

# Consumer Preferences for Wood-Framed Housing

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## Abstract

The purpose of this study was; 1) to describe consumer preferences for wood-framed housing; 2) to determine factors which affect the preferences for housing environments in wood-framed housing by demographic, current housing, and wood-framed housing-related characteristics; and 3) to identify differences in preferred wood-framed housing related characteristics by demographic and current housing characteristics.

From the visitors to a model wood-framed house in Seoul, Korea, 296 persons willing to live in a wood-framed house were selected as the sample for the study. Data were collected using a self-administered survey and analyzed by frequency distribution, factor analysis, chi-square test, t-test, and one-way analysis of variance procedures.

The results of the study indicated that among seven factors based on 32 housing characteristics, Factor 2 - "floor plan and interior environment" was the major variable which showed significant difference by selected demographic characteristics. Regarding the differences in wood-framed housing related characteristics by demographic characteristics, age, gender, education, and family life cycle showed group differences. Also, housing type was the major current housing characteristic to provide significant group difference in preferred wood-framed housing characteristics.

*Keywords: Preferences, Wood-framed housing, Housing environment*

## 1. INTRODUCTION

Wood-framed houses constructed with light frames such as platform or panel construction have been a fairly popular type of housing in many countries such as the United States, New Zealand, Canada, and Japan. These construction techniques have been introduced to Korea since late 1980s and the demand for these types of wood-framed houses has increased because of attractive outside appearance, desire to live in the countryside, and advantages for good health (Chang, 1997; Korea Housing Institute, 1996; Park, 1994). However, many people still experience a lack of knowledge on light wood construction techniques and the advantages or disadvantages living in the wood-framed houses with this type of construction (Korea Housing Institute, 1996). Also, due to many developments of wood-framed houses in Korea have done by foreign companies, inside and outside of the houses are often planned to fit into western life style. Therefore, these imported houses may not suitable for our life style.

A recent post-occupancy evaluation study (Kwon, 1998) found that residents living in wood-framed housing showed highest satisfaction on interior and exterior design in their houses compared to other housing characteristics. Also, space planning was the most influential variable on resident's satisfaction. However, no studies have been completed to discover consumer preferences or opinions on recently built western types of wood-framed housing.

The purpose of this study was; 1) to describe consumer preferences for wood-framed housing; 2) to determine factors which affect the preferences for housing characteristics of wood-framed housing by demographic, current housing, and wood-framed housing related characteristics; 3) to identify differences in preferred

wood-framed housing related characteristics by demographic and current housing characteristics.

Figure 1 shows a graphic summary of variables and relationships among the variables involved in the study.

## 2. THEORETICAL BACKGROUND

As demand for wood-framed house in Korea increases, several researches have reported characteristics of wood as a building material, construction techniques of wood-framed house (Chang, 1997; Kim et al., 1984; Park et al., 1991), and future prospects for wood-framed house (Park, 1994).

A study conducted by Korea Housing Institute (1996) surveyed residents of existing wood-framed houses and found that the residents were generally middle or high income and composed of a nuclear family with 3.8 persons. The average age of household heads ranges 40 to 50 years. In occupation, professionals/managers/self-employed consisted 71% of the respondents. Most of the wood-framed houses were 2-story buildings and Ondol heating system was widely used. The major reasons to prefer wood-framed houses were health and good exterior design. With regard to the resident's satisfaction, they showed high satisfaction in residential environment, especially, humidity, design, ventilation, and insulation.

## 3. METHODS

### 3.1 Instrument and Sample

A questionnaire was developed by the researcher. It was validated by housing researchers, home builders, developers, and designers. A pretest was performed in July 1997 with the visitors in a model wood-framed house in Seoul, Korea. Revisions were made based on

