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David Gilbert

Pierre Balestrini

Darren Littleboy

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A Study of Traditional Versus e-Government Service Channels in The UK

**Professor David Gilbert, Professor in Marketing, School of Management, University of Surrey,
Guildford, UK , email d.gilbert@surrey.ac.uk**

Pierre Balestrini, Marketing Lecturer, School of Management, University of Surrey, Guildford, UK

Darren Littleboy, Principal Consultant, Detica Ltd., Surrey Research Park, Guildford, GU2 7YP, UK.

Abstract

This paper examines the reasons individuals would choose electronic self-service delivery methods, more specifically that of the Internet, over more traditional methods of service delivery for government services. The approach taken was based upon a combination of attitudinal technology adoption models and the service quality concept, with data gathered via a questionnaire. Trust, financial security, information quality (all adoption barriers), time and money (both adoption benefits) were found to predict potential usage. The results obtained demonstrated that the current approaches are limited in that they only consider the benefits of technology adoption, they do not consider the barriers to adoption, which is particularly important for electronic public service delivery as a new offering. The results are significant to public service managers if they are to develop plans to increase the take-up of their electronic services.

1 Introduction

In response to increasing consumer power, many organisations have sought to move to Customer Relationship Management (CRM). The core principle behind CRM is for organisations to better understand the needs of each customer, in order that they may personalise their offerings and so increase customer satisfaction, which is believed to develop customer loyalty and increase customer retention Kotler [1]. The Internet has become an important component of the overall CRM approach in that it can be used as an extension to the traditional methods of business.

However, whilst customer retention in e-services is particularly important because of the ease of utilising another provider due to low switching costs, little is known about how consumers perceive and evaluate electronic service delivery. This is of particular managerial importance in the public sector, where all government organisations have to deliver all services electronically by 2005 [2]. Without an understanding of why UK citizens would use electronic service delivery channels over more traditional service delivery methods, government organisations cannot take the necessary strategic actions to meet their citizen adoption targets for

these channels. Therefore, the aim of this paper is to investigate how individuals evaluate electronic channels, more specifically the Internet, for the delivery of government services, and to predict future usage intentions.

2 Literature Review

The consumer decision-making process model [1] is used as the framework to investigate how individuals evaluate on-line self-service delivery options. Thus the assumption is made that the consumer is at the 'evaluation of alternatives' stage where the consumer choice is not between different brands, but between methods of service delivery for a single organisation.

Previous research can be described as varying along a continuum from applying existing theories in a technology context to the development of specific technology adoption approaches. This adoption led approach is applicable since a consumer choosing an electronic service delivery mechanism over more traditional means can be considered as an issue regarding technology adoption. The three main approaches repeatedly used that have sound theoretical and empirical bases, and that are considered in this review are:

- **New theory:** Diffusion of Innovation theory [3, 4] indicates that there are three main factors that are most supported by empirical studies, namely relative advantage, compatibility and complexity. However, these studies all apply to the adoption of technology to information systems for performing job roles, such as the use of spreadsheets [5], and as such may not be as valid when applied to consumers.
- **Extension of existing theory to technology:** Technology Acceptance Model [6] showed that beliefs influence attitudes about information technology, which lead to intentions and subsequently behaviours of actual technology usage. Extensions to the TAM have been thus proposed, predominantly in the area of subjective norms, which are a key part to the theory of reasoned action (TRA), but were not included within the TAM. Venkatesh and Davis [7] acknowledged that there is a need to account for social factors and updated the Technology Acceptance Model (TAM2) by

integrating subjective norms. However, this model still accounted for only 50% of the variance in technology usage intention according to Legris et al. [8], indicating that there are other significant factors not yet identified. Attitudes towards technology have been found to influence Internet usage but the more formalised approach provided by TAM has not been widely adopted in Internet research. In what was found to be one of the first applications of the TAM to the use of the Internet by consumers, O’Cass and Fenech [9] investigated attitudes towards on-line retail purchases.

