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Effects of displacement–reinforcement between traditional media, PC internet and mobile internet

A quasi-experiment in Japan

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The purpose of this investigation is to examine media displacement–reinforcement effects between traditional media, PC internet and mobile internet. The theoretical foundations draw on niche theory and enduring involvement, and adopt the satisfaction–attitude–loyalty chain as a core model. The surveys were conducted in Japan and resulted in 992 responses from a general consumer sample. Two scenarios (dining out and travel planning) were created to manipulate the level of enduring involvement. Our data fit the proposed model reasonably well, supporting 12 out of 14 hypotheses. The findings indicate that the more satisfied consumers are with traditional media and mobile internet, the more likely they are to perceive PC internet unfavourably as an alternative information source in both involvement situations. However, a favourable attitude towards mobile internet could act as a reinforcement motivator to use PC internet in high-involvement situations. Therefore, our findings support cross-media campaigns in high-involvement situations. In closing, significant limitations are recognised, and future research directions suggested.

Introduction

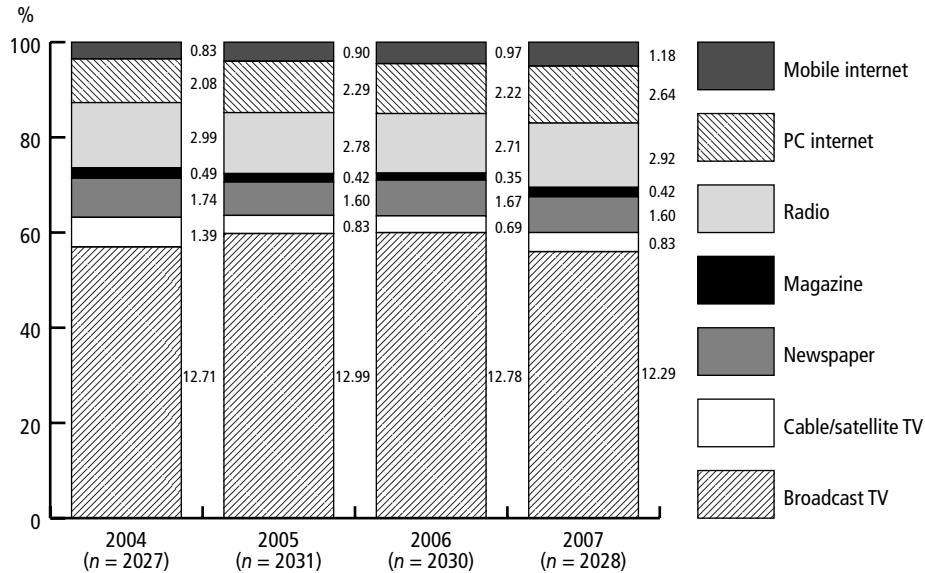
The primary objective of this study is to examine displacement–reinforcement effects between traditional media, PC internet and mobile internet.

More specifically, we investigate the structural relationships of satisfaction from, attitude towards and loyalty to these media. We argue that this research is necessary because (1) telecommunication technology is advancing at an astonishing pace worldwide, and (2) more and more consumers are adopting distinct media for their external information search. In addition, the issues concerning the rivalry between PC internet and mobile internet are increasingly important, for the following reason. On the one hand, PC internet has become the most important medium in the new millennium, leading to a considerable amount of research which has found that the internet not only strengthens marketers' persuasion but also enables consumers to make better decisions (Amichai-Hamburger 2005). On the other hand, due to the extensive connectivity of wireless internet, mobile telephony is now evolving towards the PC, with increasing location-based service capability (Okazaki 2004). A unique feature of mobile internet is its ubiquity, which enables consumers to search for information in any place, at any time. Thus, depending on the type of information they seek, consumers may be urged to choose either medium, hence the intense media rivalry that may exist between PC internet and mobile internet.

To achieve our study objective, we draw upon and link two theoretical foundations. First, we adopt niche theory to explain media displacement–reinforcement effects. Dimmick and Rothenbuhler (1984) used the *bioecological theory of the niche* to examine the competition between new and old media. We further extend this theory, to explain media competition and the coexistence between traditional media, PC internet and mobile internet. Second, we examine the role of enduring involvement in media rivalry, because consumers' information search behaviour may differ, according to the relevance or importance of the product in question.

We collected data in Japan, an Asian country that has experienced drastic changes in consumers' media use over the past decade. For example, Figure 1 shows the longitudinal changes in hours of total media usage in the past four years (Video Research 2008). Clearly, there is a gradual but steady shift from traditional to interactive media. In addition, mobile promotion is widely used by advertisers and marketers in Japan, and this will minimise the self-reported bias of respondents. A study in Japan shows that up to 58% of mobile subscribers use mobile coupons and discounts

Figure 1: Media usage fluctuation by year



Source: Video Research (2008)

more than once a month (D2 Communications 2006). We believe that these two conditions render hypotheses testing reasonable.

The remainder of this paper is organised as follows. We first review the literature to establish our theoretical foundation regarding niche theory and enduring involvement. Next, we propose a research model and a series of hypotheses. We then describe the methodology in detail, and report the results. On this basis, we draw important conclusions in terms of theoretical and managerial implications. In closing, we recognise important limitations, and suggest future research directions.

Importance of the study

Our intended contribution to the literature is threefold. First and foremost, empirical research into media displacement–reinforcement effects is limited to traditional media and PC internet (including email use), and has not yet been extended to mobile internet. However, concerns over the difference between PC (wired) and mobile (wireless) internet have been explicitly expressed (Okazaki 2005), and this research gap needs to

be filled. Second, to date, descriptive analysis prevails in the extant literature, in terms of multivariate techniques, with the interesting exception of Tsao and Sibley (2004), who used logistic regression. This study examines the structural relationships between the variables to identify clearly the antecedents and consequences of displacement–reinforcement. Third, the study uses two types of stimuli in a service context: travel planning and dining out. Given that these are the areas in which electronic promotions are most actively used, the study could provide a stronger case, with practical and useful implications for online marketers and advertisers.

