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New Insights in the Quality-Satisfaction Link:

Identifying Asymmetric and Dynamic Effects

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ABSTRACT

This study explores the relationship between service quality and customer satisfaction. Building on existing literature, the link is proposed to be asymmetric in nature. Drawing on customer delight theory and opponent-process theory, we also study the dynamics of the relationship and develop an integrative perspective. Results are obtained by applying dummy variable regression and time-based cohort analysis in two different e-service settings. The findings show that functional-utilitarian quality attributes (efficiency, fulfillment, system availability, and privacy) display habituation effects over time, so that they tend to lose their capability to delight customers. In contrast, hedonistic attributes (website design, enjoyment, and image) seem to be increasingly enjoyed after initial experience with an e-service and develop customer delight capabilities in a later relationship stage. These insights are vital for e-service managers as they help to improve the efficiency of quality investments on the Internet.

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1. Introduction

Traditionally, service quality and customer satisfaction have been among the most important research topics in services marketing literature. While researchers agree that favorable service quality perceptions lead to improved satisfaction (Cronin et al. 2000), the nature of the link has been a topic of debate. Recent insights show that this relationship may have an *asymmetric* character. That is, "one unit of negative performance could have a greater effect on overall satisfaction [...] than a corresponding unit of positive performance" (Mittal et al. 1998, p. 34). Firms need to account for these asymmetries in order to successfully implement the satisfaction-profit chain (Anderson and Mittal 2000).

In addition, current literature stresses that customer relationships unfold over time. Service quality dimensions (or *attributes*) that impact the satisfaction of newly acquired customers of a service may have little influence on the satisfaction of long-term clients. Understanding the *dynamics* in the relationship between attribute performance and customer satisfaction judgments is therefore an important prerequisite for successfully addressing customer needs across different stages of a relationship (Rust et al. 1999). Mittal and Katrichis (2000) consequently call for developing separate strategies for newly acquired and more established customers. Surprisingly, while the quality-satisfaction relationship has shown to be asymmetric and dynamic, these issues have been studied in isolation. Yet, as also called for by Slotegraaf and Inman (2004), an integrative perspective is needed in order to prevent serious resource misallocation.

A service area where resource allocation is of specific importance is the Internet. Many e-companies have experienced that not all investments in website features are equally reflected in customer satisfaction and firm performance. For instance, while AltaVista and Yahoo offered far more information services than Google (e.g., translation services, real estate offers and chat boxes), the latter company won the search engine battle by its simple interface and innovative search algorithm (Thaw 2006). While each additional service provides another reason to use the website and is likely to enhance overall satisfaction, the lack of these information services was not harmful. The quality-satisfaction link thus seems to be asymmetric in an electronic service context.

In addition, research on technology adoption has shown that the importance of technology perceptions such as usefulness and ease of use changes with experience (Venkatesh et al.

2003). Considering the active role and broad integration of customers as part-time employees in the production of e-services (Meuter et al. 2000), such experience-related effects should occur especially for services on the Internet. Therefore, both asymmetries and dynamics are prevalent in the relationship between e-service quality and satisfaction. As a first contribution, this paper takes an *integrative* perspective in studying asymmetries and dynamics in an e-service context.

Second, while previous studies have tried to identify e-service quality attributes, there is a lack of agreement on the type of attributes that capture service quality in an online environment (Fassnacht and Koese 2006). More specifically, recent studies stress the importance of *hedonistic* service aspects like enjoyment as important drivers of satisfaction in online environments (Bauer et al. 2006; Van Dolen et al. 2007). Childers et al. (2001) state that "while the instrumental aspects of the new media are important predictors of online attitudes, the more immersive, hedonic aspects of the new media play at least an equal role" (p. 527). Indeed, with rising technical standards and the convergence of functional specifications among e-service competitors, the impact of hedonistic elements could be disproportionally high. We therefore compare the impact of functional-utilitarian quality attributes to the impact of hedonistic quality attributes on customer satisfaction from an asymmetric and dynamic perspective.

Third, in order to improve the generalizability of our findings, we consider two different e-service settings. For examining transaction-related e-services, we inquire customers of online shops (Parasuraman et al. 2005). In addition, as customers increasingly search for objective information and user reviews before purchasing products or services (Smith 2002), we also target users of a large Internet portal site.

We structure this paper as follows. We first establish our conceptual framework by deriving important insights from relevant theories and literature. Second, we examine the nature of the quality-satisfaction link based on two empirical studies. Third, we conclude with theoretical and practical implications.

2. Theoretical background

2.1. Symetric versus asymetric effects

The phenomenon of concurrent channels, owned by one company and providing similar services simultaneously, is relatively new (Neslin et al. 2006). Using offline and online service channels concurrently, service providers can adapt to customers' needs and shopping patterns, while also increasing coverage and sales (Balasubramanian, Raghunathan, and Mahajan 2005). Customers can use a *mix* of both channel formats according to situational or transaction related factors. For instance, Balasubramanian, Konana and Menon (2003) describe that in the presence of an offline and online channel, online investors can partition their asset portfolio into two components. One is managed independently using online brokers and one carries investments through human brokers.

However, many modern-day providers do not consider online activities within the context of the conventional channels. Therefore, recent studies have discussed enablers of first time trial of SSCs in situations where customers can choose between the traditional (offline) channel and a new (online) channel. For instance, Meuter et al. (2005) divide predictors of SSC trial into innovation characteristics, individual differences, and consumer readiness. However, interaction effects of the traditional offline channel and the new online channel are not examined.

The majority of studies that did take into account interaction effects between different channels seem to suggest synergetic relationships between alternative channels of the same provider. Wallace, Giese, and Johnson (2004) state that satisfaction with one channel drives customer patronage, enhancing customer’s intentions to use alternative channels operating side-by-side. Strebel, Erdem, and Swait (2004) investigate the choice behavior for information channels during the purchase process for high technology durable goods. Their results show that the probability of using a specific channel is a function of the perceived quality of the other channels, where channels act as complements with synergistic effects. Van Birgelen, De Jong and De Ruyter (2006) compare cross-channel effects for different product/service types. In their study, complementary interaction effects between satisfaction with the traditional channel and technology-mediated channel satisfaction can only be confirmed for nonroutine (complex and knowledge-intensive) financial services. In contrast, for routine services these effects could not be found.

