# 15 Consumer Preference for New Wireless Data Services

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## Introduction

The Korean telecommunications services market has recently experienced an unprecedented growth in the wire-line broadband Internet access and mobile telephony markets. At 2004, 11 million households had broadband Internet access, while mobile telephony subscription reached 36 million—the corresponding penetration rates are 73% and 75%, respectively. By contrast, wire-line and wireless voice market growth have reached a plateau as broadband Internet access market nears saturation (see Fig. 15.1). Wireless Internet services, in particular public wireless local area network (WLAN) and 2.5G/3G services were introduced to stimulate this flagging telecommunications market demand. While these services offer access to the Internet, multi-media, banking and online gaming services, only minimal growth in market demand has resulted. In investigating factors inhibiting market growth several customer complaint surveys reveal that WLAN is not of a satisfactory quality due to technical vulnerability to interference and limited coverage. Further, 2.5G/3G prices are high for the low-speed transmission.

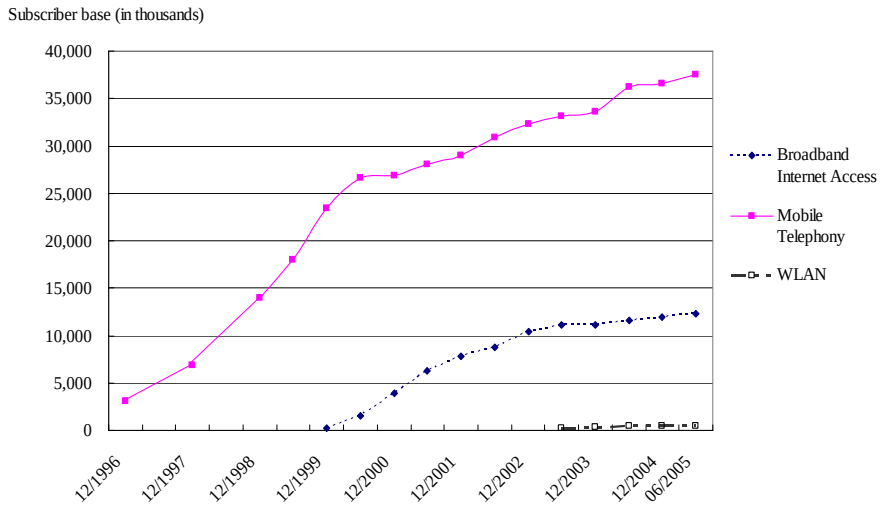


**Fig. 15.1.** Korean Telecommunications Subscription by Service. Source: MIC

In spite of service provider pre-market launch testing (for best product design), the new mobile Internet service market is yet to reach a minimum viable size (Kim 2003; Kim and Lee 2004). A possible reason for the market not attaining a high penetration may be due to service providers being aware of consumer preferences—especially in the early stages of market evolution.

From a consumers perspective it is difficult to reveal 'true' preference for an experience good prior to consumption of the good. In particular, a consumer finds the task of understanding service concepts difficult without having experience gained through evaluating alternative technical service specifications. Without this consumption experience the revelation of consumers' preference for new Internet services is likely to be confounded. Considering WLAN, e.g., based on subscription intention surveys early market estimate a potential 5 to 10 million subscribers—however the current realized base at most 500,000 subscribers. Further, a clear understanding of customer potential demand for service attributes helps managers improve product design and strategically position services. That is, companies are better able to respond to customers' needs by improving transmission speed, mobility and coverage. Conversely, when it is not technological feasible to reconfigure service features—due to service deployment schedule or expenditure limitations—then the strategic repositioning of the service is considered without technological modification to service attributes.

To obtain a better appreciation of consumer attitudes this study develops a hierarchical decision structure of consumer choice for emerging mobile services by breaking down the choice problem into a hierarchical decision structure for interrelated service attributes, e.g., transmission speed, mobility, coverage and price. The analytic hierarchy process (AHP) allows managers to analyze consumers' preferences for service attributes to determine the relative attractiveness of alternative new mobile data services. Additionally, implications of the results are discussed, especially for the successful implementation of portable Internet service (PIS). This chapter is organized as follows. In the next section, a brief description of emerging mobile services in the Korean telecommunications market is sketched. A research model is then developed using the AHP. Next the results of the analysis are discussed. Finally, implications of the study and areas for further research are presented in the final section.

