

ON RISK, CONVENIENCE, AND INTERNET SHOPPING BEHAVIOR

*Why some consumers are online shoppers
while others are not.*

The past century experienced a proliferation of retail formats in the marketplace. However, as a new century begins, these retail formats are being threatened by the emergence of a new kind of store, the online or Internet store. From being almost a novelty in 1995, online retailing sales were expected to reach \$7 billion by 2000 [9]. In this increasingly time-constrained world, Internet stores allow consumers to shop from the convenience of remote locations. Yet most of these Internet stores are losing money [6].

Why is such counterintuitive phenomena prevailing? The explanation may lie in the risks associated with Internet shopping. These risks may arise because consumers are concerned about the security of transmitting credit card information over the Internet. Consumers may also be apprehensive about buying something without touching or feeling it and being unable to return it if it fails to meet their approval. Having said this, however, we must point

out that consumers are buying goods on the Internet. This is reflected in the fact that total sales on the Internet are on the increase [8, 11]. Who are the consumers that are patronizing the Internet? Evidently, for them the perception of the risk associated with shopping on the Internet is low or is overshadowed by its relative convenience. This article attempts to determine why certain consumers are drawn to the Internet and why others are not.

Since the pioneering research done by Becker [3], it has been accepted that the consumer maximizes his utility subject to not only income constraints but also time constraints. A consumer seeks out his best decision given that he has a limited budget of time and money. While purchasing a product from a store, a consumer has to expend both money and time. Therefore, the consumer patronizes the retail store where his total costs or the money and time spent in the entire process are the least. Since the util-

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ity from the consumption of good is the same, whether the consumer obtains it at WalMart or an Internet store, the competition between these stores narrows down to the services (or bundle of services) they provide. These services tend to reduce the time the consumer spends on shopping (travel time, time spent parking, time spent traveling from the parking lot to the store, time spent in the checkout lines) either directly or indirectly. For example a retail store may have sales assistants to help consumers, or a special checkout counter for purchases of less than seven items. While retail stores aim at reducing these time costs the Internet stores go one step further by completely (almost) eliminating these costs. The only time component remaining is the time spent browsing the Web sites (which corresponds to the time spent browsing the aisles in the more traditional sources of retailing). Therefore, a great attraction of Internet is the convenience that it affords. Here, it is interesting to quote Cox and Rich, from the first issue of the *Journal of Marketing Research*, about a then-revolutionary phenomenon: "...over 90% of those surveyed stated that the major attraction of telephone shopping is its convenience..." [5].

The phenomenon of the Internet shopping today is very much akin to telephone shopping when this comment was originally made. Given that the Internet as a commercial vehicle is a relatively new concept, there is bound to be much uncertainty regarding the value of services it provides. The consumer makes his choices under conditions of uncertainty and therefore maximizes his or her

expected benefit.¹ A large number of papers in marketing deal with decision-making under conditions of uncertainty [7, 10].

An underlying construct of our approach is that different individuals would have different levels of risk acceptance (or aversion). Again, this could depend on the demographic and characteristics of an individual—an Internet "savvy" person would be less risk-averse than a novice in the area of Internet surfing. To account for this, in our framework, we allow the effect of risk on utility (or benefits to the consumer) to be a function of individual characteristics.

This framework (see Figure 1) implies that the effects of convenience and risk on channel choice patterns are moderated by individual demographic factors. It is through an analysis of these interactions that we will be able to identify those segments of the markets in which risk aversion to the Internet is the highest.

We have suggested that shopping on the Internet is perceived to be quite risky. Again, it is interesting to read in [5]: "additional elements of potential uncertainty present in telephone shopping create perceived risk which acts as a deterrent to phone shopping." The uncertainty regarding the value of services drives a consumer's beliefs about the risks associated with the purchase process. This risk decreases the overall utility (bene-

fit) the consumer obtains from shopping on the Internet. The higher the consumer's perception of the risk associated with shopping on the Internet, the higher would be their perception of the variance or uncertainty in the benefits derived. If the consumers think shopping on the Internet is highly risky, they would expect a large variance in the utility from shopping on the Internet. Hence, we capture such variance or uncertainty by the risk perceived by the consumers.

Risk is a multidimensional construct [2].

However, in the case of Internet shopping two types of risk are predominant.