- **Application of existing framework to technology:** Service Quality (for example, see Dabholkar [10]). The two previous models (Diffusion of Innovation and Technology Acceptance Model) focused specifically upon consumer perceptions of technology and their effect on the intention to use that technology. Recently, another marketing concept that incorporates consumer intentions has been applied to service delivery via technology, namely service quality. Being considered as a differentiator between organisations, it is here being used as a differentiator between service delivery methods of a *single organisation*. In the service quality literature, perceptions relate to post-consumption evaluation of service performance, whereas in the previous two models the approach to perceptions are pre-determined beliefs that lead to attitudes about the product or service. The major issues that are immediately apparent are that the delivery of service via electronic means is still a relatively new concept so that many consumers will not have experienced or interacted with it. It must be also noted that although there is an increasing proportion of the United Kingdom population who use the Internet, this proportion represents still only 50% of the related population. Furthermore, according to Oftel there is an unequal distribution of the diffusion of the Internet in the UK population: heavier users tend to be younger to middle age groups, larger households and higher income groups [11]. Therefore empirical studies may have to be based upon consumer *expectations* of service quality. The results of the Dabholkar study [10] demonstrated that speed of delivery, ease of use, reliability, enjoyment and control were all significant factors in determining expected service quality. However, the implementation of these attributes can be questioned because the study was aiming to compare consumer decision-making between traditional and technology based service delivery, whereas the instrument questions used these attributes in an *absolute* sense (about the technology), rather than a *comparative* sense.

Discussion

The literature review has highlighted areas where either the approach or the previous applications, have

limitations that may be reduced by combining all three approaches. The attitude-based methods are strong because they are supported by accepted behavioural theory linking perceptions to usage intentions. However, the primary drawback appears to be concerning the antecedents that affect the perceptions towards technology. As mentioned earlier, Legris et al. [8] described how the initial list of factors that affect technology adoption were simplified under the TAM and accounted for only 50% of the variance in technology usage intention.

For the service quality work, the attributes that are important in determining expectations have been well researched through various models, such as SERVQUAL, SERVPERF and the technical/functional model. The specific service quality dimensions have to be modified for the electronic service delivery consideration [12, 13]. However, these models are weaker in the area of linking service quality to customer satisfaction and usage (or re-usage) intentions. Therefore, the proposition is that by combining the attitude-based and service quality based approaches, the theory linking attitudes to behaviours can be exploited (DOI, TAM), with the service quality literature being used to help identify the antecedents that affect these attitudes. However, the antecedents of attitude towards technology adoption have to be defined, placing the onus on both the factors affecting consumer intentions to adopt an online service channel (considered in a comparative manner, i.e. relative benefits) and the factors representing a barrier to adopt the same.

3 Methodology

The analysis is conducted in two stages: the first as an exploratory study to identify the factors that may predict technology usage; the second to test the following hypothesis.

H₁: Each identified factor does not predict the intention to use the technology service delivery option

Whilst many of the principles from the reviewed studies can be used, the following reasons justify the modified approach taken in this research:

- The context here is a publicly available service, not one within the workplace; Whilst people are aware of the Internet, they are unlikely to have received training on how to use it or received direct marketing encouraging them to use it in general, this contrasts with potential users in a work environment; While the use of the Internet for service delivery has increased dramatically, the delivery of government services via the Internet is relatively new, so there are few people who have actually used it.

Thus, rather than questioning individuals on their perceptions developed from actual system usage, and relating this to whether they are actually intending to use it further, the study investigates the importance of the

candidate benefit-barrier factors relating to potential *willingness to use*. That is, the study does not measure actual perceptions, but investigates the factors that individuals consider important in evaluating whether or not to use the service. These factors are important to the service providers (government departments) because they contribute towards the development of attitudes in making the delivery of public services on-line more acceptable.

A self-administered postal questionnaire incorporating 5-point Likert scales was developed. The questionnaire contained 3 parts with parts B & C based upon the literature as indicated in Appendices 1 and 2:

- Part A: factual questions (demographics and previous Internet experience).
- Part B: attitude questions relating to the candidate benefit (Time, personalization, avoid personal interaction, cost, convenience, control) and barrier (visual appeal, safe, reliable, enjoyable, easy to use, confidential) factors.
- Part C: question for ‘willingness to use’ on-line public service delivery.

Stratified random sampling was performed in Guildford in which 50 streets were selected at random from the list of all streets, using the SPSS random selection facility. Individual addresses in each street selected were also chosen randomly using the same. A pilot study was carried out and consisted of 50 questionnaires distributed

through postal services within 10 streets randomly selected from the list developed. 9 responses were elicited.