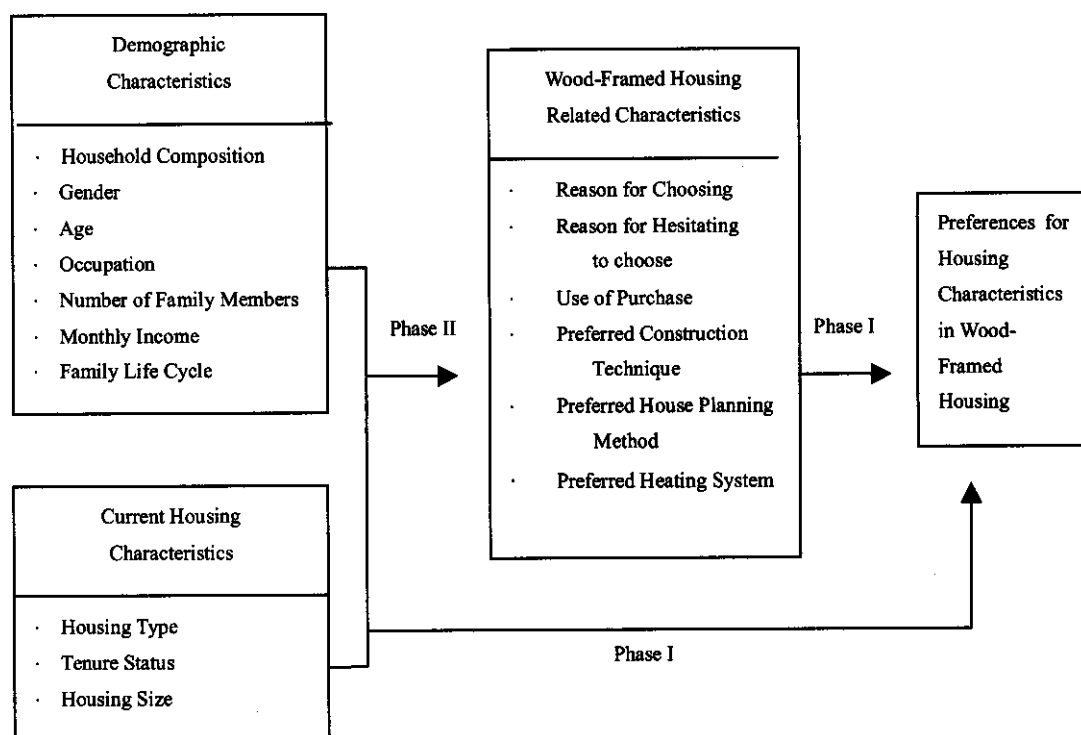


Figure 1. Study Framework

suggestions from the pilot test.

The questionnaire consisted of eight demographic characteristics (household composition, gender, age, occupation, education, number of family members, monthly income, and family life cycle), three current housing characteristics (housing type, tenure status, and housing size), six wood-framed housing related characteristics (reason for choosing, reason for hesitating to choose, use of purchase, preferred construction technique, preferred house planning method, and preferred heating system), and 32 questions measuring consumers' preferences for housing characteristics in a wood-framed house using the five-point Likert scale ("1" for "strongly disprefer" to "5" for "strongly prefer").

Among visitors to the model wood-framed house, 296 persons who were willing to live in a wood-framed house in the future were selected as the sample of this study.

### 3. 2 Data Collection and Analysis

The data were collected using a self-administered survey between August and September of 1997. Statistical analyses were performed using SAS PC program. Statistical techniques used in this study included frequency distribution, factor analysis, chi-square test, t-test, and one-way analysis of variance (ANOVA.) A confidence level of  $p < .05$  was chosen by researcher as the criterion for rejection.

## 4. DESCRIPTION OF THE SAMPLE

Table 1 shows the demographic characteristics of respondents. More than two-thirds (69.8%) of the respondents consisted of two-generation household. Over half (56%) of the respondents were male and the mean age was 37 years old. The most common type of occupation was professional (24.4%), and the education level for most respondents was more than a college education.

A little less than half (48.7%) of the respondents had monthly income of more than 4,000,000won, which is a very high income level compared to average income levels for middle class Koreans. The family in the child-education stage of the life cycle (42.5%) was the most common.

Summaries of the current housing and preferred wood-framed housing related characteristics of the respondents are found on Table 2. Many respondents (67%) were living in an apartment with more than medium size (36.8%) and more than three quarters (79%) were homeowner. Many respondents (63%) desired to live in the countryside and wood-framed housing is well suited to country living. This finding can be related to the fact that recently many upper and upper-middle income people wanted to move to rural or suburban areas because they are tired of apartment living in the cities. They desire beautiful, homogeneous neighborhood with lots of fresh air.

A most common reason for being reluctant to choose a wood-framed house was unreliable construction (29.9%)

followed by high housing prices (22.2%). The major reason for purchasing a wood-framed house was for a permanent residence (56.8%). A little less than half (42%) of the respondents had no idea what types of construction techniques existed to build a wood-framed house. Almost half (42.5%) of the respondents preferred a combined heating system of more than two heating systems rather than floor heating, and a warm air heating system.

Table 1. Demographic Characteristics of Respondents

Demographic Characteristics		N(%) <sup>a</sup>
Household Composition	One generation	49(18.1)
	Two generation	189(69.8)
	Three generation	27(10.0)
Gender	Male	136(56.0)
	Female	107(44.0)
Age	29 or less	47(19.5)
	30-39	100(41.5)
	40-49	70(29.0)
	50 or older	24(10.0)
	Mean	37 years old
Occupation	Self-managed business men	42(17.4)
	Professionals	59(24.4)
	Executives	30(12.4)
	Office workers	53(21.9)
	Full-time housewives	31(12.8)
	Other	27(11.2)
Education	Less than high school	20(8.3)
	College graduate	171(70.1)
	Graduate school	51(21.1)
Number of Family Members	Less than 2	89(32.0)
	3	35(12.6)
	4	93(33.6)
	5 or more	40(14.4)
	Mean	3.38 persons
Monthly Income	Less than 2,000,000 won	44(15.9)
	Less than 3,000,000 won	38(13.7)
	Less than 4,000,000 won	60(21.7)
	4,000,000 won or more	135(48.7)
	Mean	\$3308
Family Life Cycle	Family formation stage	35(13.4)
	Child-rearing stage	46(17.6)
	Child-education stage	111(42.5)
	Emptynest stage	69(24.4)
	Mean	3.38 persons

N=296

<sup>a</sup>Total may not add to 100% because of nonresponses.

