

Analysis for Consumer Preference Wireless Data Communication Technologies

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(wireless LAN) 가

가 , 가

가

가 가 가

가 가 (conjoint) , 가 (stated preference)

가

As the recent IT market is developing rapidly, the Wireless Data Communication (WDC) services are increasingly are penetrating the market. Wireless LAN and mobile Internet are considered as the main technologies of WDC considering the present market competition. Those services based on two kinds of technologies display differences in quality attributes such as terminal device, data transmission speed, pricing scheme and so on. Consumers' choice between these two alternatives will be affected by the difference of their preferences for such quality attributes, accordingly their preferences will determine the evolution of WDC services and related technologies.

This study adopts a conjoint methodology based on consumer valuations of quality attributes of wireless LAN and mobile Internet services in order to grasp the structure of consumer preference. Respondents rank hypothetical service alternatives featuring various combinations of these quality attributes. Using the estimation result of consumer willingness to pay for the attributes of WDC services, we predict the evolution of WDC services and related technologies along various quality dimensions, and draw policy implications for national- and company-level R&D strategies.

Keywords: Conjoint, Wireless data communication, Rank ordered logit, Bayesian

1. Mobile Data Revenues

(단위: \$)

	2003	2004	2005	2006	2007
	9,631	20,125	28,903	40,937	53,032
	1,790	3,758	8,883	13,295	18,345
	19,157	28,677	39,669	58,124	71,138
/	25,997	35,147	46,158	62,848	82,192
/	2,148	5,054	9,731	14,966	20,887
	58,723	92,761	133,344	190,170	245,594

출처: ARC(2002)

2. 가 (단위: \$)

	2005	2006	2007
가 (단위: \$)	993	1,358	1,572

출처: (ETRI), 2002

(단위: \$)

가

가 가

2.

가

가 가 가
 가 11 3,600
 가 4 9,400 (ARC, 2002).

1998 가 가 3,067
 2003 (, 2003). 가 34.5%
 가 1 SKT
 2003 15.5% (, 2004).
 ADSL

(public service)가 가 가
 가 2007
 7,332 , 39 4
 (Gartner Dataquest, 2002).

2001 9
 , 2003 36 8,000 가
 가
 (, 2005).
 가 Access point

KT (AP) 가 가
 가 2007 157 가 AP가 가

(business prospect)

Personal Digital Assistant)

(mobility)

(coverage)
 (base station)

(handoff)

AP

(fixed wireless) 가 (Byun et al, 2004).
 가 가 , , PDA 가 가 가 (Tobit)
 가 가 (Ordered probit)
 가 (Tobit)
 6가
 802.11b가 2.4GHz 11Mbps (31.93%) 가
 가 5GHz
 802.11a 54Mbps 가 (26.17%), (14.83%),
 cdma2000 1xEV-DO (14.18%) (7.91%),
 2.4Mbps (4.98%) 10% (Ordered probit)

ISM (Industrial, Scientific, Medical frequencies²⁾)
 가 가

III.
 가 (demand pull)
 16~17 (/10
 1.3 ~6.5 (/)
)³⁾ 가
 가 (Green and Srinivasan, 1978)
 (Batt and Katz, 1997),
 (Hensher, 1994; Calfee et al, 2001; Byun et al, 2004; Lee et al, 2003c), (Roe et al., 1996; Alvarez-Farizo and Hanley, 2002), (Slothuus et al, 2002)
 (Lee et al, 2003a; Lee et al, 2003b)
 , 가

2) 가 900MHz
 2.4GHz ISM
 3) 1 가 가
 512kbytes 1

3.

	, 2003 8
	20~59 /
	457
	, ,

4.

	, PDA, PC
	2, 6, 10Mbps
10	0, 1, 2
가	,
	3, 8, 13 /

457
(3).

1. 가
가
가
(part-worth),⁴⁾
(compensated surplus)
가

5)
4
, , , 가 , 5가

4) 가
(relative importance)

5) (2002)
1 가 , 2 가 , 3 가 , 4 가
가
, 10

2004) (Byun et al,
(level)
, PDA, PC
가
PC
가
(ADSL)
가
PDA 가

IMT-2000
2Mbps 10Mbps 6Mbps 가
CD 1
(650Mbytes) 43 ,
14 , 9
, 10 가
90%가 80%
10 0,1,2

ADSL
3, 8, 13

가
가 ,

162 가
(orthogonal test)

12 가
4 3

(Bayesian) (Kim et al, 2005; Train, 2003)
(Mixed logit)

2.