In line with this missing complementary effect for routine services, other works even suggest that conflicts between channels might be observed as well (Avery et al. 2007; Pauwels and Neslin 2006). For instance, Montoya-Weiss, Voss, and Grewal (2003) show that positive evaluations of the old channel can inhibit the use of the innovative channel when high levels of conflict between channel evaluations exist. Therefore, the first step for predicting the usage of new channels and to create complementary relations between channel formats should be to explore what drives customers' *relative* evaluations of alternative channels (Van Birgelen, De Jong, and De Ruyter 2006). In view of this, we propose the existence of channel dissynergies. When we use the term "dissynergies", we do not refer to economic conflicts between channels, but we stress evaluative conflicts. Again, our focus is on identifying *cognitive* processes underlying multichannel conflicts.

2.2. Static asymmetries

Previous research has considered asymmetries – as proposed by the Kano model – only from a static perspective, i.e., they have been studied at a fixed point in time. The theoretical logic for the existence of static negative asymmetries can be found along the following line of reasoning (Mittal et al. 1998). Prospect theory suggests that people judge new options with a degree of reference dependence and loss aversion (Kahneman and Tversky 1979). Reference dependence implies that gains or losses result from a comparison to a reference point; outcomes above this point are regarded as gains, outcomes below this point are treated as losses. Loss aversion involves that gains and losses are not treated equally. From a psychological point of view, a one-unit loss is weighted more than an equal amount of gain. With satisfaction judgments being reference dependent too (Homburg et al. 2005), prospect theory proposes that a one-unit decrease in attribute performance has a larger impact on overall satisfaction than an equal amount of performance increase in the same attribute. As a result, the occurrence of negative asymmetries which are represented by basic factors in the Kano Model can be expected in a satisfaction context.

Positive asymmetries find their roots in customer delight theory (Oliver et al. 1997). Customer delight is "a profoundly positive emotional state generally resulting from having one's expectations exceeded to a surprising degree" (Rust and Oliver 2000, p. 86). Factors are delight-creating if no generally accepted standard of performance exists. Such factors correspond to excitement attributes in the Kano model. Delight-creating factors have no

downside and an unlimited upside. As they create a high degree of "arousal", their existence can cause an enormous boost in customer satisfaction while their absence might not be harmful (Keiningham and Vavra 2001). For instance, the service quality of a dentist could be assessed by the attributes of timeliness of the service, the availability of the latest technologies, the design of the interior, the customizability of the music in the practice room, and the level of humor the dentist displays when serving patients. While timeliness as such may not have much impact on customer satisfaction, performance below expectations may be very detrimental. This would be a basic factor, as there are generally accepted norms on waiting time. In contrast, when music is customizable for a patient, this may boost satisfaction, whereas the lack of this "feature" may not affect satisfaction at all. In sum, delight-creating attributes substantiate the existence of positive asymmetries reflected by excitement attributes in the Kano-model as a one unit increase in the level of the quality attribute has a larger influence on satisfaction compared to a one unit decrease in the same attribute.

Previous studies have applied these underpinnings to the evaluation of asymmetric effects in the relationship between service quality attributes and customer satisfaction in offline (Mittal et al. 1998) as well as online contexts (Holloway and Beatty 2008; Zhang and von Dran 2001). For instance, Mittal et al. (1998) demonstrate negative asymmetric effects of attribute performance on customer satisfaction with medical services. Holloway and Beatty (2008) identify satisfiers and dissatisfiers of e-services by means of a critical incident technique. In a similar vein, Zhang and von Dran (2001) categorize website characteristics into exciting (e.g., enjoyment) and basic features (e.g., navigation) based on the Kano logic. Nevertheless, these studies examine asymmetries only from a static point of view. The theories underlying the observation of asymmetries have not been expanded to make predictions on how asymmetries evolve over time. In the following section, we develop an integrative framework on the *dynamics* of asymmetries.

3. Conceptual framework

3.1. Dynamic asymmetries

Existing research provides empirical evidence that customer experience with a service provider generally influences satisfaction in subsequent service usage episodes during the relationship (Bolton and Lemon 1999). Customers assess satisfaction by encoding experi-

ences in terms of gains or losses relative to their normative expectations (Oliver 1980). These normative expectations are shaped mainly by prior usage of the service, word-of-mouth, publicity, and communication initiated by the service provider (Parasuraman et al. 1991). As these expectations are influenced by external factors they are likely to change over time. Empirically, Mittal et al. (1999) and Slotegraaf and Inman (2004) provide evidence that product attribute weights for forming customer satisfaction change over time for automotive customers. Mittal et al. (2001) show that for financial and educational services, different service features contribute differentially to dynamic consumers' consumption preferences. Finally, Dagger and Sweeney (2007) show that for healthcare services, tangible elements of a service are more important to novice customers whereas provider expertise and professionalism are more important to experienced users. Yet, these dynamics have been confirmed with the underlying assumption of symmetric relationships between quality and satisfaction only. In contrast, we examine how asymmetries evolve over the relationship cycle.

As discussed earlier, the basis for a positive asymmetry is born for factors that can be denoted as customer delight attributes. However, with increasing knowledge on how a service provider performs, the element of surprise fades. Through learning and habituation effects, service attributes that were formerly recognized as new, interesting, and challenging, lose their ability to trigger customer delight. This is accompanied by rising expectations, because expectations are known to track performance observations (Rust and Oliver 2000). As the customer cognitively develops minimum standards with regard to the attribute's performance, the attribute will no longer display an unlimited upside only. Negative effects on satisfaction will emerge if the attribute displays low quality levels. Therefore, the positive asymmetry has converted into a symmetric effect that mirrors a performance attribute in the Kano model. After this institutionalization, an attribute can spread to become a market standard by means of word-of-mouth and vicarious experience (File et al. 1994), but also by technological advances. For example, consider the hard competition among Internet service providers (ISP) in the late nineties for offering the highest available connection speeds as new service offerings rapidly became market standards. Now, ISPs offering only dial-up connections no longer exist. Hence, after the delight element has faded and symmetric effects are observed, the attribute further develops into a negative asymmetry: its presence does not add much to overall customer satisfaction, but when absent, a substantial level of dissatisfaction arises.

