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# **Expected Values on the Continuous Intention to Use IoT Products from the Perspective of Expectation-Confirmation Theory**

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The primary purpose of this study is to identify the problems of existing IoT products and identify the actual needs of customers through analysis of experienced IoT products. Compared to the development of the Internet of Things (IoT) technology, research in the field of technology and institution has been conducted, but research on the analysis of users' positions had not been conducted much. Therefore, this study aimed to establish an AI TV product planning strategy through the analysis of satisfaction and continuous use intention according to the expected value factors of IoT product users. According to the manufacturer's market approach, the types of consumers are divided into 'single-person households', 'two to three-person households', and 'four or more households'. It was intended to establish a product strategy in the direction of supplementing problems by reflecting expected factors through user analysis of consumers' IoT products. In order to establish a different product strategy for each household unit, the relationship with the intention of continuous use was studied through the satisfaction of each household unit. Through this, verification was conducted through literature and empirical studies on what value factors play an important role in allowing users to continue to use IoT products in the long term.

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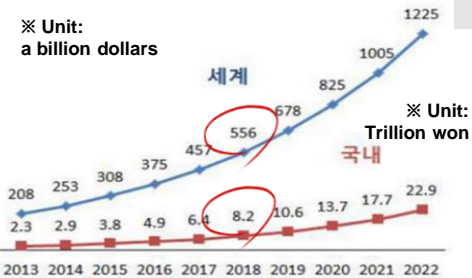
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# 4<sup>th</sup> Industrial Revolution Core Technology : IoT industry

## ● Key technology of the Fourth Industrial Revolution : Internet of Things (IoT)

- ▶ Global market size in 2020: \$1 trillion forecast
- "2020 Domestic Market Size: 14 trillion won" Forecast
- ▶ Gartner has been selected as one of the top 10 strategic technologies for six consecutive years from 2012 to 2017
- ▶ Market share is dominated by TOP3 (Apple, Nest, Google) → 7th place, and Samsung and domestic companies are also commercialized



글로벌 G20 국가(2016년)			아시아 태평양 국가(2017년)		
1	미국		1	대한민국	
2	대한민국		2	일본	
3	영국		3	중국	
4	호주		4	인도네시아	
5	일본		5	필리핀	
6	독일		6	대만	
7	캐나다		7	중국어	
8	중국		8	말레이시아	
9	프랑스		9	태국	
10	이탈리아		10	베트남	

## ● Trends in IoT of Domestic Companies

구분	기업명	최근 동향
스마트 가전	삼성전자	- 2018년부터 출시되는 모든 가전제품에 OCF 인증을 받을 계획 - 사물인터넷 기기용 보안 칩 솔루션 개발 - NB-IoT 연동이 가능한 IoT 위치 알람이 「커넥트 태그」 출시
	LG전자	- 일반 가전에 부착하여 제품 상태를 파악하고 원격으로 제어할 수 있는 스마트싱큐 센서와 허브 출시 - 문을 두드려 냉장고 내용물을 볼 수 있고 스마트싱큐 앱과 연동할 수 있는 IoT 냉장고 「LG 디오스 노크온 매직스페이스 냉장고」 출시
	동부대우전자	- SK텔레콤 스마트 홈 서비스에 연결될 수 있는 IoT 벽걸이 드럼 세탁기 「미니」 출시
	쿠쿠전자	- LG유플러스와 손잡고 IoT@home 앱과 연동되는 IoT 밥솥, IoT 공기청정기, IoT 생수기 등 3종 출시
	SK매직	- 이동식 습도 센서와 IoT 기능을 적용한 「매직 안심 가습기」 출시
	경동나비엔	- IoT 보일러 「나비엔 콘덴싱 스마트 특」 출시
	귀뚜라미보일러	- 원격 제어뿐만 아니라 사용자 생활패턴을 분석하고 학습하는 IoT 보일러 「거꾸로 IoT 콘덴싱 가스보일러」 출시
	린나이코리아	- SK텔레콤/LG유플러스 스마트 홈 서비스와 연동 가능한 IoT 보일러 「스마트 와이파이 보일러」 출시
	코웨이	- 공기질 측정이 가능한 IoT 공기청정기 「아이오케어」 출시
	쿨러노비타	- LG유플러스 IoT@home 앱과 연동할 수 있는 IoT 비데 출시
특정 산업용 제품	이도링크	- IoT 가스원격검침기 개발
	모다정보통신	- 일본 히타치에 IoT 모듈과 단말기 공급
	바른전자	- KB국민은행에 IoT 디지털저금통 「리브통」을 공급하고, 세계에서 가장 작은 크기의 로라 통신 모듈 개발
	솔루엠	- SK텔레콤 로라 망을 기반으로 위치를 확인할 수 있는 「키코」, 「키코 카드」, 「키코 미니」 출시

(자료) IITP

## IoT Product Market for Consumers, "Expected Competition"

- ▶ Need to approach with detailed analysis and strategy



# I . Research Background and Goal

- 1 Key technology of the 4th Industrial Revolution: Internet of Things (IoT) ▶ Industrial revitalization is slow.**  
▶ First mentioned by MIT Cabin Ashton in 1999, the forecast for annual growth of 24.4% from \$240 billion in 2010 to \$1.7 trillion in 2019  
The purpose of the drive begins with the need to discover new markets, no complex structures, platforms, or global standards that require cooperation from various industries
- 2 Rapid market growth is expected when solving technology/institutional issues ▶ Competition is expected around the consumer market**  
▶ Shipment in the endpoint market, consumer market leads the enterprise market by 6:4 (Based on sales, consumer :enterprise = 4:6)  
Consumer markets: low price, short life expectancy, low differentiation, competitive edge.
- 3 Identifying satisfaction/continuous use intentions through analysis of experienced IoT products ▶ Establishing product planning strategies**  
▶ Consumer markets are growing mainly among telecommunication companies SKT, LGU+, KT and IT companies, and manufacturing companies. It is predicted that an approach with more detailed analysis and strategy will be needed.



## Research Question /Goal

- What expected value will significantly affect the user's satisfaction/continuous use intention?
- Establishing product strategies through analysis of differences by household unit, income level, and region
- ▶ **Provides strategic insight into IoT product planning for telecommunications, IT companies, manufacturers**

## II. Literature review

Research through IoT user analysis is in its early stages, and research on satisfaction/continuous use intention/new product use intention through user analysis is needed.

### Existing literature review

Division	Research	Research details
<b>Technology Acceptance Model<sup>1,2</sup></b>	<ul style="list-style-type: none"> <li>Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. (FD Davis, 1989)</li> <li>A Comprehensive Study on the Technology Acceptance Model (TAM) Research. (Yoo Jaehyun and Park Chul, 2010)</li> <li>A theoretical extension of the technology acceptance model: Four longitudinal field studies. (Venkatesh, Davis, 2000).</li> </ul>	<ul style="list-style-type: none"> <li><b>Perceived usefulness and perceived ease of use</b> have an important influence on the user's attitude, and attitude has a great influence on usage intention and system use.</li> </ul>
<b>UTAUT</b>	<ul style="list-style-type: none"> <li>User acceptance of information technology: Toward a unified view. (Venkatesh, 2003).</li> </ul>	<ul style="list-style-type: none"> <li>Based on the existing eight acceptance theories, a study was conducted by <b>adding performance expectations, effort expectations, and promotion conditions</b></li> </ul>
<b>Internet of Things User Value Factor Study</b>	<ul style="list-style-type: none"> <li>Factors of User Value in IoT Services (Joo Hyun Park, Han Young Ryu, 2016)</li> <li>User Value Analysis of U-City Residential Environment Service (Kim Hyang-sook, Kim Hyo-chang, 2015)</li> <li>A Study on the Effect of User Value and Characteristics on Smart Home Service Purchase Intention (Yuna Noh, Choi Sun-mi, 2015)</li> </ul>	<ul style="list-style-type: none"> <li>The user value factors of IoT service were defined and <b>five value factors</b> were derived</li> </ul>
<b>Expected matching model</b>	<ul style="list-style-type: none"> <li>Understanding Information System Continuance (Bhattacharjee, 2001)</li> </ul>	<ul style="list-style-type: none"> <li>Depending on the level of agreement with <b>expectations</b>, it affects <b>perceived usefulness and satisfaction</b>, which affects the intention of continuous use.</li> </ul>