Product category risk is associated with the product itself. This risk is allied with the consumers' belief regarding whether the product would function according to their expectations. The risk is greatest when the product is technologically complex, or if it satisfies ego-related needs (products whose consumption is observable by others), price is high, and so forth. For example, consider the following purchasing activities:

- Buying a bottle of cologne
- Buying a home theater system
- Buying a computer
- Buying a tie
- Buying a book
- Buying a software package

While the risk for buying books and software may not be high, it is likely to be high for products such as stereo equip-



¹A detailed analysis of our model is contained in a separate appendix, available from the authors upon request.

ment, computers, cologne, and so on. Cologne is a product with high ego-satisfying characteristics, others are technologically complex and priced high. Further, we know from past research (and intuition) that more interactive purchases take place in product categories in which fashion, material, or size risks are high [6]. In these products, feel and touch are important—fashion products are a good example, where the feel of a fabric has to be experienced prior to purchase. The color may not be exactly as it appeared when displayed on the computer screen. Some market experts predict that retail stores will ultimately survive because of this old-fashioned “feel-the-merchandise” belief [9]. To summarize, we list some issues here as bases for consideration.

The likelihood of purchasing on the Internet decreases with increases in product risk.

- Product risk increases as the technical complexity of the product increases.
- Product risk is higher for products associated with higher ego-related needs.
- Product risk increases with the price of the product.
- Product risk will be higher for product categories where feel and touch are important.

Financial risk. This risk is associated with the Internet as a purchasing medium per se, rather than the consequences of purchasing particular goods. A large number of studies show that consumers are quite apprehensive about communicating credit card information over the Internet [6]. This risk is not particularly on account of the monetary amount involved in the transaction but more because it puts the consumer at risk of losing money via credit card fraud. Most of the Internet channels are quite open and susceptible to unscrupulous tapping. This is one of the primary reasons that while the Internet has become an important vehicle for carrying information to consumers, it has failed, thus far, to materialize as a retailing point. Most of the corporate Web sites are visited by thousands of surfers every day, but very

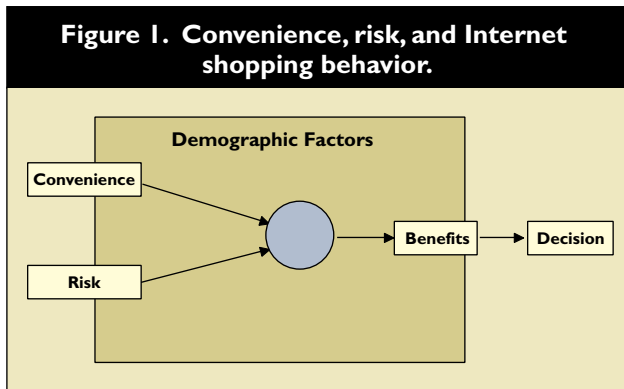


Table 1. Results of factor analysis.

Statement	Convenience Factor	Financial Risk Factor
Web vendors provide better customer service and after-sales support	0.713	
Web vendors are more reliable	0.710	
It is easier to cancel orders with Web vendors	0.657	
Web vendors deliver orders/services in a more timely manner	0.634	
It is easier to place orders with Web vendors	0.603	
It is easier to contact Web vendors	0.598	
Web vendors offer more useful information about choices	0.589	
Web vendors have simpler payment procedures	0.578	
Returns and refunds are easier with Web vendors	0.550	
Web vendors offer better prices	0.506	
Providing credit card information through the Web...		
...is riskier than providing it over the phone to an off-line vendor		0.850
...is riskier than providing it to some unknown store when traveling		0.831
...just plain foolish		0.781
...is the single most important reason I don't buy through the Web		0.776
...is riskier than faxing it to an offline vendor		0.770
...wouldn't matter if the products/services were of a higher quality		-0.111
...wouldn't matter if the process were considerably lower		-0.115
...wouldn't matter if the Web vendor was well-known		-0.215
It is safer to use credit cards when making purchases from Web vendors		-0.583

few of these visits translate to sales. We thus speculate the following.

The likelihood of purchasing on the Internet decreases with financial risk. In addition to risk there may be individual characteristics and idiosyncrasies that affect the likelihood of purchasing on the Internet.