## Emerging Mobile Data Services in Korea

Figure 15.2 displays mobile data and broadcasting services including: WLAN, terrestrial and satellite digital multi-media broadcasting (DMB), PIS and high-speed downlink packet access (HSDPA), in terms of their relative mobility and speed. WLAN offers very high speed broadband Internet access in hot spots, but due to limited service coverage and poor quality of the service is not widely deployed. Currently, Korea Telecom and Hanaro Telecom are providing 10Mbps Internet access service via 2.4GHz radio frequency and are expected to launch 54Mbps service via 5GHz.

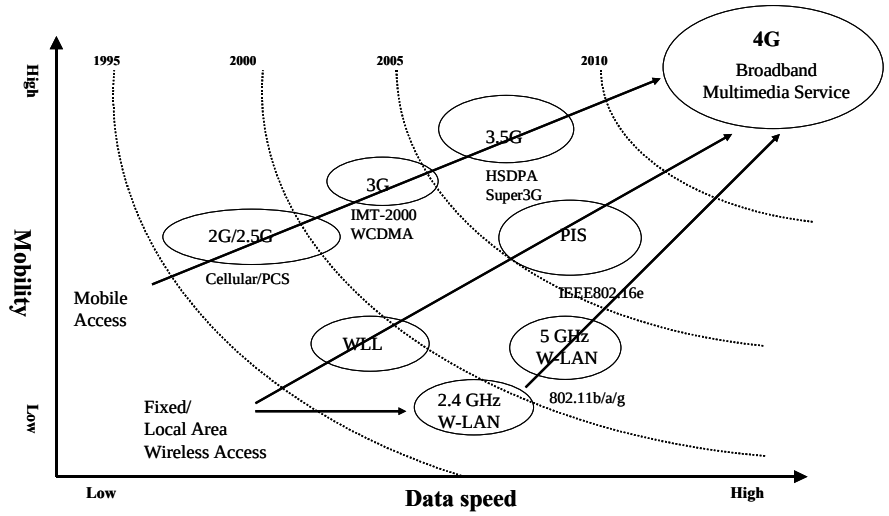


**Fig. 15.2.** Mobile Internet Service by Mobility and Speed. Source: ETRI

DMB provides TV and cable channels via satellite and terrestrial networks. WLAN is priced at approximately US$ 10 per month. DMB is to be launched July 2005 as a free service. TU Media—satellite DMB provider launched on May 1—offers 7 video and twenty audio channels from which subscribers choose at most three channels. Despite transmission of terrestrial broadcasting channels by the satellite DMB service being forbidden, TU Media has gained more than 100,000 subscribers in the first three months (Joongang Daily Newspaper, 25 July 2005). For terrestrial DMB services, providers including major terrestrial broadcasting companies will begin commercial service by end-2005. PIS is a wireless broadband (WiBro) facility that provides mobile Internet access at current wire-line broadband service (about 2Mbps) speeds. The Ministry of Information and Communication (MIC) allocated licenses to KT, SK Telecom and Hanaro Telecom in February 2005. Meanwhile, Hanaro Telecom recently withdrew from the PIS market, while SK Telecom has not commenced investment. Only KT has embarked on PIS network investment and is intending to launch commercial service in June 2006 (Korea Times, 25 April 2005). HSDPA evolved as a wireless technology that enhances EVDO and W-CDMA technology. HSDPA is more mobile than PIS but with a lower transmission speed. SK Telecom and KT Freetel will test HSDPA in 2005 and commence commercial operations in June 2006 (Digital Times, 12 July 2005).

## Consumer Preference for Emerging Services

Kim (2003) considers IMT-2000 service as comprised the attributes high-speed Internet access, video phone and global roaming in conducting a conjoint analysis

to determine attribute part-worth values. Kim and Lee (2004) also use a conjoint model to develop quantitative forecasts for the market shares of emerging mobile data and broadcasting services. However, their data collection period does not allow consideration of hierarchical decision processes. Also, respondents are required to rate or rank a choice set comprised of alternative product bundles. Trade-offs by consumers between attributes in the rating or ranking of bundles implies attribute valuations (Green and Srinivasan 1990; Lilien and Rangaswamy 2002). Considering respondents are often not familiar with technical service descriptions responses may be inconsistent or invalid, viz., responses may not accurately reflect 'true' respondent preferences. Further, this lack of understanding of new emerging mobile services often dilutes the reliability of responses. For example, a market survey on consumers' intention to subscribe to PIS, conducted in April 2004 by a Korean government sponsored research institute, reports a willingness-to-pay (WTP) value that is different for respondents who intend to become PIS subscribers (prospects) and those who do not (non-prospects). Surprisingly, prospects WTP is approximately US$ 10 per month but US$ 20 per month for non-prospects.[1] This outcome shows that WTP and subscriber intention responses are not consistent. Clearly, during the experiment respondents should be assisted to better understand service concepts in terms of constituent attributes, especially for yet deployed high-tech services.