Theoretical framework

Niche theory

The first theoretical perspective we adopt in this study is niche theory. The word ‘niche’ means an opening to hold something, such as a statue or a base. Niche theory was originally developed in animal community ecology to explain ‘how populations compete and coexist with limited resources in an ecological community’ (Dimmick & Rothenbuhler 1984, p. 105). Since then, this term has been widely extended to other disciplines, such that ‘niche market’ or ‘niche player’ is often used in marketing. Dimmick (1997) argues that consumers tend to allocate their niche time according to gratifications. Gratifications are ‘utilities consumers use to make media and content choices’ (Dimmick 1997, p. 37), which may be affective (e.g. needs for relaxation, pastimes or entertainment) or cognitive (e.g. needs for learning, improvement or understanding). Whether a new medium survives or prospers depends on its gratification opportunities, which can be defined as consumers’ perceived properties of a medium that allow them to obtain greater opportunities for satisfaction (Dimmick *et al.* 1992). If one medium offers the same gratification opportunities as another, the two media may overlap or compete. Because the spatial area of the niche is likely to be shared by the two media, then, if their competition is very intense, the more powerful medium may appropriate the niche space of the other. If this appropriation is only partial, media *displacement* will take place; otherwise (but rarely), competitive exclusion will occur.

Niche theory has been applied to explain the evolving use of interactive media in place of face-to-face communication. Dimmick *et al.* (2000)

argue that a new medium, such as email, prospers when it provides ‘new solutions to old needs or to more contemporary needs’ (p. 240). Email is often preferred to phone calls, because people see it as necessary to overcoming temporal and spatial barriers, even though it may not be the optimal medium for conveying feelings. As a result, two media are likely to coexist with some displacement (e.g. long-distance phone calls), not complete replacement. Dimmick *et al.* (2004) furthered understanding of media displacement effects between interactive and traditional media in the provision of news. Based on niche theory and uses and gratifications theory, they compared consumers’ perceived gratification opportunities from the internet directly with those from television (broadcast and cable), newspaper and radio. The findings of particular interest to our study are as follows.

- The internet has the greatest niche on the gratification opportunities dimension ‘providing news’.
- The internet and broadcast television have a relatively high degree of overlap or similarity between their niches on this dimension. Thus, the two media are likely to serve some similar needs, and so they could be close substitutes that compete with each other for news consumers. Furthermore, consumers tend to perceive the significant superiority of the internet as a news medium, compared to television. As a result, the internet has a significant displacement effect on television.
- The internet and newspapers share the gratification opportunities for providing news to a much lesser extent than the internet and television. However, consumers perceived a significant superiority of the internet as a news medium, and a displacement effect thus tends to occur.
- The internet and radio overlap little for the gratification opportunity, so they are unlikely substitutes. More complementarity or *reinforcement* may exist between them.

To date, this work serves as a cornerstone in media displacement–reinforcement research, although two important limitations can be posulated. First, one may question what might occur when two media

generally overlap in a particular gratification opportunity but behave differently for a specific content. May this condition still produce a reinforcing effect? Second, the study skilfully describes the interrelationship between media gratification opportunities and consumer choice. However, it does little to explain the causal relationship between the determining factors.

Our literature review found two studies that approached these two questions. First, Lin (1999) addressed the media substitution hypothesis in terms of TV exposure and online service access. Lin found that the empirical correlations between the perceived motives associated with TV use and online service access were significant but very weak. This study indicates that the usage motives of these two media are parallel in a broad sense, but deviate when specific content access is considered. Second, Tsao and Sibley (2004) addressed whether the internet displaces or reinforces 'other media' as a source of advertising information. Other media include TV, radio, magazines, billboards, daily/weekly paid-for newspapers, free community papers, direct mail and in-store advertising sheets. A logistic regression analysis found that attitude towards internet advertising was positively associated with all four predictor variables: attitudes towards magazines, radio, direct mail and billboards. That is, favourable attitudes towards other media are likely to reinforce the attitude towards internet advertising as a source of information. However, when usage of internet advertising was considered as a dependent variable, the results were mixed. The increasing usage of internet advertising was positively associated with attitudes towards direct mail and television, but negatively associated with attitudes towards free community papers and weekly newspapers. Thus, there appear to be some displacement effects between internet advertising and free community papers and weekly newspapers.

Table 1 summarises our literature review of the media displacement–reinforcement research related to niche theory and/or uses and gratifications theory.

Enduring involvement

Another important theoretical perspective is product involvement. Houston and Rothschild (1978) distinguish two types of involvement: *situational*