As consumers become more knowledgeable, their perception of risk decreases. Therefore, consumers

who are endowed with greater knowledge would tend to be less risk-averse. Knowledge is known to be a multidimensional construct [1, 4]. There are two aspects of knowledge: information capital and human capital. Information capital is the knowledge that consumers accumulate over time about computers, the Internet, and so forth. As the consumers accumulate such information these products cease to be a black box and become more like any other tool that consumers use every day. Hence, we expect consumers with greater computer experience to be more favorably inclined to shopping in cybermalls in particular, which results in the following point.

The likelihood of purchasing on the Internet increases as the consumer's experience on the Internet increases. Age influences through the second dimension of knowledge—human capital. This dimension deals with the experience with and knowledge about products. As people mature, through experience they learn more about the products in the marketplace and form more confident opinions about what suits their likes and what does not. Since they know what they need in any given situation, they do not have to feel and touch and be reassured by a salesperson that what they are purchasing is really what they need. Through experience they gain the confidence to choose products on their own initiative.



A second reason why older people would find Internet stores more attractive is because their lives are typically more time-constrained. As people climb higher in their professional careers, the demands on their time increase, forcing them to look for retail formats where they have to spend the least time. For this the Internet is ideal. (The reader should keep in mind that we are referring to consumers who already are on the Internet. Thus, elderly individuals who may have an aversion to computers and the Internet in general are not included within the domain of our study.) Therefore, we note the following.

The likelihood of purchasing on the Internet does not decrease with age (up to a certain age). The knowledge of product class builds up human capital [4]. In one

view, men typically buy hardware, software, electronics and women buy food, beverages, and clothing. Therefore the human capital of men is going to be higher for hardware, software, electronics. Since men are considered to traditionally buy in these product categories, they have greater confidence about what they need and they can go ahead and place orders on the Internet. But if it comes to food and beverages, the typical man is at a loss. He needs to look at a number of brands, read the labels, and generally examine the offerings before he can decide what to buy. Hence:

The likelihood of purchasing on the Internet for product categories like hardware, software, electronics is higher for men, and the likelihood of purchasing on the Internet for product categories like food, beverages, and clothing is higher for women. The consumer would choose Internet over the more traditional sources of retailing if his or her expected utility is greater than that from more traditional sources. Thus he would choose to patronize the retail format that gives him the maximum expected utility. While it is not possible to ascertain what the consumer actually prefers, the choices he or she makes are observable. It is then possible to infer the effects that the underlying variable had on this decision. Such analysis also allows uncovering hidden effects on preference.²

Data and Analysis

The data used in this article was collected via an online survey conducted by Georgia Institute of

Table 2. Product categories ordered by product risk parameter.

Product Category	Product Category Risk
Home Electronics More than \$50	-4.953
Legal Services	-4.558
Home Electronics Less than \$50	-4.089
Hardware More than \$50	-3.510
Software More than \$50	-3.362
Sunglasses	-3.298
Hardware Less than \$50	-3.261
Investment Choices	-2.799
Food and Beverages	-2.627
Videos and Movies	-2.551
Concerts and Plays	-2.296
Software Less than \$50	-2.296
Apparel and Clothing	-2.244
Travel	-2.113
Books	-1.757
Other Web Services	0.535
Music and CDs	0.736

²Readers are referred to our technical appendix, available from the authors upon request.

Technology's Graphics, Visualization, and Usability Center from April through May 1997 and endorsed by the World Wide Web Consortium (W3C). This article is based on the results obtained by analyzing the "Security of Transactions," "Opinion of Vendors," "Purchasing Behavior" and "General Demographics" sections of the survey.³

A detailed study of the dynamics of shopping behavior is necessary in order to understand such behavior. The respondents were asked what channels they used to make purchases of various products and services. In total there were 23 categories listed, of which we could use 17 in our analysis (the rest did not generate enough responses). Table 2 lists the product categories studied in our analysis.

The general demographics section of the survey contained an exhausting list of questions about the demographic profile of each respondent. The critical variables that were utilized in this study were:

- Gender;
- The age of the individual;
- The number of years the respondent had spent on the Internet;
- Marital status; and
- Whether the Internet was accessed at work.

The first three variables were included as per our earlier discussion. The number of years spent on the Internet acts as a proxy for the consumers' length of experience on the Internet (up to a limit). The last two variables were included primarily for the purposes of exploratory research.

