

HOW DO CONSUMERS TRUST THE SIGNALS IN E-COMMERCE MARKET - THE CASE OF COSMETICS PRODUCTS

Pham Thi Huong Huyen

huyenph@neu.edu.vn

Nguyen Thi Trang Nhung

nguyennhung.rf.tanviet@gmail.com

Vu Nhat Quang

quangvn.isfa7@gmail.com

Le Thi Viet Lien

121998vietlien@gmail.com

Nguyen Thi Hong Yen

hongyen.yynn@gmail.com

Mathematical Economics Faculty, National Economics University, Viet Nam

Abstract

Consumer trust is an important factor in consumer decision, especially in the market of credence good – the good that sellers know about its quality, but buyers do not. If the good is traded in E-commerce market, that information asymmetry can be even more amplified. This paper empirically studies how young consumers trust the signals provided by sellers (with a purpose of reducing the asymmetry) in the e-commerce market with the case of cosmetics. Cosmetics are the item chosen as a research object because it is a typical good for the group of goods – the group of goods that consumers can hardly distinguish the quality even after being used. In summary, we use a Rank Ordered Logit model for the surveyed data set to rank the importance of signals in customers' online cosmetic consumption decisions in conditions of asymmetric information of both markets and products. The signals include product quality signals, service signals, and operation signals. After controlling factors about customer characteristics, the authors find that signals such as "The store is a genuine agent", "the store is a booth on Shopee Mall", and "famous Beauty Bloggers review the store" receive the most trust from the customers. In addition, these signals also play an essential role in customer purchase intention. In contrast, stores respond to customers quickly and allow consumers to track orders as signals that are not so important to customers. Moreover, the higher the convenience of the rated site, the higher the level of trust in the signals will be. This result can be applied in categories including medicine, old electronics, and organic food.

Keywords: *Credence goods, E-commerce, ROL model*

1. Introduction and literature review

In the past few years, the e-commerce market has been increasingly active. Along with that, asymmetry in the e-commerce market in general and some items themselves have contained asymmetries, such as cosmetics, particularly a hot issue that receives the attention of both consumers and businesses. Because of the difference in information capture between consumers and businesses due to the "late" nature of transactions, inferior quality products and false signals are rampant in the market and even more alarming when they are processed more and more sophisticatedly. This asymmetry makes it almost impossible for consumers to distinguish between products and reliable signals from counterfeits. Therefore, this market also gradually gives customers a less sympathetic view and they remain loyal to the traditional shopping style even though online shopping brings many utilities.

The theory of information asymmetry between buyers and sellers was first mentioned by Akerlof [1]. He took into consideration the informational asymmetry in the product. Specifically, in the used car trading market, buyers are entirely disadvantaged compared to sellers when it is impossible to know in advance the quality of cars they bought before using them. The theory also points out that information asymmetry will direct the market away from its optimal level, and even extreme asymmetry can lead to the collapse of the market.

One theory developed from Akerlof's asymmetric information theory is the theory of signaling proposed by Spence. In asymmetric information, the theory is that suppliers of high-quality products must provide signals to consumers to help them distinguish their products from low-quality products. Signals can be in different forms, such as labeling, packaging and pricing.

Applying these two foundational theories to items containing asymmetric information, Stiglitz and his associates [3] studied asymmetry in the insurance market. In this market, customers or insurance buyers have more information than the sellers - the insurance companies. Insurers will categorize their customers by risk type by offering a wide range of insurance products to everyone and for customers to choose for themselves. For example, a low-premium, high-deductible health insurance policy will attract healthy customers while less attractive to customers with multiple health problems. Unhealthy customers are more likely to buy premium, low-discount policies. In this way, the market will lead to what the authors call a "Separating equilibrium" state, in another word, the market in which people's risk portfolios are determined by the type of insurance they have purchased. Stiglitz and Rothschild also point to certain conditions under which there will be no balance, and the market simply does not exist. In addition, he pointed out that asymmetric information and economic motivations are not merely academic abstractions but specific phenomena of far-reaching explanation in the analysis of institutions and market conditions in other developing economies.