In sum, over the course of time, customer delight principles would predict that quality

attributes change their valence from a positive asymmetry to a negative asymmetry. This is consistent with empirical insights from both product-related and service-related attributes (Nilsson-Witell and Fundin 2005). However, the "wear-out process" suggested by delight theory is not initiated for all attributes simultaneously. This is in line with opponent-process theory (Solomon and Corbit 1974) predicting that emotions are paired and that when one emotion in a pair is experienced, the other is suppressed. Examples of pairs include happiness and sadness or pleasure and fear. After habituation of one emotion of the pair by repeated activation with similar stimuli, an opponent reaction in the opposite direction will emerge. Hence, people search for stimuli that are relatively opposite to what has been encountered before. Solomon and Corbit (1974) give the example of skydivers. Beginners experience greater fear in their jumps than more experienced divers. After numerous jumps, the fear of jumping decreases and post-jump pleasure increases.

The theory is also very relevant for better understanding satisfaction formation on the Internet (Bowling et al., 2005; Rust and Oliver 2000). Translated to our e-service context, an attribute that initially created delight loses its ability to do so as it is increasingly suppressed by the opponent attribute. More specifically, we make the distinction between a pair of functional-utilitarian and hedonistic service quality attributes, because the Internet is a medium that may fulfill functional or entertainment needs (Hoffman and Novak 1996). As such, online behavior has been regarded from either a goal-directed, functional-utilitarian perspective or an experiental, hedonistic perspective (Novak et al. 2003). The resulting characterization of e-service usage as "work" or "fun" underscores that these aspects form a pair of opposite attributes (Childers et al. 2001).

3.2. Dynamics of functional-utilitarian and hedonistic attributes

Building on opponent process theory, we expect these two categories to exhibit different dynamic patterns of asymmetries. Technology adoption research shows that effort saved due to increased ease of use allows people to redeploy their efforts so that more difficult to evaluate attributes can be appreciated (Davis et al. 1989). In similar vein, we expect that customers cannot enjoy the hedonistic aspects without full comprehension on the functioning of an e-service. Insights from customer relationship management indicate that satisfaction in the early stages of product or service use is mainly driven by cognitive factors, while affective attributes become more important as clients build a stable relationship towards a provider

(Johnson et al. 2006; Rust et al. 2000). As the customers' experience with a particular offering grows, attitudes toward affective service attributes become stronger, more salient, and more likely to guide satisfaction formation and subsequent behavior (Fazio et al. 1989; Priester et al. 2004).

In an Internet context, instrumental and goal-oriented motives have shown to be the primary determinants for initially choosing an online service channel as functional-utilitarian features help to fulfill economic needs for adopting e-services (Parasuraman et al. 2005). In addition, Olsen and Johnson (2003) state that in the early stage of a relationship life cycle customers are in an information-gathering or problem-solving mode. Therefore, rational, economic-based perceptions are more relevant. Hence, functional-utilitarian attributes may be more salient to new than to long-term customers (Mittal et al. 1998). Having acquired certain abilities and capabilities in handling the website enhances customer perceived control over the Internet technology (Hoffman and Novak 1996). In turn, this knowledge facilitates to derive emotional benefits from an e-service encounter. Therefore, in contrast to functional-utilitarian attributes, Voeth et al. (2005) emphasize that hedonistic factors are the primary determinant for *continuously* using innovative technologies that potentially satisfy entertainment needs. Childers et al. (2001) also find that enjoying aspects of the service encounter ("shopping as fun") are less important for first-time customers of online shopping than for experienced ones. Novak et al. (2003) illustrate that sustainable online customer experiences are positively correlated with "fun, recreational and experiental uses of the Web" (p. 40). In conclusion, hedonistic quality aspects should become more salient in later consumption stages.

Salience reflects the degree of ease with which attributes come to mind or are recognized when thinking about or seeing a certain object (Van Ittersum et al. 2007). The degree of salience is generally positively correlated to an attribute's ability to spark high levels of customer satisfaction in terms of customer delight (Slotegraaf and Inman 2004; Steenkamp and Van Trijp 1997). Consistent with the insights above and opponent process theory, hedonistic attributes become salient in a later phase and only *then* acquire the potential to cause positive asymmetries leading to customer delight. Hence, customer delight could be regarded as the result of an *interaction* between an attribute's salience and the attribute's power to exceed expectations to a surprising degree. This implies that people can be surprised by the quality of an attribute, but if this attribute is non-salient, customer delight is not created irrespective of the degree of performance this attribute has. Moreover, only a quality attribute

that is salient to a customer at the point of evaluation can trigger delight. To do so, quality levels also need to exceed customer expectations. For functional-utilitarian attributes, delight is especially likely to arise for novice customers because their goal-oriented motives are more salient compared to their entertainment needs. In addition, because of their inexperience with e-services in general and hence their lower expectations, they are easily surprised (Shankar et al. 2003). Due to the described salience shift, hedonistic attributes stand out with more prominence in the cognitive field for long-term customers. Their expectations towards these attributes are low as hedonistic features have not been consciously considered before (Van Ittersum et al. 2007).

In sum, we expect that functional-utilitarian and hedonistic service quality attributes display a different potential to exhibit positive asymmetries (i.e., to create customer delight) across the customer relationship cycle. On the one hand, functional-utilitarian attributes evolve through a habituation cycle so that their ability to exhibit positive asymmetries in an early relationship stage fades over time. In other words, the likelihood of developing negative asymmetries increases. On the other hand, hedonistic factors are suppressed in earlier usage stages. As these factors represent the opponent attributes of functional-utilitarian features, they only become salient in later consumption stages and do not *initially* display such positive asymmetries. Their ability to exhibit positive asymmetries is revealed only for more experienced users as the opponent process emerges. In other words, the likelihood of developing positive asymmetries increases. Hence, we hypothesize:

Hypothesis 1. Functional-utilitarian e-service quality attributes evolve over time, such that they increase in their potential to exhibit negative asymmetries.
Hypothesis 2. Hedonistic e-service quality attributes evolve over time, such that they increase in their potential to exhibit positive asymmetries.

4. Methodology and study design

4.1. Research setting

In order to improve the generalizability of our findings, we collected data in two e-service settings. In study 1, a German market research institute distributed the questionnaire to randomly selected members of its database. Following the procedure suggested by Parasura-

man et al. (2005), participants were asked to recall a recently used *online shop* and refer to that experience regarding their answers. Study 2 targeted users of one of the largest *Internet portal* sites in Germany and was conducted in close co-operation with the respective provider. The online questionnaire was presented to randomly selected users of the price and product comparison function of the respective portal. Portal visitors could participate in the survey by clicking on a flash banner.