### Direction of research development

- ✓ **Study on the initial acceptance intention of IoT services.**  
↓
- ✓ **Feel the need for research through IoT service user analysis**  
↓
- ✓ **Analysis of satisfaction/continuous use factors through user analysis**  
↓
- ✓ **Purpose of establishing new product planning strategy**

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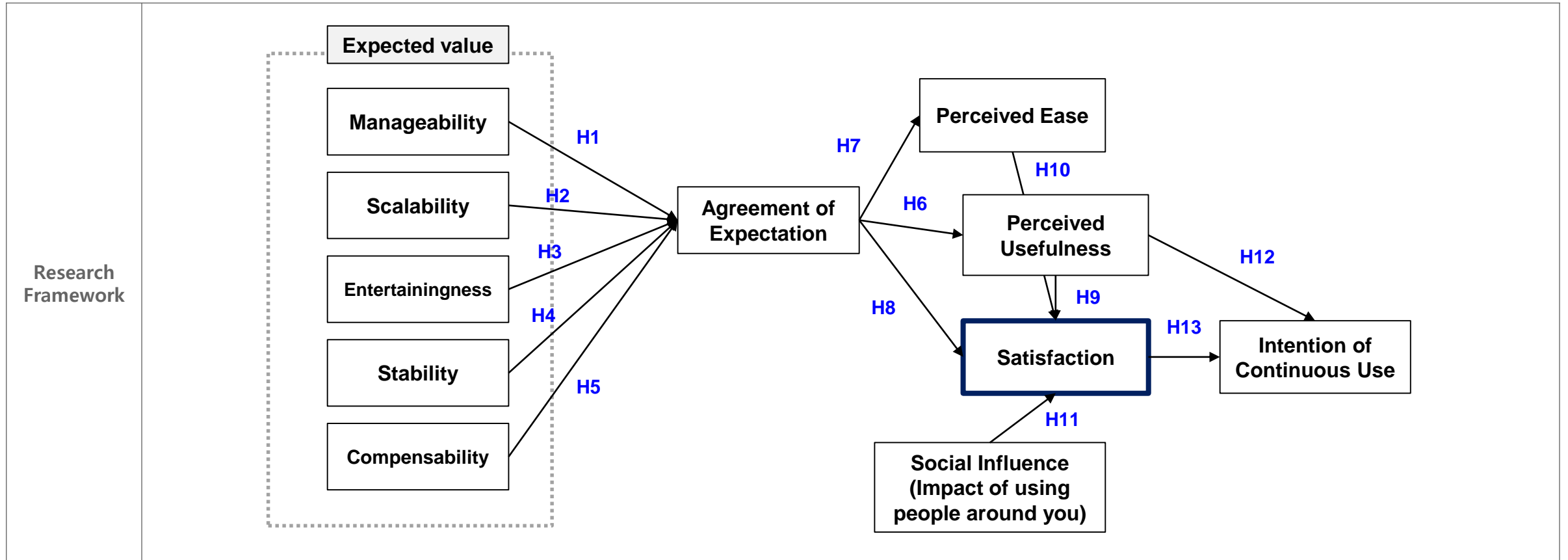
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# III. Research model and hypothesis

## Research model

Income Level, Household Unit, Region





# III. Research model and Hypothesis

## Hypothesis (Overall sample)

H1. Expectations for the manageability of IoT products will have a positive effect on meeting expected values.

H2. Expectations for the scalability of IoT products will have a positive effect on meeting the expected value.

H3. Expectations for entertainingness of IoT products will have a positive effect on meeting the expected value.

H4. Expectations for the safety of IoT products will have a positive effect on meeting the expected value.

H5. Expectations for the compensability of IoT products will have a positive effect on meeting the expected value.

H6. The expected match of IoT product users will have a positive effect on perceived usefulness.

H7. The expected match of IoT product users will affect perceived ease of use.

H8. The expected match of IoT product users will affect satisfaction.

H9. Perceived usefulness will affect satisfaction.

H10. Perceived ease will affect satisfaction.

H11. Social influence (peripheral) will affect satisfaction.

H12 The perceived usefulness will affect the intention of continuous use.

H13. Satisfaction will affect the intention of continuous use.

## IV. Research Methodology : Definition of Research variables (1/2)

In this study, the questionnaire questions of existing studies were modified and introduced according to the definition of each variable, or translated according to the subject of this study.

#	Variable	Definition	Question	Related Research
1	Manageability	<b>The value of wanting users to manage situations anytime</b> , anywhere remotely, not just internally, but externally, while using IoT products	4 questions	Kim Hyang-sook, Kim Hyo-chang (2015) Balta-Ozkan, N., Davidson, R. (2013) Park Joo-hyun, Ryu Han-young (2016)
2	Scalability	<b>Value that users want to be able to integrate or expand</b> with new devices, technologies, services, etc. while using IoT products	4 questions	Kang Eun-hye, Park Nam-chun (2014), Kim Hyang-sook, Kim Hyo-chang (2015), Park Joo-hyun, Ryu Han-young (2016)
3	Entertainingness	<b>The value that users gain</b> from using IoT products	4 questions	Park Chan-sun, Moon Hyung-don (2014) Park Joo-hyun, Ryu Han-young (2016)
4	Stability	<b>The value of wanting users to proactively prevent and protect against accidents or external physical threats</b> that may occur in a specific space while using IoT products	4 questions	Krishnamurti, T., Schwartz, D. (2012) Park Joo-hyun, Ryu Han-young (2016)
5	Compensability	<b>The value that users want to pay for their efforts</b> or service use with the satisfaction they want to gain physically and psychologically while using IoT products	4 questions	Balta-Ozkan, N., Davidson, R. (2013) Park Chan-sun, Moon Hyung-don (2014) Park Joo-hyun, Ryu Han-young (2016)

# IV. Research Methodology : Definition of Research variables (2/2)

In this study, the questionnaire questions of existing studies were modified and introduced according to the definition of each variable, or translated according to the subject of this study.

#	Variable	Definition	Question	Related Research
6	Meeting expectations	The level at which the user's expectations for IoT products are met after the product is used	5 question	Bhattacharjee (2001)
7	Perceived usefulness (expected before introduction)	The extent to which IoT products are perceived to be useful for life	4 question	Davis, F. D (1989)
8	Perceived ease	Decreased levels of mental effort with IoT products	4 question	Davis, F. D (1989)
9	Social Influence	The degree of impact on people around you who are using IoT products	4 question	Venkatesh et.al. (2003) Yang Seung-ho, Hwang Yun-sung et al (2015)
10	Satisfaction	The level of satisfaction users feel after using IoT products	4 question	Davis, F. D (1989) Bhattacharjee (2001)
11	Intention of continuous use	Intent to continue using IoT products	4 question	Bhattacharjee (2001)

# IV. Research Methodology : Data collection and Analysis method

The survey was conducted through Tillionpanel, and after securing the data, the characteristics and statistical analysis of the collected data were conducted with SPSS, Smart PLS, and Python.