Also, based on asymmetric theory (Akerlof) and signaling (Spence), some recent studies consider asymmetry and consumer confidence in the e-commerce market - an emerging and potential market.

In particular, the trim studies have reached certain conclusions. Z.liu [4] research on an online shopping app – Alibaba has discovered information asymmetry in e-commerce because of the difference between the time, space, and location of transactions. He has carried out the operational analysis, characteristics, and factors that influence the information asymmetry between buyers and sellers in the e-commerce market. Accordingly, during the transaction of the e-commerce market, the seller owns all the information about the store and the goods sold. However, because the seller pursues his interests, it maximizes the non-disclosure of its non-positive information or goods; information shared by both parties is unevenly distributed, causing problems of unfavorable selection and moral risks. Since then, Z.liu has analyzed the "game" made against the strategic choices of buyers and sellers in conditions of incomplete information. Finally, the study makes practical policies or proposals for analytical results, which reduces the level of information asymmetry in e-commerce so that Alibaba and other e-commerce platforms can achieve better development.

Another research trend that delivers more well-founded results is dosing studies, primarily using quantities of economic models and Machine Learning. Mavlanova and her associates' research uses a combination of Content analysis and K-means to compare signaling methods of online drug-selling websites. The study takes into account signaling in three aspects: the cost of signal s falsity, the ease of verification of the signal, and the time of signaling (before purchase, during purchase, and after purchase). Research shows that low-quality sellers display fewer signals than high-quality sellers, as well as low-cost and easy-to-verify signals such as "addresses," "communications." Meanwhile, signals such as "have a genuine agent", "have a seal from a third party" or "have a warehouse address" are high-cost and easy-to-verify signals that are only used by high-quality sellers. High-cost signals are not always profitable for low-quality sellers due to their initial cost because they often enter and exit the market quickly and re-appear with new domains. In contrast, high-quality sellers remain on the market and therefore benefit from the display of high-cost signals. Alternatively, research by Moriuchi [6] in Japan has pointed to the relationship between signaling and consumer trust. Research shows that their people are not willing to ignore product quality in exchange for discounted items or convenience in the online market. Instead, they are only willing to consume in the online market when they have confidence in product quality. For Japanese people, the trust when buying their goods comes from the belief in the product quality of the online shop, the supplier' coverage (for example, through advertising), fewer promotions, and finally, positive reviews of former consumers. These statements are concluded by analyzing the element - analyzing the original composition

(PCA) based on the data set surveyed by NTTCom Online Marketing Solutions Corporation (NTTCom) from customers who regularly shop online.

Studies of asymmetry in the e-commerce market combined with the asymmetry of credit items in Vietnam are pretty scarce, mainly dosing studies, or there is no combination of both issues. For example, Tran Ha Anh Quan and Tran Huy Anh Duc [7] study factors affecting customer trust in the e-commerce market. Although this study has found some specific factors that affect customer trust, it has not been intensely exploited in the asymmetry of markets and goods.

Summing up, studies show that, with items in the e-commerce market in general and credit items in particular, consumers often cannot evaluate the quality of products themselves before deciding to order and consume. Therefore, they must rely upon the signals given by businesses. In these signals, in addition to genuine and complex signals such as "genuine agents", "stores on Shopee Mall", ..., there are still unfounded and easily created signals such as "address", "communication method", "commitment to return", ... The above signals in Vietnam may not be reliable because the management mechanism is not as tight as in developing countries, so assessing the role of these signals for the Vietnamese market is essential and useful for both businesses and consumers. This will limit the information asymmetry between buyers and sellers when the buyer passively absorbs the business's signals. The results make consumer confidence in the e-commerce market decreasing and gradually shifting with traditional shopping. Therefore, to develop this market and build consumer trust, it is vital to stand as the underlying party for the accuracy of signals from state management agencies. In this study, we will be primarily interested in evaluating signals on the part of customers, namely the study of consumer confidence. In the situation that consumers cannot verify the quality of products before deciding to buy online, and even after receiving goods for typical items such as cosmetics, what signals will they rely on? It is the issue of top concern in this article, from which it is possible to make some recommendations for businesses, the state, and consumers. The selection of cosmetic items for research is based on two main reasons: Firstly, it is possible consider both asymmetry in the market and like the item – a combination that almost no research has mentioned; Secondly, cosmetics are an increasingly popular item for today's youth.