Since the data for this study were collected from a single source, we tried to minimize common method bias a priori by evaluating response styles (Weijters et al. 2008). We integrated two pairs of reversed items: "I knew exactly what I would buy beforehand" / "I decided upon what to buy while I was shopping" (online shop), and "I knew exactly what my product of interest would cost" / "I learned about the price of my product of interest while I was comparing products" (Internet portal). This allowed us to identify acquiescent respondents (Winkler et al. 1982). Specifically, respondents scored high on both statements were deemed to respond in an inconsistent and acquiescent way and were not included in the analyses. Resulting from this procedure, we obtained a final sample size of 456 in study 1 and 558 usable questionnaires study 2. Both samples were of sufficient size to achieve a high level of statistical power (McQuitty 2004). The characteristics of respondents are reported in table 1.

Demographics	**Study 1** **Online shop** **n = 456**	**Study 2** **Internet portal** **n = 558**
Age (years)		
Mean	34.6	35.0
Standard Deviation	12.6	13.6
	Percentage	
Gender		
Female	45	52
Male	55	48
Net household income		
< 25.000 Euros	47.0	47.8
25.000 – 49.999 Euros	32.2	34.7
50.000 – 74.999 Euros	14.3	11.9
> 75.000 Euros	6.4	5.6

Table 1: Demographic profiles of the samples

4.2. Measurement

To assess the functional-utilitarian attributes of e-service quality, we used the E-S-QUAL operationalization by Parasuraman et al. (2005). They distinguish four dimensions of e-service quality, measured by 22 items in total. Items were tailored to our specific context where applicable. *Efficiency* denotes the ease and speed of accessing and using the website, and is measured with 8 items for the online shop and 7 items for the Internet portal. One item was not applicable in the second study, because no *transactions* are established on the Internet portal. *Fulfillment* is defined as the extent to which the website's promises about order delivery and item availability are fulfilled. However, respondents were only able to order items in the online shop, not on the Internet portal. As the advertising campaign of the portal claims that information presented is accurate and complete, here fulfillment indicates whether the information presented in the price and product comparison function was perceived to be accurate and helpful for online shopping activities. This dimension is assessed using 7 items. *System availability* denotes the correct technical functioning of the website and is tapped by 4 items in study 1 and 3 items in study 2. Finally, *privacy* reflects the degree to which the website is safe and protects customer information, and is measured with 3 items in the online shop survey and 2 items in the Internet portal study as users did not provide their credit card information here. As suggested by Parasuraman et al. (2005) the described scale modifications should be applied especially when assessing the quality of pure-service sites: "Adapted scale versions [...] need to be created and formally evaluated in the context of pure-service sites, including […] portals, and other such sites" (p. 229).

To decide on attributes to capture the hedonistic aspects of e-service quality, we studied existing scales on electronic service quality. Zeithaml et al. (2002), Wolfinbarger and Gilly (2003), and Bauer et al. (2006) all point to the importance of *website design* denoting the visual appeal of the virtual interface. We therefore consider this hedonistic factor and measure it with 3 items, adapted from Wolfinbarger and Gilly (2003). In addition, in affecting individual's attitudes towards technology, literature has repeatedly stressed the importance of *enjoyment*. This captures the entertaining aspect of using the Internet as a service channel (Childers et al. 2001; Van der Heijden 2004). In addition, studies emphasize the role of *image*, reflecting the degree to which use of an innovation is perceived to enhance one's status in one's social system (Venkatesh and Davis 2000; Lu et al. 2003). We apply these insights to the field of e-service quality, and assess enjoyment with 4 items adapted from Childers et al.

(2001). In addition, image was measured with 3 items derived from Venkatesh and Davis (2000). Finally, overall customer satisfaction was assessed using 3 items suggested by Szymanski and Hise (2000), and Hennig-Thurau et al. (2002). Apart from the items adapted from Szymanski and Hise (2000) which were measured based on two semantic differentials, participants indicated their (dis)agreement with a statement using a 7-point Likert scale that ranged from *strongly disagree* to *strongly agree*. The corresponding items are displayed in table 2 and 3.

4.3. Data analysis and methodology

Construct reliability and validity

To test the validity and reliability of the measures, we first estimated two measurement models; one for the online shop and one for the Internet portal. We observed the factor loadings of the confirmatory factor analysis (CFA) in AMOS 5.0 using the maximum-likelihood estimator (Arbuckle 2003). This analysis showed satisfactory global fit measures for both measurement models meeting the threshold levels recommended in the literature (Hu and Bentler 1999). Due to insufficient factor loadings, three original E-S-QUAL items (one for capturing efficiency and two for assessing fulfillment) had to be eliminated in the online shop study. In the Internet portal study, we eliminated one efficiency item and one fulfillment item. The remaining factor loadings from the CFA provide evidence for convergent validity as all items load sufficiently high on the corresponding constructs, exceeding the threshold value of .50 suggested by Anderson and Gerbing (1988). Composite reliability values vary from .84 to .95 and are above the minimum value of .70 (Nunnally 1978). The details of our analyses are reported in tables 2 and 3 and indicate a reliable and valid measurement of all constructs.