## 5. FINDINGS AND DISCUSSION

### 5.1 Preferences for Housing Characteristics in Wood-Framed Housing

Thirty-two questions were included in the original instrument to measure consumers' preferences for housing characteristics in wood-framed housing using the five point Likert-type scale. Responses from the respondents were factor analyzed by principal-component factor analysis using varimax rotation in the SAS program. Factor solutions computed were based on factors with eigenvalues equal to or greater than 1.0.

Seven factors including all 32 questions were produced (see Table 3). These factors were named as follows: Factor 1 – Aesthetics and interior/exterior design; Factor

2 – Floor plan and interior environments; Factor 3 – Housing size and space use; Factor 4 – Privacy and Convenience; Factor 5 – Economy; Factor 6 – Noise and moisture condition; and Factor 7 – Community condition. Total variance explained by the seven factors was about 64%. Seven factors were used as dependent variables in t-test and analysis of variances procedure.

Table 2. Current Housing and Wood-framed Housing Related Characteristics

Current Housing Characteristics		N(%) <sup>a</sup>
Housing Type	Single detached house	54(19.6)
	Apartment	185(67.0)
	Others	37(13.4)
Tenure Status	Own	219(79.3)
	Rent	54(19.6)
Housing Size	30 pyung or less	48(18.4)
	31-40 pyung	96(36.8)
	41-50 pyung	56(21.4)
	51 pyung or more	61(23.4)
Wood-Framed Housing Related Characteristics		N(%)
Reason for Choosing	Beauty in exterior appearance	32(15.2)
	Good for health	36(17.1)
	Desire for living in the countryside	133(63.0)
	Other	10(4.7)
	Mean	3.38 persons
Reason for Reluctant to Choose	Unreliable construction	70(29.9)
	Housing prices	52(22.2)
	Unsafe in waterproof/fire	41(17.5)
Use of Purchase	Permanent residence	150(56.8)
	Secondary residence	30(11.4)
	Retirement home	73(27.7)
	Light wood frame	53(21.2)
Preferred Construction Technique	Timber	35(14.0)
	Other	57(20.8)
	No knowledge	105(42.0)
Preferred House Planning Method	Resident's participation	162(60.7)
	Choose from catalogues/model houses	100(37.5)
Preferred Heating System	Floor heating (Ondol)	79(29.5)
	Warm air heating	67(25.0)
	Other	114(42.5)

N=296

<sup>a</sup>Total may not add to 100% because of nonresponses.

Among the seven factors, Factor 6 indicated the highest mean score (4.51 out of 5) which means consumers had the greatest preference in better "noise and moisture condition" in wood-framed housing (see Table 3). "Aesthetics and interior/exterior design"(4.46 ) also was considered as a second preference in housing characteristics of wood – framed housing.

In terms of a single variable, "efficiency in heating and cooling" ranked the highest mean score (4.77), followed by "widely open to natural environment" (4.74).

### 5.2 Preferred Housing Characteristics in Wood-Framed Housing by Demographic Characteristics

The differences between each of the seven factors which indicated preference for housing characteristics and selected demographic characteristics were tested by

Table 3. Respondents' Preferences for Housing Characteristics in Wood-Framed Housing

Factor	Item	M <sup>a</sup>	SD
Factor 1 (Aesthetics & Interior /Exterior Design)	Quality of interior design	4.66	0.69
	Quality of interior finishes and equipments	4.65	0.72
	Colors in interior space	4.49	0.77
	Outside view	4.45	0.85
	Exterior landscaping	4.36	0.87
	Design in exterior spaces (walls, roofs, etc.)	4.23	0.90
<b>Overall</b>		<b>4.46</b>	<b>0.60</b>
Factor 2 (Floor Plans & Interior Environments)	Efficiency in heating and cooling	4.77	0.58
	Efficiency in ventilation	4.73	0.58
	Structural safety	4.61	0.82
	Type of heating system	4.50	0.77
	Easiness of house maintenance	4.50	0.78
	Floor plan	4.49	0.85
	Use/location of electrical outlets	3.97	1.72
<b>Overall</b>		<b>4.45</b>	<b>0.56</b>
Factor 3 (Housing Size & Space Use)	Interior landscaping	3.99	1.12
	Housing Size	3.96	1.01
	Easiness of house remodeling	3.94	1.16
<b>Overall</b>		<b>3.96</b>	<b>0.86</b>
Factor 4 (Privacy & Convenience)	Privacy from outside	4.35	0.85
	Size/number of closets	4.21	0.96
	Convenience to use public/community facilities	4.06	0.99
	Convenience to make relationship with neighborhood	3.89	1.02
	Crowdness in neighbors	3.87	1.09
<b>Overall</b>		<b>4.08</b>	<b>0.65</b>
Factor 5 (Economy)	Housing cost	4.31	0.99
	Monthly housing expenses	4.28	0.90
	Housing investment value	4.04	1.09
<b>Overall</b>		<b>4.21</b>	<b>0.85</b>
Factor 6 (Noise & Moisture Condition)	Noise from outside	4.65	0.66
	Moisture control	4.28	0.76
	Quality of insulation	4.04	0.85
<b>Overall</b>		<b>4.51</b>	<b>0.64</b>
Factor 7 (Community Condition)	Widely open to natural environment	4.74	0.81
	Educational condition for children	4.28	1.07
	Convenience to use public transportation	3.94	1.21
<b>Overall</b>		<b>4.32</b>	<b>0.80</b>
<b>Overall Wood-Framed Housing Characteristics</b>		<b>4.32</b>	<b>0.49</b>