Table 1: Prior research on media displacement–reinforcement

Author (year)	Theoretical basis	Media examined	Sample size	Major findings
Lin (1999)	UGT	Internet and TV	384	TV-use motives are mainly insignificant predictors of potential online service adoption. In the future, greater convergence may arise between TV and online services, which continue along technological as well as content dimensions.
Stempel et al. (2000)	Information-seeking model	Traditional media ¹	805	Internet users are more likely than non-users to be newspaper readers and radio news listeners, but there is no significant behavioural difference for local and network TV news viewing. Clearly, the internet is not the cause of the decline in use of the other media.
Kaynay & Yelsma (2000)	NT	Internet, TV, telephone, newspaper, and domestic conversations	169	The usage level is a significant predictor of time displacement. TV viewing experience has a greater displacement effect, compared to the other media activities, and the levels of displacement were more uniform across heavy and light users of online media.
Ferguson & Perse (2000)	UGT	Internet (web surfing) and TV	250	There are common reasons for using the internet and TV: Entertainment, Pass Time, Relaxation, Social Information, and Information. The internet may be functionally similar to TV, especially in its use for diversion. But there are indications that the internet may not be as relaxing a use of time as TV viewing.
Dimmick et al. (2000)	NT	Email and telephone	881	A wider spectrum of needs is being served by the telephone, whereas email provides greater gratification opportunities. The results indicate competition, but also that the two media are not close substitutes.
Dimmick et al. (2004)	NT	Internet, TV and newspaper	211	The internet has a competitive displacement effect on traditional media in the daily news domain, with the largest displacements occurring for TV and newspapers.
Tsao & Sibley (2004)	NT	Internet and traditional media ²	2032	Although internet advertising provides many unique features, it does not displace most media as an information source. Internet advertising is likely to reinforce the use of billboards, direct mail, magazines and TV, but to displace free community papers and weekly paid papers as advertising sources.
Dutta-Bergman (2004)	NT, Selective exposure, Involvement, etc.	Internet and traditional media	3142	There is media complementarity between the internet and traditional media, in that users of online news in a specific content area are also more likely to seek out news in the same area from traditional media.
Kink & Hess (2008)	Theory of planned behaviour, UGT	Search engines and traditional media ³	300	Compared to search engines, traditional media are gratifying a wider spread of users' needs. Although Yellow Pages and directory assistance are potentially substitutable, encyclopaedias serve those needs that search engines cannot fulfil. Traditional media companies face increased competition, but do not necessarily have to be in an inferior competitive position.

Notes: NT = niche theory; UGT = uses and gratifications theory; ¹ Local TV news, Network TV news, Daily newspaper, Radio news, News magazine, Grocery store tabloid, Political magazine, Internet, Online service; ² Billboards, Daily paid-for newspaper, Direct mail, Free community papers, In-store advertising sheets, Magazines, Radio, Television, Weekly newspapers; ³ Paper-based encyclopaedias, Yellow Pages and telephone-based directory assistance

involvement and *enduring involvement*. Situational involvement refers to 'temporary feelings of involvement that accompany a particular situation' (Richins & Bloch 1992, p. 143). In other words, it relates to the ability of a particular situation to evoke individuals' concerns for their behaviour in that situation. By contrast, enduring involvement stems from an individual's value system and prior experience with products, thus reflecting the relatively stable nature of a personality trait. Thus, enduring involvement is an individual difference variable representing the general, long-run concern with a product that a consumer brings to a situation (Bloch & Richins 1983; Shaffer & Sherrell 1997).

A positive linkage between consumers' external information search and involvement has been ascertained in marketing (Beatty & Smith 1987; Goossens 2000), and it has been suggested that the intensity of the search reflects response involvement (Zaichkowsky 1985). Furthermore, enduring involvement associated with a purchasing decision is highly related to information search effort. In this regard, Beatty and Smith (1987) found that purchase involvement, time availability and product-class knowledge were the primary determinants of retailer search and media search. Of particular interest to our study, we believe that media displacement–reinforcement may depend on the level of information need associated with a particular product, and thus on the level of enduring involvement associated with pre-purchase information. For example, prior research on involvement seems to suggest that, when individuals are more concerned about the purchase, they will seek out information via the best medium available that fits their time availability. However, to date, information regarding the relationship between enduring involvement and media displacement has been almost non-existent.

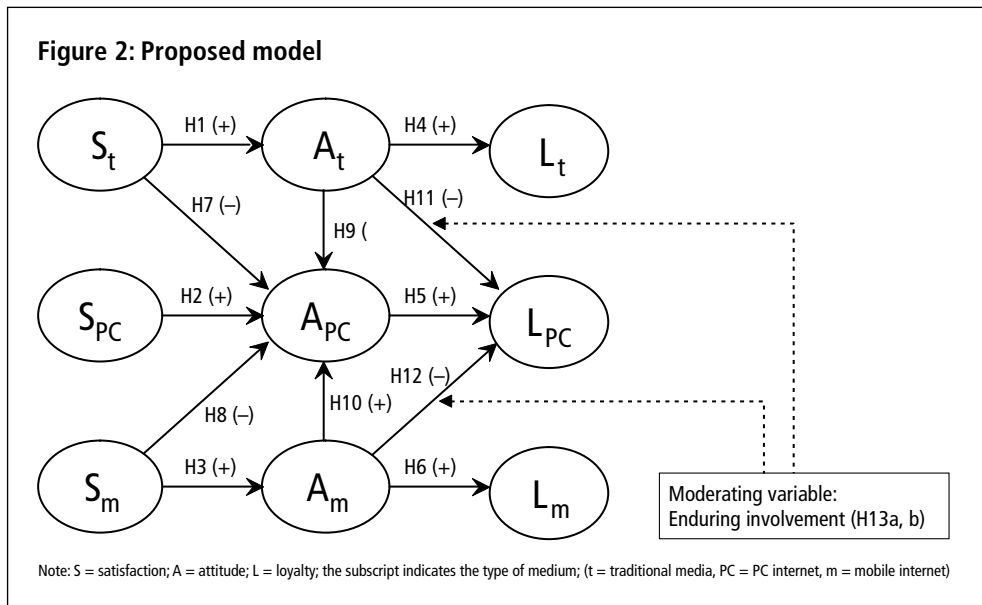
Proposed model and hypotheses

The preceding discussion crystallises three important rationales that justify the current study. First, niche theory is not only a useful but also an effective theoretical framework to explain media displacement–reinforcement effects when a new medium emerges and offers similar functions to those provided by existing media. However, the theory *per se* has not offered any testable 'causal' model, and this makes it necessary for us to propose a structural model, and to validate it with empirical data. Second, the recent

proliferation of the mobile internet worldwide provides a practical motivation to update prior research on consumers' perceptions of different types of media, including PC internet, mobile internet and traditional media. Third, the question of how the impact of situational involvement would affect media displacement–reinforcement should be addressed.