In response to the above arguments AHP methodology is employed for this study. AHP procedures assist a decision-maker to organize judgments so as to make effective decisions (Saaty 1977, 1980; Vargas 1990; Saaty and Vargas 1994). Unstructured problems are addressed by using a hierarchical decomposition which reflects a natural and flexible human thinking process (Simon 1962). While respondents in a conjoint experiment are confronted with a choice, ranking or rating task that implies an attribute trade-off, AHP develops a trade-off in the course of structuring and analyzing a series of simple reciprocal pair-wise comparison matrices (Wind and Saaty 1980) and deals with stated preferences at all levels of the decision process (Javalgi et al. 1989). That is, to construct a hierarchy of goals, criteria and alternatives are arranged so that a complex decision problem is decomposed into manageably smaller parts. Namely, a judgment process begins in such a way that criteria or attributes (features) of an alternative are compared in relation to the elements of the next (higher) level (Saaty and Vargas 1994). Moreover, pair-wise comparisons provide a measure of any inconsistency from the responses and can be used to improve the consistency of judgments. In particular, respondents are encouraged to consider alternative decision criteria. AHP provides decision-markers with an ability to integrate multi-attribute consumer preferences to assess the relative attractiveness of new services. AHP methods have been applied to decision making, resource allocation, marketing decisions, long-range planning, business case evaluation and credit scoring (Wind and Saaty 1980; Zahedi 1986, Javalgi et al. 1989; Davies 1994; Cho and Han 2002).

[1] During the survey, all respondents are asked to reveal their WTP for PIS prior to deciding whether to subscribe. This procedure provides a WTP for both non-prospects and prospects.

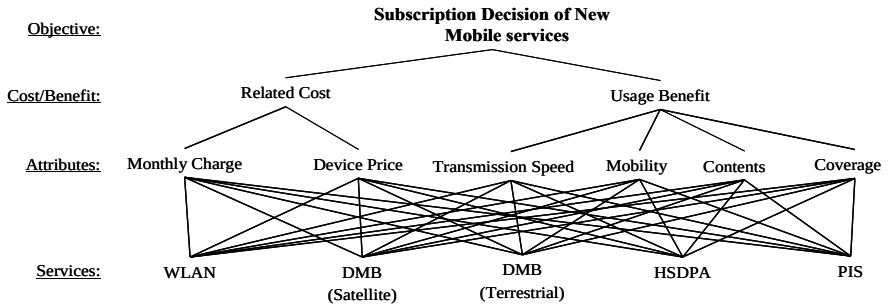


**Fig. 15.3.** A Decision Hierarchy for Emerging Mobile Services

## Hierarchical Preference Structure

A consumer decision hierarchy for new mobile services is developed in Fig. 15.3. The hierarchy is based on the: cost and benefit expressed as objectives reflecting related costs and use benefit; and service attributes comprising cost- and benefit-related elements, viz., monthly subscription fee, device price, transmission speed, content, mobility and coverage. Table 15.1 shows that with little available information concerning consumer criteria for subscribing to new mobile services basic decision elements are constructed mostly as service-related technical features and other commonly used attributes from received consumer surveys (Ahn 2004; Hong et al. 2004). These decision criteria are reviewed by a panel of field experts from a leading telecommunications company.

