

Customer Adoption of E-service: an Experimental Study

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Customer adoption of e-service: an experimental study

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Abstract *So far, the term e-commerce has been primarily associated with communicating the brand and/or enabling sales transactions. However, the next vista for companies operating in the virtual marketplace seems to be e-service or, delivering value-added, interactive services to customers. This e-business function has been left virtually unexplored in the services research literature. In this article, an attempt is made to investigate the impact of organizational reputation, relative advantage, and perceived risk on perceived service quality, trust and behavioral intentions of customers towards adopting e-services. In the context of an electronic travel service, hypotheses on the relationships between aforementioned variables are investigated by means of an experimental study. The results suggest that the three factors have a significant main effect on the customers' attitude and behavior towards e-service. The only exception is that relative advantage does not appear to have a significant impact on customer trust. The results also show that organizational reputation and perceived risk have a combined effect: a good organizational reputation impacts the effect of perceived risk on the three dependent variables. Finally, the three factors appeared to be evenly important in the forming of customers' attitude and behavior. Again, the only exception is that organizational reputation and perceived risk appear to be more important in terms of trust than relative advantage.*

Introduction

The Internet has been identified as the world's fastest growing marketplace with seemingly limitless opportunities for marketing products and services (Clever Domains, 1999). A review of practitioners' rationales for exploring these opportunities reveals that the main driving forces behind the explosive growth of the virtual marketplace are, among others, cost efficiency, 24/7 accessibility, a lack of geographic limitations, interactivity and low entry barriers (Porteus, 1999; Marianko, 1998; Durr, 1998). Traditionally, the concept of e-commerce has been associated with providing information, expressing brand awareness and telling the corporate story in the virtual marketplace. Also, the use of virtual storefronts enabling sales transactions and the distribution of products is now embraced as a second important function of e-commerce by a growing number of companies. Recently, however, it has become clear the information and sales functions of e-business need to be supplemented by electronic customer service, or e-service. As Stepanek (1999) states:

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From Chase Manhattan Bank to Thomas Cook Travel Group Ltd., companies are waking up to the need for so-called E-service. It takes many forms: schmoozing shoppers over the Web through e-mail and Web chats, or sophisticated software that tracks buyers' habits and supplies instant help. Done right, E-service can dish up more than just digital warm-fuzzies. It can improve the bottom line.

There are several reasons for the implementation of the e-service function. One has been termed the "service multiplier effect" (Aberdeen Group, 1999), which refers to the fact that any e-business presence creates a demand for pre- and after-sales service activities. Hewlett Packard, for instance, is rapidly transforming their after-sales business into a profit-generating e-service business unit (McCarthy, 1999). Furthermore, the implementation of e-services extends the range of options for customers and the use of an enhanced service portfolio may improve the value of a relationship with a particular company for the customer (Alsop, 1999). Finally, e-service applications may considerably decrease the cost of service and allow for service differentiation and segmentation in service contracts (i.e. one segment of customers may be offered self-service only, while another is entitled to self-service as well as live interaction and support). Delivering value-added, interactive services to customers on-line, in real time, in a shared community of users seems increasingly important for gaining a competitive edge in the electronic marketplace by strengthening relationships with key (e-) constituencies. E-services range from the electronic provision of traditional services (services with an "e" in front), such as investing and airline ticketing, to intelligent interactivity in post-sales product support.

As innovations in electronic service abound and the technological solutions for deploying e-services are advancing rapidly, little is known about the way in which customers will welcome this new e-business function. Nevertheless, customer adoption is arguably a critical factor in realizing the potential of e-service marketing and creating market space. As Forrest and Mizerski (1996, p. 18) state: "There is little beyond relatively primitive clickstream market research to substantiate a demand for interactive services". Therefore, this study aims to explore customer attitude and behavior towards e-service from an innovation perspective. By taking an adoption theory perspective, we focus on factors that impact customer perceived quality and trust as well as intended use of this new service delivery format. This paper is structured as follows. First, we discuss the concept of e-service. Subsequently, a theoretical framework for studying customer attitude and intentional behavior towards e-service will be proposed. On the basis of this framework, a set of hypotheses will be developed that relates determinants of service adoption success to customer attitude and intended behavior towards e-service. The hypotheses are tested by means of an experimental study. Finally, we discuss the results of the experiment and present a number of theoretical and managerial implications following from our results.

Conceptualizing e-service

The concept of service seems to be inextricably linked to e-business. A self-service kind of marketplace environment has already been developed

successfully in which people can help themselves in finding information and to buy a product (Earle, 1999). This self-service environment has been directed primarily to the push of sales or e-commerce. The number of queries made through the Internet and e-mail sent asking for information and support on purchased products is expanding rapidly (Jha, 1999). This suggests that more and more customers are looking for company access and customer support through the Internet and e-mail. In addition to the provision of peripheral service such as customer support, an increasing number of service providers are using electronic ways of distributing their core services. As an extension of the do-it-yourself trend, customers are now increasingly demanding do-it-for-me services, supplementing as well as cannibalizing on existing service delivery formats. Consequently, banks, airlines, car rental companies, management consulting companies and educational institutions are increasingly opting for on-line service delivery to meet e-customer demand (Forrest and Mizerski, 1996). Several conceptualizations of e-service have been offered in, primarily electronic, papers (Poulin, 1999; Hamilton, 1999; Porteus, 1999; McCarthy, 1999; Marianko, 1998; Durr, 1998; Aberdeen Group, 1999; University of Minnesota, 1999). A recurring theme in these conceptualizations of e-service is integration, the seamless incorporation of technology and customer-oriented functions within the firm. Earle (1999, p. 2) provides a good example that illustrates this theme:

What if you had an e-service that did travel planning for you and you could go to a single Web-site and do all of those activities from one place? And then, for example, if you were booked on American Airlines and your flight got cancelled (a plausible scenario). You'd have to move to another airline. The system would automatically adjust everything else in your travel plan to accommodate to the fact you were on a different airline and you were arriving two hours later. Your car would be held for you, your hotel notified, and your dinner reservation rescheduled.