The current study seeks to expand on Tsao and Sibley's (2004) displacement–reinforcement framework, by extending it in two important ways. First, we attempt to include one emergent medium of new telecommunication technology: the mobile internet. As described in the preceding section, in recent years the use of the mobile internet has proliferated worldwide. In particular, internet access via the mobile device now exceeds that via personal computers in Japan, thus drastically increasing its presence in cross-media promotions. Second, we introduce a variable that has not been taken into account in prior research: satisfaction from media. Specifically, attitudes towards and usage of PC internet are associated with attitudes towards its competing media. Competing media include traditional media and mobile internet.

Figure 2 shows our research model.



Core model

This model describes the causal relationships between three principal variables associated with traditional media, PC internet and mobile internet: satisfaction (hereafter, S_t , S_{PC} and S_m , respectively), attitude (A_t , A_{PC} and A_m) and loyalty (L_t , L_{PC} and L_m). Satisfaction refers to whether ‘the consumers’ fulfilment is pleasant or unpleasant’, and it is framed as a general evaluative construct (Olsen 2002, p. 241), while attitude is ‘a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour’ (Eagly & Chaiken 1995, p. 1).

To distinguish the two concepts, Oliver (1980) argues that brand attitudes are likely to be the *result* of customer satisfaction and thus a *determinant* of repurchase behaviour. Consumer satisfaction is transient, situationally orientated and consumption-specific, while attitude is relatively enduring and more general to a product or experience (Oliver 1981). Westbrook and Oliver (1981) point out that satisfaction represents an assessment of the totality of the purchase situation relative to expectations, whereas attitude is a form of liking for the product. Satisfaction and attitude may depart, especially when expectations and product performance differ. In this study’s context, it is expected that the performance of each medium will lead to different outcomes, and thus attitude and satisfaction may diverge significantly. We can therefore posit that satisfaction would have positive effects on attitudes in each medium. It follows that:

H1: A_t is directly and positively associated with S_t .

H2: A_{PC} is directly and positively associated with S_{PC} .

H3: A_m is directly and positively associated with S_m .

Loyalty is defined as the relationship between relative attitude and repeat patronage, which is often expressed as frequent behaviour (Dick & Basu 1994; Olsen 2002). The most common assessments of loyalty are behavioural measures expressed over time, or repurchase patterns (Bloemer & Kasper 1995). Following this line, this study views loyalty as a consumer’s expressed desire to be a regular user of a given medium. Here, the emphasis is on behavioural loyalty, of which attitude acts as a determinant, because a strong link exists between attitudes and behaviour. This has been supported in a variety of settings in advertising and marketing

research (Fishbein & Ajzen 1975; Ajzen & Fishbein 1980; Bagozzi 1981; MacKenzie & Lutz 1989; Dabholkar & Bagozzi 2002). Furthermore, prior studies of branding research suggest that customer satisfaction affects loyalty through brand attitude (Suh & Yi 2006). Similarly, the aligned structure of cognition affection (attitude) and action is a necessary sequence in the customer's orientation to the focal brand loyalty (Oliver 1999; Olsen 2002). Thus:

H4: L_t is directly and positively associated with A_t .

H5: L_{PC} is directly and positively associated with A_{PC} .

H6: L_m is directly and positively associated with A_m .

$$S_{t/m} \rightarrow A_{PC}$$

Niche theory predicts displacement effects between competing media. In this light, we argue that, when consumers favourably perceive the totality of the gratification opportunities for a particular medium, they are likely to develop a liking for that medium, but not for others. That is, when consumers search a particular medium for specific information, *and* when they are highly satisfied with the performance of that medium, their attitude towards the other media will be less favourable. Thus, we postulate that satisfaction with traditional media and mobile internet will have adverse effects on attitude towards PC internet. More formally:

H7: A_{PC} is directly and negatively associated with S_t .

H8: A_{PC} is directly and negatively associated with S_m .

$$A_{t/m} \rightarrow A_{PC}$$

Prior research suggests that reinforcement effects can be expected between distinct media when their gratification opportunities complement each other. We argue that this will occur at the attitudinal level. That is, attitudes towards a certain medium have no adverse effects, but they have positive effects on attitudes towards the other media. For example, Tsao and Sibley (2004) found that active internet users are likely to also develop favourable attitudes towards other media, which suggests that competition between the media may not arise, at least not at the attitudinal level.

This is also consistent with Lin (1999), who found significant but weak correlations between the usage motives of two competing media (TV and internet). Likewise, previous studies have also shown positive associations between new and traditional media (Leong *et al.* 1998; Stempel *et al.* 1998). Thus:

H9: A_{PC} is directly and positively associated with A_t .

H10: A_{PC} is directly and positively associated with A_m .

$$A_{t/m} \rightarrow L_{PC}$$

Displacement effects can be most manifest at the behavioural level. Tsao and Sibley (2004) found negative relationships between internet advertising and weekly newspapers. The reason for this is that the instant speed of information transmission via the internet may pose a major threat to the everyday print media. Similarly, the ubiquitous nature of mobile internet may be a threat to the internet, due to similar gratification opportunities. As an increasing number of similar services are available in wireless internet, consumers may move from fixed to mobile: attitude towards mobile internet may relate negatively to the use of PC internet. Moreover, similar evidence can be found in the uses and gratifications literature, in that when consumers perceive a similar information need, they tend to seek a new medium that offers greater gratification opportunities. Thus:

H11: L_{PC} is directly and negatively associated with A_t .

H12: L_{PC} is directly and negatively associated with A_m .