## AHP Procedures

The AHP procedure consists of distinct stages: developing a decision hierarchy of the multi-criteria multi-attribute problem; making pair-wise judgments; calculating the consistency of responses and weighting the criteria and attributes; and aggregating decision elements relative weights to determine a set of relative preferences for the alternatives (Saaty 1980; Saaty and Vargas 1982). In Stage 1, relative the contribution of related cost and use benefit on the subscription to new mobile services is evaluated. Pair-wise judgments are based on a ratio from 1 to 9—rising from equal to extreme importance. Similarly, the relative impact of a monthly charge and device price for related costs at the next level are measured. Also, the relative contribution of service features, i.e., transmission speed, mobility, content and coverage, on benefits are measured (see the questionnaire document contained in the Appendix). In Stage 2, the relative preference for a service in terms of monthly charge and respondent favorite device price are based on actual fees, rather than by comparing price pairs using the 9-point evaluative scale. Pre-test results indicate that for related costs most respondents prefer a less expensive alternative, irrespective of the price difference. Accordingly, this study as-

sumes that the related-cost consumer preference for a service relative to another alternative is linearly associated to the inverse of the actual price ratio between service pairs. For example, an alternative with a monthly charge of US$ 10 is coded three times preferred to an alternative with a US$ 30 monthly subscription fee.[2] Conversely, for device price respondents are required to nominate a preferred device by service. This price is treated as the device price for that service, and the device price for another service is calculated as the inverse of the actual device price ratio.

**Table 15.1.** Decision Criteria and Service Attributes

| Criteria | Services | | | | |
|---|---|---|---|---|---|
| | WLAN | S-DMB | T-DMB | HSDPA | PIS |
| Monthly charge[a] | US$ 8 (fixed) | US$ 10 (fixed) | Free | US$ 33 (average) | US$ 25 (average) |
| Device price | Cell phone: US$ 650<br>PDA phone: US$ 980 plus US$ 120 for an add-on module<br>Handheld PC: US$ 830 plus US$ 120 for an add-on module<br>Notebook: US$ 2,800 plus US$ 120 for an add-on module | | | | |
| Average speed | Very high (4 Mbps) | HQ TV via 7 inch device | | High (2 Mbps) | Intermediate (1 Mbps) |
| Mobility | Fixed or cordless | To 250km/h | | To 100km/h | To 60km/h |
| Contents | Wireline Internet content | Three terrestrial channels | Eleven cable channels | Wireless Internet content | |
| Coverage | Hot spots | National | | 84 major cities | |

Note. *a* US$ 1=KRW 1,200. For related costs, initial subscription fees are ignored as they are similar among services or not available. Device price is average price by category based on a Korean on-line price comparison Web site. For PDA, handheld PC and notebook there are two prices, viz., a device purchase and add-on module price.

[2] For terrestrial DMB service with monthly subscription is free the related cost of terrestrial DMB is assumed always preferred to other alternatives, viz., using the 9-point evaluative scale DMB is coded nine times preferred to other alternatives for the monthly charge.

In Step 3, the relative importance of a service by feature is measured via pair-wise comparison. However, when the value of a feature is identical for a pair of services then the comparison is redundant. Therefore, comparison for equivalent values is excluded, viz., the services are coded 1 for equal importance. For example, both satellite DMB (S-DMB) and terrestrial DMB (T-DMB) have an identical national service coverage feature. In Step 4, a respondent's consistency is evaluated at all levels of the hierarchy using an eigenvalue method.[3] In Step 5, when the consistency ratio (CR) is less than 0.2 responses a respondent is included in the sample.[4] In Step 6, a combined group judgment (CGJ) is used to aggregate individual judgments for a level by calculating the geometric average for an individual's judgments. The resulting comparison matrix of CGJ scores is used to derive priority value for respondents (Davies 1994). Finally, in Step 7, a composite priority of the element within a level and relative preference for alternative services is derived by applying the eigenvalue method to the CGJ obtained in Step 6.

## Results

Following the Step 1 to Step 4, data for the study is obtained from a face-to-face survey conducted in September 2004 from a sample of 650 respondents (refer to the questionnaire in the Appendix). Stratified sampling is implemented by demographic strata, e.g., respondent age, gender and residential location, based on Korean year 2000 census data. The survey is conducted in six cities for respondents aged from 14 to 50 years. Respondents are solicited on the street, primarily in downtown areas on an understanding that US$ 20-US$ 30 is to bee paid in compensation. The computer software package *Expert Choice* (Forman and Saaty 1983) is used to validate respondent consistency for a particular level of the hierarchy in Step 5. Among the 650 survey respondents, 110 are selected based on consistency index analysis, i.e., the respondents have a $CR \leq 0.2$.[5] Step 6 requires that the 110 consistent respondents be aggregated via a geometric mean, resulting in a comparison matrix for every hierarchy level. For example, Table 15.2 shows aggregated pair-wise judgments comparing related cost and use benefit for sub-