2. Method

Rank Ordered Logit (ROL) regression model.

To prove the quality of their products and prestige, or in other words, to minimize the asymmetry between buyers and cosmetic sellers, businesses need to give signals to attract consumer trust. However, besides the genuine signals, difficult to fake or need significant costs such as genuine agent certification, is the booth on Shopee Mall, ... then there are very easy to fake signals with the low cost such as communication methods and return

commitments, ... So, what signals do consumers believe? Therefore, this section will evaluate what signals are important to consumers when they decide to buy cosmetics online, thereby showing the feasibility of the signaling policies of the business.

In the questionnaire, consumers will perform a rating of 9 signals of the business given according to the degree of importance gradually increasing from 1 to 9. Since dependent variables are rating variables, the appropriate resolvable model is Rank Ordered Logit. The model was first introduced by Beggs [10]. The model can be concisely explained as follows:

For signal set from enterprises including J items; Random signals rated J by individual i (U_i), defined as:

$$U_{ij} = v_{ij} + \epsilon_{ij}$$

The defining part of v_{ij} the signal, which is the random component of ϵ_{ij} the signal, is assumed to be independent and follows the distribution of extreme values. As long as the random variables are independent and distributed identically, we have the following formula (Beggs and associates, 1981):

$$P(U_{i1} > U_{i2} > \dots > U_{ij}) = P(U_{i1} > U_{ij} | j \geq 2) \dots P(U_{i(j-1)} > U(r_{ij}) | j \geq j) \\ = \prod_{j=1}^J \frac{e^{v_{ij}}}{\sum_{k=1}^J \delta_{ijk} e^{v_{ik}}}$$

Therefore, the probability that the I rating signal 1 first, ..., the final J signal will be:

$$P(U_{i1} > \dots > U_{ij}) = \prod_{j=1}^J \frac{e^{v_{ij}}}{\sum_{k=1}^J \delta_{ijk} e^{v_{ik}}} \quad (1)$$

Moreover, it can be in which it can be in which: v_{ij}

$$v_{ij} = a_j + \sum_{i=1}^J \beta_j x_i \quad (2)$$

The indicators i sign the second person, and j are the corresponding signals; is a vector of the characteristics of the answer; $x_i \alpha, \beta$ are the numbers to estimate.

From (1) and (2), the probability function will be:

$$L(\alpha, \beta) = \prod_{i=1}^N \prod_{j=1}^J \frac{e^{a_j + \sum_{i=1}^N \beta_j x_i}}{\sum_{k=1}^J \delta_{ijk} e^{a_k + \sum_{i=1}^N \beta_j x_i}} \quad (3)$$

According to Beggs and his partner (1981), the ability function to concave co-variables, so the first-tier condition is also eligible for the highest function. Therefore, the parameters (α, β) can be estimated by explained to the first-degree condition for the function (3).

Data

Research items are cosmetics – favorite items of young people. Therefore, the study carried out a randomized investigation from students of the National Economics University. The data collection is done as follows: The author's group goes to several random classes, gives questionnaires and funding to all students in the class, and collects questionnaires soon after. The questions are based on previous studies and after examining samples on 20 consumers and eliminating inappropriate factors. The result received a questionnaire of 15 questions/group of questions. The questionnaire was then investigated for the second time by 30 other random consumers to ensure the words used in the questionnaire were easy to understand and clear. The survey received 305 responses, of which 42 responses that had never used cosmetics were removed from the list, the set of data used for calculation and analysis in the remaining study of 263 responses.