By linking all the processes that are important for the entire trip planning, a more effective service for one customer can be achieved. This effectiveness level would be much harder to obtain when these business processes and technologies would not be integrated. Interestingly, this hypothetical e-service might already have become a reality, for it has been argued that a catalytic driving force for the growth of e-service has been the symbiotic, self-adjusting and self-optimizing relationship between the content of an e-service and its prospective users (e.g. Travelocity.com). With regard to this customer-provider relationship, it has been argued, "as users interact with the content within a market space, a cycle of success can be created wherein content attracts users, users create more content and new content enhances the value" (Spalter, 1996, p. 174). As a result of the ascent of content (Horowitz, 1998), it seems that the meaning may no longer be the message. Aforementioned issues lead us to compose the following conceptualization of e-service:

E-service is an interactive, content-centered and Internet-based customer service, driven by the customer and integrated with related organizational customer support processes and technologies with the goal of strengthening the customer-service provider relationship.

The rapid growth and proliferation of e-services highlights the potential of this emerging area of services. In order to turn this potential into realizable organizational benefits, customers will have to adopt and actually use e-service. It seems, therefore, imperative to know what factors influence customer attitude and behavior towards this e-service. Adoption theory and signaling theory will be used in this study to research these influencing factors, as will be discussed in the next section.

Theoretical framework

As e-service has been described as a “chapter 2 Internet innovation” (Earle, 1999), it seems critical to examine which factors influence customer adoption of this new way of marketing services. Adoption process theory may provide valuable insight for building a theoretical framework. Within this research stream models have been developed to study the acceptance of new products, ideas, and practices. Early applications have focused on farmer’s adoption of farm practices (Ryan and Gross, 1967; Wilkening, 1958; Lionberger, 1959; Fliegel and Kivlin, 1996), school system’s acceptance of new practices (Mort and Cornell, 1983), and physicians’ acceptance of new drugs (Katz, 1957). Several more recent empirical studies have validated adoption theory in a wide range of products (Holak and Lehman, 1990; Labay and Kinnear, 1981; Ostlund, 1973; Rogers, 1983).

Previous empirical research has uncovered several factors that have an impact on how attitude and behavior in relation to innovations are formed (e.g. Rogers, 1983; Ostlund, 1973). Six independent innovation attributes have been found to have an impact on customer perceptions of innovations, outperforming other types of adoption predictors, such as customer characteristics and situational variables. These six are relative advantage, compatibility, complexity, triability, communicability, and perceived risk. *Relative advantage* denotes the extent to which the innovation is perceived to be superior to alternatives already available (both economic and non-economic considerations). These alternatives encompass other product/service classes, forms, and brands. *Compatibility* is the degree to which an innovation is consistent with current values, habits, and past experiences of potential adopters. It is the degree to which it is consistent with the existing customer affect, cognition, and behavior. *Complexity* refers to the extent to which the use of the innovation is easily understood and perceived to require little learning. It is the perceived difficulty of use. *Triability* is the degree to which the innovation is perceived as available for trial on a limited basis without a large commitment. It is the perceived possibility to try out the innovation before actually adopting it. *Communicability* is the extent to which the innovation lends itself for communication, particularly the extent to which the use of the innovation is observable by others. Finally, *perceived risk* is the degree to which innovation performance and/or psychological (concern regarding others’ opinions of one’s decision) risks are attributed to the innovation. After reviewing a number of studies, Rogers (1983) indicates that the perceived

innovation attributes have explained 49 per cent to 87 per cent of the variance in the rate of adoption of various innovations.

In previous work in adoption process theory, the focus has been primarily on the adoption of products and, to a much lesser extent, services, marketed via traditional channels. Therefore, it has remained empirically unclear whether the proven applicability of the theory can be extended to services, which are delivered electronically.

Particularly relative advantage and perceived risk seem relevant in explaining the adoption of e-services. In many studies relative advantage has been identified as the most powerful attribute. A plausible explanation, which is frequently offered is that customers will look for innovations that provide an advantage over the current products or services. For companies to distinguish themselves on line there is a strong need to offer better and more unique customer service options (Tambini, 1999). The finding of Lefkoff-Hagius and Mason (1993) that beneficial attributes are very important in customers' preference formation also reinforces this. It may be likely that relative advantage will also play a role in respect to the attitude and behavior of customers toward e-services. Relative advantage is often operationalized in the innovation literature in terms of extra functionalities such as "ease of use", "time-saving" and "range of options". Likewise, "convenience" is often quoted as a unique selling point of e-service. For instance, real-time access to financial information and ease of execution are important reasons why an increasing number of financial traders are using e-trading services over more traditional ways of service delivery. By putting the convenience factor as a prime relative advantage, on-line service providers are trading time for money and making a profit by leveraging convenience. As Siebel and Hous (1999, p. 81) put it: "Virtuality empowers visitors [of Web-sites] by making it easier for them to get what they want".

A second relevant innovation attribute is perceived risk. This attribute has also been identified as a critical attribute of innovations and it seems particularly applicable to services, as the level of perceived risk is generally considered to be higher than for products. The problem of risk has increased considerably with the advent of on-line service providers. Not only are customers unable to derive quality cues from tangible aspects and have to release personal and/or financial information, they often do not know whether the service provider is "big or small, new or established, legitimate or illegitimate" (Hagel and Singer, 1999, p. 10). The increase in information asymmetry in e-business leads to include perceived risk as a possible determinant of e-service adoption.

Rogers (1983) argues that attributes that have an indirect effect on innovation adoptions may also play an important role. Signaling theory motivates why the reputation of an organization could provide the customer with this missing information. Therefore, we examine whether signaling theory could supplement the factors adoption process framework. Signaling theory emerged from the study of information economics under conditions in which

buyers and sellers possess asymmetric information when facing a market interaction (Boulding and Kirmani, 1993; Spence, 1974). The crux of signaling theory is that the customer will perceive strategies, actions, or other organizational aspects in market interaction as costly for bad businesses and profitable for good ones (Ippolito, 1990). A strategy that is perceived to be differentiating between good and bad businesses is called a signal (Boulding and Kirmani, 1993). Customers will search for strategies, actions, or other organizational aspects that they perceive to be costly for bad and profitable for good businesses. These will be used to derive information about unobservable product or service attributes that customers deem to be important (Boulding and Kirmani, 1993). This derived information will then have a profound effect on the customer attitude and behavior toward the product or service.

It is important to stress that customers will need to associate different costs for good and bad businesses with a certain strategy. These costs can be in different forms. It can be in the form of forgone profits, investments, or lost reputation (Boulding and Kirmani, 1993). This implies that an organization with a good reputation, and that is perceived as placing great importance on maintaining it, will be preferred over the organization that has a bad reputation and does not really care about it. The good business will incur high costs (in the form of loss of reputation) when it delivers bad products or services to its customer because the organization is perceived to value its reputation highly. The latter will not incur these costs as it does not attach value to the loss of reputation. The organizational reputation functions as a signal. We posit that customers infer assumptions about the e-service from the reputation of an organization.