[3] Pair-wise comparison data are collected and entered as reciprocals with n unit entries. The main diagonal in a comparison matrix the eigenvalue problem $Aw = \lambda \max w$ is solved for a vector $w$ that denotes attribute priorities (Wind and Saaty 1980). The consistency index of a matrix of comparison is calculated by the rule, $CI = (\lambda \max - n)/(n-1)$, and the consistency ratio is obtained by comparing CI with the average random consistency index (Saaty and Vargas 1994).

[4] Judgments whose CR is lower than 0.1 are reasonable, lower than 0.2 is tolerable and higher than 0.2 should be revised or discarded (Saaty 1980).

[5] The reason for the small number of consistent respondents is explained by not understanding concepts of new mobile services or the respondents recruited are not expert and so unable to make considered choices.

scription to new mobile services.[6] Table 15.3 and Table 15.4 list combined group judgments for service attributes for the related cost and use benefits, respectively.

**Table 15.2.** Aggregate Judgment, Cost and Benefit to Overall Goal

| | Related cost | Use benefit |
|---|---|---|
| Related cost | 1 | 1.27 |
| Use benefit | 1/1.27 | 1 |

**Table 15.3.** Combined Group Judgment, Costs

| | Monthly charge | Device price |
|---|---|---|
| Monthly charge | 1 | 1.15 |
| Device price | 1/1.15 | 1 |

**Table 15.4.** Combined Group Judgment, Features to Benefit

| | Seed | Content | Mobility | Coverage |
|---|---|---|---|---|
| Transmission speed | 1 | 1.36 | 1.37 | 1/1.04 |
| Contents | 1/1.36 | 1 | 1/1.29 | 1/1.48 |
| Mobility | 1/1.37 | 1.29 | 1 | 1/1.26 |
| Coverage | 1.04 | 1.48 | 1.26 | 1 |

Following Step 7, *Expert Choice* is used to calculate local priorities for an element along with global priorities at a particular level of the hierarchy, and is shown in Table 15.5. Local priorities for related cost and use benefit are rescaled so that the highest value for criterion is set to unity with the remaining values transformed proportionately.[7] For example, not scaled local priorities for the monthly charge and device price are 0.535 and 0.465, respectively. Since the weight for the monthly charge is higher it is set at unity and the weight for the device price is 0.869, i.e., 0.465/0.535. Also, composite global priorities are calculated by multiplying local priorities at a level by the weight at the next level. For example,

[6] 1.27 means that related cost is 1.27 times more important than use benefit, whereas 1/1.27 has the opposite meaning.

[7] This absolute priority determination method is applied when the number of features across a criterion at the same level of the hierarchy is disproportionate to control the size effects of the features under a criterion of the global priorities. For example, this procedure would apply when the number of features in the use benefit criterion is four and the number for the related cost is two. Since the local priorities are reduced proportionately depending on the number of sub-criteria the effect of the sub-criteria under the use benefit of the global priorities under relative priority determination is reduced to half of that under absolute priority determination.

0.487, a global priority for the device price is derived by multiplying 0.869 (local priority) by 0.560 (weight for related cost). Based on priority results contained in Table 15.5, related cost is slightly more important than use benefit while the most important criterion affecting new mobile service subscription is the monthly charge, which is in line with the findings reported by Lee (2004). However, device price is important to consumers than the monthly charge. For use benefits, transmission speed has the highest priority. This finding is also consistent with Lee's (2004) results. Service coverage is also perceived important and suggests that consumers expect their mobile data or broadcasting service use may fluctuate by location and time. Finally, mobility and available content features are relatively less important.