Based upon the response rate of 18% from the pilot study, 555 questionnaires were then distributed. A follow-up visit to selected non-respondents was performed in order to increase response rates and finally 111 completed questionnaires were returned.

The reliability of the scales was calculated using Cronbach alpha whereby the scale items in the pilot for benefits and barriers were .75 and .72 respectively and for the final survey these were .83 and .8 respectively. However the reliability may indicate that together the questions measure benefits and barriers, but there was a question that they may not group under the 12 factors proposed as individually the items might not be robust. Therefore, factor analysis was used to identify the underlying constructs that characterise the data response and to investigate the convergent and discriminant validity of the emerging factors.

4 Analysis and Results

Compared to the UK total population census data [14], age range 25-34 and 55+, and people not working full-time were respectively over-represented and under-represented in the sample (Table 1).

Table 1: Comparison of demographic data

Category	Response	Study response (%)	1991 census (%)
Age	18-24	14	13
	25-34	42	20
	35-54	35	33
	55+	9	34
Work status	Full-time	89	46
	Not full-time	11	54

Source: Fieldwork and LGA (2000)

The following table contains the means and standard deviations (SD) for each construct. Each construct is grouped according to the relative benefit and barrier factors.

Table 2: Descriptive Statistics attributed to Construct

Construct	Mean	Standard Deviation
<u>Perceived Benefits</u>		
Avoid Personal Interaction	3.60	0.94
<i>Control</i>	4.20	0.76
<i>Convenience</i>	3.96	0.96
<i>Cost</i>	3.17	1.10
<i>Personalisation</i>	3.55	1.00
<i>Time</i>	4.15	0.80
<u>Perceived Barriers</u>		
Confidential	4.80	0.54
<i>Easy to use</i>	4.34	0.64
<i>Enjoyable</i>	3.46	1.00
<i>Reliable</i>	4.55	0.62
<i>Safe</i>	4.57	0.61
<i>Visual Appeal</i>	3.81	0.89

Source: Fieldwork

The constructs with the largest means (5 = “Strongly Agree” and 1 = “Strongly Disagree”) are those that the respondents have deemed to be the most important. Of

the largest 5 means, only 1 of them is a construct from the ‘relative benefits’ factors (relating to time), which provides an initial indication that, currently, people are more concerned about the risks than the potential benefits. This may be due to the current immaturity of the offering and the lack of exposure that the general public has to government services on-line.

The largest means are those relating to safety, confidentiality and reliability. This is a potentially important observation given that the only potential barrier included within the attitude based models is the ease of use of the technology option. It is interesting to note that a question (“prepared to pay for the online service”, 2.05) within the cost construct has the lowest mean for all questions across constructs, indicating that people certainly would not expect to pay for electronic service delivery even if the level of service exceeded other methods.

Factor Analysis

Exploratory factor analysis was used to identify the constructs that characterise the attitudes towards the on-line delivery of public services. To identify the number of key (also called principal) factors that explain the majority of the variance within the data and satisfying the assumptions of the test the principal component method was used [15]. Tables 3 and 4 summarize the results.