As it is relatively hard to obtain sufficient information about an innovation to make an adoption decision upon, customers will search for other supplemental information to satisfy their information need. Signaling theory predicts that organizational reputation can fill this information gap when the organizational reputation is perceived as a signal. We, therefore, suggest that organizational reputation, when perceived as a signal, could also be an evaluation criterion that has a significant impact on the attitude and behavior of customers towards e-service. In conclusion, we posit that relative advantage, perceived risk, and organizational reputation are likely to have an impact on the attitude and behavior towards e-service. In the next section, we will develop a set of hypotheses concerning this impact.

Development of hypotheses

In most models of customer evaluations of services the focus has been on a comparative judgment of expectations versus perceived performance resulting in the evaluative judgment of perceived service quality. Since perceived service quality is crucial in evaluations of any service, we propose to use it as a dependent variable in our design, reflecting the customer's attitude towards e-service. In addition, many services are difficult to evaluate prior to purchasing and experiencing them and even after they have been provided to

customers. This refers to the so-called “credence qualities” of services (Zeithaml and Bitner, 1996). This credence component emphasizes the need for trust in service relationships. Crosby *et al.* (1990) stated that positive evaluative judgments are primarily dependent on the fact whether customers feel that they can rely on a service provider’s integrity and that they have confidence in this reliance in anticipation of future interactions. This is especially the case when the service is complex, the environment is dynamic and the customer is relatively unsophisticated about the service (Crosby *et al.*, 1990). These are characteristics particularly applicable to electronic service delivery. As Siebel and Hous (1999) argue, trust is an essential concept that e-business should attend to. While trust has been considered a relationship building block and since we defined the objective of e-service as strengthening relationships with customers, it seems imperative to incorporate trust as a second attitudinal element in our e-service adoption research design. A final construct that needs to be incorporated is behavioral intentions, i.e. the intention of the customer to make use of the e-service. As Davis and Venkatesh (1996) argue, an individual’s intention to use is “the single best predictor of actual usage”. This holds specifically when the focus is on virtual concepts of an innovation which, although technologically possible, have not been marketed on a large scale. In this case, customer preference and intended consumption that precede actual adoption should be investigated (Tornatski and Klein, 1982).

Organizational reputation

With respect to organizational reputation, we propose that an organization with a good reputation will lead customers to have a more positive attitude and intended behavior towards the e-service that is offered. Computer manufacturer Dell has an excellent reputation for providing after-sales e-services. At the Dell.com site answers to customer questions are not only available from the real technicians, but also from user boards that frequently have the experience and the answers that technicians do not. Based on signaling theory research, we posit that customers are likely to use reputation as a cue to evaluate the e-service. Therefore, we hypothesize that:

H1: Customers will evaluate an e-service offer by companies that have a good organizational reputation more favorably than an e-service offer by companies than have a bad reputation in terms of the following evaluative criteria:

- *H1a:* trust;
- *H1b:* perceived quality;
- *H1c:* intention to use.

Relative advantage

An e-service that provides a high relative advantage over existing formats of service delivery will result in more positive customer attitude and behavior. As was mentioned, companies need to offer better and more unique customer

services options if they want to distinguish themselves on-line (Tambini, 1999). A pioneer and innovator in the field of interactive marketing, Amazon.com, has rapidly developed into the world's biggest bookshop with a market capitalization that surpasses traditional booksellers by far. Traditional booksellers sell books. Amazon sells information about books. Amazon uses information to add value to books. When customers get an e-mail telling them that a new book has just been published and that it is just one click away, a customer experience is created that fosters customer loyalty. In order to attract customers, the e-service offer will have to emphasize benefits over existing service delivery channels. Therefore, we hypothesize that:

H2: Customers will evaluate an e-service offer with a high relative advantage more favorably than an e-service offer with low relative advantage in terms of the following evaluative criteria:

- *H2a:* trust;
- *H2b:* perceived quality;
- *H2c:* intention to use.

Perceived risk

It has been argued that the inherent service characteristic of intangibility causes customers to perceive a higher risk level. A service in general requires the customer to release personal data. In the case of e-service even higher perceived risk levels are likely to be involved. This implies that perceived risk will be of crucial importance to the attitude and behavior of customers towards the e-service. Reputation, brand development, endorsements and airtight and extraordinary guarantees may fill the risk gap. This effect is hypothesized in the following set:

H3: Customers will evaluate a low perceived risk e-service offer more favorably than a high-perceived risk offer in terms of the following evaluative criteria:

- *H3a:* trust;
- *H3b:* perceived quality;
- *H3c:* intention to use.

Organizational reputation and perceived risk

Besides their individual separate effects on attitude and behavior towards e-service, organizational reputation and perceived risk are also likely to have a combined (interaction) effect. As we argued above, e-service is characterized by an inherently high level of perceived risk. A good organizational reputation may compensate for the perceived risk. Therefore, we suggest that the (negative) effect of the high perceived risk is diminished by a good organizational reputation. As a consequence, the following set of research

hypotheses is formulated concerning the interaction between organizational reputation and perceived risk:

H4: In the case of high risk, customers will evaluate an e-service offer by a company that has a good organizational reputation more favorably than an e-service offer by a company that has a bad organizational reputation in terms of the following evaluative criteria:

- *H4a:* trust;
- *H4b:* perceived quality;
- *H4c:* intention to use.

Organizational reputation and relative advantage

Organizational reputation and relative advantage are both hypothesized to have a significant positive impact on the attitude and behavior of customers towards e-service. Due to the inherent difficulties of trying a service before actually purchasing it, it will be relatively difficult for customers to evaluate the benefits the e-service will actually deliver. As e-service is an innovative service delivery format, there will be only few sources, besides the service organization itself that can inform the customer about the e-service. The perception of relative advantage will, therefore, be influenced by the promotion of the relative advantage by the service organization itself. Credibility of this promotion depends highly on the source (Block and Roering, 1979). This suggests that the organizational reputation will have a larger effect on the attitude and behavior towards the e-service than relative advantage. This line of reasoning is reflected in the following set of research hypotheses:

H5: Customers will evaluate a low relative advantage e-service offer that is offered by a company that has a good organizational reputation more favorably than a high relative advantage e-service offer that is offered by a company that has a bad organizational reputation, in terms of the following evaluative criteria:

- *H5a:* trust;
- *H5b:* perceived quality;
- *H5c:* intention to use.