<sup>a</sup> Higher mean scores are associated with greater preferences.

ANOVA and t-test procedures (See Table 4).

As a result of the statistical analysis, those who had more than five family members were more likely to prefer "community condition". Females were more likely to prefer better "floor plans and interior environments", and better "community condition". Those who were 50 or older were more likely to prefer better "floor plans and interior environments". In occupation, full-time housewives preferred better "floor plans and interior environments" than office workers. "Noise and moisture condition were more preferred by full-time housewives".

Based on these results, "floor plan and interior environment" was the major variable which showed significant differences by selected demographic characteristics.

### 5. 3 Preferred Housing Characteristics in Wood-Framed Housing by Current Housing and Wood-Framed Housing Related Characteristics

ANOVA and t-test were performed to examine group differences (see Table 5).

Significant group difference existed between homeowners and renters for Factor 5 – the Economy factor. In other words, renters were more likely to prefer better economic aspects (Factor 5) of wood-framed housing. In the effect of current housing size on preference for housing characteristics in wood-framed housing, those living in a house with 41-50pyung and 51 pyung or more were more likely to prefer better "housing size and space use" (Factor 3).

In six selected wood-framed housing related characteristics, those who were reluctant to choose a wood-framed house because of high price and unreliability of the construction company were more preferred better economic aspects (Factor 5) of wood-framed housing than those not being reluctant to live there.

Respondents who were willing to purchase a wood-framed house as a permanent residence were more likely to prefer "aesthetic and interior/exterior design" (Factor 1). Also, respondents who preferred to choose a wood-framed house based on the company's catalogues or model houses were more likely to prefer better "community condition" (Factor 7).

Table 4. Preferred Housing Characteristics in Wood-Framed Housing by Demographic Characteristics

Housing Preferences		Factor1		Factor2		Factor3		Factor4		Factor5		Factor6		Factor7		Overall	
		M	S	M	S	M	S	M	S	M	S	M	S	M	S	M	S
Number of Family Members	Less than 2	4.40		4.36		3.97		4.01		4.15		4.40		4.31 B		4.27	
	3	4.59		4.53		3.87		4.12		4.40		4.60		4.38 B		4.39	
	4	4.42		4.50		3.99		4.08		4.17		4.60		4.18 B		4.32	
	5 or more	4.53		4.46		3.95		4.16		4.24		4.49		4.55 A		4.37	
Gender	F	1.26		1.29		0.16		0.64		0.77		1.70		2.77*		0.79	
	Male	4.22		4.40		3.88		4.02		4.13		4.46		4.20		4.26	
	Female	4.50		4.54		4.06		4.15		4.30		4.57		4.46		4.40	
	t	-1.10		-1.98*		-1.61		-1.63		-1.5		-1.31		-2.60*		-2.41*	
Age	29 or less	4.45		4.49 B		3.85		4.05		4.15		4.41		4.44		4.31	
	30-39	4.45		4.44 B		4.01		4.12		4.22		4.59		4.34		4.33	
	40-49	4.37		4.38 B		3.88		3.95		4.21		4.38		4.28		4.24	
	50 or more	4.65		4.79 A		4.17		4.27		4.21		4.72		3.97		4.49	
Occupation	F	1.26		3.36*		1.05		1.78		0.07		2.57		1.86		1.63	
	Self-managed business men	4.60		4.53 AB		4.14		3.98		4.13		4.59 B		4.17		4.35	
	Professionals	4.40		4.46 AB		3.88		4.13		4.12		4.60 B		4.35		4.30	
	Executives	4.39		4.48 AB		3.75		4.10		4.13		4.40 B		4.17		4.26	
	Office workers	4.38		4.24 A		3.76		3.94		4.15		4.30 B		4.26		4.18	
	Full-time housewives	4.57		4.62 A		4.16		4.36		4.50		4.72 A		4.54		4.52	
	Other	4.37		4.44 AB		3.86		3.97		4.03		4.40 B		4.35		4.25	
	F	1.28		2.35*		1.51		2.02		1.11		2.50*		0.99		2.19	

\*P&lt;.05

1) S: Student-Newman-Keuls Test

2) Higher mean scores are associated with greater preferences.

3) Factor1: Aesthetics and Interior/ Exterior Design Factor2: Floor Plans and Interior Environments

Factor3: Housing Size and Space Use Factor4: Privacy and Convenience Factor5: Economy

Factor6: Noise and Moisture Condition Factor7: Community Condition

4) The table shows only the groups that indicated significant differences.