Table 3: Results of factor analysis for 9 extracted factors

Question	Candidate Factor	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	Factor 9
Q1	Easy	-0.104	-0.008	-0.065	-0.026	0.072	0.026	-0.109	0.419	-0.086
Q2	Time	0.131	0.150	-0.002	0.121	0.162	-0.190	0.170	0.592	0.193
Q3	Safe	-0.006	-0.051	0.017	-0.258	0.072	-0.131	-0.027	0.016	-0.043
Q4	Convenience	0.215	-0.139	0.155	0.085	0.017	-0.218	-0.039	0.272	0.095
Q5	Visual	0.505	0.120	0.011	0.033	0.003	0.081	-0.047	-0.026	-0.048
Q6	Easy	0.093	-0.021	0.030	-0.114	0.151	0.484	-0.169	0.079	-0.084
Q7	Reliable	0.080	0.003	-0.001	0.162	0.257	0.352	-0.046	0.103	0.070
Q8	Visual	0.994	-0.102	-0.154	-0.046	0.073	-0.130	-0.008	-0.092	-0.133
Q9	Time	0.204	0.152	0.199	-0.016	0.236	0.111	0.253	0.168	-0.244
Q10	Control	0.235	0.095	0.198	-0.084	-0.041	0.180	-0.128	0.351	-0.038
Q11	Personalise	0.098	0.321	-0.007	0.091	-0.044	-0.054	0.191	0.277	-0.271
Q12	Convenience	0.287	0.088	0.037	-0.058	-0.230	-0.129	-0.060	0.395	-0.108
Q13	Reliable	-0.057	-0.058	0.282	-0.110	0.108	0.567	0.026	0.063	0.013
Q14	Avoid	-0.003	0.118	-0.001	0.667	0.063	-0.145	-0.056	0.066	-0.167
Q15	Time	0.119	-0.049	0.309	0.176	0.040	-0.095	-0.267	0.273	0.128
Q16	Cost	0.157	0.346	0.062	0.252	0.196	0.020	0.042	-0.003	-0.131
Q17	Reliable	0.097	0.060	0.166	0.105	-0.065	-0.047	0.747	-0.080	0.052
Q19	Easy	-0.050	-0.070	0.182	0.133	0.274	0.259	-0.099	0.248	0.322
Q20	Time	0.096	-0.199	0.246	0.215	0.155	0.067	-0.170	0.126	0.338
Q21	Control	0.064	0.458	0.196	0.017	0.034	-0.031	-0.120	0.035	-0.085
Q22	Avoid	0.099	0.297	0.250	-0.284	0.109	-0.042	-0.132	0.178	0.022
Q23	Safe	-0.079	0.176	0.682	-0.018	-0.141	-0.041	-0.060	-0.108	0.013
Q24	Cost	0.012	0.592	0.029	0.090	0.023	0.042	-0.068	0.012	0.045
Q25	Person	0.033	0.168	0.114	-0.100	0.073	-0.012	-0.012	-0.072	-0.221
Q26	Easy	-0.107	0.130	0.129	-0.060	0.210	-0.211	-0.255	-0.008	-0.178
Q27	Safe	0.048	0.213	0.029	-0.256	0.234	0.033	-0.028	0.098	-0.176
Q28	Enjoyable	0.182	0.185	-0.115	0.080	0.042	-0.049	0.004	-0.096	0.772
Q29	Person	-0.146	0.163	-0.106	-0.241	-0.048	-0.243	-0.240	0.222	-0.216
Q30	Confidential	0.042	-0.007	0.024	0.045	-0.120	0.540	-0.094	0.002	-0.012
Q31	Enjoyable	0.165	-0.090	-0.030	0.052	-0.004	-0.044	0.065	0.073	0.823
Q32	Reliable	0.180	0.100	0.327	-0.142	0.204	-0.049	-0.175	0.024	0.103
Q33	Easy	-0.009	0.106	0.157	0.318	0.254	0.080	-0.167	0.102	-0.278
Q34	Enjoyable	0.078	0.085	-0.076	-0.124	0.737	0.090	-0.085	-0.015	-0.052
Q35	Reliable	0.006	0.030	-0.092	-0.048	0.067	-0.032	0.609	0.048	0.028
Q36	Visual	0.020	0.085	-0.134	-0.005	0.400	0.109	-0.024	0.089	-0.251

Source: Fieldwork n=111

Table 4: New constructs and corresponding reliabilities

	Factor	Reliability
Relative benefits	Avoid interaction	0.52
	Cost	0.66
	Time	0.62
Barriers	Experience	0.78
	Information quality	0.67
	Financial Security	0.70
	Low stress	0.68
	Trust	0.79
	Visual appeal	0.67

Source: Fieldwork

As per Table 3 above, 9 factors were identified (High factor loadings (>0.5) have been highlighted in bold, while moderate loadings (>0.3) have been highlighted in light grey boxes), 4 of which are original factors, and 5 are new factors. Whilst the relative benefit factors of avoid interaction, cost and time remained, the individual factors for convenience, control and personalisation no longer existed. This result does not agree with the studies that have identified these very factors, potentially because of the different application, that is government services over the Internet.

Within the barriers factors, easy to use, security, confidential, reliable and enjoyable have all been replaced with factors that are a combination of the items within the original factors. This is a significant result, since the attitude-based models (such as the Technology Acceptance Model) all have 'easy to use' as the single barrier to adoption. Here, easy to use was not found to be a factor used in evaluating such technology options, but there were five other barrier factors: experience, financial security, information quality, low stress and trust.

An important observation is that the reduction in factors has come from the relative benefits side, rather than the barriers, indicating again that the barriers to use are especially important in determining whether people will adopt public sector on-line service delivery.