Moderation of enduring involvement

Finally, when consumers are highly involved in an information search, they are likely to seek the most appropriate medium that fits their information needs, and this depends largely on the level of enduring involvement. As we have seen in the previous section, enduring involvement concerns a general long-run concern with a product that a consumer brings to a situation. For example, when consumers can easily search and download information for a relatively low-involvement product, TV is unlikely to be chosen. By contrast, when they need more detailed or personalised

assistance for a relatively high-involvement product, print media may be favoured over other alternatives. Here, we choose to seek the moderating effect of enduring involvement in the attitude–loyalty paths in Figure 2. The reason for this is that the path between attitude towards traditional media and loyalty to PC internet is the only relationship that has been empirically confirmed in prior research, and it is thus reasonable to extend it to the mobile internet (Tsao & Sibley 2004). Furthermore, it has been observed that consumers are likely to engage in more extensive information search when they are interested in purchasing a higher-involvement product (Volk & Kraft 2005). Thus, we postulate that enduring involvement will moderate the media displacement effects of attitudes towards traditional media and towards mobile internet on PC internet. More specifically:

H13a: The negative relationship between A_t and L_{PC} will be attenuated by a high enduring involvement.

H13b: The negative relationship between A_m and L_{PC} will be attenuated by a high enduring involvement.

Methodology

Scenario method

To address these research questions, two distinct scenarios were prepared, for high- and low-involvement products (Dabholkar & Bagozzi 2002). In an attempt to make the scenarios more realistic, regardless of media type, services were used as stimuli. To achieve high involvement on the part of the participants, we prepared the scenario of a luxury vacation, for which the respondents were supposed to search the media to find the best travel information. To create low involvement, we prepared a scenario of dining out, in which the respondents were to search the media for the best restaurant information. A pre-test, including a manipulation check, was performed with 30 potential respondents. The respondents' perceived levels of involvement were measured by three questions ('This product means a lot to me', 'I constantly compare the prices and other conditions offered by various companies' and 'I always weigh the pros and cons of my

choice' (Ganesh *et al.* 2000)). Each item was compared for the high- and low-involvement scenarios, and this was statistically significant at $p < 0.01$ ($F = 13.57, 12.65, \text{ and } 13.04$, respectively) and thus justified the use of the scenarios. A realism check was performed by asking the respondents to rate two questions ('The situation described was realistic' and 'You had no difficulty imagining yourself in the situation') on a scale of 1 to 7 (completely disagree/completely agree) (Dabholkar & Bagozzi 2002). The results produced a rating of 5.1, which was deemed to be sufficiently realistic for the purpose of this study.

Questionnaire

The questionnaire was divided into three parts. The first included questions related to demographic information, such as age, gender and occupation. The second and third parts involved the main questions on the use of the traditional, PC internet and mobile internet media for high- and low-involvement products. All scale items were adopted from prior research. The scale items for satisfaction and loyalty were adapted from Olsen (2002) and other relevant studies from the service and loyalty literature. The scale items for attitude were taken from Dabholkar and Bagozzi (2002). All scales were measured using 7-point Likert scales (see Appendix).

All items were first prepared in English and adapted to the study's context (i.e. media usage). They were then translated into Japanese and back-translated into English by a native bilingual translator, to ensure consistency and accuracy of meaning. A group of academics in advertising and marketing checked the wording and made appropriate modifications. Finally, the questionnaire was pre-tested with 80 potential respondents to check the wording and reliability of the question items. These were found to be acceptable.

Respondents' profile

The final questionnaire was uploaded on to a website created for the study purpose. A professional research firm recruited 1,000 respondents from its consumer panel. The study used a quasi-experimental, within-subject design, in which all respondents were exposed to both scenarios.

The online panels produced a total of 992 responses. In terms of occupation, the majority (57%) were office workers, including executives, managerial, administrative and clerical; almost one-third were housewives (16%) and professionals (15%); self-employed adults and students were in the minority (less than 10%). Table 2 shows the age and gender distribution of the respondents.

Table 2: Age and gender distribution of the sample (%)

Age	Male	Female
20–29	26.0	25.2
30–39	34.0	33.3
40–49	40.0	41.5

Note: $n = 992$

As a preliminary analysis, we performed a test for common method bias using the post hoc Harman's single-factor test. All the construct variables were included in an exploratory factor analysis, and the unrotated factor solution was examined. We found that no single factor accounted for the majority of the variance in the variables (Harman 1976).

Results

Model assessment

Next, we analysed our proposed model by examining the direct links between the constructs. In doing so, we followed the two-step approach recommended by Anderson and Gerbing (1988), which consists of (1) the estimation of a confirmatory factor analysis (CFA), and (2) the estimation of the structural model. In the former, the CFA was performed for high- and low-involvement situations, each of which was composed of 9 latent constructs and a total of 30 variables, including satisfaction, attitude and loyalty factors for each of traditional media, PC internet and mobile internet. We used the maximum likelihood method with AMOS 7.0 (Byrne 2001). In the light of the recommendations by Bagozzi and Yi (1988), multiple indexes were used to assess the goodness of fit of the overall model: the Satorra-Bentler χ^2 statistic, the comparative fit index (CFI), the Tucker-Lewis index (TLI) and the standardised root mean squared error of approximation (RMSEA). The two CFAs produced the following results for the high-involvement group: $\chi^2 = 1932.76$ ($df = 368$), CFI = 0.96, TLI = 0.95 and RMSEA = 0.066; and for the low-involvement group: $\chi^2 = 1958.18$ ($df = 368$), CFI = 0.95, TLI = 0.94 and RMSEA = 0.066. In a

model with ‘good’ fit, the χ^2 statistic should not be significant at the 5% level. However, the literature suggests that this index becomes too sensitive to larger sample size (Hair *et al.* 2006). The values of the CFI and TLI indexes should be close to 1, although values between 0.90 and 0.95 are considered adequate (Bagozzi & Yi 1988). The RMSEA index should be close to zero (Byrne 2001). Thus, in both models, all the indexes except the χ^2 statistic are in an acceptable range. In addition, all items exhibited high standardised loadings on their intended factors. Thus, the measurement model was deemed acceptable for both involvement groups.