Other sections of the survey focused on consumers' perceptions and attitudes toward transactions on the Web. In particular, we focused on sections that delineated consumers' motivating and resisting forces with respect to their attitudes about the Internet as a viable shopping medium. The "vendor opinion" section asked the respondents to rate statements such as "Web vendors offer better prices" (as compared to traditional channels) on a 5-point agreement scale. The same scale was used to measure the consumers attitudes about the security of financial transactions on the Web. Questions were of the type "Providing credit card information through the Web is just plain foolish."

Data Analysis

First the attitudes and opinion variables were factor analyzed. The key responses of the respondents were

Table 3. Product categories ordered by convenience parameter.

Product Category	Convenience
Home Electronics More than \$50	0.748
Home Electronics Less than \$50	0.566
Hardware Less than \$50	0.477
Software More than \$50	0.473
Hardware More than \$50	0.470
Concerts and Plays	0.469
Legal Services	0.468
Investment Choices	0.463
Music and CDs	0.433
Books	0.424
Videos and Movies	0.402
Software Less than \$50	0.401
Food and Beverages	0.320
Sunglasses	0.293
Other Web Services	0.270
Travel	0.230
Apparel and Clothing	-0.005

categorized into two distinct groups, one reflecting the financial risk and the other reflecting the convenience offered by the Internet stores.

The table clearly shows the nature and description of these two factors. The first factors have variables that highlight the positive aspects of the Internet and hence we use the name "Perceived Convenience" to describe it. The second factor reflects the "Perceived Financial Risk" of the Internet. Prior literature has shown there exists a relation between the risk perception of a new channel and the choice transacting via that channel. It is important for us therefore to use these new constructs in order to investigate the preceding issues about shopping behavior on the Internet.

How Risk, Convenience, and Demographics Affect Internet Shopping

The results of the analysis show some interesting (and some expected) results. Shopping on the Internet indeed did have similar amounts of product risk associated with it. There were only two categories ("Other Web Services" and "Music and CDs") that had positive preference for the Internet as a channel for purchasing goods. This needs some explaining! Most products when associated with the purchase on the Internet seem risky however, for these two categories respondents actually have a preference to shop on the Internet. For the first category, the reason is obvious. The first place one would go for Web services would be the Web itself. But the second ("Music and CDs") is not that simple. One argument would be that these products are not inher-

³Details about the surveys are available from the authors upon request.

Table 4. Product categories ordered by financial risk parameter.

Product Category	Financial Risk Parameter	Purchases (Count)	Purchases (% of total)
Books	-1.634	858	25%
Software More than \$50	-1.185	892	26%
Hardware Less than \$50	-0.838	705	21%
Music and CDs	-0.689	616	18%
Hardware More than \$50	-0.670	797	23%
Software Less than \$50	-0.625	1144	33%
Other Web Services	-0.574	1192	35%
Apparel and Clothing	ns	213	6%
Concerts and Plays	ns	216	6%
Food and Beverages	ns	99	3%
Home Electronics Less than \$50	ns	229	7%
Home Electronics More than \$50	ns	208	6%
Investment Choices	ns	331	10%
Legal Services	ns	93	3%
Sunglasses	ns	49	1%
Travel	ns	720	21%
Videos and Movies	ns	269	8%

ns: Not Significant at 0.1 level

ently risky. One knows exactly what one is about to get. The Internet reduces enough cost (or adds enough convenience) to actually make its purchase feasible.

In Table 2 we rank order the various categories in terms of decreasing product risk. The product risk is (naturally) higher for technologically complex products like electronics, hardware, and so forth. The product risk is also higher for ego-related products like sunglasses. The table therefore tends to lend credence to our conjecture that product categories associated with higher expenditure levels will have higher product risk (for example, Risks associated with Hardware, Software, and Electronics for “more than \$50” are greater than their respective counterparts at the “less than \$50” levels). Product risk is higher for food as one has to feel and touch it to determine freshness and so forth. It is interesting to see that product risk is low for apparel and clothing, whereas one would expect it to be high (because feel and touch are important). Though no details of the types of clothes purchased on the Internet are available, our perception is that most of the clothes are of a standardized type, like jeans or T-shirts, where color and sizes are probably well known and are not important considerations.