Table 1. Basis statistics for demographic variables

Variable		In template (Person)	Percent (%)
Gender	south	120	39.47
	female	184	60.53
Age	2000	92	30.26
	2001	137	45.07
	2002	59	19.41
	1999	16	5.27
Area	rural	124	40.79
	urban	180	59.21

The data collected is exceptionally even in terms of gender as well as hometown. Meanwhile, students born in 2001 accounted for half of all observations in the sample.

According to the survey, 86.18% of respondents used to buy cosmetics online. Over 74% of consumers used cosmetics from mid-range to high-end brands, and 89% believed that the products received were of the right quality as advertised when buying online. The above figures show that consumers also have a certain confidence in the online market. However, the number of people who believe in the quality of products when buying traditionally still reaches a higher percentage (96%). The figure is pretty close to reality because, besides the utilities of online shopping, consumers face more risks.

After studying the properties and effects of cosmetics. As well as gaps in online cosmetic consumption from previous research articles such as Kim [8]. Since then, the topic has carried out a review of the level of apprehensive of customers on a scale of liker 5 from very unbelievable (1) to very confident (5) about the risks that can be encountered as follows:

Health risks when using cosmetics online: Suffering from dangerous diseases such

as lead poisoning, skin cancer,...; Premature skin aging; Allergenic when used; Causes end noisy disorders.

Service risks when buying cosmetics online: Addresses and phone numbers provided on the web are misused; Account number took advantage of; The store does not give returns as committed; Cannot contact the store when the product has a problem; Do not receive goods after paying online via app.

Below is a brief description of customers' risk aversion when using online cosmetics through the author's survey.

Level of fear of risks of customers when consuming cosmetics in the e-commerce market

Table 2. Level of risk apprehensive of customers (unit: % by line)

Risk	Very unbelievable	Unbelievable	Medium news	Pretty trusting	Very trusting
Dangerous diseases	3.42	14.83	33.46	27.76	20.53
Aging skin	3.42	23.57	31.94	23.95	17.11
Allergy	3.42	23.95	30.04	27.38	15.21
End noisy disorders	4.56	23.95	30.80	28.14	12.55
Address, phone number misused	3.04	20.53	39.92	28.90	7.60
Don't give back	6.08	28.14	31.56	29.66	4.56
No contact	7.98	25.86	34.98	26.62	4.56
Account number being taken advantage of	5.32	29.66	36.50	24.33	4.18
Do not receive goods after payment	15.59	31.94	36.12	15.21	1.14

The majority of questioners were more concerned about health risks than service risks; the risk of dangerous diseases was the one that consumers were most concerned about (20.53%), followed by skin-related problems with 17.11% and endocrine disorders with 15.21%. In the survey, people were less interested in whether the account number was taken advantage of or did not receive the goods after paying online.

The e-commerce market in Vietnam is a new market with pretty a few loopholes in operation, which is why customers have a fairly high level of risk when trading in this market, especially with credit items such as cosmetics. Therefore, businesses need to send signals to attract and build trust with consumers.

Through previous research on consumer confidence such as Mavlanova [5], Morais [9], and through sample surveys about the signals that Vietnamese cosmetic consumers are

interested in when buying cosmetics online. The authors' team has synthesized some of the following signals:

Signals to increase customer confidence in product quality: The store is a genuine agent; The store is a shop on Shopee Mall; Products reviewed by famous Beauty Bloggers; Stores regularly receive good customer feedback

Signals that show that the enterprise has a system that operates in a system and reliably: The store is a genuine dealer; The store is a store on Shopee Mall; Products are reviewed by famous Beauty Bloggers; The store often receives good feedback from customers

The following signals indicate that the enterprise has a system that operates systematically and responsibly: The store has a specific address; The store displays the contact method; The store responds to customers quickly; Stores allow consumers to track order; The store commits to return and exchange when detecting inferior quality products

So, do the signals given by businesses promote the effect of attracting and building trust with customers? This is a question that is always interested by brands because each signal requires certain costs.

Customer confidence in the signals issued by the business.

In the questionnaire, the answer will evaluate the above nine signals on a liker five scale from very unbelievable (1) to very confident (5).