Perceived risk and relative advantage

Both perceived risk and relative advantage have been hypothesized to have a main effect on attitude and behavior towards e-service. A high perceived risk level implies that customers expect the probability to be high that the e-service will not be as expected and thus they will not receive the promised benefits (relative advantage). A consequence is that even when the relative advantage of the e-service will be high the risk level will have a stronger effect on the customer attitude and behavior towards e-service. This effect is being

strengthened by the intangibility of e-service. To test this suggestion, we have formulated the following set of hypotheses:

H6: Customers will evaluate a low relative advantage e-service offer that is characterized by low risk more favorably than a high relative advantage e-service offer that is characterized by high risk, in terms of the following evaluative criteria:

- *H6a:* trust
- *H6b:* perceived quality
- *H6c:* intention to use

Perceived risk and organisational reputation

The last set of hypotheses deal with the relative importance of organizational reputation and perceived risk in relation to trust in, perceived quality of, and intention to use the e-service. Both organizational reputation and perceived risk are strongly related to the e-service characteristic of intangibility, because it makes the e-service hard to evaluate at forehand. This will be an important aspect in the adoption process of e-service by customers. Expectations are difficult to formulate by customers as the intangibility limits trial and thereby information gathering. This is even more difficult for e-service since this is an innovative service. Therefore, organizational reputation serves as an important source for customers to derive expectations about the e-service. Perceived risk is a direct consequence of the difficulty in forming a clear picture of the e-service due to its intangibility and innovative nature. It will therefore also have a significant impact. Both organizational reputation and perceived risk are related to the intangibility and innovative nature of the e-service and are considered to have the same impact on the attitude and behavior. This results in the following set of hypotheses:

H7: Customers will evaluate a high risk e-service offer that is offered by a company that has a good organizational reputation the same than a low risk e-service offer that is offered by a company that has a bad organizational reputation, in terms of the following evaluative criteria:

- *H7a:* trust;
- *H7b:* perceived quality;
- *H7c:* intention to use.

In the next we report on the results of an experimental study designed to test aforementioned hypotheses.

An experimental study

Experimental design

To test the above-positated hypotheses we designed a between-subjects, fixed-effects factorial design consisting of three factors. Organizational reputation (OR) was manipulated on two levels:

- (1) good organizational reputation; and
- (2) bad organizational reputation.

Relative advantage (RA) was manipulated on two levels:

- (1) high relative advantage; and
- (2) low relative advantage.

Finally, perceived risk (PR) was manipulated on two levels as well:

- (1) high perceived risk; and
- (2) low perceived risk.

Consequently, we arrived at a full 2³ factorial design, which allows us to explicitly take into account interaction effects (Keppel, 1991).

Stimulus materials

Role-playing scenarios were developed reflecting our experimental design. The purpose of the scenarios was to help subjects put themselves into the situation in order to test the hypotheses. Each scenario contained the description of a hypothetical e-service of a travel organization. The scenarios were developed after in-depth interviews with two travel agents and visits to electronic travel agency sites, to ensure whether each scenario depicted a realistic situation. The purpose of these scenarios was to help respondents place themselves into the situation in order to test our hypotheses. Each scenario started with instructions how to complete the survey. Respondents were asked to read the instructions and scenario very carefully before answering the questions. It was specifically stated that the scenario was hypothetical. Respondents were asked to put themselves in the situation in which they had to choose a holiday after a year of hard work. Each scenario was built around the three factors, organizational reputation, relative advantage, and perceived risk. A sample scenario is included in the Appendix.

The manipulation occurred with respect to aforementioned factors. A good organizational reputation was operationalized by stating that in numerous independent tests among travel agencies, the organization was ranked in the top of these tests. This effect was reinforced by:

- good reports heard from friends about this travel agency;
- the impression that the organization highly valued customer service; and
- the fact that the organization had been in the travel business for a long period.

A bad reputation was created by stating that:

- in independent tests the organization always ranked among the worst;
- that friends were spreading negative stories about it; and
- that the organization had entered the travel business only recently.

High relative advantage was operationalized by stating that the e-service offered far more advantages over the other available services and far more options on the basis of a consumer travel Web-site that offers comparative assessments of travel agencies. Examples of this are that customers could now select their own seats in the plane and their own specific room in the hotel in real time after having seen photographic material and the hotel layout. The idea of a low relative advantage was created by stating that the e-service did not offer anything additional over the other available service formats. With respect to a low-risk level associated with the e-service, it was stated in the scenario that the e-service had been tested elaborately before it was made available to customers. Therefore, no problems had occurred so far in its use by customers and even if a problem might occur, extensive warranties were available to the customer. A high-risk level was reached by stating the opposite: poor testing of the e-service, numerous problems had already occurred and no warranties were offered at all when this service was used. On the basis of these manipulations, eight scenarios were developed in order to be shown to the test subjects.

Pretest

Using simple random sampling, 30 respondents were selected for a pretest. The pretest served two purposes:

- (1) to assess whether the desired state was induced by the manipulations of the independent variables; and
- (2) to assess the reliability of the dependent measures.

The subjects were interviewed immediately after exposure to the manipulation (Perdue and Summers, 1986). The interviews revealed that the manipulations were successful in inducing the desired state of mind. Only minor adaptations were necessary for the role-playing scenarios. Moreover, preliminary analyses indicated that the dependent measures showed sufficient reliability in terms of coefficient alpha.

Procedure

A total of 202 respondents participated in our study. They were randomly assigned to the eight treatment conditions. As we expected relatively large to very large effects for all treatments and as we anticipated the dependent variables to be highly intercorrelated, a sample size of approximately 25 would suffice to achieve a power ($1-\beta$) of 0.80 at a $\alpha = 0.05$. Each respondent received a booklet, which included the instructions, a description of the scenario, the perceived service quality, trust and behavioral intention measures. Furthermore, manipulation checks were added to assess whether the state intended by three independent variables was induced (Perdue and Summers, 1986).

Results*Manipulation checks*

An analysis of the manipulation checks was performed to see whether the scenarios evoked the desired mindset of the respondents. The results suggest that there were differences between good and bad organizational reputation ($F_{1, 193} = 28.12 [p < 0.001]$), high and low relative advantage of the Internet service ($F_{1, 194} = 25.06 [p < 0.001]$), and high and low risk of service use ($F_{1, 194} = 13.29 [p < 0.001]$) as intended by the scenario designs.