Table 4 indicates acceptable reliability (above 0.6) and thus the results are representing people's attitudes although the 'avoid interaction' factor requires further validation through future research. Since the items that load onto each factor (loading > 0.3) do not load onto any other factors (loadings all < 0.3), then both convergent validity (items yield comparable results) and discriminant validity (items do not 'characterise' other constructs) can be inferred [16].

Hypotheses Testing

Whilst the nature of the data is ordinal (use of likert scale for each statement considered on their own), the use of parametric tests is warranted, in line with previous research reviewed earlier in this paper and with the behavioural sciences in general, as the underlying scale is continuous for each construct [17]. The assumptions of the tests used, namely linearity, homoscedasticity (the latter two assumptions were checked after generating scatterplots), random sample, normality and independence of observations are here all satisfied. Pearson linear correlation and multiple linear regression were performed below to test the research hypotheses.

Result Hypothesis H1

H₁: Each identified factor does not predict the intention to use the technology service delivery option

Before testing whether there is actual dependency between the 9 factors and willingness to use, it is useful to investigate whether there is any potential relationship by considering the correlation between each of the factors and 'willingness to use'. Pearson Product-Moment Correlation was used for that purpose (Table 5).

Table 5: Correlation between new factors and 'willingness to use'

Factor	r	r²	Sig. (2-tailed)
Avoid interaction	0.182	0.033	0.061
Cost	0.478	0.229	0.014
Time	0.763	0.582	0.000
Visual appeal	0.328	0.108	0.042
Experience	0.363	0.132	0.002
Financial security	0.651	0.424	0.001
Information quality	0.525	0.276	0.021
Low stress	0.307	0.094	0.033
Trust	0.614	0.377	0.000

Source: Fieldwork n=111

All results were reported as statistically significant at the 95% confidence level except for the 'avoid interaction' factor. Therefore it indicates that there is a relationship between willingness to use and each of the factors identified except for the 'avoid interaction' factor.

More specifically there is a strong correlation ($r \geq 0.5$) between time, financial security, trust, information quality and willingness to use the government online service, and a medium correlation between cost, experience, visual appeal, low stress and willingness to use the government online service. This is reflected in the variance shared by the variables (r^2), with time helping to explain 58% of the variance in respondents' scores on the willingness to use scale, with financial security at 42%, trust at 38%, information quality at 28%

and cost at 23%. The other factors only have an explained variance of 15% or lower.

Since the correlation analysis demonstrated a relationship between some of the constructs, a multiple linear regression analysis was performed to investigate whether any of the factors actually predict willingness to use the technology and see which variables have the greatest effect. Table 6 shows the results obtained.

Table 6: Results of multiple linear regression

	Sum of Squares	df	Mean Square	F	Sig.
Regression	53.377	9	5.931	40.923	0.015
Residual	18.695	101	0.145		
Total	72.072	110			

R	R ²
0.566	0.320

	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	-2.293	0.429		-5.35	0.000
Avoid interaction	0.040	0.032	0.061	-1.24	0.216
Cost	0.039	0.014	0.160	2.77	0.006
Time	0.168	0.019	0.519	8.96	0.000
Visual appeal	0.030	0.025	0.065	-1.21	0.228
Experience	0.001	0.016	0.002	0.04	0.970
Financial Security	0.097	0.027	0.233	3.53	0.001
Information quality	0.038	0.044	0.191	3.09	0.004
Low stress	0.013	0.027	0.026	0.46	0.645
Trust	0.072	0.023	0.200	3.18	0.002

The interpretation of the results in Table 6 is that the linear combination of the factors was significantly related to the willingness to use the technology self-service option, accounting for approximately 32% of the variance ($F(9,101) = 40.923, p < 0.05$).

It can be seen that the strongest significant predictors of willingness to use the technology at the 95% confidence level, are: Time, Financial Security, Trust, Information quality and Cost. In other words the hypothesis is rejected for these factors and accepted for the factors of avoid interaction, visual appeal, low stress and experience.

5 Discussion and Conclusion

The present research identified nine factors that are shown to be reliable measures for characterising the attitudes towards on-line public service delivery. These nine factors were either slight modifications of the original factors ensued from previous studies, or totally new factors; 3 of which were relative benefits (time, cost and avoiding interaction) and 6 of which were barriers to adoption (experience, information quality, financial security, low stress, trust and visual appeal).