Data collection

#	Content	Details	Reference
1	Subject	<ul style="list-style-type: none"><li>Designate IoT products as experienced users for research expertise</li><li>Smart speakers, smart appliances, other IoT devices, smart bands, and etc</li></ul>	Experience of using after demographic survey (No) Out
2	Survey method	<ul style="list-style-type: none"><li>After completing it with <b>Qualtrics</b>, ask Tillionpanel, an online survey company, to conduct a survey</li></ul>	Total 443 participants
3	Survey Period	<ul style="list-style-type: none"><li>11/11~11/14 (4 days)</li></ul>	
4	Questionnaire	<ul style="list-style-type: none"><li>Each item is measured on a Likert 7-point scale (1=not very much~7=very much)</li></ul>	Total 79 questions

Analysis method

#	Content	Details
1	Participate in the survey	<ul style="list-style-type: none"><li>A total of 443 participants (Experienced: 234; Non-experienced: 210) ▶ <b>Analysis of 208 out of 234 experienced people who removed unfaithful answers</b></li></ul>
2	Data Reliability/Validity Analysis	<ul style="list-style-type: none"><li>Analysis proceeds with <b>SPSS Statistics 21.0, Smart PLS 2.0</b> ▶ Reliability of research variables (using Cronbach's Alpha, Composite Reliability, Average Variation Extracted coefficient)</li></ul>
3	Sample characteristics	<ul style="list-style-type: none"><li>Analyze csv files (<b>Python</b>)</li></ul>

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# V. Research Analysis Result : Demographic Characteristics

The key demographic characteristics are as follows.

Content		Value	Rate(%)
Sex		208	100.0%
	Male	106	51.0%
	Female	102	49.0%
Age		208	100.0%
	20s	42	20.2%
	30s	81	39.0%
	40s	60	28.9%
	50s & older 50s	25	12.0%

Content		Value	Rate(%)
Income (won)		208	100.0%
	30 mil or less	39	18.8%
	50 mil or less	62	29.8%
	80 mil or less	68	32.7%
	100 mil or less	26	12.5%
	100 mil more	13	6.3%

Content		Value	Rate(%)
Region		208	100.0%
	Kyoungki	49	23.6%
	Kangwon	5	2.4%
	Chungcheong	8	3.8%
	Gyeonsang	12	5.8%
	Jeolla	18	8.7%
	Jeju	1	0.5%
	Seoul	68	32.7%
	Incheon	9	4.3%
	Daejeon	10	4.8%
	Daegu	10	4.8%
	Ulsan	4	1.9%
	Busan	14	6.7%
	Etc	0	0.0%

Content		Value	Rate(%)
Household		208	100.0%
	One	67	32.2%
	Two	37	17.8%
	Three	36	17.3%
	Four and more	68	32.7%

Content		Value	Rate(%)
Marriage		208	100.0%
	Y	90	43.3%
	N	118	56.7%

Content		Value	Rate(%)
Child		208	100.0%
	Y	70	77.8%
	N	20	22.2%

## V. Research Analysis Result : Basic statistics

Among IoT products, 52.7% of people who have experienced using smart speakers (including redundancy), and the number of times used per day accounted for 80.8% from 1 to 3 times.

Content	Value	Rate(%)
Experience using IOT (Redundant)	298	100.0%
Smart Speaker	157	52.7%
Smart band	51	17.1%
Smart home appliance	37	12.4%
IoT device	49	16.4%
Etc	4	1.3%

Content	Value	Rate(%)
IoT usage per day	208	100.0%
One & under	78	37.5%
Two or three	90	43.3%
Four or five	13	6.3%
More than five	27	13.0%

# V. Research Analysis Result : Verification of reliability of research variables

**Cronbach's Alpha (CA) :** The coefficient of each research variable is 0.6 or more, so it is reliable.

**Composite Reliability (CR) :** The coefficient of each research variable is 0.7 or more, so it is reliable.

**Average Variance Extracted (AVE) :** The coefficient of each research variable is 0.5 or more, so it is reliable.

#	Variable	Cronbach's Alpha (CA)	Composite Reliability (CR)	Average Variance Extracted (AVE)
1	Manageability	0.795	0.939	0.915
2	Scalability	0.782	0.935	0.909
3	Entertainingness	0.835	0.953	0.934
4	Stability	0.816	0.947	0.924
5	Compensability	0.717	0.910	0.869
6	Meeting expectations	0.745	0.936	0.914
7	Perceived usefulness	0.765	0.928	0.896
8	Perceived ease	0.766	0.929	0.898
9	Social Influence	0.809	0.944	0.921
10	Satisfaction	0.729	0.915	0.876
11	Intention of continuous use	0.836	0.953	0.935



# V . Research Analysis Result : Correlation Analysis

**Correlation Coefficient** : The coefficient for each variable is less than 0.85, so there is discriminant validity

**The square root of the AVE of each structure (Bold)** : Reliable because it is higher than the correlation coefficient between different structures

Correlation Table

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Manageability	<b>0.891</b>										
Scalability	0.497	<b>0.863</b>									
Entertainingness	0.477	0.820	<b>0.900</b>								
Stability	0.643	0.724	0.623	<b>0.846</b>							
Compensability	0.554	0.714	0.768	0.614	<b>0.854</b>						
Meeting expectations	0.529	0.618	0.552	0.679	0.496	<b>0.903</b>					
Perceived usefulness	0.704	0.595	0.490	0.718	0.589	0.546	<b>0.914</b>				
Perceived ease	0.523	0.622	0.704	0.530	0.625	0.438	0.477	<b>0.875</b>			
Social Influence	0.651	0.757	0.775	0.670	0.742	0.565	0.568	0.653	<b>0.874</b>		
Satisfaction	0.577	0.687	0.805	0.626	0.759	0.535	0.556	0.652	0.747	<b>0.915</b>	
Intention of continuous use	0.802	0.411	0.373	0.631	0.477	0.535	0.696	0.436	0.524	0.463	<b>0.885</b>

※ Diagonal numbers indicate the square root of AVE. The other numbers indicate the correlation coefficient.