	Factor loading	CR	AVE
Functional-utilitarian e-service quality attributes			
Efficiency		.88	.51
o This website makes it easy to find what I need	.50		
o This website makes it easy to get anywhere on the site	.85		
o This website enables me to complete a transaction quickly	.61		
o Information at this website is well organized	.65		
o This website loads its pages fast	.77		
o This website is simple to use	.82		
o *This website enables me to get on to it quickly (eliminated)*	*.37*		
o This website is well organized	.75		
Fulfillment		.84	.53
o This website delivers orders when promised	.66		
o *This website makes items available for delivery within a suitable time frame (eliminated)*	*.42*		
o This website quickly delivers what I ordered	.51		
o This website sends out the items ordered	.89		
o This website has in stock the items the company claims to have	.60		
o *This website is truthful about its offering (eliminated)*	*38*		
o This website makes accurate promises about delivery of products	.90		
System Availability		.89	.68
o This website is always available for business	.82		
o This website launches and runs right away	.89		
o This website does not crash	.80		
o Pages at this website do not freeze after I enter my order information	.78		
Privacy		.89	.74
o This website protects information about my web-shopping behavior	.83		
o This website does not share my personal information with other sites	.91		
o This website protects information about my credit card	.84		
Hedonistic e-service quality attributes			
Website design		.86	.67
o This website is visually appealing	.83		
o This website's appearance is professional	.84		
o This website has innovative features	.78		
Enjoyment		.89	.67
o Shopping at this website is fun	.70		
o Shopping at this website is exciting	.86		
o Shopping at this website is interesting	.89		
o Shopping at this website is enjoyable	.82		
Image		.89	.73
o People in my personal environment who use this website have more prestige than those who do not	.92 / .81		
o People in my personal environment who use this website have a high profile	.83		
o Using this website is a status symbol in my personal environment			
Customer satisfaction		.94	.84
o Overall, how do you feel about your experience with the online shop?			
o Very dissatisfied (= 1) to very satisfied (= 7)	.87		
o Very displeased (= 1) to very pleased (= 7)	.95		
o I think I did the right thing when I decided to use this online shop	.96		
Global fit measures: $\chi 2(406) = 1250$, CFI = .91, TLI = .90, RMSEA = .07			

Table 2: Reliability and validity measures in the online shop study

	Factor Loading	CR	AVE
Functional-utilitarian e-service quality attributes			
Efficiency		.95	.78
o This website makes it easy to find what I need	.90		
o This website makes it easy to get anywhere on the site	.93		
o Information at this website is well organized	.80		
o This website loads its pages fast	.87		
o This website is simple to use	.90		
o *This website enables me to get on to it quickly (eliminated)*	*.45*		
o This website is well organized	.93		
Fulfillment		.94	.71
o This website gives accurate price and product comparisons as promised	.81		
o This website redirects me to the online shop of my choice within a suitable time frame	.90 .92		
o This website quickly delivers the price and product comparisons I query	.81		
o This website delivers relevant price and product comparisons I queried	*.48*		
o *The price and product comparisons include the number of companies and online shops the website claims to compare (eliminated)*	.78		
o This website is truthful about its price and product comparisons	.82		
o This website makes accurate promises about price and product comparisons			
System Availability		.91	.78
o This website is always available for business.	.90		
o This website launches and runs right away.	.90		
o This website does not crash.	.85		
Privacy		.94	.88
o This website protects information about my web-shopping behavior	.92		
o This website does not share my personal information with other sites	.96		
Hedonistic e-service quality attributes			
Website design		.94	.84
o This website is visually appealing	.88		
o The website's appearance is professional	.93		
o The website has innovative features	.94		
Enjoyment		.95	.82
o Using this website is fun	.83		
o Using this website is exciting	.95		
o Using this website is interesting	.96		
o Using this website is enjoyable	.88		
Image		.95	.85
o People in my personal environment who use this website have more prestige than those who do not	.93 .93		
o People in my personal environment who use this website have a high profile	.91		
o Using this website is a status symbol in my personal environment			
Customer satisfaction		.94	.83
o Overall, how do you feel about your experience with the Internet portal?			
o Very dissatisfied (= 1) to very satisfied (= 7)	.84		
o Very displeased (= 1) to very pleased (= 7)	.95		
o I think I did the right thing when I decided to use this Internet portal	.94		
Global fit measures: $\chi 2(349)=1195$, CFI=0.95, TLI=0.95, RMSEA=0.07			

Table 3: Reliability and validity measures in the Internet portal study

To check for discriminant validity, we applied the Fornell and Larcker (1981) test. This requires the square root of the AVE of each construct to exceed the correlation shared

between the latent construct and other latent constructs in the model. Tables 4 and 5 show the details of this analysis for both settings and indicate that all e-service quality constructs pass the test.

Constructs	Efficiency	Fulfillment	System Availability	Privacy	Website design	Enjoyment	Image	Customer satisfaction
Efficiency	*.71*							
Fulfillment	.59	*.73*						
System Availability	.64	.56	*.82*					
Privacy	.48	.47	.39	*.86*				
Website design	.68	.54	.56	.37	*.82*			
Enjoyment	.59	.39	.37	.39	.57	*.82*		
Image	.66	.57	.49	.59	.55	.53	*.85*	
Customer satisfaction	.70	.70	.54	.56	.52	.53	.77	*.91*

Square root of Average Variance Extracted on diagonal

Table 4: Fornell and Larcker test for discriminant validity in the online shop study

Constructs	Efficiency	Fulfillment	System Availability	Privacy	Website design	Enjoyment	Image	Customer satisfaction
Efficiency	*.88*							
Fulfillment	.65	*.84*						
System Availability	.75	.46	*.88*					
Privacy	.71	.69	.60	*.94*				
Website design	.80	.53	.80	.62	*.92*			
Enjoyment	.65	.80	.44	.61	.53	*.91*		
Image	.77	.76	.61	.83	.71	.66	*.92*	
Customer satisfaction	.70	.78	.50	.73	.56	.78	*.80*	*.91*

Square root of Average Variance Extracted on diagonal

Table 5: Fornell and Larcker test for discriminant validity in the Internet portal study

Dummy variable regression

For assessing the effects of the seven e-service quality factors on customer satisfaction, regression analysis with dummy variables was applied (Anderson and Mittal 2000; Mittal et al. 1998). Here, a set of dummy variables is created for each quality attribute. The attributes are represented by the factor scores of the respective scale items. As limit values, we used the upper and lower quartiles of the standardized factor scores (Brandt 1988). For factor scores in the upper quartile, the first dummy was set to 1, for all other scores the dummy was set to 0. Additionally, for factor scores in the lower quartile, the second dummy was set to 1 and all

other scores to 0. Thus, a pair of dummies was created for every service quality attribute, resulting in 14 dummy variables. These dummies represented the independent variables in the regression analyses. The dependent variable was represented by the factor score of the three items measuring customer satisfaction. By means of the dummy regression, effects of high (upper quartile) and low (lower quartile) e-service quality in a specific attribute on customer satisfaction can be contrasted. The Fornell and Larcker test showed that all attributes are sufficiently distinctive in their meaning. Consequently, and in line with Mittal et al. (1998), we calculated the satisfaction impact of the dummies of each attribute individually.

