similar to each other. Again, the 'Wired' were significantly lower than the other groups in their use of ICT to maintain family relationships. With respect to Research Question 2a, the answer is that there are significant differences in ownership of devices and services that are reflected in the ways they are used in a family context.

Table 4. Results of Factor Analysis

		Factors	
		1	2
	Stay connected with family members away from home	.82	.27
	Stay in contact with extended family	.81	.24
	Stay emotionally connected with family members	.78	.25
	To update friends about family happenings	.76	.19
	To 'spice-up' sex life with spouse or partner	.07	.83
	To manage or find information about family finance or investments	.33	.71
	To work out family issues or reach family decisions	.39	.70
	To track the location of other family members	.22	.66
	Eigen-value	4.07	1.10
	Variance Explained of each factor	50.89%	13.76%
	Total Variance Explained	64.65%	

Factors Affecting Family ICT Usage

In response to Research Question 3, a regression analysis was conducted for each of the family usage factors. Independent variables included nationality, gender, age, number of children 18 years of age or under in the household, the number of devices used by the family, the number of network services used by the family, the number of ICT services used by the family, ICT attitude (as measured by the question, "I believe that improvements in ICT have been a good thing"), and ICT interest (as measured by the question, "I follow developments in ICT closely"). To confirm potential interactions between independent variables, a VIF (variance inflation factor) test was conducted. Generally, when this value is over 10, there is multicollinearity among independent

variables. In Table 6, VIF values of all independents variables were lower than 5, so correlation between independent variables was not an issue.

Korean families used ICT more for both family intimacy and relationship maintenance. Women used ICT more than men for family intimacy, but there was no significant difference based on gender for relationship maintenance use. The types of devices or services used by the families were significant predictors of both intimacy and relationship maintenance. The degree to which the family was networked was not a significant predictor of either intimacy or relationship maintenance. Attitude to ICT mattered in the use for family intimacy but not for relationship maintenance. Interest/knowledge in ICT proved to be significant for both

Table 5. Comparison of ICT Usage Purposes by Family Types

ICT Usage Purpose	Cluster						
	Tech-Savvy	Wireless	In-Between	Wired	Just Mobile		
Individual	3.31a	3.19ab	3.03b	2.48c	3.03b	3.07	29.55***
Family Intimacy	3.27a	2.80b	2.80b	2.13c	2.66b	2.81	47.14***
Family Relationship Maintenance	2.48a	1.98b	1.89b	1.49c	1.90b	2.01	49.57***

***p<.001, **p<.01, *p<.05
(abc): Scheffe's Post Hoc Multiple Comparisons

Table 6. Results of Regression Analysis

Independent Variables	Dependent Variables								VIF
	ICT Usage for Family Intimacy				ICT Usage for Relationship Maintenance				
	b	beta	t	Sig.	b	beta	t	Sig.	
Constance	−.58 **		−2.80	.005	−.21		−1.25	.212	
Country(0=American)	.43 ***	.24	4.07	.000	.85 ***	.53	9.8	.000	5.26
Demographic									
Gender(0=Male)	.31 ***	.17	6.61	.000	−.03	−.02	−.73	.464	1.05
Age	.00	−.02	−.39	.695	.00 *	−.12	−2.32	.021	4.91
No. of children under 18	.02	.03	1.19	.233	.04 ***	.08	3.22	.001	1.03
ICT Usage									
Device	.21 ***	.13	4.36	.000	.18 ***	.12	4.56	.000	1.26
Network	.07	.03	1.25	.211	.03	.02	.69	.492	1.17
Service	.45 ***	.31	10.64	.000	.34 ***	.27	9.87	.000	1.29
ICT Attitude	.15 ***	.13	4.65	.000	−.01	−.01	−.20	.839	1.19
ICT Interest/Knowledge	.11 ***	.13	4.24	.000	.11 ***	.15	5.12	.000	1.45
F	52.07***				79.18***				
R square	.304				.399				
Adjusted R square	.298				.394				

***p<.001, **p<.01, *p<.05

intimacy use and relationship maintenance.

The family intimacy model proved to be a good fit with a significant F value, however it is clear that intimate communications depends on more than ICT as the R-square is .304 meaning that about 70 percent of family intimate communications is unexplained by the model. As a predictor of ICT use of relationship maintenance purposes the model produced a good fit, however about 60 percent of the variation was unexplained by the factors included in the model.

Discussion and Conclusions

Three research questions were proposed and we found that each had a significant response. With respect to Research Question 1, families can be divided according to their ownership of ICT devices and use of ICT services. It would also seem that heavy owners of ICT devices find the most ways to use ICT in their family communications. These 'Tech-Savvy' heavy users represented over 25 percent of the respondents to the survey. It should also be noted that almost 14 percent of the respondents fell into the 'Wired' cluster and made significantly less use of ICT in their family communications. Both groups are large and worthy of attention from family relationship counselors, manufacturers of ICT devices and services, and future researchers. The largest number of families seemed to fall in the middle, where families find ICT devices and services which met their particular needs and making only light use of the rest.

With respect to Research Question 2, there was an underlying structure to the uses of ICT families used. Three factors were identified by the analysis. Two of these three factors were related to family relations and communications. The first family related factor had to do with maintaining contact between family members. The second had to do with collecting information to improve family functioning.

Finally, with respect to Research Question 3, nationality of the respondents, gender, devices owned, services employed, attitude to ICT, and interest in and knowledge of ICT all were significant predictors of use of ICT for purposes of family intimacy. Nationality, age, number of children in the household, number of devices used by the family, services used by the family, and interest

in and knowledge of ICT were all significant predictors of ICT use for relationship maintenance. Both models were a good fit, with significant F values. The R-square values suggest that while 30-40 percent of the variation was explained by the models, a fair amount is yet to be explained.

The findings of this study also provide some support for the Hertlein model. Some of the relationships described in the model (e.g. ecological influencing methods of family communication) were found to be significant. Also, we identified two of the three changes to process that Hertlein suggested would exist.

Limitations and Implications

As with any study of specific countries or cultures, care must be taken in generalizing the results. As was discussed, Korea and the United States are culturally different which lends support to the generality of the findings. Still, there may be interactions between other culture, political, and economic systems which have not been fully explored.

Results of the regression equations suggest that there are still important factors related to ICT use in the family that have yet to be uncovered. Identification of these factors would be a useful area for further research.

Findings for this research could be useful in a number of ways. For example, a family advisor might want to find the ways that a particular family uses ICT before making recommendation for improving family communications. Device makers and software developers could use the findings to estimate the demand that might exist for new technologies. Advertisers and marketers might be interested in the impact that their messages would have based on the media used.

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