**Table 15.5.** Local and Global Priority by Feature

| Criteria | Sub criteria | Local priority | Global priority | Overall rank |
|---|---|---|---|---|
| Related cost (0.560) | Monthly charge | 1 | 0.560 | 1 |
| | Device price | 0.869 | 0.487 | 2 |
| Use benefit (0.440) | Speed | 1 | 0.440 | 3 |
| | Content | 0.667 | 0.293 | 6 |
| | Mobility | 0.787 | 0.346 | 5 |
| | Coverage | 0.979 | 0.431 | 4 |

The attractiveness of mobile data and broadcasting services regarding their cost- and benefit-related features are illustrated in Table 15.6 and Table 15.7, respectively. Also, global priorities for mobile service by feature are contained in Table 15.8. Finally, overall mobile service priorities are listed in Fig. 15.8. The reported priority sequence is T-DMB, S-DMB, WLAN, HSDPA and PIS. That is, T-DMB performance dominates all service features and importantly it is provided for free. Also, S-DMB has an advantage over other mobile Internet services suggesting that DMB services may gain higher penetration rates than for mobile Internet services. Further, only small differences in global priorities among WLAN, HSDPA and PIS are reported.

**Table 15.6.** Attractiveness of Mobile Service by Cost

| Sub criteria | Alternative | Weight |
|---|---|---|
| Monthly change | WLAN | 0.122 |
| | S-DMB | 0.104 |
| | T-DMB | 0.683 |
| | HSDPA | 0.041 |
| | PIS | 0.050 |
| Device price | WLAN | 0.202 |
| | S-DMB | 0.205 |
| | T-DMB | 0.205 |
| | HSDPA | 0.205 |
| | PIS | 0.193 |

**Table 15.7.** Attractiveness of Mobile Service by Benefit

| Sub criteria | Alternative | Weight |
|---|---|---|
| Speed | WLAN | 0.252 |
| | S-DMB | 0.249 |
| | T-DMB | 0.249 |
| | HSDPA | 0.155 |
| | PIS | 0.095 |
| Content | WLAN | 0.217 |
| | S-DMB | 0.189 |
| | T-DMB | 0.198 |
| | HSDPA | 0.198 |
| | PIS | 0.198 |
| Mobility | WLAN | 0.135 |
| | S-DMB | 0.231 |
| | T-DMB | 0.231 |
| | HSDPA | 0.238 |
| | PIS | 0.165 |
| Coverage | WLAN | 0.064 |
| | S-DMB | 0.337 |
| | T-DMB | 0.337 |
| | HSDPA | 0.131 |
| | PIS | 0.131 |

Finally, comparison of PIS and HSDPA by service feature in particular the monthly charge provides a small advantage for PIS and suggests that to gain competitive advantage PIS providers should improve transmission speed and mobility capability to at least equal HSDPA. Further, it is arguable that under an expectation that HSDPA providers will reduce their monthly charge the current PIS price advantage will not remain.

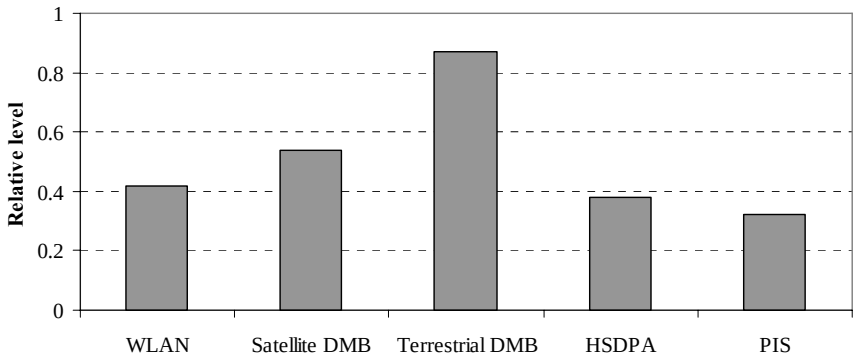


**Fig. 15.4.** Overall Mobile Service Priorities

**Table 15.8.** Global Priority of Mobile Service by Feature

| Level 1 | Level 2 | Level 3 | Level 4 | |
|---|---|---|---|---|
| Mobile service Subscription (1.000) | Related cost (0.560) | Monthly charge (0.560) | WLAN | 0.068 |
| | | | S-DMB | 0.058 |
| | | | T-DMB | 0.382 |
| | | | HSDPA | 0.024 |
| | | | PIS | 0.028 |
| | | Device price (0.487) | WLAN | 0.098 |
| | | | S-DMB | 0.100 |
| | | | T-DMB | 0.100 |
| | | | HSDPA | 0.095 |
| | | | PIS | 0.094 |
| | Use benefit (0.440) | Transmission speed (0.440) | WLAN | 0.111 |
| | | | S-DMB | 0.110 |
| | | | T-DMB | 0.110 |
| | | | HSDPA | 0.068 |
| | | | PIS | 0.042 |
| | | Content (0.293) | WLAN | 0.064 |
| | | | S-DMB | 0.055 |
| | | | T-DMB | 0.058 |
| | | | HSDPA | 0.058 |
| | | | PIS | 0.058 |
| | | Mobility (0.346) | WLAN | 0.047 |
| | | | S-DMB | 0.080 |
| | | | T-DMB | 0.080 |
| | | | HSDPA | 0.082 |
| | | | PIS | 0.057 |
| | | Coverage (0.431) | WLAN | 0.028 |
| | | | S-DMB | 0.145 |
| | | | T-DMB | 0.145 |
| | | | HSDPA | 0.056 |
| | | | PIS | 0.056 |