Next, to test whether the measurement model was invariant between the high- and low-involvement groups, a multigroup analysis was performed, in which the unconstrained and constrained models were estimated simultaneously across groups. This procedure yielded a chi-square difference of 18.94 with 21 degrees of freedom, which is statistically insignificant ($p = 0.59$). We then pooled the two samples to assess the overall model reliability and validity. Specifically, the composite reliability (CR) and average variance extracted (AVE) were calculated to determine the level of internal consistency (Fornell & Larcker 1981). The former represents a lower bound estimate of internal consistency due to its assumption of equal weightings of items, while the latter acts as a more stringent indicator of internal consistency (Hair *et al.* 2006). Table 3 summarises the results. All scores exceeded a benchmark of 0.70.

Discriminant validity was assessed from the latent constructs correlations matrix, where the square roots of the average variance extracted (AVE) along the diagonal are reported. The correlations between the constructs are reported in the lower left off-diagonal elements in the matrix. Fornell and Larcker (1981) suggested that average variance shared between a construct and its measures should be greater than the variance shared between the constructs and other constructs in the model. Thus, discriminant validity is satisfied when the diagonal elements (square

Table 3: Reliability assessment

Constructs	Alpha	CR	AVE
Satisfaction from traditional media	0.89	0.98	0.76
Satisfaction from PC internet	0.86	0.97	0.68
Satisfaction from mobile internet	0.92	0.99	0.85
Attitude towards traditional media	0.93	0.99	0.78
Attitude towards PC internet	0.95	1.00	0.83
Attitude towards mobile internet	0.94	1.00	0.82
Loyalty to traditional media	0.94	0.99	0.84
Loyalty to PC internet	0.92	0.99	0.82
Loyalty to mobile internet	0.96	0.99	0.89

root AVE) are greater than the off-diagonal elements in the same row and column. This condition was met for all the combinations.

Given the results of the CFA, a subsequent analysis involved the hypothesised relationships between the proposed constructs. Hence, the structural model was assessed with maximum likelihood method using AMOS 7.0 (Byrne 2001) for each involvement group. Multiple indexes indicated a reasonable model fit, except for the χ^2 value: in the high-involvement group, $\chi^2 = 2224.55$ ($df = 392$, $p < 0.001$), CFI = 0.95, TLI = 0.95 and RMSEA = 0.069; in the low-involvement group, $\chi^2 = 2278.87$ ($df = 392$, $p < 0.001$), CFI = 0.94, TLI = 0.93 and RMSEA = 0.070. Thus, we concluded that the model fit was sufficiently adequate (Byrne 2001). All standardised path coefficients of the *core* S–A–L model in all media (that is, the S–A–L sequences in traditional media, PC internet and mobile internet) were statistically significant at a significance level of 0.001, for both levels of involvement. The hypothesised directions were all supported: satisfaction, attitude and loyalty were positively and significantly related to one another. Table 4 shows the structural model results for high- and low-involvement situations.

Hypothesis testing

H1 to H6 address the direct effects of the satisfaction–attitude–loyalty chain in each medium. Specifically, H1–H3 predict positive relationships between satisfaction from, and attitudes towards, traditional media, PC internet and mobile internet, respectively. By the same token, in H4–H6, we posit positive relationships between attitudes towards, and loyalty to, traditional media, PC internet and mobile internet, respectively. The structural equation modelling reveals that all the hypothesised paths are positive and statistically significant in both involvement levels. Further, the effect size of these paths is extremely strong in both cases. Therefore, H1 to H6 are supported by our data.

In H7 and H8, we postulate the media displacement effects of traditional media and mobile internet on PC internet. Our results indicate that the effects were negative and statistically significant (standardised $\beta = -0.53$ in H7; -0.32 in H8) in the high-involvement scenario. In the low-involvement scenario, the effects were also significant and even greater

Table 4: Structural model results

Hypothesised paths	Model 1: High enduring involvement scenario			Model 2: Low enduring involvement scenario		
	Standardised coefficient	Standard error	t-value	Standardised coefficient	Standard error	t-value
H1: Satisfaction from traditional media → Attitude towards traditional media	0.98	0.02	41.30***	0.97	0.03	31.48***
H2: Satisfaction from PC internet → Attitude towards PC internet	0.99	0.03	37.98***	0.97	0.03	32.12***
H3: Satisfaction from mobile internet → Attitude towards mobile internet	0.97	0.02	44.79***	0.97	0.03	36.51***
H4: Attitude towards traditional media → Loyalty to traditional media	0.78	0.03	30.83***	0.78	0.04	29.27***
H5: Attitude towards PC internet → Loyalty to PC internet	0.79	0.03	33.45***	0.80	0.03	32.30***
H6: Attitude towards mobile internet → Loyalty to mobile internet	0.81	0.03	33.84***	0.70	0.03	25.82***
H7: Satisfaction from traditional media → Attitude towards PC internet	-0.53	0.10	-4.25***	-0.78	0.14	-4.71***
H8: Satisfaction from mobile internet → Attitude towards PC internet	-0.32	0.07	-3.09**	-0.63	0.10	-4.71***
H9: Attitude towards traditional media → Attitude towards PC internet	0.55	0.10	4.50***	0.77	0.15	4.72***
H10: Attitude towards mobile internet → Attitude towards PC internet	0.33	0.07	3.21**	0.68	0.10	5.10***
H11: Attitude towards traditional media → Loyalty to PC internet	-0.06	0.02	-2.65**	-0.09	0.02	-3.99***
H12: Attitude towards mobile internet → Loyalty to PC internet	0.05	0.02	2.23*	-0.04	0.02	-1.61

Note: * $p < 0.001$, ** $p < 0.01$, *** $p < 0.05$, n.s. = non-significant

Model 1: $\chi^2_{392} = 2,224.55$ ($p < 0.001$), CFI = 0.95, TLI = 0.95, RMSEA = 0.069

Model 2: $\chi^2_{392} = 2,278.87$ ($p < 0.001$), CFI = 0.94, TLI = 0.93, RMSEA = 0.070

(standardised $\beta = -0.78$ in H7; -0.63 in H8). This rings true for both H7 and H8.