Table 5. Preferred Housing Characteristics on Wood-Framed Housing by Current Housing and Wood-Framed Housing Related Characteristics

Housing Preferences		Factor 1		Factor 2		Factor 3		Factor 4		Factor 5		Factor 6		Factor 7		Overall	
		M	S	M	S	M	S	M	S	M	S	M	S	M	S	M	S
Current Housing Characteristics																	
Tenure Status	Own	4.41		4.43		3.82		4.03		3.97		4.50		4.40		4.27	
	Rent	4.46		4.45		4.00		4.10		4.25		4.51		4.30		4.34	
Housing Size	T	0.55		0.31		-1.34		0.70		-2.15*		0.07		0.87		0.92	
	30 pyung	4.48		4.44		3.58 B		4.07		4.32		4.45		4.38		4.29	
	31-40 pyung	4.40		4.41		3.90 AB		4.04		4.22		4.46		4.36		4.30	
	41-50 pyung	4.47		4.44		4.04 A		4.08		4.22		4.52		4.26		4.33	
	51 pyung or more	4.49		4.52		4.09 A		4.16		4.14		4.58		4.31		4.36	
	F	0.26		0.43		2.68*		0.39		0.30		0.43		0.27		0.24	
Wood-Framed Housing Related Characteristics																	
Reason For Reluctant to Choose	Unreliable construction	4.40		4.41		4.03		4.12		4.33 A		4.45		4.32		4.31	
	Housing price	4.46		4.43		3.95		3.95		4.39 A		4.44		4.31		4.31	
	Unsafe in waterproof / fire	4.42		4.51		3.93		4.11		4.19 AB		4.49		4.29		4.33	
	No reluctance	4.64		4.56		4.09		4.15		3.85 B		4.57		4.34		4.38	
Use of Purchase	F	1.47		0.69		0.29		0.89		3.25*		0.31		0.02		0.19	
	Permanent residence	4.56 A		4.49		4.00		4.11		4.27		4.55		4.41		3.78	
	Secondary residence	4.25 B		4.36		3.93		4.40		3.98		4.28		4.24		4.19	
	Retirement home	4.33 B		4.40		3.93		4.03		4.21		4.53		4.22		4.26	
	F	3.48**		1.00		0.05		0.43		1.49		2.17		1.55		2.69	
Preferred House Planning Method	Resident's participation	4.45		4.46		3.98		4.13		4.19		4.56		4.41		4.34	
	Choose from catalogues/ model house	4.47		4.45		3.94		4.02		4.22		4.42		4.20		4.30	
	T	0.28		0.16		0.35		1.23		-0.27		1.56		2.00*		0.62	

\*P&lt;.05 \*\*P&lt;.01 \*\*\*P&lt;.001

1) S: Student-Newman-Keuls Test

2) Higher mean scores are associated with great preference

3) The table shows only the groups that indicated significant differences.

#### 5. 4 Differences in Wood-Framed Housing Related Characteristics by Demographic Characteristics

The significant relationships between each of the selected

demographic characteristics and six wood-framed housing related characteristics were tested by using the chi-square analysis.

In reason for choosing a wood-framed house by demographic characteristics, gender, age, types of occupation, educational level, monthly income, stage in family life cycle were the variables which indicated statistically significant group differences (see Table 6).

Desire for living in the country was the most common reason to choose wood-framed housing by both men and women, but female respondents were also likely to choose it because of attractive or beautiful exterior appearance. Those age 50s were more likely to choose "desire for living in the country" and those age 40s preferred more on "good for health" as a reason for choosing a wood-framed house. Also those age 20s showed relatively high percentage in the reason for attractive exterior appearance compared with other age groups.

Respondents who were professionals were more likely to say they wanted to live in a wood-framed house because they believed it was good for health. Respondents who were executives or full-time house wives were more likely to choose a wood-framed house because of desire for living in the country. Also, office workers showed more preference "attractive exterior appearance".

Those who were college graduates indicated a high desire for living in the country, but those with lower than a high school education, reported "attractive exterior appearance" as a reason to choose a wood-framed house.

Those with the highest income reported relatively higher

frequency in the reason of desire for living in the country, and those with relatively lower incomes indicated attractive exterior appearance or health aspect of wood as reasons to choose a wood-framed house.

Those in the child-education stage chose a wood-framed house because of desire for living in the country. Those in the emptynest stage selected "attractive exterior appearance" as the major reason for selecting a wood-framed house.

In summary, males, age 50 and older, executives or full-time house wives, college graduates, those with highest income, and those in the child-education stage of family life cycle showed higher preferences for living in the country as a reason to choose a wood-framed house. Females, younger, office workers, those with lower incomes, those with lower education levels, and those with emptynest stage of family life cycle indicated a higher preference for attractive exterior appearance as a reason to choose a wood-framed house.