## Conclusions

Using the AHP procedure this study derives relative weights for decision criteria and relative preferences for emerging Korean mobile data service markets. The analysis requires that the decision is structured. First, the complex decision of whether to subscribe to new mobile services is decomposed into a hierarchy of interrelated decision elements. In particular, following the AHP procedure, respondents are encouraged to reveal their subscription intentions for new mobile services by comparing pairs of elements by decision criteria. Also, to improve the consistency of respondent's judgments a measure of response inconsistency is applied to obtain relative weights by decision element using the eigenvalue method.

While it is possible to assign weights directly to an element at a particular level such direct assignment of weights is too abstract for an evaluator and results in inaccuracy (Zahedi 1986). Second, results from the analysis indicate that the economic costs associated with new mobile data service use are perceived more important to subscription than any corresponding benefits. Also, reported is that the monthly charge is the more important among cost features, and transmission speed and service coverage are more the important features among use benefits. This concern about the national coverage of service is shared by managers of mobile service companies. Managers believe that limited coverage will inhibit new mobile service adoption. Third, to successfully introduce PIS services the results suggest—from the perspective of technical performance—that the transmission speed which is relatively slow must be improved. This is especially the case considering that WLAN has an enhanced transmission speed of up to 54Mbps. Also, as T-DMB service is identified as the most preferred mobile service there is some merit in PIS providers offering bundled services, with DMB focusing on the broadcasting and PIS on mobile Internet service. This scenario makes possible that bundled services complement one another, viz., a PIS provider can accelerate market penetration in the beginning and eventually preempt the market.

To conclude, several areas that warrant further analysis must be identified. First, this study constructs the subscription decision for a new mobile service via AHP procedures through the consideration of two cost- and four benefit-related service features. However, there is a methodological objection to the approach taken, viz., it is reasonable to argue that the attributes employed in a decision problem should not be provided to the respondent a priori—they should be chosen by the decision maker (Keeney 1981). Therefore, a potentially better model would arise from allowing respondents to search from a set of attributes to indicate the attributes that are most relevant to them. Such a procedure is likely to increase the accuracy of the estimated weights and reduce the reported inconsistency level. Second, potential discrepancy between customers' preference and actual subscription are not distinguished in this study. In a further study it would be possible to improve PIS and other emerging mobile service demand forecasts by considering the gap between respondent subscription intentions and actual behavior. Finally, customer preferences and subscription intentions require evaluation by other market research methods for the purpose of comparison, conjoint methods are a likely candidate for consideration.

## Appendix: AHP Questionnaire

The following are related cost and use benefits questions for mobile data and broadcasting services.

► **Related costs**: monthly charge, device price
► **Usage benefits**: access to wireline broadband Internet service, wireless Internet and contents, mobile broadcasting services

| Intensity of Importance | Definition | Explanation |
|---|---|---|
| 1 | Equal importance | Two activities considered equally important |
| 3 | Moderate importance of one over another | One activity is marginally favored over another |
| 5 | Essential or strong importance | One activity is strongly favored over another |
| 7 | Very strong importance | One activity is very strongly favored and its dominance is demonstrated in practice |
| 9 | Extreme importance | The evidence favoring one activity over another is of the highest possible order |
| 2, 4, 6, 8 | | Intermediate values between two adjacent judgments |

Q1. Compare the relative importance with respect to the subscription of new mobile services

| Evaluation criterion | Numerical scale | Evaluation criterion |
|---|---|---|
| Related cost | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Usage benefit |

Q2. Compare the relative importance with respect to related costs

| Evaluation criterion | Numerical scale | Evaluation criterion |
|---|---|---|
| Monthly charge | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Device Price |