Next, H9 and H10 test our reinforcement hypotheses, which predict that attitudes towards traditional media and towards mobile internet, respectively, will influence positively attitude towards PC internet. The results indicate that the effects of both paths between attitudes are significant and positive in both involvement levels. Thus, H9 and H10 are both supported.

Finally, H11 and H12 postulate our media displacement hypotheses with regard to the paths from attitude towards traditional media and mobile internet to loyalty to PC internet, respectively. Specifically, we posited these effects to be significantly negative. However, our data provide somewhat mixed results. With regard to H11, the effect was significant and negative for both involvement levels. Thus, H11 is supported. In contrast, for H12, the path was significant but positive for the high-involvement situation, while it was insignificant for the low-involvement situation. Thus, H12 was not supported by our data.

Moderating effect of enduring involvement

Finally, to address H13a and H13b, multigroup analyses were performed using AMOS 7.0 with the maximum likelihood method. Following Byrne (2001), the multigroup baseline model was estimated with high- and low-involvement groups simultaneously, without placing any equality constraints on the hypothesised paths. Their fit indexes serve as initial points of comparison in addressing whether the proposed structural relationships would hold in the same way across the two groups. The chi-square value of the unconstrained model was 3931.53 ($p < 0.001$), with 393 degrees of freedom. The other indexes indicate a good fit (CFI = 0.95; TLI = 0.94; RMSEA = 0.067). In the constrained model, equality constraints were imposed on all measurement weights and structural paths. The chi-square value increased to 4535.47 with 798 degrees of freedom. The difference in the chi-square values between the constrained and unconstrained models was 603.94 with 405 degrees of freedom, which was statistically significant at $p < 0.001$. Given this evidence of non-invariance between the constrained and unconstrained models, we proceeded to test for the invariance of each path separately.

We tested first for the invariance of all measurement weights, where these were found to be invariant ($\chi^2 = 19.85$, $df = 21$, $p = 0.53$). We then proceeded to test the invariance of the structural paths. The structural weights of all hypothesised paths were found to be invariant across groups ($\chi^2 = 51.72$, $df = 33$, $p = 0.02$). Given findings of non-invariance at this level, we then tested for the invariance of each path separately. This procedure identified the following three paths to be invariant across groups: (1) H7: the path from S_t to A_{PC} ; (2) H9: the path from A_t to A_{PC} ; and (3) H12: the path from A_m to L_{PC} . Thus, H13a was rejected. Furthermore, as seen in the preceding section, the path H12 was positive in the high-involvement situation in an individual estimation. Thus, the enduring involvement moderated the relationship between A_m to L_{PC} in the hypothesised direction. Therefore, H13b was supported.

Based on these findings, in the following section we attempt to provide interpretations and the implications of the findings.

Conclusion

The current study adopts two theoretical frameworks: (1) niche theory and (2) enduring involvement. These frameworks were integrated into a satisfaction–loyalty–attitude model that was tested by 992 responses obtained from Japanese general consumers. The results provide us with important implications from both theoretical and managerial perspectives.

Theoretical implications

First and foremost, this study successfully extends and improves our knowledge of the effects of competing media beyond Lin (1999) and Tsao and Sibley (2004), by comparing the structural relationships between satisfaction from, attitude towards and loyalty to traditional media, PC internet and mobile internet. In particular, the present study is a pioneering exploration of the role of mobile internet in media displacement–reinforcement. In line with prior research, our findings suggest that traditional media, PC internet and mobile internet generally have complementary effects at an attitudinal level. Relationships between attitudes towards one medium and attitudes towards the others were consistently positive, regardless of the type of medium and the involvement level, indicating somewhat

harmonious coexistence at this level. By contrast, the effects of satisfaction from traditional media as well as from mobile internet on attitudes towards PC internet were strikingly negative, regardless of the involvement level. This indicates that the global evaluation of the gratification opportunities of a particular medium acts as a strong determinant of liking (that medium) or disliking (the others), especially when the performance of each medium would lead to different outcomes. This finding is particularly important given the scarcity of any simultaneous examination of media satisfaction and attitude.

Next, one of the two hypotheses was supported for the moderation role of enduring involvement. Specifically, a positive link between attitude towards mobile internet and loyal behaviour to PC internet providers was confirmed. That is, mobile users may become willing to reinforce their information search via PC internet when they are highly involved with the product in question. This finding makes an explicit contribution to the literature, because prior research has confirmed only displacement effects between attitudes towards traditional media and intention to use PC internet (Tsao & Sibley 2004).

In addition, this finding provides two important implications. First, wireless internet could become a complementary medium to wired internet, according to the level of information relevance and needs. That is, when consumers search for information on a high-involvement product, the depth of information sought may be just as important as the speed of information search. Thus, the two media complement each other. Second, mobile internet converts into a serious substitute in the case of lower enduring involvement, because the speed of information search outweighs the depth of information sought. Thus, mobile internet may be preferred to PC internet.

On the other hand, satisfaction from traditional media and mobile internet exhibits strong displacement effects on attitude towards PC internet at both levels of enduring involvement. That is, when consumers know that the global performance of traditional media or mobile internet as information source is superior, they are unlikely to feel close to PC internet. However, when consumers foresee the limitations of traditional media or mobile internet in terms of transmission speed or information depth, respectively, they may become interested in or feel open to PC internet, even for a low-involvement product.