The next finding deals with ascertaining the relative convenience offered by the Internet. Again we can assemble a similar ordering based on our estimate of the convenience.

Readers should note we would expect many factors to affect this ordering. On the one hand larger, expensive, and more-involved products (home electronics, hardware) would be more convenient to buy on the Internet; on the other hand, products that require touch and feel (clothing, sunglasses) would be inconvenient. We accept that our analysis cannot accurately predict the tastes of the consumers, however, it does give the reader a general idea about what product categories are suited for commerce on the Internet. Table 3 shows that our general contentions are valid. The one interesting result was that “apparel and clothing” was considered a negative convenience by the respondents. We feel that is very intuitive—It is easy to imagine the inconvenience caused when a shirt

(or skirt) just doesn’t fit!

The effect of financial risk varies across product categories conditional on that category being perceived as a viable transaction type. The reader should note that this definition of financial risk is measured as the risk of credit card “fraud” and not as the risk of obtaining a poor price on a product. Since we did not have data on the actual number of transactions in each product category, we could not estimate the true effect. However, we did contend that product categories that are presently engaged in Internet commerce (hardware, software, CDs, and books) would be the ones with a higher financial risk parameter. Table 4 orders the product categories on the basis of their financial risk parameters and shows that this holds true.

The results in Table 5, regarding the influence of demographics on risk aversion, indicate that older consumers seem more open to purchasing on the Internet as do consumers who have spent more time using the Web. As expected the effect of gender was mixed. In the product categories where men have greater experience (for example, hardware, software, and electronics), being male significantly increased the probability of purchase while in categories such as food, beverages, and clothing the effect of being male was significantly negative.

One interesting result was that women are more likely to shop for legal services on the Internet. As per expectation the access point



Table 5. Results of interaction logit analysis.

		Hardware		Software		Home Electronics					
		Less than \$50	More than \$50	Less than \$50	More than \$50	Less than \$50	More than \$50	Legal Services	Food and Beverages	Investment Choices	Sunglasses
		1	2	3	4	5	6	7	8	9	10
Product Risk (Intercept)	1	-3.261**	-3.510**	-2.296**	-3.362**	-4.089**	-4.953**	-4.558**	-2.627**	-2.799**	-3.298**
Convenience	2	-0.477**	0.470**	0.401**	0.473**	0.566**	0.748**	0.468**	0.320**	0.463**	0.293**
Financial Risk	3	-0.838**	-0.670*	-0.625*	-1.185**	-0.906	-0.387	-0.761	0.414	-0.595	-0.303
Demographics											
Age	4	0.003	0.002	0.023**	0.019**	-0.015	-0.001	0.020	-0.003	-0.001	0.008
Access Point (Work=1)	5	-0.235	-0.194	-0.198	0.115	-0.015	-0.125	-0.708	-0.305	0.204	-0.553
Years on Web	6	0.433**	0.538**	0.299**	0.349**	0.266**	0.412**	0.192	0.035	0.088	0.150
Gender (Male=1)	7	0.695**	0.881**	0.480**	0.851**	1.614**	1.078**	-0.736*	-0.617**	0.595**	-0.555*
Marital Status (Married=1)	8	0.325**	0.282**	-0.075	0.178	-0.174	0.018	-0.084	-0.238	0.116	-0.503
Interactions with Financial Risk											
Age	9	-0.004	-0.007	0.012	0.004	0.007	0.009	-0.015	-0.013	0.003	-0.003
Access Point	10	0.060	0.162	0.159	0.018	0.425**	0.157	-0.165	0.128	-0.025	-0.317
Years on Web	11	0.017	0.032	0.041	0.062	-0.097	-0.002	0.322	-0.033	0.065	0.098
Gender	12	0.290	0.128	0.243	0.068	0.649	-0.150	-0.091	-0.100	-0.014	0.063
Marital Status	13	-0.060	0.077	0.138	0.162	-0.459**	-0.401*	0.315	-0.307	-0.092	-0.117

*significant at 0.05 level

**significant at 0.01 level

has no direct effect on the probability of purchase. This variable was incorporated to check that the correctness of the assumptions. Similarly, marital status was another control variable. We did not expect marital status to have any significant effect, and the results were generally supportive of our assumptions. The only exception in the 17 product categories studied was hardware, where marital status did have a significant effect.