## V. Research Analysis Result : Verification of Model Conformity

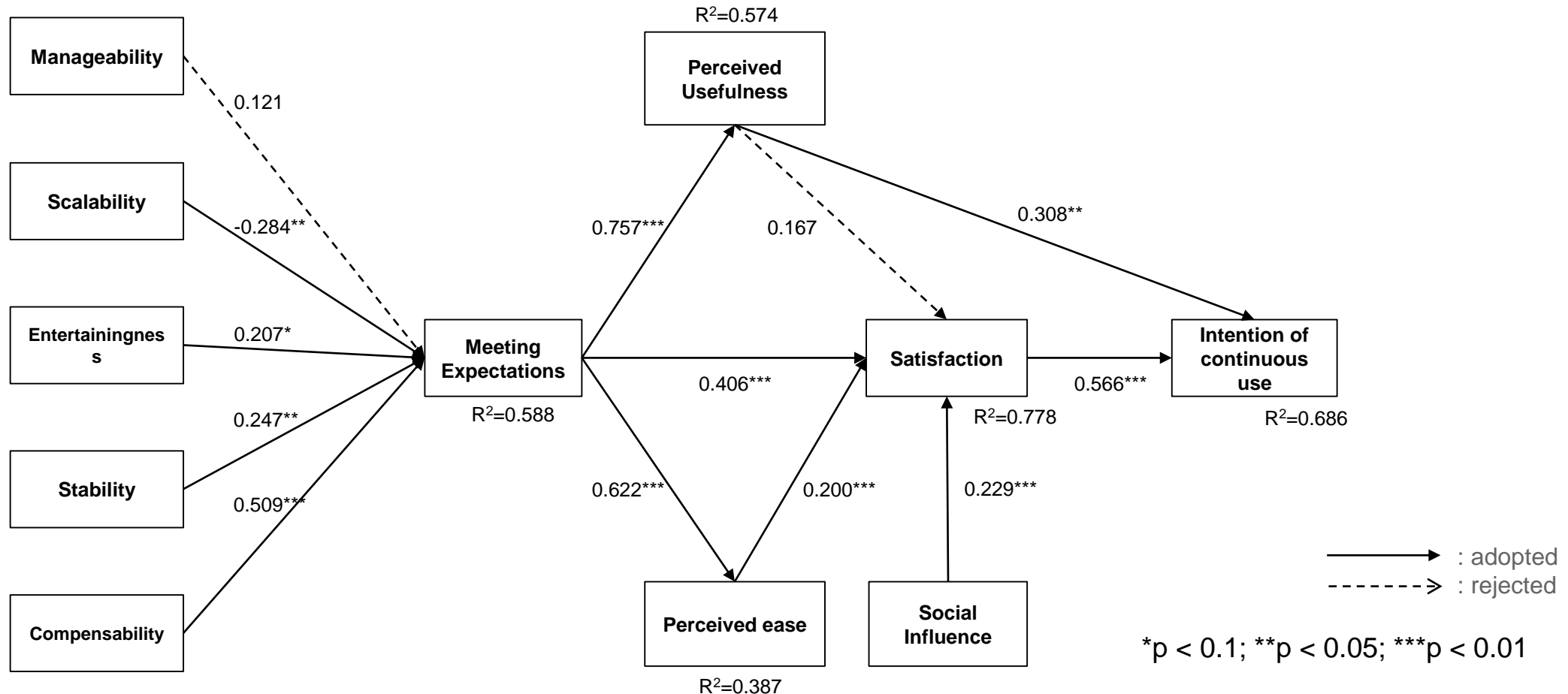
It is judged that the  $R^2$  coefficient of all variables is 0.38 or higher, thus the conformity of the research model is very high.

#	Variable	$R^2$
1	Meeting Expectation	0.588
2	Perceived usefulness	0.574
3	Perceived ease	0.387
4	Satisfaction	0.778
5	Intention of continuous use	0.686

※. Conformity is very high if  $R^2$  is above 0.26; normal if  $R^2$  is above 0.13 and below 0.26; low if 0.02 and below 0.13.

# V. Research Analysis Result : Research Model (Overall Sample)

In this study, the proposed hypothesis was verified after 400 resampling with the bootstrap sampling technique using Smart PLS.



# V. Research Analysis Result : Hypothesis validation (Overall)

## Hypothesis validation

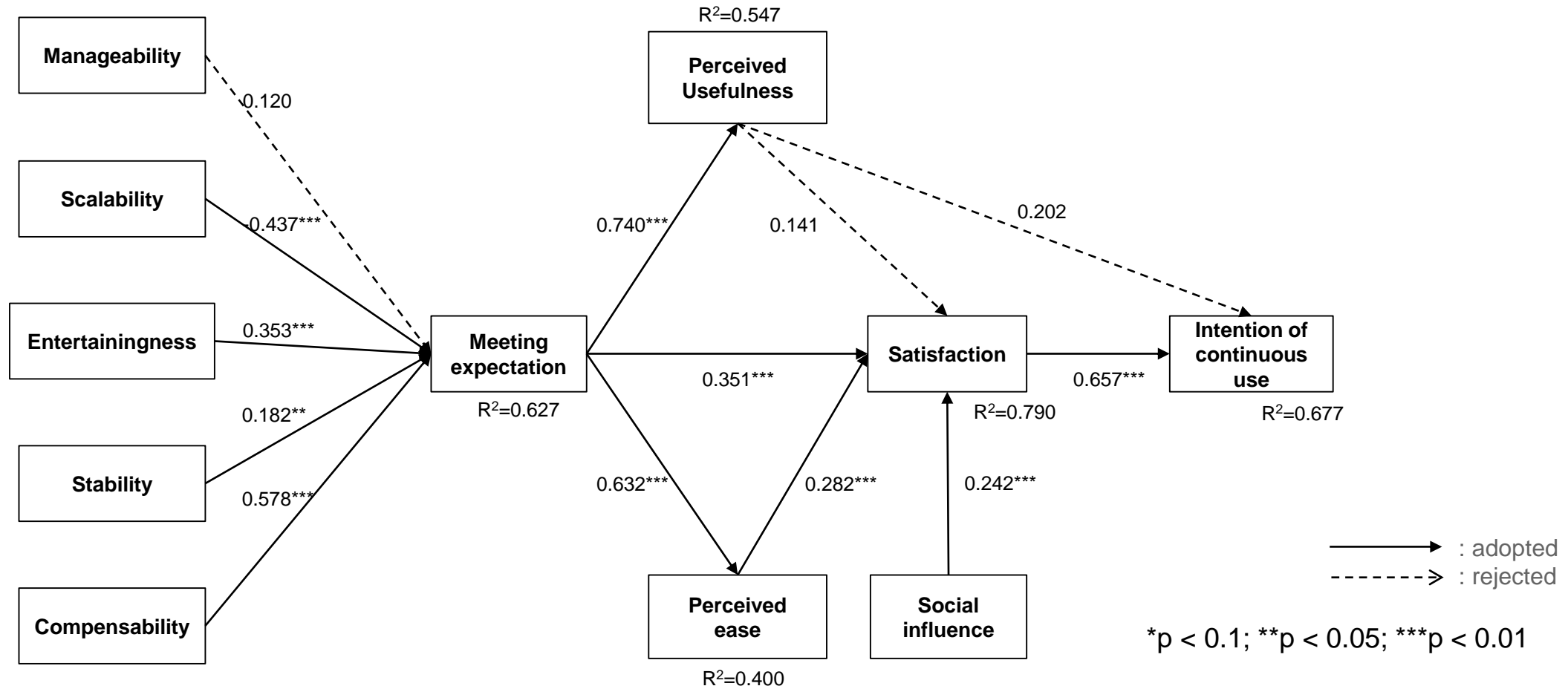
Hypothesis	External variable ( independent )	Internal variable ( dependent )	P_value	Status	Influence
H1	Manageability	Meeting expectation	-	rejected	No significant impact
H2	Scalability	Meeting expectation	P<0.05	adopted	Significant impact
H3	Entertainingness	Meeting expectation	p<0.1	adopted	
H4	Stability	Meeting expectation	p<0.05	adopted	
H5	Compensability	Meeting expectation	p<0.01	adopted	
H6	Meeting expectation	Perceived usefulness	p<0.01	adopted	
H7	Meeting expectation	Perceived ease	p<0.01	adopted	
H8	Meeting expectation	Satisfaction	p<0.01	adopted	
H9	Perceived usefulness	Satisfaction	-	rejected	No significant impact
H10	Perceived ease	Satisfaction	p<0.01	adopted	Significant impact
H11	Social influence	Satisfaction	p<0.01	adopted	
H12	Perceived usefulness	Intention of continuous use	p<0.05	adopted	
H13	Satisfaction	Intention of continuous use	p<0.01	adopted	

## Result

- I thought the use of IoT products would have a large purpose of manageability, but it was confirmed that it did not show much value in reality.
- Confirm that usefulness does not have a significant effect on satisfaction
- ▶ Analysis of the results of sampling by **income, household unit, and region** is carried out