Managerial implications

The findings of this study offer rich information regarding consumers' media displacement–reinforcement behaviour, and this will enable advertisers and marketers to make better decisions on media usage in cross-media campaigns. First, the fact that attitude towards traditional media and towards mobile internet positively affects attitude towards PC internet suggests that worldwide cross-media campaigns in due course indeed make sense at an affective level. The results indicate that active media users who develop affection towards traditional media are also likely to perceive new media positively. On the other hand, the negative relationship between attitude towards traditional media and loyalty to PC internet indicates that cross-media campaigns that attempt to *capture* net users through traditional campaigns may have a serious side-effect, in that consumers who are unsatisfied with traditional media may switch to the PC for future information search.

Second, it is striking that attitude towards mobile internet reinforces loyalty to PC internet in the high-involvement scenario. This information is extremely useful for media planners, because it encourages and justifies the use of mobile media as a cross-media campaign. That is, firms and advertisers can use mobile devices as an initial platform by providing an information link, by which consumers can extend and complete their information search on PC. This is exactly the opposite of what is currently happening in Japan, where many firms offer QR code (quick response code, shown in Figure 3) on their websites, to enable consumers to quickly scan the image and access the corresponding mobile sites.

However, the findings of our study suggest that firms and advertisers should find a means of enabling consumers to 'jump' from mobile to PC. That is, when regular mobile users are in search of a high-involvement product or service, they are likely to be willing to access PC internet for further information. This may be largely due to the recently developed sophistication of mobile communication technology. In the past, the mobile device was said to have significant limitations in usability: the small screen and small keys were major obstacles to easy use. Hence, mobile devices have been thought to play, at most, a secondary or complementary role to the PC. However, most recent mobile phones (e.g. the iPhone) or PDAs possess a high-speed internet connection with a user-friendly interface,

Figure 3: QR code cross-media campaign

The image is a screenshot of the Yahoo! Japan homepage. At the top, there are logos for Bb, OAK, My, and YAHOO! JAPAN, along with icons for a mobile phone and a camera. Below the logos is a navigation bar with links for 'ウェブ' (Web), '登録サイト' (Registered Sites), '画像' (Images), '動画' (Videos), 'ブログ' (Blogs), '検索' (Search), '知恵袋' (Q&A), '地図' (Maps), and '商品' (Products). A search bar is located below the navigation bar. The main content area is divided into several sections. On the left, there is a sidebar with links to various services like 'ショッピング' (Shopping), 'オークション' (Auctions), '旅行' (Travel), 'ニュース' (News), '天気' (Weather), 'スポーツ' (Sports), 'ファイナンス' (Finance), 'テレビ' (TV), '地図' (Maps), '路線' (Routes), '不動産' (Real Estate), 'グルメ' (Gourmet), '自動車' (Cars), 'ブログ' (Blogs), 'ビューティー' (Beauty), and '出会い' (Meetings). The main content area features a 'トピックス' (Topics) section with headlines about the 2008 Tokyo Olympics, a 'おもしろい' (Interesting) section with a recipe for 'つまみ' (Appetizers), and a 'おすすめセクション' (Recommended Section) with images of clothing items. In the bottom right corner, there is a QR code and text that reads '世の中がひとめで分かる。オークションの出品無料。100分の写真を持ちこよう。' (The world is understood in a glance. Free listing on auctions. Bring 100 photos in 100 seconds.)

An example of cross-media campaign via an industrial quick response (QR) code can be found on Yahoo! Japan's homepage; in the lower-right corner, the code is shown; mobile users scan it to subscribe to Yahoo!'s mobile news service

thus enabling users to make a successful transition from PC to mobile in their information search. Users are probably now capable of using both tools with equal weight, and of distinguishing their use according to their specific information needs. This point deserves further attention from both practitioners and academics in future explorations.

Limitations and future research suggestions

First, some may criticise the study context (created by the scenario method) as somewhat artificial, and subject to social desirability bias. Second, this study is based on self-reported data, and thus the sample's 'real' experience of PC and/or mobile internet usage was not established. Third, an additional limitation is the operationalisation of 'traditional' media, which was conceptualised at an aggregate level. All these factors limit any generalisation of the findings of this study.

The results of this study raise several questions that may be addressed in future extensions. First, this study only examined services to create enduring involvement. However, tangible products may elicit different kinds of involvement, in which consumers may perceive the media differently. Second, the model proposed in this study should be tested on different age groups, since prior research suggests that the primary users of mobile internet are still located in the youth segment. Specifically, the effects of attitude towards mobile internet on loyalty to PC internet may be different in the more mature generations. Finally, future study must explore the gratification opportunities of different media. An interesting extension of the present study would include one more antecedent of satisfaction in the model. For example, media performance could be incorporated as the very reason why consumers feel satisfied with a certain medium. This would also strengthen our argument, by relating our model to a performance–satisfaction–loyalty chain, as has been documented in the fields of service research and customer relationship research. Such an extension of the model would provide very meaningful contributions to the media displacement–reinforcement research literature.

Appendix: Questionnaire items used in this study

1. Satisfaction (Babin & Griffin 1998)

- Please indicate your overall feeling toward this medium based on a 7-point scale (very satisfied–very dissatisfied).
- Based on your total experience with this medium, please express as a percentage your satisfaction with this medium.
- As a source of information for advertising, you are satisfied with this medium.

2. Attitude (Dabholkar & Bagozzi 2002)

- Good–Bad
- Useful–Useless
- Beneficial–Not beneficial
- Favourable–Unfavourable

3. Loyalty (Olsen 2002)

- Please let us know how long you were exposed to this medium yesterday.
- If you have an hour, you will go straight to this medium and get information you'd like.
- In the future, when you need to gather information, you will first use this medium.

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