In case of a significantly stronger effect in the upper (lower) quartile positive (negative) asymmetries are identified. Yet, literature does not provide concrete evidence at what point the difference between the dummy-regression parameters becomes significant (Brandt 1988). Several studies on assessing asymmetric effects using dummy regression report their results without any evaluation of the significance of the estimates (Brandt 1988; Matzler et al. 2004). This implies that the effects would have been measured without error. However, since these measures are calculated from a finite sample of observations they are liable to sampling error. Studies based on Monte-Carlo simulations show that the paired t-test is a well-performing method for assessing the significance of estimates across multiple samples larger than 100 respondents (Greene 2008). This is a conservative test as the null hypothesis (i.e., equal effects in lower and upper quartile sample) is rejected in too few cases compared to the simulation outcomes. Consequently, we conduct paired t-tests based on the respective dummy-regression parameters to assess the significance of the differences. This is the basis for testing our hypotheses.

Time-based cohort analysis

For testing the proposed dynamic shifts in the quality-satisfaction link, we split both samples in two customer cohorts. One cohort contains customers in an early relationship stage (novice customers); the other cohort embodies customers in an advanced relationship stage (long-term customers). For determining the relationship stage we used *consumption experience* (Jap 1999). We conceptualized consumption experience as a combination of *usage frequency* and *relationship length*. This is in line with Dagger and Sweeney (2007) and Verhoef et al. (2002) who call for considering consumption frequency as an important determinant of temporal shifts of attribute satisfaction effects which should be taken into account in addition to

relationship length.

Both measures were surveyed as categorial variables. In particular, for assessing usage frequency, we asked respondents about their frequency of visiting the specific website. Five categories were distinguished, ranging from "once every day" to "less than twice a year". Relationship duration was measured by asking about the time period the particular online shop or Internet portal has been used. Again, five categories were given as answering option, ranging from "less than six months" to "4 years or more". We multiplied both measures which lead to our consumption experience scale with the endpoints 1 and 25. Based on this measure, the customers were split in two cohorts (novice and established customers) by means of a median split. This procedure resulted in two groups of novice customers encompassing 252 customers in the online shop study and 237 customers in the Internet portal study. The long-term customer clusters contain 204 customers in study 1 and 321 customers in study 2.

In order to assure comparability of the corresponding cohorts, chi-square tests were conducted with respect to demographic variables and general Internet experience. The chi-square tests revealed that the samples neither differed in terms of the key demographic variables for age, gender and income nor in terms of Internet experience. Generally, the described time-based cohort analysis is an appropriate method if the primary goal is to analyze the dynamic effects of perceptual constructs on dependent relational constructs at different stages of a customer life cycle (Dagger and Sweeney 2007; Venkatesan and Kumar 2004). Using cohorts instead of a longitudinal design has the additional advantage that biases due to panel effects are avoided (Johnson et al. 2006).

4.4. Results

Tables 6 and 7 report the results of our analyses for novice customers versus long-term customers. For both cohorts, the standardized regression weights of the dummies describing a quality attribute are reported. Values in the "lower quartile" column indicate the effect of the respective quality attribute on customer satisfaction when being *low in quality*. In contrast, the values in the "upper quartile" column indicate the effect of the attribute on satisfaction when being *high in quality*. These values are compared for significance in the column "t-value diff. test" and the difference is consequently labeled in the column "asymmetry type". When the t-value is non-significant, we conclude a symmetric effect to exist; when the lower quartile

value is significantly larger than the upper quartile value in absolute terms, we conclude a negative asymmetry to exist; when the upper quartile value is significantly larger than the lower quartile value in absolute terms, we conclude a positive asymmetry to exist. Finally, the asymmetry types are compared between novice and long-term customers and the dynamics are evaluated as being downward (i.e., increasing ability to exhibit negative asymmetries), stable (no change) or upward (i.e., increasing ability to exhibit positive asymmetries).

Study 1: Online shop

In total, 9 out of 14 effects are asymmetric in nature. Every e-service quality attribute displays at least one asymmetric effect on satisfaction in either the novice or the long-term customer group. In particular, novice customers experience either symmetric (for efficiency and system availability) or positive effects (fulfillment and privacy) for functional-utilitarian attributes. For the long-term customer cohort, three negative asymmetries and one positive asymmetry are observed for functional-utilitarian attributes. Here, efficiency, system availability and privacy exhibit significantly stronger effects in case of poor service quality when compared to the influence on satisfaction in the upper quality quartile. Hence, these quality attributes experience a downward development so that their ability to display positive asymmetries diminishes while their potential to cause negative asymmetries increases. In contrast, the positive asymmetric effect of fulfillment on satisfaction is present in both cohorts, indicating a stable effect.

Evaluating the hedonistic quality attributes, website design, enjoyment and image all show symmetric effects for novice customers. For long-term customers, these symmetric impacts on customer satisfaction turn into positive asymmetries. Consequently, when assessing the dynamics of these effects, the hedonistic website features show an explicit upward trend.

Service quality attribute	Novice customers (n=252)				Long-term customers (n =204)				
	Lower quartile	Upper quartile	t-value diff. test	Asymmetry type	Lower quartile	Upper quartile	t-value diff. test	Asymmetry type	Dynamics
Functional-utilitarian									
Efficiency	-.24**	.19**	1.23	Symmetric	-.19**	.14**	1.95**	Negative	Downward
Fulfillment	-.08	.18***	4.30***	Positive	-.12**	.21***	1.99**	Positive	Stable
System availability	-.14**	.12**	.51	Symmetric	-.14*	.04	2.74***	Negative	Downward
Privacy	-.10**	.15**	1.48*	Positive	-.34***	.19**	2.50***	Negative	Downward
Hedonistic									
Website design	-.18**	.16**	.49	Symmetric	-.11**	.17**	1.65*	Positive	Upward
Enjoyment	-.20**	.17**	.96	Symmetric	-.14**	.27***	1.68*	Positive	Upward
Image	-.18**	.22**	1.02	Symmetric	-.16**	.27***	2.73***	Positive	Upward
*p < 0.1;** p < 0.05; *** p < 0.01 (two-tailed)									