Reliability of dependent measures

The three dependent variables have been operationalized by several items. Trust in the e-service was operationalized by three items with a on a seven-point Likert-type scale (1 = completely disagree and 7 = completely agree). The coefficient alpha for this scale is 0.83. The measure of perceived quality was operationalized by four items on a similar seven-point Likert-type scale. The coefficient alpha is 0.69. The intention to make use of e-service was operationalized by two items and exhibited a coefficient alpha of 0.77. All measures were developed specifically for this study. Aforementioned scales are rendered in Table I.

Outlier detection

As MANOVA is particularly sensitive to outliers, we started our data analyses with testing for univariate and multivariate outliers (Tabachnik and Fidell, 1996). We ran tests for univariate and multivariate outliers separately for each cell of the design. Our analyses revealed that six observations might be considered univariate outliers and one observation might be considered a multivariate outlier. These observations were subsequently eliminated from the data matrix.

Statements	Cronbach alpha
<i>Trust</i>	
1. I can trust this service	0.83
2. I can trust that possible problems will be solved well	
3. I can trust this service less than other services	
<i>Quality</i>	
1. I do not have to expect that this service will be fast	0.69
2. I can safely make use of this service	
3. I can adapt this service to my own specific demands and wishes	
4. The overall quality of this service appears to me as being good	
<i>Intention</i>	
1. On the basis of this description, I would consider to make use of this service	0.77
2. I would warn interested friends not to make use of this service	

Table I.
Dependent variable
measures

Testing assumptions of MANOVA and dependent variables

Given the large sample size and the robustness of MANOVA to departure from multivariate normality (Tabachnik and Fidell, 1996), violations of multivariate normality are not expected to be severe. In addition, inspection of the histograms, normal-probability plots, skewness and kurtosis for each dependent measure for each cell showed only slight departures from normality. Another assumption underlying MANOVA is equality of variance-covariance matrices. This assumption can be tested using Box's M test for homogeneity of dispersion matrices. However, this test is usually not very useful, as it is extremely sensitive to multivariate non-normality (Tabachnik and Fidell, 1996).

Assumptions of dependent measures

If the dependent variables are uncorrelated, MANOVA is superfluous, in such a case one might be able to rely on univariate ANOVAs (one for each dependent variable). The pooled within-groups correlation matrix revealed relatively high correlations between the dependent variables. Additionally, we carried out principal components analyses to assess whether the three variables would load on separate components. Our analyses showed that each dependent variable loaded high (>0.7) on only one component. This indicates that the three measures are tapping different concepts. Finally, Bartlett's test of sphericity was used to test the null hypothesis that the correlation matrix came from a population of variables that are independent.

Results of MANOVA

Research into the robustness of the statistics available for MANOVA suggested that Pillai-Bartlett trace criterion (V) might be the most robust statistic for general protection against departures from multivariate normality and homogeneity of variance-covariance matrices (Tabachnik and Fidell, 1996). Therefore, we will only report the Pillai-Bartlett trace criterion and its F approximation. However, it must be noted that all the four rival tests (Wilk's likelihood ratio criterion [W], Hotelling-Lawley trace criterion [T], Roy's largest root criterion [R], Pillai-Bartlett trace criterion [V]) are asymptotically equivalent in large samples. The results of MANOVA are summarized in Table II.

It can be concluded that the main effects (on all three dependent variables) of organizational reputation, relative advantage, and performance risk are significant. This is an indication that the three dependent variables (trust, perceived quality, and intention to use) are different for the two levels of organizational reputation (*organizational reputation*: $V = 0.230$; $F_{3, 192} = 19.12$ [$p < 0.001$]). The same is true for both relative advantage (*relative advantage*: $V = 0.195$; $F_{3, 192} = 15.48$ [$p < 0.001$]) and performance risk (*performance risk*: $V = 0.264$; $F_{3, 192} = 23.00$ [$p < 0.001$]).

None of the two-way interactions between the three independent variables appear to be significant (OR * RA: $V = 0.006$; $F_{3, 192} = 0.39$ [$p = 0.758$]; OR * PR: $V = 0.034$; $F_{3, 192} = 2.23$ [$p = 0.086$]; RA * PR: $V = 0.021$; $F_{3, 192} = 1.39$ [$p =$

Table II.
Results of MANOVA

Effect	Pillai's Trace [PT]	$F_{3, 192}^a$	p -value	Power ^b
<i>Main effects</i>				
Organizational reputation (OR)	0.230	19.12	0.000	1.000
Relative advantage (RA)	0.195	15.48	0.000	1.000
Perceived risk (PR)	0.264	23.00	0.000	1.000
<i>Two-way interaction</i>				
OR * RA	0.006	0.39	0.758	0.127
OR * PR	0.034	2.23	0.086	0.558
RA * PR	0.021	1.39	0.246	0.367
<i>Three-way interaction</i>				
OR * RA * PR	0.013	0.82	0.487	0.224
Notes: ^a F-approximation; ^b Computed using alpha = 0.05				

0.246]). This is also the case for the three-way interaction (OR * RA * PR: $V = 0.013$; $F_{3, 192} = 0.82$ [$p = 0.487$]). A review of the power analysis reveals that the power of these interaction analyses is by far insufficient (power ranging from 0.22 to 0.56). The power of a statistical test is the probability of correctly rejecting the null hypothesis when it should be rejected. This means that the performed MANOVA is weak in identifying significant differences between groups caused by the interaction effects. We will use univariate analyses to further explore the relationships uncovered by the omnibus test, this is rendered in Figure 1.

The figure suggests that there are interaction effects to be found if the power of the test increases. Distinctions in the slopes of the two lines in the graphs are considered to be caused by interaction of the independent variables. Especially Figures 1b, 1c, and 1e are showing lines with distinct slopes. However, whether these slope differences are real or due to sampling randomness is yet to be determined. In an attempt to achieve a higher power for the analysis of interaction effects, two-way ANOVAs have been applied to the three dependent variables. The results are shown in Table III.

A two-way effect of organizational reputation and risk on trust was found. The power of this analysis has increased significantly (power = 0.798). The effect on trust now appears to be significant ($F_{1,194} = 6.56$ [$p = 0.011$]).