► **Transmission speed**: Average transmission speed of services (e.g., Mbps)
► **Contents**: Applications subscribers are actually using (e.g., email, search
► **Mobility:** Maximum speed of vehicles where subscribers are able to use services without any interruption (e.g., if a certain service is available in a car, then its mobility is up to about 100km/h)
► **Coverage:** Areas where services are available (e.g., hotspots, indoors, nationwide, etc.)

| Q3. Compare the relative importance with respect to usage benefits | | |
|---|---|---|
| Evaluation criterion | Numerical Scale | Evaluation Criterion |
| Transmission Speed | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Contents |
| Transmission Speed | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Mobility |
| Transmission Speed | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Coverage |
| Contents | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Mobility |
| Contents | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Coverage |
| Mobility | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Coverage |

The following questions concern devices.

| Q4. Mark all devices that you own now | | | | | |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| Devices | ① Smart phone | ② PDA phone | ③ Handheld PC | ④ Notebook | ⑤ DMB device (vehicles only) |

| Q5. Choose one device you are most likely to use with each service. (Note: add-on modules are available only when you have owned the device for which you are to add on module.) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Devices | Smart phone | PDA phone | | Handheld PC | | Notebook | | DMB device (vehicle only) |
| | New purchase | Add-on module | New purchase | Add-on module | New purchase | Add-on module | New purchase | New purchase |
| WLAN | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | - |
| Terrestrial DMB | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ |
| Satellite DMB | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ |
| HSDPA | ① | ② | ③ | - | - | - | - | - |
| PIS | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | - |

The following questions concern use benefits from mobile data and broadcasting services. Transmission speeds are those currently available.

► **Transmission speeds of some telecommunications services**

- Broadband Internet access with ADSL technology: 1 Mbps
- Broadband Internet access with VDSL technology: 4 Mbps
- WLAN: 4 Mbps

| Q6. Compare the relative importance with respect to transmission speed | | |
|---|---|---|
| Evaluation criterion | Numerical Scale | Evaluation criterion |
| Data transmission | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Data transmission |
| Intermediate (1 Mbps) | | High (2 Mbps) |
| Data transmission | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Data transmission |
| Intermediate (1 Mbps) | | Very high (4 Mbps) |
| Data transmission | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Broadcast transmission |
| Intermediate (1 Mbps) | | Moderately high enough to watch TV channels via 7 inch device |
| Data transmission | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Data transmission |
| High (2 Mbps) | | Very high (4 Mbps) |
| Data transmission | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Broadcasting transmission |
| High (2 Mbps) | | Moderately high enough to watch TV channels via 7 inch device |
| Data transmission | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Broadcasting transmission |
| Very high (4 Mbps) | | Moderately high enough to watch TV channels via 7 inch device |

| Q7. Compare the relative preference with respect to contents | | |
|---|---|---|
| Evaluation criterion | Numerical scale | Evaluation criterion |
| Wireline Internet Contents | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | 3 terrestrial TV Channels |
| Wireline Internet Contents | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | 11 cable TV channels (excluding terrestrial) |
| Wireline Internet Contents | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Wireless Internet contents |
| 3 terrestrial TV Channels | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | 11 cable TV channels (excluding terrestrial) |
| 3 terrestrial TV Channels | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Wireless Internet contents |
| 11 cable TV Channels (excluding terrestrial) | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Wireless Internet contents |

| Q8. Compare the relative preference with respect to mobility | | |
|---|---|---|
| Evaluation criterion | Numerical scale | Evaluation criterion |
| Fixed or cordless | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Moderate (up to 60km/h) |
| Fixed or cordless | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | High (up to 100km/h) |
| Fixed or cordless | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Very high (up to 250km/h) |
| Moderate (up to 60km/h) | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | High (up to 100km/h) |
| Moderate (up to 60km/h) | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | High (up to 100km/h) |
| High (up to 100km/h) | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Very high (up to 250km/h) |

| Q9. Compare the relative preference with respect to coverage | | |
|---|---|---|
| Evaluation criterion | Numerical scale | Evaluation criterion |
| Hotspots | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | 84 major cities |
| Hotspots | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Nationwide |
| 84 major cities | ⑨⑧⑦⑥⑤④③②①②③④⑤⑥⑦⑧⑨ | Nationwide |

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