Table 6: E-service attribute evaluations for the online shop study

Service quality attribute	Novice customers (n=237)				Long-term customers (n =321)				
	Lower quartile	Upper quartile	t-value diff. test	Asymmetry type	Lower quartile	Upper quartile	t-value diff. test	Asymmetry type	Dynamics
Functional-utilitarian									
Efficiency	-.27***	.53**	3.56***	Positive	-.32***	.41***	1.78**	Positive	Stable
Fulfillment	-.36***	.52***	2.18**	Positive	-.42***	.40***	.33	Symmetric	Downward
System availability	-.32***	.32***	.07	Symmetric	-.30***	.10*	4.89***	Negative	Downward
Privacy	-.33***	.35***	.90	Symmetric	-.44***	.24***	4.50***	Negative	Downward
Hedonistic									
Website design	-.30***	.32***	.46	Symmetric	-.25***	.31***	1.32*	Positive	Upward
Enjoyment	-.41***	.42***	.20	Symmetric	-.40***	.45***	1.30*	Positive	Upward
Image	-.29***	.32***	.64	Symmetric	-.36***	.46***	2.11**	Positive	Upward
*p < 0.1;** p < 0.05; *** p < 0.01 (two-tailed)									

Table 7: E-service attribute evaluations for the Internet portal study

Study 2: Internet portal

As can be seen in table 7, 8 out of 14 effects show significant negative or positive asymmetries. More specifically, the functional-utilitarian attributes display either symmetric effects or positive asymmetries for novice customers. As for the first study, fulfillment displays a positive asymmetry, whereas system availability is assessed as a symmetric effect. Additionally, efficiency displays potential for positive asymmetries in this study, as significant larger effects in the upper quartile compared to the lower quartile are revealed. Privacy exerts similar impacts on satisfaction in the upper and lower quartile and is therefore categorized as a symmetric effect. Assessing the dynamics, an efficient operation of an Internet portal seems to be a stable delight factor as a superior performance in this attribute is highly appreciated even by experienced users. The remaining three factors show a clear downward trend as they develop into basic factors (system availability and privacy) or performance factors (fulfillment) of an Internet portal.

Regarding hedonistic attributes, symmetric effects are disclosed in the novice customer group. Here, the impacts of e-service quality on satisfaction are almost identical in the upper and lower quartiles of the respective quality features. Consequently, no significant differences are observed. For more experienced customers though, website design, enjoyment and image exhibit consistent positive asymmetries. This upward pattern corresponds to the one observed in the online shop setting.

Overall, 17 out of 28 examined effects are asymmetric in nature, i.e. their impact on customer satisfaction varies significantly in case of poor compared to superior service quality. This result underscores the necessity for including asymmetric types of effects when analyzing the quality-satisfaction link in an Internet context. Regarding the proposed dynamics of the effects, we find strong support for both hypotheses. For the functional-utilitarian attributes, the dynamics show two consistent downward moving attributes. System availability and privacy obviously forfeit their potential to steadily create customer delight. In other words, both features develop into basic features of an e-service implying that even high quality standards can only prevent customer dissatisfaction. While efficiency also exhibits such a downward movement in study 1, it turns out as a stable factor in study 2. The opposite is true for fulfillment as the classification as a constant delight creating factor in study 1 does not hold in study 2. Here, fulfillment is categorized as a symmetric attribute. In sum, 6 out of 8 possible developments of the functional-utilitarian attributes are characterized by a downward

movement in terms of effect nature. This gives ample empirical support for hypothesis 1.

The evolution pattern for the hedonistic quality features is even more clear-cut compared to the functional-utilitarian attributes. For all hedonistic attributes, the influence on satisfaction develops from a symmetric effect in the novice customer group into a positive asymmetry among long-term customers. Hence, website design, enjoyment and image unfold their delight creating potential by displaying positive asymmetries in later consumption stages. Apparently, these quality facets become more salient with increased relationship duration and experience with the e-service offer. This development provides convincing empirical support for the proposed upward dynamics expressed in hypothesis 2.

5. Conclusion

5.1. Discussion

This paper set out to explore the relationship between e-service quality and customer satisfaction by integrating both functional-utilitarian and hedonistic quality attributes in a dynamic framework. Building on customer delight theory, opponent-process theory, and previous empirical results showing that the influence of service quality attributes on satisfaction is in fact asymmetric, we developed two hypotheses in order to compare the role of functional-utilitarian and hedonistic attributes across two customer cohorts: novice customers and long-term customers of e-services.

An important first insight of our study is that, while previous research has shown asymmetries to occur in offline settings (Anderson and Mittal 2000; Mittal et al. 1998; Mittal et al. 1999), asymmetric effects also appear in *online* settings. For the 28 pairs of dummy variables tested, 17 effects were asymmetric, 11 effects were symmetric. Given the dominant fraction of asymmetric effects, future studies should account for the occurrence of asymmetric relationships, especially when analyzing the link between service quality and satisfaction on the Internet. More specifically, for novice customers, the functional-utilitarian attributes fulfillment and privacy exhibit positive asymmetries in study 1. Accordingly, an accurate and reliable service provision as well as a confidential handling of information assures superior customer satisfaction ratings in the early stages of a provider-customer relationship. Fulfillment also reveals positive asymmetries among novice customers of the Internet portal; less experienced customers seem to highly appreciate a precise and trustworthy price comparison.

This connects to observations that the Internet is a platform where trust between transaction parties is of major importance (Gefen et al. 2004). Our results confirm that inexperienced customers can be delighted by just delivering the service as promised. A positive asymmetry also applies to the aspect of efficiency of the Internet portal, indicating that providing well-structured content and high ease of use boosts customer satisfaction in the early phase of a customer relationship.

For long-term users, system availability and privacy show negative asymmetries in both the shopping and the portal context. A service provider that proactively offers more privacy-enhancing options as well as a stable website does not gain additional satisfaction scores over the course of time. “Sticky” customers seem to form high expectations concerning these elements. Consequently, performing worse on these functional factors than the commonly accepted standard (e.g., not offering Secure Socket Layer (SSL) data protection) is a cardinal sin as expert customers will be largely dissatisfied. This also holds true for efficiency in the online shop study. Expert users seem to put much emphasis on the functioning of the web site. A divergence from generally accepted web standards such as clear navigation menus at the left or top of the screen is met with large dissatisfaction.