Hypotheses testing

The 2^3 factorial design resulted in eight different sampling groups. ANOVA was conducted to determine whether these groups differed significantly on the three dependent variables. The analysis suggests that the groups indeed differ on the three dependent variables (*Trust*: $F_{7,194} = 13.94$ [$p < 0.001$]; *Perceived quality*: $F_{7,194} = 14.47$ [$p < 0.001$]; *Intention*: $F_{7,194} = 13.94$ [$p < 0.001$]).

With respect to *HI*, we find that a good organizational reputation increases the trust in, the quality perception of, and the intention to use the e-service by the customer significantly over the same service provided by an organization with a bad reputation (*Trust*: $t_{195} = 5.57$ [$p < 0.001$]; *Perceived quality*: $t_{194} =$

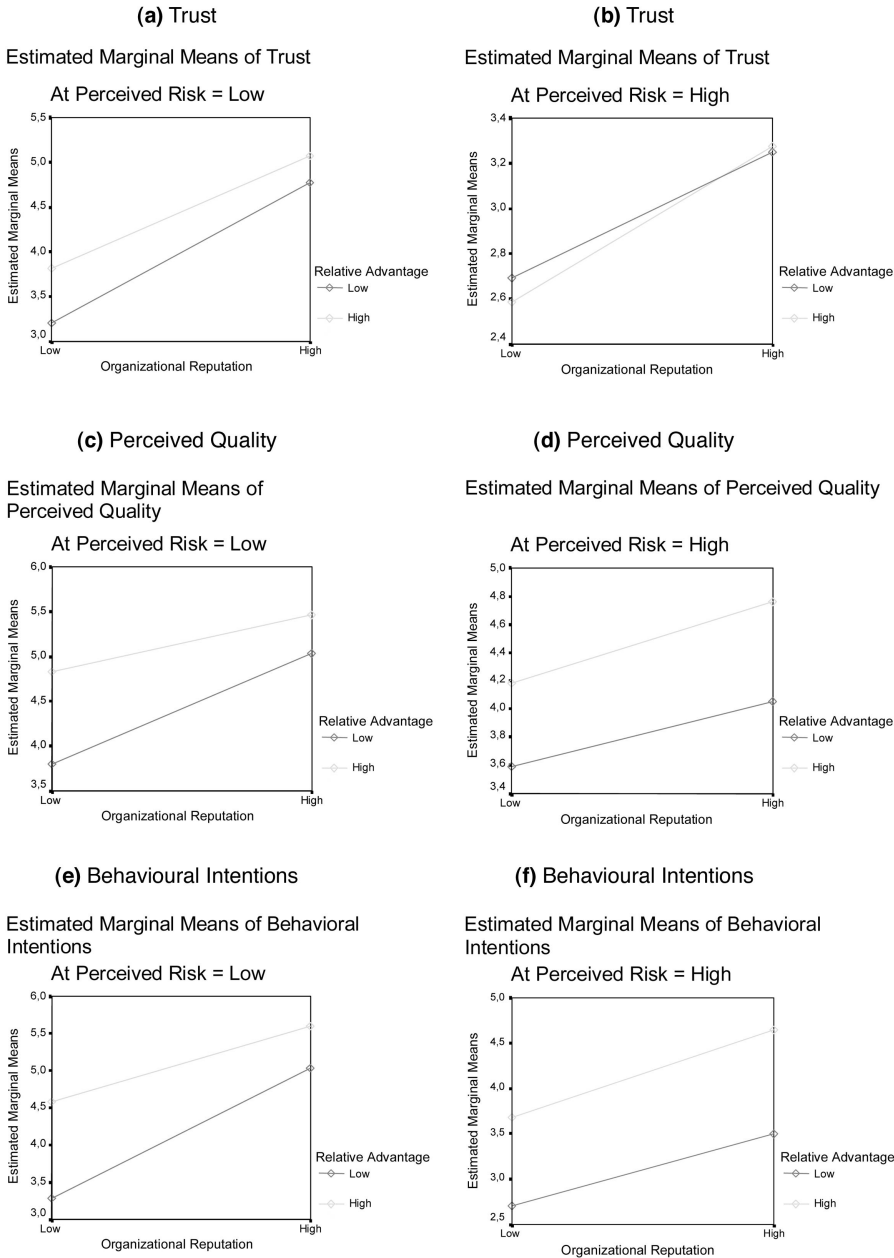


Figure 1. Graphical representation for means for interaction effects between organizational reputation, relative advantage and perceived risk

5.30 [$p < 0.001$]; *Intention*: $t_{200} = 5.46$ [$p < 0.001$]). Therefore, we cannot reject *H1a*, *H1b*, and *H1c*.

With regard to *H2*, we can conclude that high relative advantage increases customer quality perception of and intention to use the e-service over a low

Effect	$F_{1, 194}$ ^a	<i>p</i> -value	Power ^b
<i>Main effects</i>			
On trust			
Organizational reputation (OR)	43.39**	0.000	1.000
Relative advantage (RA)	1.78	0.184	0.264
Perceived risk (PR)	66.78**	0.000	1.000
On perceived quality			
Organizational reputation (OR)	35.80**	0.000	1.000
Relative advantage (RA)	32.48**	0.000	1.000
Perceived risk (PR)	27.56**	0.000	0.999
On intention			
Organizational reputation (OR)	37.13**	0.000	1.000
Relative advantage (RA)	28.54**	0.000	1.000
Perceived risk (PR)	28.46**	0.000	1.000
<i>Two-way interactions</i>			
On trust			
OR * RA	0.09	0.759	0.061
OR * PR	6.56*	0.011	0.798
RA * PR	2.56	0.111	0.357
On perceived quality			
OR * RA	1.01	0.316	0.170
OR * PR	2.84	0.094	0.388
RA * PR	0.118	0.731	0.064
On intention			
OR * RA	0.60	0.440	0.120
OR * PR	1.86	0.174	0.274
RA * PR	0.124	0.725	0.064
<i>Three-way interaction</i>			
On trust			
OR * RA * PR	0.53	0.467	0.112
On perceived quality			
OR * RA * PR	2.21	0.139	0.316
On intention			
OR * RA * PR	1.47	0.227	0.226

Table III.
Results of ANOVAs

Notes: ^a F-approximation; ^b Computed using alpha = 0.05;
* Significant at 0.05 level; ** Significant at 0.001 level

relative advantage situation (*Perceived quality*: $t_{195} = 4.95$ [$p < 0.001$]; *Intention*: $t_{200} = 4.66$ [$p < 0.001$]). However, relative advantage did not appear to have an effect on the level of trust in the e-service (*Trust*: $t_{200} = 0.99$ [$p = 0.322$]). As a result, we cannot reject *H2b* and *H2c* but we have to reject *H2a*.