(IIA: Independent of Irrelevant Alternatives) 가

(RUM: Random Utility Model)

가 가 가
가 가
IIA 6) 가

$$U_{ij} = V(w_i, x_j) + \varepsilon_{ij} = V_{ij} + \varepsilon_{ij} \quad (1)$$

(consistency)

U_{ij} i 가 j
 w_i , x_j j
 V_{ij} (deterministic term) ε_{ij}
(stochastic term)
(1)

$$\beta = N(b, W) \quad (4)$$

(ordered data)
가
가 (Rank-ordered logit model)

N , b W
 β 가

가 J 가
1 $r = (r_1, r_2, \dots, r_J)$
가
(log-likelihood function)
(Hausman and Rudd, 1987; Koop and Poirier, 1994).

$$\Pr[U(r_1) > U(r_2) > \dots > U(r_J) | \beta] = \prod_{h=1}^{J-1} \frac{e^{V_h}}{\sum_{m=h}^J e^{V_m}}$$

$$L(r | b, W) = \int L(r | \beta) \phi(\beta | b, W) d\beta \quad (5)$$

$$\Pr[U(r_1) > U(r_2) > \dots > U(r_J)] = \prod_{h=1}^{J-1} \frac{e^{V_h}}{\sum_{m=h}^J e^{V_m}} \quad (2)$$

가 가
가

$$\ln L(\beta) = \sum_{i=1}^J \ln \left[\prod_{h=1}^{J-1} \frac{e^{V_h}}{\sum_{m=h}^J e^{V_m}} \right] \quad (3)$$

가 k

β (vector)

6)

IIA

가

5.

		(Level)
RANK		가 ' 1 '
		가 ' 4 '
PDA ^a	PDA	PDAP ' 1 ', ' 0 '
NPC ^a	NPC	' 1 ', ' 0 '
SPEED	(Mbps)	2, 6, 10
BREAK	10 ,	0, 1, 2
PRICESYS	가	' 1 ', ' 0 '
PRICE	(/)	3, 8, 13
	()	
PDA_INC	PDA	PDA × INCOME ^b
NPC_INC		NPC × INCOME
SPD_INC		SPEED × INCOME
BRE_INC		BREAK × INCOME
PSYS_INC	가	PRICESYS × INCOME
PRI_INC		PRICE × INCOME

a) PDA, NPC가 ' 0 '

b) INCOME: 가 400 400 ' 1 : 400 ' 0 '

(MWTP: Marginal Willingness To Pay) (6)

$$+ \beta_{BRE_INC} BRE_INC_{ij} + \beta_{PSYS_INC} PSYS_INC_{ij}$$

$$+ \beta_{PRI_INC} PRI_INC_{ij} + \varepsilon_{ij} \quad (7)$$

$$-\frac{U/k}{U/p} = -\frac{T^{-1}/y}{T^{-1}/y} \cdot \frac{y/k}{y/p} = -\frac{y/k}{y/p} \quad (6)$$

(7) Limdep 8.0, Gauss

IV.

5 ()

가 가

가

7 β 가

$$y_{ij} = \beta_{PDA} PDA_j + \beta_{NPC} NPC_j + \beta_{SPEED} SPEED_j$$

$$+ \beta_{BREAK} BREAK_j + \beta_{PRISYS} PRICESYS_j$$

$$+ \beta_{PRICE} PRICE_j + \beta_{PDA_INC} PDA_INC_{ij}$$

$$+ \beta_{NPC_INC} NPC_INC_{ij} + \beta_{SPD_INC} SPD_INC_{ij}$$

가 (7) 가 (heterogeneity) 가 (-), (+) 가 , 가 , 7)

6.

		(/)
<i>PDA</i>	0.0442	0.5120
<i>NPC</i>	-0.1234	0.5078
<i>SPEED</i>	0.1781*	0.7547
<i>BREAK</i>	-0.0466	-0.0697
<i>PRICESYS</i>	-0.0656	-0.6405
<i>PRICE</i>	-0.2039*	
<i>PDA_INC</i>	0.0829	
<i>NPC_INC</i>	0.4053*	
<i>SPD_INC</i>	-0.0959*	
<i>QUA_INC</i>	0.0672	
<i>PSYS_INC</i>	-0.0839	
<i>PRI_INC</i>	0.0650*	

*: 5%

7.

		8)	(/)
<i>PDA(N^a)</i>	0.4625*	0.5662*	0.5131
<i>NPC(N)</i>	0.2220*	0.6039*	0.1628
<i>SPEED(L^a)</i>	0.3820*	0.2374*	0.4778
<i>BREAK(L)</i>	-0.0206*	0.0012*	0.1247
<i>PRICESYS(N)</i>	-0.3079*	0.6603*	-0.2332
<i>PRICE(L)</i>	-1.2639*	50.7034*	
<i>PDA_INC(N)</i>	0.3041*	0.5392*	
<i>NPC_INC(N)</i>	-0.0661	0.8613*	
<i>SPD_INC(N)</i>	0.3883*	0.2553*	
<i>QUA_INC(N)</i>	0.3612*	0.6858*	
<i>PSYS_INC(N)</i>	0.0729	1.0585*	
<i>PRI_INC(N)</i>	0.1910*	0.3228*	

*: 5%, a: 가, b: 가

가 , 가

가 (heterogeneity)가 5% 가

7) 가 PC

8) 가

et al, 2004)

가

가 가

가

가
가

가

가

가
가 가

가

DMB(Digital Multimedia Broadcasting)

(Byun et al, 2004)

가

10

PDA
(Convergence)

가

V.

가

(product innovation)
(Wibro)

가

PDA

가

가

가

가

PDA,

가

가

가

(heterogeneity) 가

IIA

가

가

가

PC가

(process innovation)

가

가

가

PC

PC가

가

가

가

PC

가

PC

가

가

- 가
가
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