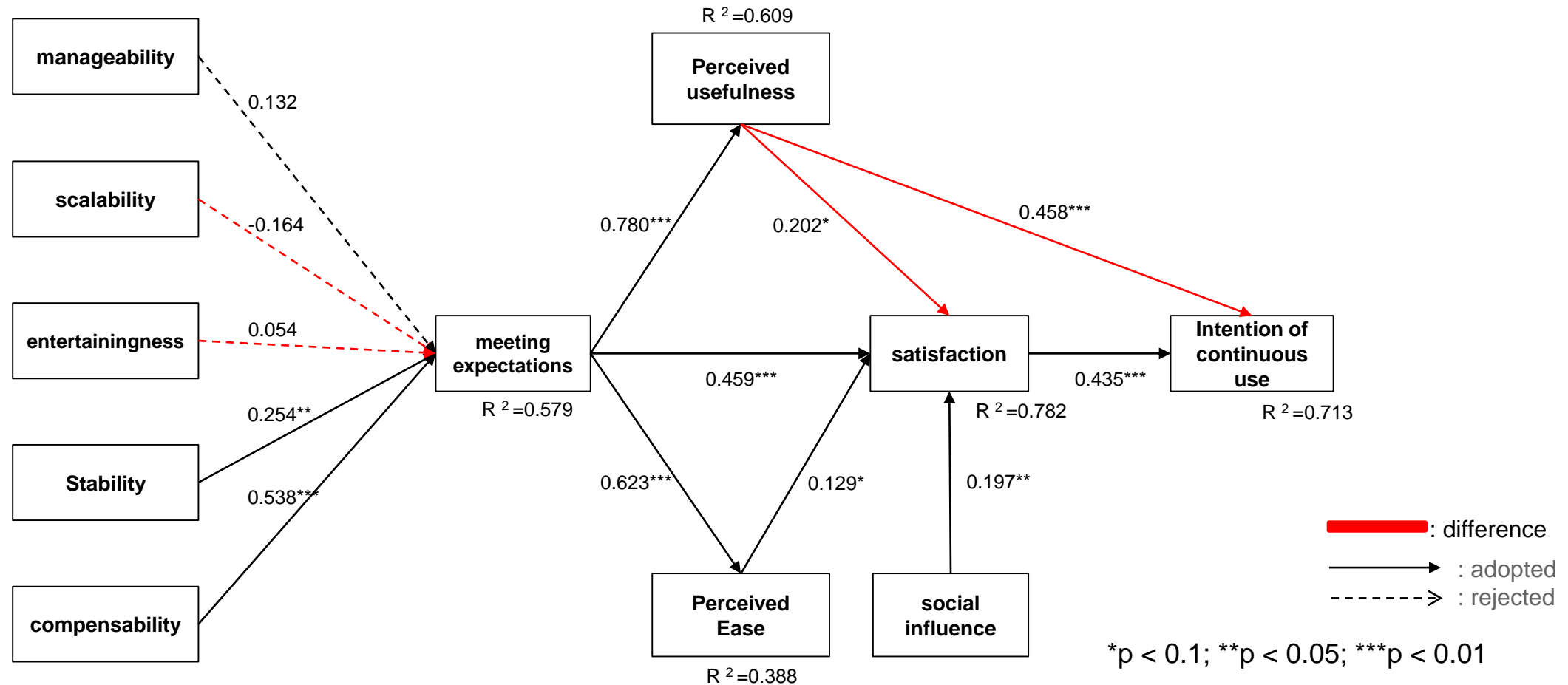
# V. Research Analysis Result : Research model (more than 50 million won)

In this study, the proposed hypothesis was verified after 400 resampling with the bootstrap sampling technique using Smart PLS.



# V. Research Analysis Result : Research model (50 million won or less )

In this study, the proposed hypothesis was verified after resampling 400 times with the bootstrap sampling technique using Smart PLS .



# V. Research Analysis Result : Hypothesis validation (based on income)

## Hypothesis validation

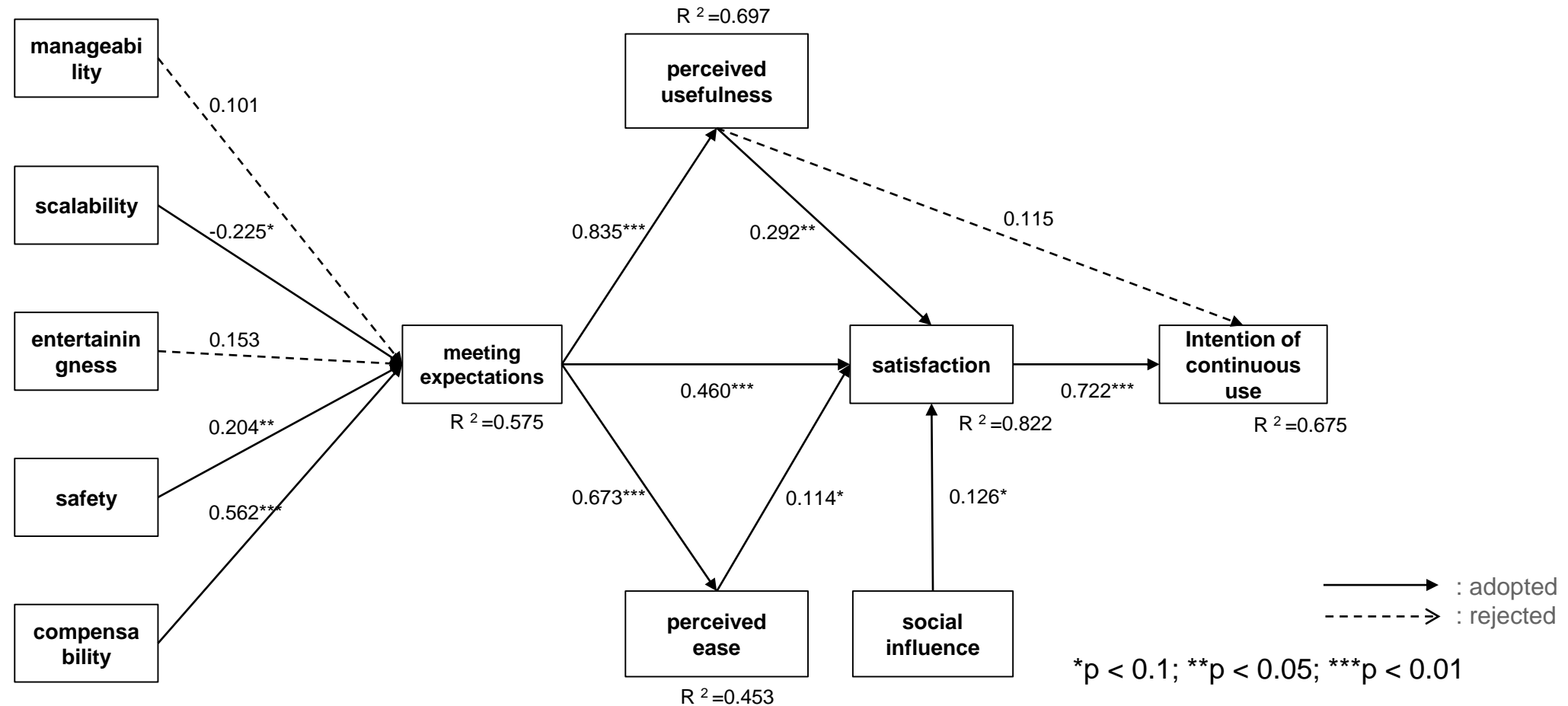
Hypot hesis	External variable ( independent )	Internal variable ( dependent )	50 million income P_value	Status	50 million income or less P_value	Status
H1	Manageability	meeting expectations	-	rejected	-	rejected
H2	Scalability	meeting expectations	$p < 0.01$	adopted	-	rejected
H3	Entertainingness	meeting expectations	$p < 0.01$	adopted	-	rejected
H4	Safety	meeting expectations	$p < 0.05$	adopted	$p < 0.05$	adopted
H5	<b>Compensability</b>	meeting expectations	$p < 0.01$	adopted	$p < 0.01$	adopted
H6	meeting expectations	Perceived usefulness	$p < 0.01$	adopted	$p < 0.01$	adopted
H7	meeting expectations	Perceived Ease	$p < 0.01$	adopted	$p < 0.01$	adopted
H8	meeting expectations	satisfaction	$p < 0.01$	adopted	$p < 0.01$	adopted
H9	Perceived usefulness	satisfaction	-	rejected	$p < 0.1$	adopted
H10	Perceived Ease	satisfaction	$p < 0.01$	adopted	$p < 0.1$	adopted
H11	Social influence	satisfaction	$p < 0.01$	adopted	$p < 0.05$	adopted
H12	perceived usefulness	intention of continuous use	-	rejected	$p < 0.01$	adopted
H13	satisfaction	intention of continuous use	$p < 0.01$	adopted	$p < 0.01$	adopted