As shown in Table 7, as a result of testing group differences in use of purchasing a wood-framed house by demographic characteristics, age and education were the only variables which indicated statistically significant differences. Respondents who were in their 20s and 30s would like to purchase a wood-framed house as permanent residence. And those in their forties and fifties were more likely to purchase it as a retirement home for their later life.

Those with a college education were more likely to purchase a wood-framed house as their retirement home. However, those with less than high school education

Table 6. Differences in Reason for Choosing by Demographic Characteristics

N(%)

Demographic Characteristics		Reason for Choosing			Total	$\chi^2$ value
		Beauty in exterior appearance	Good for health	Desire for living in the country		
Gender	Male	10 (10.20)	14 (14.29)	74 (75.51)	98 (100.00)	$\chi^2 = 7.62^*$ $df = 2$
	Female	19 (23.75)	15 (18.75)	46 (57.50)	80 (100.00)	
	Total	29 (16.29)	27 (16.29)	120 (67.42)	178 (100.00)	
Age	29 or less	11 (33.33)	4 (12.12)	18 (54.55)	33 (100.00)	$\chi^2 = 13.12^*$ $df = 6$
	30-39	9 (12.00)	13 (17.33)	53 (70.67)	75 (100.00)	
	40-49	5 (10.00)	10 (20.00)	35 (70.00)	50 (100.00)	
	50 or older	1 (6.25)	1 (6.25)	14 (87.50)	16 (100.00)	
	Total	26 (14.94)	28 (16.09)	120 (68.97)	174 (100.00)	
Occupation	Self-managed business men	3 (11.54)	3 (11.54)	20 (76.92)	26 (100.00)	$\chi^2 = 22.03^*$ $df = 10$
	Professionals	4 (8.16)	12 (24.49)	33 (67.35)	49 (100.00)	
	Executives	2 (8.00)	2 (8.00)	21 (84.00)	25 (100.00)	
	Office workers	9 (26.47)	7 (20.59)	18 (52.94)	34 (100.00)	
	Full-time Housewives	3 (13.64)	1 (4.55)	18 (81.82)	22 (100.00)	
	Total	21 (13.46)	25 (16.03)	110 (70.51)	156 (100.00)	
Education	Less than High school	5 (35.71)	0 (0.00)	9 (64.29)	14 (100.00)	$\chi^2 = 12.41^*$ $df = 4$
	College graduate	15 (13.04)	16 (13.91)	84 (73.04)	115 (100.00)	
	Graduate school	8 (17.39)	13 (28.26)	25 (54.35)	46 (100.00)	
	Total	28 (16.00)	29 (16.57)	118 (67.43)	175 (100.00)	
Monthly Income	Less than 2,000,000 won	7 (22.58)	7 (22.58)	17 (54.84)	31 (100.00)	$\chi^2 = 12.60^*$ $df = 6$
	Less than 3,000,000 won	7 (22.58)	5 (16.13)	19 (61.29)	31 (100.00)	
	Less than 4,000,000 won	10 (23.81)	10 (23.81)	22 (52.38)	42 (100.00)	
	4,000,000 or more	8 (8.25)	14 (14.43)	75 (77.32)	97 (100.00)	
	Total	32 (15.92)	36 (17.91)	133 (66.17)	201 (100.00)	
Family Life Cycle	Family Formation Stage	7 (22.33)	7 (22.33)	16 (53.33)	30 (100.00)	$\chi^2 = 18.20^{**}$ $df = 6$
	Child-rearing stage	7 (21.87)	2 (6.25)	23 (71.87)	32 (100.00)	
	Child-education stage	3 (3.95)	16 (21.05)	57 (75.00)	76 (100.00)	
	Emptynest stage	14 (26.92)	8 (15.38)	30 (57.69)	52 (100.00)	
	Total	31 (16.32)	33 (17.36)	126 (66.32)	190 (100.00)	

\* $P < .05$  \*\* $P < .01$  \*\*\* $P < .001$

1) The table shows only the groups that indicated significant differences.

Table 7. Differences in Use of Purchase by Demographic Characteristics

N(%)

Demographic Characteristics		Use of Purchase				$\chi^2$ value
		Permanent residence	Secondary residence	Retirement home	Total	
Age	29 or less	26 (59.09)	10 (22.73)	8 (18.18)	44 (100.00)	$\chi^2=17.71^{**}$ $df=6$
	30-39	64 (71.11)	6 (6.67)	20 (22.22)	90 (100.00)	
	40-49	31 (46.97)	8 (12.12)	27 (40.91)	66 (100.00)	
	50 or older	11 (47.83)	4 (17.39)	8 (34.78)	23 (100.00)	
	Total	132 (59.19)	28 (12.56)	63 (28.25)	223 (100.00)	
Education	Less than high school	12 (63.16)	7 (36.84)	0 (0.00)	19 (100.00)	$\chi^2=18.89^{**}$ $df=4$
	College graduate	86 (56.21)	15 (9.80)	52 (33.99)	153 (100.00)	
	Graduate school	33 (66.00)	4 (8.00)	13 (26.00)	50 (100.00)	
	Total	131 (59.00)	26 (11.72)	65 (29.28)	222 (100.00)	

\*P&lt;.05 \*\*P&lt;.01 \*\*\*P&lt;.001

1) The table shows only the groups that indicated significant differences.

showed relatively high frequency in having a secondary house, compared to other higher education group.