The effect of the risk level is hypothesized in *H3*. We find that a low risk level with the e-service results in higher customer trust in, perceived quality of, and intention to use e-service than high risk levels (*Trust*: $t_{191} = 7.28$ [$p < 0.001$]; *Perceived quality*: $t_{200} = 4.39$ [$p < 0.001$]; *Intention*: $t_{200} = 4.50$ [$p < 0.001$]). Therefore, *H3a*, *H3b*, and *H3c* cannot be rejected.

According to *H4* it was hypothesized that the effect of high perceived risk on the three dependent variables with the e-service was softened by a good

organizational reputation. We find that, irrespective of the relative advantage, customers have a higher level of trust in, perceive a higher quality of, and have a higher intention to use an e-service characterized by high risk and a good organizational reputation than one by high risk and a bad organizational reputation (*Trust*: $t_{100} = 2.97$ [$p = 0.004$]; *Perceived quality*: $t_{100} = 3.18$ [$p = 0.002$]; *Intention*: $t_{100} = 3.16$ [$p = 0.002$]). It is, therefore, not possible to reject *H4a*, *H4b*, and *H4c*. Consequently, the effect of high risk is less negative in terms of trust, perceived quality, and intention to use e-service when the organization has a good reputation.

With respect to *H5*, we find that customers have a higher level of trust in an e-service that has a good organizational reputation and low relative advantage than one that has a bad organizational reputation and high relative advantage (*Trust*: $t_{97} = 2.89$ [$p = 0.005$]). However, there appeared to be no difference between these two services in terms of perceived quality and intention to use it (*Perceived quality*: $t_{97} = 0.21$ [$p = 0.835$]; *Intention*: $t_{97} = 0.50$ [$p = 0.619$]). *H5b* and *H5c* have to be rejected, while we cannot reject *H5a*.

According to *H6* it is hypothesized that risk has a more profound influence on trust in, the quality perception of, and the intention to use e-service than relative advantage has. Our data indicates that customers have more trust in an e-service characterized by low risk and low relative advantage than in one by high risk and high relative advantage (*Trust*: $t_{95} = 4.24$ [$p < 0.001$]). However, the customers appeared to be indifferent about these two e-services in terms of perceived quality and intention to use (*Perceived quality*: $t_{89} = -0.371$ [$p = 0.711$]; *Intention*: $t_{101} = -0.100$ [$p = 0.921$]). This means that *H6a* has cannot be rejected while *H6b* and *H6c* have to be rejected.

Finally, we expected that organizational reputation and risk would have the same influence on the three dependent variables. This idea was formulated in *H7*. In relation to that, we find that respondents have the same level of trust, the same quality perception of, and the same intention to use the e-service in case of good organizational reputation and high risk as in the case of a bad organizational reputation and low risk (*Trust*: $t_{100} = -1.054$ [$p = 0.294$]; *Perceived quality*: $t_{90} = -0.572$ [$p = 0.569$]; *Intention*: $t_{100} = 0.616$ [$p = 0.539$]). Therefore we cannot accept *H7a*, *H7b*, and *H7c*.

Conclusion

Discussion

This study was aimed at nuancing the intricate interplay between organizational reputation, relative advantage, and perceived risk as innovation attributes in the case of e-service. Various observations can be drawn from our results.

First of all, a good organizational reputation is conducive to the adoption of e-services. This is consistent with earlier findings in relation to traditional delivery formats in which a positive relation was found between organizational reputation and attitude and behavior (e.g. Boulding and Kirmani, 1993). This means that organizational reputation also has an influence in the case of using

on-line services. For customers that purchase services via the Web, relative advantage results in higher service quality perceptions of the e-service and a higher intention to use it. Similar findings are reported in the adoption literature. However, no significant differences were found in terms of the level of trust. This suggests that on-line customers do not view relative advantage as a factor that enhances their faith in the new service. With regard to perceived risk, we found that lower risk levels promote trust, perceived quality and intention to use services that are offered via the Web. This is consistent with earlier findings from both the adoption and the services marketing literature (e.g. Rogers, 1983; Zeithaml and Bitner, 1996). In these literatures, a strong negative relationship was consistently found between risk and attitude and behavior.

Furthermore, the results show that in case customers perceive risk to be high, there is again a positive relation between the attitude and behavior towards e-service and the organizational reputation of the company providing the e-service. This suggests that customers expect that an organization with a good reputation will do its best to reduce the negative consequences of the high risk level associated with the e-service. This effect is consistent with earlier findings in adoption literature (e.g. Block and Roering, 1979). Moreover, it is shown, that risk and organizational reputation are more important for the level of trust than relative advantage. Indeed, relative advantage might influence the perceived quality and the intention to use the e-service, but if the organization has a bad reputation they probably do not expect to gain this relative advantage. The same is true for perceived risk. High perceived risk can be interpreted as the probability of not obtaining the expected relative advantage. Therefore, when customers perceive the risks of an e-service offering to be high, they do not have trust in receiving the promised benefits.

Our findings also suggest that risk and organizational reputation have the same effect on attitude and behavior. Apparently there is some trade-off between these two factors. When the risks are high, but the organization has a good reputation, customers seem to have confidence in the fact to deliver the promised benefits in every way they can. However if the risks are low, and the reputation of the organization is bad, they are willing to take the risk, because they probably feel that they have not a great deal to loose.

Theoretical implications

Part of the strength of a study lies in the recognition of its limitations. These limitations form directions for future research and point to theoretical implications. First of all, the data for this experiment was collected in a laboratory setting. This results in a high internal validity (Calder *et al.*, 1981), but the generalizability of the findings would be limited with regards to real-life settings. Furthermore, the use of an experimental design is subject to other inherent limitations pertaining to a possible lack of realism. For instance, respondents had to judge hypothetical cases on the basis of limited information. Although the results of the manipulation check show successful

manipulation of the experimental variables, there may be a difference between simulation and real experience, affecting the way in which respondents react to the situation. To overcome this limitation, it may be useful to present audiovisual scenarios, which are more realistic than verbal stimuli. In this way, the manipulated conditions are more closely to holistic experience (*“gestalt”*) of an e-service encounter.