The test results showed that all factors except avoid interaction, correlated with a willingness to use electronic government services; time, cost, financial security, trust and information quality were the significant predictors of usage. This result indicates that the previous models are restricted in that they do not consider the barriers to adoption, and that the benefits of usage will never be realised if these concerns are not addressed. This supports the results obtained for the attitude models in previous research that only capture 50% of the usage intention [7], and that success modifications have only increased this percentage incrementally [8]. It is proposed here that those models already capture the majority of the usage intention from the benefits perspective, but that significant advances will not be achieved unless the barriers to adoption are incorporated.

Furthermore, the results differ from some of the published literature in that ease of use and some of the perceived usefulness aspects did not emerge as important from the results. This may be because of previous applications [6, 4] which were predominantly applied in the work environment to technologies introduced for employees, rather than to the Internet.

This research can significantly help public sector managers in better understanding why individuals may choose to receive public services via online channels rather than by more traditional means, and help them to draw strategies for enticing people to use such channels.

Thus, from a marketing perspective, the factors identified that predict a willingness to use on-line service delivery could form the basis of a promotion campaign. Guildford Borough Council [18] has recently distributed information about the convenience benefits of their council tax website. However, within this research convenience was not found to be one of these factors; the literature could focus more on giving assurances to address the concerns of trust, financial security and information quality, in addition to highlighting the benefits of saving time and money (if appropriate).

There are aspects of the research that may limit the interpretation of the results. Firstly, the data were collected solely in Guildford, which is not necessarily representative of the UK population. The sampling method used in this research, namely stratified random

sampling, may however reinforce the validity of the results obtained here.

Further study is recommended to both validate the current scales identified in this research and to investigate whether other factors emerge. The current study could thus be extended to incorporate additional factors such as in own ability [23] to explain more of the variance in the willingness to use the technology.

Appendix 1: Relative benefit factors sources

Factor	Source references	Notes
Avoid personal interaction (no necessity to interact)	Forman and Ven (1991) Hansen (1995) Meuter et al (2000) Prendergast and Marr (1994)	
Control (ability to exert more control)	Cabinet Office (1998) Dabholkar (1996) Liao and Cheung (2002) Zhu et al (2002)	This can be expressed as giving empowerment to the individual
Convenience (ability to receive service how and when required)	Cabinet Office (1998) Meuter et al (2000) Szymanski and Hyse (2000) Zhu et al (2002)	This factor relates to the electronic service being more accessible and available
Cost (ability to save money)	Liao and Cheung (2002)	Includes savings to both the individual and the organisation providing the service
Personalisation (ability to tailor to the individual)	Van Riel et al. (2001)	Includes the technical aspect of being able to customise a public sector website.
Time (ability to save time with the service)	Berkley and Gupta (1994) Dabholkar (1996) Hansen (1995) Liao and Cheung (2001, 02) Meuter et al (2000)	Includes the time spent queuing at government offices or on the phone and also includes the responsiveness of the service delivery.

IT literacy [19], prior experience of using online commercial services [20, 21], culture [22] and confidence

Appendix 2: Barrier factors

Factor	Reference	Notes
Confidentiality (Personal data kept private)	Cabinet Office (1998) Van Riel et al (2001) Zhu et al (2002)	Relates to 'Assurance' SERVQUAL dimension
Easy to use (delivery mechanism has to be easy to use)	Agarwal and Prasad (1998) Dabholkar (1996) Lederer et al (2000) Meuter et al (2000)	
Enjoyable (experience of use should be enjoyable)	Dabholkar (1996) Davis et al (1989) Liao and Cheung (2001)	
Reliable (has to have required and trusted services)	Berkley and Gupta (1994) Evans and Brown (1988) Hansen (1995) Zhu et al (2002)	This factor also includes accuracy and currency (up-to-date) of the information on the website. Direct relationship with 'Reliability' SERVQUAL dimension
Safe (secure with respect to entering financial details)	Cabinet Office (1998) Berkley and Gupta (1994) Evans and Brown (1988) Szymanski and Hyse (2000) Liao and Cheung (2001, 2002)	
Visual appeal (website should look good)	Lederer et al (2000) O'Cass and Fenech (2003)	A technical attribute of the website itself, and can be considered as a technical service quality attribute

6 References

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