Based on these results, it is found that those with age 40s and graduate school education were more likely to purchase a wood-framed house as their retirement home.

As shown in Table 8, differences in preferred house planning methods by demographic characteristics were conducted. Gender, age, and number of family members were the variables which indicated significant group differences.

Females preferred to be actively involved in planning their housing rather than choosing from catalogues or model houses. On the other hand, males preferred to choose from

In summary, younger, females, families with a few persons preferred to build their wood-framed housing by their active participation.

With regard to differences in preferred heating system by demographic characteristics, family life cycle was the only variable which showed significant result (see Table 9). Respondents in family formation stage preferred more on a combination of more than two types of heating systems. But those in the empty nest stage preferred not only floor heating but also warm air heating systems. This finding is interesting because most of the home builders or developers assumed that the most preferred heating system in a wood-framed house by consumers of all ages is floor heating. But

Table 8. Differences in Preferred House Planning by Demographic Characteristics

N(%)

Demographic Characteristics		Preferred House Planning Method			$\chi^2$ value
		Resident's Participation	Choose from Catalogues / Model house	Total	
Gender	Male	72 (54.96)	59 (45.04)	131 (100.00)	$\chi^2=5.16^*$ $df=1$
	Female	69 (69.70)	30 (30.30)	99 (100.00)	
	Total	141 (61.30)	89 (38.70)	230 (100.00)	
Age	29 or less	33 (75.00)	11 (25.00)	44 (100.00)	$\chi^2=12.89^{**}$ $df=3$
	30-39	63 (67.02)	31 (32.98)	94 (100.00)	
	40-49	32 (47.76)	35 (52.24)	67 (100.00)	
	50 or older	10 (43.48)	13 (56.52)	23 (100.00)	
	Total	138 (60.53)	90 (39.47)	228 (100.00)	
Number of Family Members	Less than 2	61 (72.62)	23 (27.38)	84 (100.00)	$\chi^2=8.14^*$ $df=3$
	3	22 (64.71)	12 (35.29)	34 (100.00)	
	4	51 (57.95)	37 (42.05)	88 (100.00)	
	5 or more	28 (50.00)	28 (50.00)	56 (100.00)	
	Total	162 (61.83)	100 (38.17)	262 (100.00)	

\*P&lt;.05 \*\*P&lt;.01 \*\*\*P&lt;.001

1) The table shows only the groups that indicated significant differences.

catalogues or model houses. Those who were in their 20s and 30s showed higher preferences for building their housing by their active participation and those who were in the 40s and 50s preferred to build their housing by choosing an example from catalogues or model houses.

The families with few family members (2-3 persons) were more likely to build their house by their participation and the families with more than 4 persons and more preferred to choose a sample from catalogues or model houses.

the results of the study was somewhat different.

##### 5.5 Differences in Wood-Framed Housing Related Characteristics by Current Housing Characteristics

As a result of testing group differences in use of purchase of a wood-framed house by current housing characteristics, housing size and housing type were the variables which reported significant differences (see Table 10).

Table 9. Differences in Preferred Heating System by Demographic Characteristics

N (%)

Demographic Characteristics		Preferred Heating System				$\chi^2$ value
		Floor heating	Warm air heating	Other	Total	
Family Life Cycle	Family formation stage	3 (9.09)	10 (30.30)	20 (60.61)	33 (100.00)	$\chi^2 = 15.09^*$ $df = 6$
	Child-rearing stage	16 (36.36)	8 (18.18)	20 (45.45)	44 (100.00)	
	Child-education stage	31 (30.39)	22 (21.57)	49 (48.04)	102 (100.00)	
	Emptynest Stage	22 (34.92)	22 (34.92)	19 (30.16)	63 (100.00)	
Total		72 (29.75)	62 (25.62)	108 (44.63)	242 (100.00)	

\* $P < .05$  \*\* $P < .01$  \*\*\* $P < .001$ 

1) The table shows only the groups that indicated significant differences.

Table 10. Differences in Use of Purchase by Current Housing Characteristics

N (%)

Current Housing Characteristics		Use of Purchase				$\chi^2$ value
		Permanent residence	Secondary residence	Retirement home	Total	
Housing size	30 pyung or less	19 (67.86)	3 (10.71)	6 (21.43)	28 (100.00)	$\chi^2 = 19.61^{**}$ $df = 6$
	31-40 pyung	50 (64.94)	4 (5.19)	23 (29.87)	77 (100.00)	
	41-50 pyung	48 (63.16)	5 (6.58)	23 (30.26)	76 (100.00)	
	51 pyung or more	28 (47.46)	16 (27.12)	15 (25.42)	59 (100.00)	
Total		145 (60.42)	28 (11.67)	67 (27.91)	240 (100.00)	
Housing Type	Single detached house	27 (51.92)	12 (23.08)	13 (25.00)	52 (100.00)	$\chi^2 = 9.38^*$ $df = 4$
	Apartment	105 (62.87)	13 (7.78)	49 (29.34)	167 (100.00)	
	Others	18 (54.55)	5 (15.15)	10 (30.30)	33 (100.00)	
	Total	150 (59.53)	30 (11.90)	72 (28.57)	252 (100.00)	

\* $P < .05$  \*\* $P < .01$  \*\*\* $P < .001$ 

1) The table shows only the groups that indicated significant differences.