As a second insight, our study shows that the identified asymmetries tend to be dynamic, i.e. they shift over time. We expected that functional-utilitarian service quality attributes would evolve over time, such that they increase in their ability to display negative asymmetries. For both studies, three of the four functional-utilitarian attributes do indeed show such a downward dynamic, lending evidence for our first hypothesis. For the online shop, only fulfillment shows a stable pattern: in the novice customer segment as well as in the long-term customer segment consistent positive asymmetries are revealed. This finding can be explained by the fact that fulfillment is not only assured through online activities but also offline activities of the provider (e.g., shipping of the ordered products, advise and support through service employees via phone). For attributes that can be assessed using online and offline experiences, stable and precise reference frameworks for evaluation can be expected (Hsee 1996). For the Internet portal, the efficiency of delivering well organized and complete information has enhanced effects on satisfaction which are stable over time. The absence of a downward trend might be explained by the complexity of finding the right information on the Internet. Customers consequently keep their appreciation for a portal that delivers an accurate and reliable picture of all their buying options. If this information would be presented by

multiple websites in a similar fashion, the expectations of customers concerning efficiency are raised. Then, this might result in a negative asymmetry.

Third, our results provide striking evidence for a time-dependent shift in the dominance of delight creating factors from functional to hedonistic attributes. For both the online shop as well as the Internet portal, we find all three hedonistic factors to adhere to this expected upward pattern providing strong support for the second hypothesis. For expert-customers, the majority of functional elements exhibit negative asymmetries. Thus, experienced users seem to know what to expect from a website in terms of its functional-utilitarian features. It can be assumed that these customers show an increasing habituation with respect to functional benefits of an e-service. This in turn leads to a decreasing probability to surprise customers and create delight by providing superior performance on functional characteristics such as system availability or privacy. Over time, an opponent process is activated leading to an increased focus on hedonistic elements. Hence, they are salient in later consumption stages and only then gain the potential to spark delight. This corresponds to findings in the offline world that affective attributes become more important as clients build a steady relationship to a provider (Rust and Oliver 2000). As an interesting hedonistic factor, image displays a positive asymmetry only for long-term customers on both types of websites. This corresponds to insights in the recent trend of service providers developing online customer communities. Community users carry pride in being recognized as users of an Internet portal (Mathwick et al. 2008), but getting social support and building social capital delights only long-term users. Customers need to be long-standing and active users of the community in order to build their expert image vis-à-vis other customers and leverage their (online) social network.

In sum, customers tend to start with online shopping as an alternative channel to offline shopping. However, as customers get familiar with all functionalities, they open themselves for the fun mode of shopping (Childers et al. 2001). More specifically, where novice customers experience little satisfaction from customizable layouts, large community networks and fun experiences such as trivia's, games and chat functions, these elements have the ability to boost satisfaction for the more experienced e-service consumer. This contrasts suggestions based on flow theory stating that enjoyment is a general precondition for using the Internet and that the Internet is basically an “entertainment medium” (Orwall 2001) or a “hedonic type of environment” (Childers et al. 2001) for all customers.

5.2. Managerial implications

Our results emphasize the necessity of considering both functional-utilitarian and hedonistic quality attributes throughout the e-service provision. Moreover, they contradict the erroneous beliefs of many service managers sticking to the linear relationship paradigm. The tenacity of belief in this paradigm concerning the quality-satisfaction link is a possible explanation for the frustration of many e-service providers with the outcomes of their quality management. Some of them have even called for abandoning service quality management as a means for enhancing satisfaction (Anderson and Mittal 2000). Instead, if asymmetries are taken into account, overspending for "negative" and underspending for "positive" attributes can be avoided. Thus, our approach helps e-service managers to coexist with finance and operations by mapping service-related expenditures.

For instance, fulfillment displays positive asymmetric effects in the novice customer group across both studies. This shows that delighting new customers can be surprisingly simple if one adheres to the rule "practice what you preach". In addition, efficiency and privacy also show their potential to delight inexperienced customers. Therefore, goal-oriented aspects of using

e-services have the potential to trigger delight for novice customers and should at least be up-to-standard when targeting new customers. While "newbies" are easily impressed by service features like state-of-the-art data protection, low downtimes, and e-service providers delivering their promises, the majority of such functional-utilitarian attributes lose potential to trigger delight over time. Hence, managers may shift the quality focus and the corresponding financial and time investments from functional-utilitarian to hedonistic attributes with increased customer experience and relationship length. That is, continuously improving quality of functional attributes would not be efficient. In later relationship stages, the performance of hedonistic attributes should be enhanced as they display higher "satisfaction returns on quality".

Our findings show that providers should customize their offering for *individual* customers, as a customer may start using the e-service only years after its initial introduction on the Internet. A practical solution for discerning novice and long-term customers are customer profiles. For example, portal users often log in first for checking their email. Usage information is consequently registered in the user's profile, which could include visit frequency, clickstream behavior, or transactions. This allows the service provider to allocate the user to either the

novice or long-term customer group (Wee and Ramachandra 2000). After the successful segmentation, service providers can dynamically adapt the content of the website. Novice customers should be proactively approached and adverted to features like product information via buttons or banners, quick links or guided tours. These goal-oriented attributes support less experienced customers and yield delight potential. After a learning period and gaining experience with the e-service, more hedonistic elements may be added to trigger emotional responses. Possibilities include chat functions with other customers, customizable website look and feel, displaying products in a 3D virtual walk-through shop instead of the standard website lists, or lotteries for free products.

5.3. Limitations and future research directions

Our study opens several interesting avenues for future research. First, this study is among the first to statistically test asymmetries in the relationship between service quality and customer satisfaction. In doing so, we compare the difference in coefficients of a dummy regression equation by means of t-tests. This method seems valid in assessing asymmetries. However, given the fact that we do not find asymmetries for *all* attributes considered, future studies could make a methodological contribution by comparing different methods for assessing asymmetries. Second, where we focus on the relationship between service quality and customer satisfaction, Anderson and Mittal (2000) suggest that more relationships in the satisfaction-profit chain may be asymmetric. Consequently, future studies could statistically substantiate the asymmetric nature of the customer satisfaction – customer profitability link. A service provider's *capability* of converting satisfaction assets into profitable outputs is an aspect gaining increased importance (Gupta and Zeithaml 2006). By examining a cause-and-effect chain leading from service quality investments via satisfaction to customer profitability, the total effect of service quality initiatives on a firm's financial performance can be traced.
Finally, while a time-based cohort analysis is a statistically sound method for drafting such dynamic effects (Dagger and Sweeney 2007; Venkatesan and Kumar 2004), future studies could try to monitor each specific customer over the course of time by applying a longitudinal design.

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