Managerial Implications

In terms of the perceptions of the consumers regarding Internet as a marketplace, we find the Internet is still seen as a risky proposition, and such risk outweighs the convenience that it offers. The managers of Internet stores should, rather than focusing on shopping convenience, begin thinking about how to reduce the risk perception. There are two components to this risk. For example, there is a great deal of current emphasis on making the Internet connections more secure. However, this alone is not enough as there is product risk too. Managers should generate some plans to overcome this risk perception on the part of the consumers. Our analysis also shows there is a basis for segmentation on the basis of gender, marital status, and age.

Such segmentation would, however, need to be tailored for each product category.

It must be noted that while the model offers a framework to study consumer behavior on the Internet, it is limited by the fact that it fails to incorporate those who prefer not to access the Internet (or more importantly those who did not respond to the survey). Furthermore, this study is conducted at a given point in time and as the technology grows and is better understood by the consumers these perceptions will change.

So far we have focused on the impact of risk and convenience as determinants of channel choice. An interesting question for further investigation is: what level of perceived financial risk would make the Internet a competitive choice. (Note that we have not talked about either convenience or product category risk because these can be explicitly controlled by the manager.) Making the Internet "competitive" implies that, given a particular risk level, the consumer would be indifferent when faced with a choice about shopping at Internet or traditional stores. In preliminary analysis we find that Internet stores have a long way to go before they become a viable threat to traditional outlets (catalogs, retail stores, and so forth).



		Videos and Movies	Music and CDs	Books	Concerts and Plays	Travel	Apparel and Clothing	Other Web Services
		11	12	13	14	15	16	17
Product Risk (Intercept)	1	-2.551**	0.736**	-1.757**	-2.296**	-2.113**	-2.244**	0.535**
Convenience	2	0.402**	0.433**	0.424**	0.469**	0.230**	-0.005**	0.270**
Financial Risk	3	-0.245	-0.689*	-1.634**	-0.499	-0.472	-0.539	-0.574**
Demographics								
Age	4	-0.013	-0.021**	0.011**	-0.016*	0.013**	0.000	-0.004
Access Point (Work=1)	5	-0.153	-0.176	-0.008	0.071	0.035	-0.003	-0.206*
Years on Web	6	0.141	0.139**	0.257**	0.074	0.209**	0.091	0.112**
Gender (Male=1)	7	0.487*	-0.103	-0.321**	-0.034	-0.097	-0.908**	0.228*
Marital Status (Married=1)	8	-0.144	-0.099	-0.130	0.035	-0.013	0.236	0.063
Interactions with Financial Risk								
Age	9	0.000	-0.002	0.011*	0.003	0.003	-0.004	0.004
Access Point	10	0.111	-0.113	-0.245*	-0.169	-0.010	-0.113	-0.118
Years on Web	11	-0.069	0.018	0.177*	0.054	-0.018	0.053	0.042
Gender	12	0.268	-0.036	0.195	-0.030	0.265*	0.227	0.056
Marital Status	13	-0.209	0.033	-0.004	-0.099	-0.312	0.123	-0.046

By determining the “optimal” risk at which the Internet is “competitive” (the level at which a consumer will be indifferent between shopping at Internet or traditional stores) we can estimate what is the relevant risk reduction needed to achieve that level. (See the Appendix, available from the authors, for details.) For example in the Software <\$50 category the results show that $f(\phi)$ is estimated to be around 7.26 with a 95% confidence interval given by [5.78, 8.46]. The present estimated mean for perceived risk in this category is about 16.73. In other words there needs to be between a 50% to 65% reduction in perceived risk before consumers think of the Internet as an equivalent alternative to traditional sources.

Most categories showed similar results, which has significant implications for entrepreneurs looking at the Internet as an investment ground. First they may have to look for mechanisms that allow them to signal the security of financial transactions on the Web. Examples of these would be building secure sites and encrypting information. They may also want to explore alternative modes of payment. Recent innovations in banking such as virtual accounts and e-cash are steps in this direction. This is clearly an area for interesting future research. The ability to quantify the amount of perceived risk reduction that is needed before the Internet becomes a viable shopping medium will allow managers to make decisions regarding their advertising focus and spending. **G**

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