## Interpretation of results

- Perceived usefulness - satisfaction  
Perceived usefulness - intention to continuous use: Non-significant results .
- In the case of high-income people, **product value , brand name, and design confirmed to be of greater value** rather than the usefulness of the product.
- Scalability and entertainingness are not significant in satisfaction and intention of continuous use (50 million or less )
- Confirm that low-income families are more interested in **safety, time saving, and cost reduction** that are actually beneficial to life than incidental value.

# V. Research Analysis Result : Research model (one or two person household )

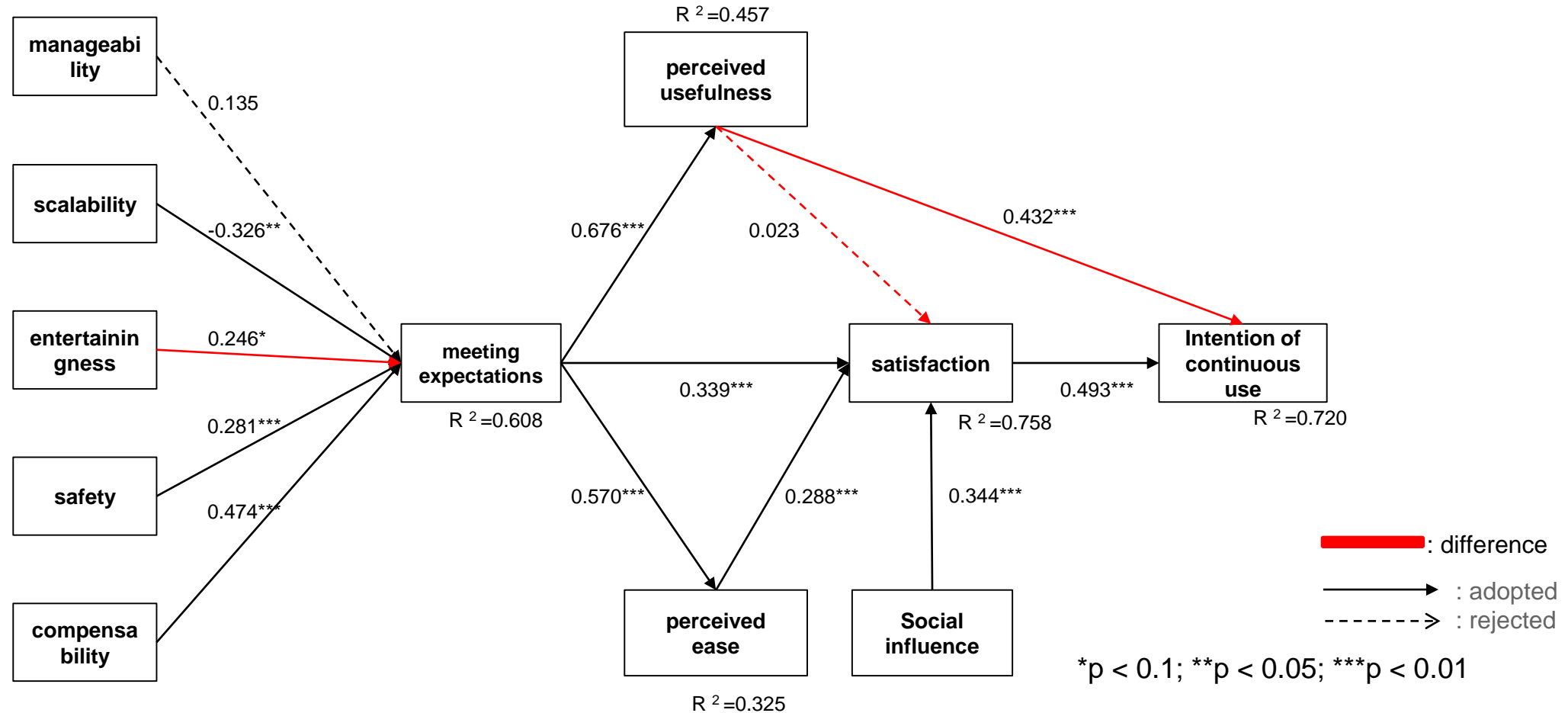
In this study, the proposed hypothesis was verified after resampling 400 times using the bootstrap sampling method using Smart PLS .





# V. Research Analysis Result : Research model (three or more households)

In this study, the proposed hypothesis was verified after resampling 400 times using the bootstrap sampling method using Smart PLS .