Respondents currently living in a house with less than 30 pyung showed relatively higher preferences for purchasing a wood-framed house as a permanent residence. And those living in 41-50 pyung houses preferred to buy a wood-framed house for preparation for retirement life and those living in more than 51 pyung wanted to purchase it for a secondary residence.

Respondents living in an apartment showed the most interest in purchasing a wood-framed house as a permanent residence. But those living in other types of housing (such as townhouses, or villas) were more likely to prefer to purchase it as a retirement home. In other words, those living in a small size house and an apartment want to purchase a wood-framed house as a permanent residence.

As shown in Table 11, with regard to differences in preferred house planning method in a wood-framed house by current housing characteristics, only housing size reported significant result. In other words, those living in a single-family detached house preferred residents' participation as a house planning method and those living in an apartment were more likely to choose a wood-framed house from company's catalogues or model houses.

In summary, among three selected current housing characteristics, current housing size was the major variable to make significant group differences in preferred wood-framed housing related characteristics.

## 6. CONCLUSIONS AND IMPLICATIONS

Based on the major findings of this study, the following conclusions were suggested.

- 1) In general, consumers indicated higher preferences (4.32 point out of 5) on the 32 housing characteristics of wood-framed housing suggested in this study. Especially, to increase consumer satisfaction on their wood-framed house, "noise and moisture condition", "aesthetics and interior / exterior design" and "floor plans and interior environments" should be given more consideration by developers or planners.
- 2) Females, those in their fifties or more, and full-time housewives were more likely to show higher preferences on floor plans and interior environments in wood-framed housing. Also, those who want to purchase a wood-framed house as their permanent house were more

Table 11. Differences in Preferred House Planning Method by Current Characteristics

N (%)

Current Housing Characteristics		Preferred House Planning Method			$\chi^2$ value
		Resident's participation	Choose from catalogue/ model house	Total	
Housing Type	Single Attached house	37 (71.15)	15 (28.85)	52 (100.00)	$\chi^2 = 8.52^*$ $df = 2$
	Apartment	102 (58.96)	71 (41.04)	173 (100.00)	
	Others	22 (61.11)	14 (38.89)	36 (100.00)	
	Total	161 (61.69)	100 (38.31)	261 (100.00)	

\* $P < .05$  \*\* $P < .01$  \*\*\* $P < .001$ 

1) The table shows only the groups that indicated significant differences.



preferred the aspect of aesthetics and interior and exterior design. And those currently living in large size houses were more preferred housing size and space use in wood-framed house. Therefore, if homebuilders would desire to plan the wood-framed houses, they should consider these group differences on preferred housing characteristics and so that they provide more appropriate wood-framed house to the specific target groups.

- 3) This study found that the consumers who were female young and who were in the few family members preferred more to participate actively to built their wood-framed house. Previous study (Kwon, 1998) also found that a wood-framed house planned by resident's participation produced high housing satisfaction. Therefore, increasing opportunities for consumer's involvement should be expanded in order to facilitate their willingness to live in a wood-framed house and increase their satisfaction.
- 4) The findings indicated various heating systems in wood-framed houses can be accepted by consumers. Therefore, the further studies will be needed to find out more suitable heating systems for a wood-framed house.

This study provides some insight into factors that might affect consumer preferences for wood-framed housing at the point of the development of western wood-framed houses in our society which is in the beginning stage.

This study only focused on consumer preferences in selected housing characteristics and other housing related characteristics in wood-framed housing. The findings of this study may be used by researchers, home builders, developers, and designers to suggest background knowledge about current status of consumer preferences for wood-framed housing.

All the variables used in this study were selected based on previous researches on housing preferences. Future studies may include some additional variables to provide more appropriate information about consumer preferences for wood-framed housing.

## REFERENCES

- Chang, S. S. (1997). Advantages of wood-framed house. *Korea Wood Construction Association 1997 Proceedings*, 1-20.
- Kim, K. D (1984). Constuction system of wood-framed house in Canada. *Journal of the Architectural Institute of Korea*, 28(116).
- Korea Housing Institute (December, 1996). Wood-framed housing in Korea: An overview. *Korean Housing Institute Report 96-8*.
- Kwon, O. J. (1998). Post-occupancy evaluation by residents in wood-framed housing, *Journal of the Architectural Institute of Korea*, 14(11), 11-22.
- Park, M. J. (1994). Present situation and prospect in wood-framed architecture, *Forestry Administration Research*, 84-90.
- Park, M. J. et al. (1991). Housing market system and development of wood-framed home. *Journal of Wood Science Technology*, 19(3), 53.