Furthermore, evaluative judgments have been restricted to a single service episode in this study. Future experiments might investigate how these judgments develop over time, in order to examine the impact of service process and service outcome more profoundly and in line with real-life situations. Additional research is needed to address how each of the variables used in this study has an impact on actual behavior rather than customer evaluative judgments.

Finally, additional research is needed to study the applicability of the entire adoption and signaling theory towards innovative services and service delivery format. Attention should be focused even more on how both theories might complement each other in respect to innovative services.

Managerial implications

Our findings have several implications for organizations that are interested in offering e-service to customers. The first implication is derived from the fact that an organizational reputation has an important influence on the customers' attitude and behavior. If an organization has a good organizational reputation, then it should try to capitalize on it by stressing it in the context of their e-service. This implies that companies should communicate a strong *“e-mage”* to its customers, using various communication channels. For this purpose, companies also should try to leverage existing brand equity. Furthermore, they can link their sites to credible reference sites to back up their good reputation or publish best practice cases (e.g. Hewlett Packard's e-services). Finally, as the site of Novell.com shows, it seems important to offer a clear and comprehensive site that highlights the company's mission and identity. From this, customers can derive a picture of the organizational reputation for themselves. The results clearly show that organizational reputation has a strong positive impact on the customers' trust in, quality perception of, and intention to use their e-service. When the *“e-mage”* is bad, this will have a negative impact on attitude and behavior. It could become a serious impediment for a successful operation of e-service. Drawing the customers' attention to the advantages of the e-service will most likely not solve sufficiently the problem that bad reputation causes. This is especially true in relation to the level of trust in the service as organizational reputation was found to be of more influence on it than relative advantage.

Relative advantage appeared to have a large effect on perceived quality and intention to use the e-service. A review of several practitioner rationales shows that convenience factor is considered an important reason why customers will start using e-service in the first place. Also, as e-customers are able to make efficient comparisons of companies, service features and prices, it becomes important to stand out. As distribution formats are becoming commodities, and

as technology features can be easily copied, content of the service becomes the value-added component. The importance of content implies emphasizing the relative advantages of the e-service offer. One important aspect of compelling content is offering so-called “thick description”. This signifies that the multi-layered texture of socio-cultural reality should be taken into account. A visit to the Virtual Vineyards Web site not only offers goal-directed features like product descriptions and ordering options, it also offers experiential features such as the possibility to ask questions, product-related trivia, visualizations of recipes and chat options in a wine-and-cheese gathering community. It is literally, as well as figuratively, the electronic grapevine.

Although relative advantage shows an influence on attitude and behavior, it should not be positioned solely as the reason why customers should use the e-service. Our study implies that relative advantage is indeed an important ingredient, but that a good organizational reputation and a low-risk level should back it up. This is especially true in respect to the trust customers have in the e-service. Trust plays a very significant role, because customers often have to release personal and/or financial data to the e-service provider. As no physical presence is required, the e-service provider could be anybody. This shows that unlike some practitioners suggest, promoting the relative advantage heavily without taking the organizational reputation and risk level into account would not be an optimal strategy. It is therefore very important to gain the customers’ trust by emphasizing privacy, security and confidentiality (e.g. Charles Schwab e-investments). In addition to this, companies can implement features like click-to-talk buttons into their Web-sites for contacting company representatives, interactive chat-rooms for real-time query, and knowledge bases for automated e-mail responses (like MCI Worldcom). Furthermore, it helps to be in touch with company affinity groups through companies such as DoubleClick. These means make it easier for customers to access as much information about the organization as possible, which will help to enhance their trust in the organization.

Our finding in respect to the risk level is that it is an important factor for the forming of customer attitude and behavior towards e-service. It is crucial that the organization tries to reduce the perceived risk level as much as possible. A high-risk level will scare of customers to make use of e-service. A good organizational reputation can be used in this respect. We found that it moderates the negative effect of a high-risk perception in relation to the trust in the e-service. So, if an organization wants to use e-service, it should take measures that reduce the risk of the e-service as perceived by customers; for instance, by implementing a strong warrant policy. Another important factor in this respect is the fact that services by nature are intangible, which implies risk as we have argued before. However, in communicating your e-service to customers visibility cues can be offered. The service process as well as the service outcome can be illustrated to the customer through multi-media aids, like the intelligent software agents that assist customers at Cisco’s customer service site.

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Appendix. Sample scenario (good organizational reputation, high relative advantage, and low risk e-service offer)

Situation description

You have been working hard during the last year and you feel that you are entitled to a little get-away trip. Therefore, you have collected information from several travel agency Web sites. On the basis of this information you have selected a destination. You have already decided that you want to fly, stay at a hotel, and make use of a rental car. It appears that several travel companies offer such a vacation on the Internet. After an extensive comparison, you are in the process of making a choice for one of them.

Golden Travel is one of the companies that offers your desired vacation trip. Golden Travel has been active in the travel industry for a long time. In several studies of consumer organizations, Golden Travel has been ranked as an agency that offers excellent services to their customers. From some of your friends who have traveled with Golden Travel before, you hear

nothing but good “news” about the agency. In short, it is a travel organization with a good name in the business.

Golden Travel has started an Internet travel service. The company was among the first to offer this option to customers. From a travel Web site comparison report, it appears that Golden’s new service is much more extensive than those from other electronic travel services and that it has a lot to offer. For instance, in the event of a flight cancellation, the new Internet service would transfer you completely automatically to another comparable flight. Likewise, the rest of your travel plans would be adjusted to this change. Your rental car would be held, your hotel notified, and dinner reservation rescheduled. In addition, you can now personally look at the seats in the airplane and reserve the one you like. You can now also determine for yourself which room in the hotel you want to have, just by clicking one button. To do this, you can look at photographs of the rooms and at the layout of the hotel. With this new Internet service, you can pose your questions with your PC seven days a week, 24 hours a day. You will get an answer on your questions on short notice. By clicking a button on the Web-site you can also talk directly to an employee of Golden Travel through the microphone of your PC. Thus, you can manage your entire trip from your own home, 24 hours a day.

You have also learned from the travel Web site comparison report that this new Internet service has been extensively tested before making it available to customers. So far, no major problems have occurred with respect to this new service, according to the consumer travel Web page. Furthermore, in case of problems, you notice that the company offers an elaborate warranty system with this new electronic service.