# V. Research Analysis Result : Hypothesis validation (household unit)

## Hypothesis validation

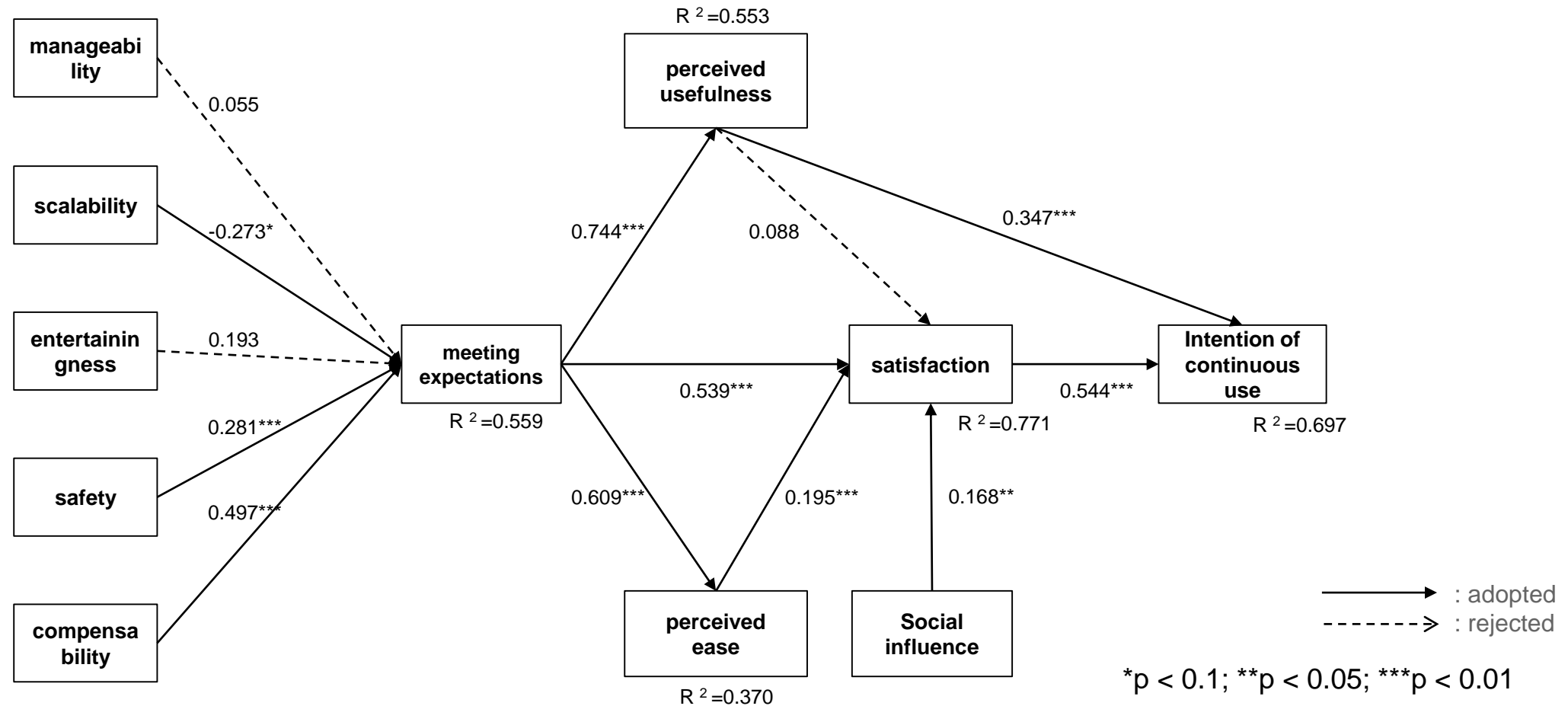
Hypothesis	External variable ( independent )	Internal variable ( dependent )	1-2 person household		3 or more households	
			P_value	Status	P_value	Status
H1	Manageability	meeting expectations	-	Rejected	-	Rejected
H2	Scalability	meeting expectations	p < 0.1	adopted	p < 0.05	adopted
H3	entertainingness	meeting expectations	-	Rejected	p < 0.1	adopted
H4	Safety	meeting expectations	p < 0.05	adopted	p < 0.01	adopted
H5	<b>Compensability</b>	meeting expectations	p < 0.01	adopted	p < 0.01	adopted
H6	meeting expectations	perceived usefulness	p < 0.01	adopted	p < 0.01	adopted
H7	meeting expectations	Perceived Ease	p < 0.01	adopted	p < 0.01	adopted
H8	meeting expectations	satisfaction	p < 0.01	adopted	p < 0.01	adopted
H9	Perceived usefulness	satisfaction	p < 0.05	adopted	-	Rejected
H10	Perceived Ease	satisfaction	p < 0.01	adopted	p < 0.01	adopted
H11	Social influence	satisfaction	p < 0.01	adopted	p < 0.01	adopted
H12	perceived usefulness	intention of continuous use	-	Rejected	p < 0.01	adopted
H13	satisfaction	intention of continuous use	p < 0.01	adopted	p < 0.01	adopted

## Interpretation of results

- In the case of households with one to two people, manageability and entertainingness were not significant in satisfaction and continuous use.
- ▶ Contrary to expectations, in the case of household with one to two people, **entertainingness is not meaningful for meeting expectation.**
- In households with 3 or more people, Significant results were obtained for entertainingness. (meeting expectations)
- ▶ **IoT devices that can be enjoyed by the family**

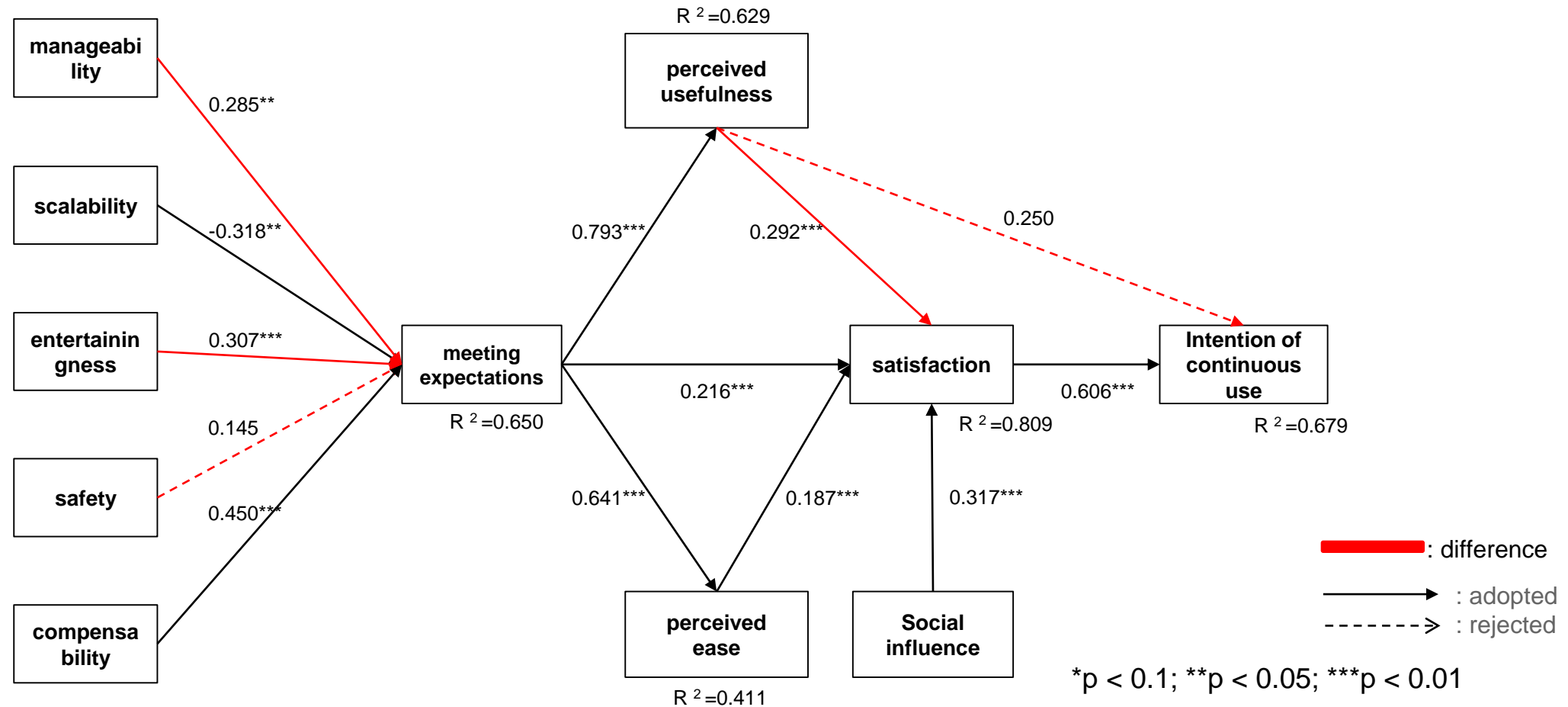
# V. Research Analysis Result : Research model (Seoul - Metropolitan Area)

In this study, the proposed hypothesis was verified after resampling 400 times with the bootstrap sampling technique using Smart PLS .



# V. Research Analysis Result : Research model (Non-Metropolitan Area)

In this study, the proposed hypothesis was verified after resampling 400 times using the bootstrap sampling method using Smart PLS .



# V. Research Analysis Result : Hypothesis validation ( by region )

## Hypothesis validation

Hypot hesis	External variable ( independent )	Internal variable ( dependent )	Seoul – Metropolitan Area		non-metropolitan area	
			P_value	Status	P_value	Status
H1	Manageability	meeting expectations	-	Rejected	p < 0.05	adopted
H2	Scalability	meeting expectations	p < 0.1	adopted	p < 0.05	adopted
H3	entertainingness	meeting expectations	-	Rejected	p < 0.01	adopted
H4	Safety	meeting expectations	p < 0.01	adopted	-	Rejected
H5	Compensability	meeting expectations	p < 0.01	adopted	p < 0.01	adopted
H6	meeting expectations	Perceived usefulness	p < 0.01	adopted	p < 0.01	adopted
H7	meeting expectations	Perceived Ease	p < 0.01	adopted	p < 0.01	adopted
H8	meeting expectations	satisfaction	p < 0.01	adopted	p < 0.01	adopted
H9	Perceived usefulness	satisfaction	-	Rejected	p < 0.01	adopted
H10	Perceived Ease	satisfaction	p < 0.01	adopted	p < 0.01	adopted
H11	social influence	satisfaction	p < 0.05	adopted	p < 0.01	adopted
H12	Perceived usefulness	Intention to use continuously	p < 0.01	adopted	-	Rejected
H13	satisfaction	Intention to use continuously	p < 0.01	adopted	p < 0.01	adopted

## Interpretation of results

- Seoul - Metropolitan area, the results were not significant in terms of manageability and entertainingness .
  - ▶ It is judged that the construction of the infrastructure is relatively better in the metropolitan area than in the non-metropolitan area.
  - ▶ **Safety is considered important because there are relatively many accidents and accidents in Seoul**
- In the case of non-metropolitan areas, manageability and safety are not significant.
- ▶ **Less risk of accidents compared to the metropolitan area entertainingness, Compensability and manageability are judged to be more important rather than values for safety.**

# V. Research Analysis Result : Summary of results 1

Significant differences were confirmed in satisfaction / continuous use / intention to use new products according to value factors by income level, household unit, and region. Accordingly, it is necessary to establish a product planning strategy for each group.

Value factor	Income level		Household unit		Region		● : Significant x : not significant
	50 million	50 million or less	1-2 people	3 people or more	Seoul - Metropolitan Area	non-metropolitan area	
Manageability	x	x	x	x	x	●	<b>1</b> Manageability is generally unsatisfactory (Excluding non-metropolitan areas)
Scalability	●	x	●	●	●	●	
Entertainingness	●	x	x	●	x	●	
Safety	●	●	●	●	●	x	<b>2</b> Compensability generally wants profit value through time saving and cost reduction
Compensability	●	●	●	●	●	●	
Analysis result	<b>3</b> In the case of less than 50 million people, they are not satisfied with their manageability Difficult to find significance in scalability and entertainment		<b>4</b> Neither group is satisfied with manageability Difficult to find significance in the case of one or two households in entertainment		<b>5</b> Seoul and the metropolitan area are not satisfied with their manageability Difficult to find significance in entertainingness in the case of Seoul and the metropolitan area Difficult to find significance in safety in the case of non-metropolitan areas		

# V. Research Analysis Result : Summary of results 2

Significant differences in satisfaction and continuous use of intention according to income level, household unit, and region are confirmed. The meeting expectation, social influence, satisfaction, and continuous use of intention have a significant effect on each dependent variable.

Value factor	Income level				Household unit				Region				● : Significant x : not significant  * A: Satisfaction ** B: Continuous use
	50 million		50 million or less		1-2 people		3 people or more		Seoul - Metropolitan Area		non-metropolitan area		
	A	B	A	B	A	B	A	B	A	B	A	B	
Perceived usefulness	x	x	●	●	●	x	x	●	x	●	●	x	
Perceived Ease	●		●		●		●		●		●	1	Perceived ease has a positive effect on overall satisfaction and continuous use intention.
analysis result	2 At income of 50 million won or more, perceived usefulness is not significant for satisfaction/continuous use intention				3 In a family of 1 or 2, perceived usefulness is not significant for continuous use of intention, and satisfaction is not significant in a family of 3 or more people.				4 In the metropolitan area, perceived usefulness is not significant for satisfaction, and the intention to continuous of use in the non-metropolitan area is not significant				

※ Meeting expectation (satisfaction), Social influence (satisfaction), satisfaction (continuous use of intention), and continuous use of intention (new product use of intention) were all confirmed as significant results and were not mentioned.  
 → Name of independent variable (Name of dependent variable)

## V. Research Analysis Result : Implications

Based on the results of this research, implications were drawn from the perspective of telecommunications company, manufacturers, and content planners.

### Implications of the analysis results

Target	implication
Telecommunications / Manufacture company	<ul style="list-style-type: none"><li>• <b>Proof of need for product segmentation strategy → Provide insight on planning strategy</b><ul style="list-style-type: none"><li>- Competition is expected and detailed requirements of the consumer market need to be analyzed</li><li>- Searching for ways to maximize profitability through linkage with sales agencies</li></ul></li></ul>
Content developer / Planner	<ul style="list-style-type: none"><li>• <b>Fun &amp; Care is an important factor → Provide insight to contents developers and planners</b><ul style="list-style-type: none"><li>- Securing new contents such as golf and games through linkage between IoT products</li></ul></li></ul>



# Table of Contents

- I. Research background and goal
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# VI. Conclusion and limitations : Conclusion

Positioning can be broadly classified into three types : **Premium, low-cost , and family-type + Safety**

Low price positioning	Premium positioning	Family positioning	Add Value / Be Safe
<ul style="list-style-type: none"> <li>Affordable price</li> <li>Energy / Time saving</li> <li><b>Service and Contents</b> → Electricity bill reminder, energy optimization service</li> <li><b>Minimize entertainment contents</b></li> </ul>	<ul style="list-style-type: none"> <li>Premium value, High quality, Highend design</li> <li><b>Interior item (self-satisfaction)</b> → Signature Brand</li> <li><b>Improve contents diversity meeting customers' needs</b> → entertainingness, scalability, safety</li> </ul>	<ul style="list-style-type: none"> <li><b>IoT Device Rental Service, Trade-In Promotion</b> → Secure enjoyable contents (Sports game, golf machine)</li> <li><b>Secure communicable contents (double-income couple↑)</b> → Wireless conversation robot, communication cotents on AI TV</li> <li><b>Manufacturer / Telecommunicati on company contents related promotion</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Safety Values</b> <ul style="list-style-type: none"> <li>- Anxiety about old home appliances, (explosions) → Automatic product management function</li> <li>- Crime rates in the metropolitan area → Smart lighting /CCTV products bundle</li> <li>- Companion animals (Business trip/travel) → Add Auto Management Contents</li> </ul> </li> </ul>
<p><b>“ Satisfy needs by securing target marketing strategy and improving contents diversity “</b></p>			
 	  	  	

# VI. Conclusions and Limitations : Limitations and Future Research Directions

## Limitations of the survey (small sample size)

- ▶ Among the survey participants, 208 people have experienced using IoT devices, limiting the number of samples

## A study of a large number of samples

- ▶ Segmentation by household, region, income and other demographics
- ▶ Segmentation analysis by target is possible

## Early Stages of Growth in the IoT product

- ▶ Research results may differ after market revitalization

## Conduct additional research after market activation

- ▶ As a growing industry, IoT product market is expected to become more active
- ▶ Since the share of experienced users is low, research will be conducted with many samples after industrial activation 1 or 2 years

## Limited user expected value variable

- ▶ When using various variables, extended research results can be confirmed

## Expansion of user expectations

- ▶ There are various value factors for IoT products and services  
→ Expansion of research

## Korean market only

- ▶ Among the global markets, Korea's IoT market portion is small

## Overseas market (ex. USA , India ) research

- ▶ Research through analysis of various overseas consumers  
Overseas market product segmentation strategy establishment possible

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