Table 3. Consumer confidence in signals when shopping online (unit: % by column)

signal \ Trust level	Very unbelievable	Unbelievable	Medium news	Pretty trusting	Very trusting
The store is a shop on Shopee Mall	0	2	29	40	30
The store is a genuine agent	0	1	25	47	27
Products reviewed by Beauty Blogger	1	10	40	36	14
Store with a specific address	0	6	47	40	6
Store receives good customer feedback	1	10	36	46	7
Store return commitments	1	13	36	41	9
Have communication methods displayed	0	14	52	30	4
Allow consumers to track orders	0	17	52	28	3
Store responds to customers quickly	3	19	57	20	2

In the above signals, considering the total percentage of customers who evaluate pretty confident, we find that the first 3 signals receive the most trust from customers with the percentage of trust: 70%; 74%; 50%. Realize that these 3 signals are official signals – certified and guaranteed information security help consumers have a basis for trusting the products they consume and the services they receive.

The signal group that receives a pretty high trust from customers is the 4th signal; 5; 6 according to table 3 with the percentage of customers trusting are 46%; 53%; 50%. Signals 5 and 6 have a fairly reliable and very trusting customer volume higher than signal 3. However, on the other hand, the number of customers is only half that of signal 3, so signal 3 is still more important. Considering that this signal group is intended to assert itself about the quality of its products, however, this information is difficult to verify, and no agency guarantees their accuracy.

The group that received the least customer trust was the last 3 signals with the corresponding percentage: 34%; 31%; 22%. These are signals about the service of the store and less correlation with the quality of the product.

So are the signals most trusted by customers important signals when consumers decide to buy cosmetics online? To answer this question, the authors continued to survey how important the signals are to respondents by ranking 9 signals on a scale of 1 to 9 with 1 being the least important and 9 as the most important. The results are as follows:

Ranked the top nine on a scale of 1 to 9.

From table 4, we consider the first signal (The store is a store on Shopee Mall) - this is the signal that many consumers rank highest when deciding to buy cosmetics online. For example, the number 47 in this line said 47% of the questioning people ranked this signal as the most important of the 9 indicators given.

Table 4. The importance of signals when consumers decide to buy online

(unit:% by line)

Signal	Rank								
	1	2	3	4	5	6	7	8	9
The store is a shop on Shopee Mall	4	3	1	1	3	5	11	25	47
The store is a genuine agent	8	5	1	3	7	8	17	19	33
Products reviewed by Beauty Blogger	2	3	5	10	10	16	14	22	18
Store with a specific address	8	7	8	6	16	10	20	15	11
Store receives good customer feedback	6	6	9	10	16	14	19	12	9
Store return commitments	3	2	6	6	14	21	21	18	8
Have communication methods displayed	7	5	5	5	15	13	25	16	8
Allow consumers to track orders	5	8	10	8	16	16	19	13	6
Store responds to customers quickly	6	5	5	11	16	18	22	9	6

The ranking results from table 4 are pretty similar to table 3 in terms of reliability and importance of signals to customers. Accordingly, genuine signals such as the booth on Shopee Mall, which is a genuine agent and reviewed by the famous Beauty Blogger, are still the most important signals for customers and the most trusted signals for consumers.

Furthermore, customers are not too concerned about service signals such as order tracking and quick responses.

3. Results

The topic of performing a revoicing of 9 ranking signals of trust (Rank) to evaluate the contribution of each signal to trust. The signals include: Signal1 (Store with a specific address); Signal2 (Does the store leave a communication metho; Signal3 (The store is a genuine agent); Signal4 (The store is a shop on Shopee Mall); Signal5 (Products reviewed by famous Beauty Bloggers); Signal6 (Store responds to customers quickly); Signal7 (Stores regularly receive good feedback from customers); Signal8 (Stores that allow consumers to track orders); Signal9 (Store commits returning if the product has problems).

Control variables include: Risk_health (Level of health risk apprehensive); Risk_ser (Level of service risk apprehensive); Signal_health (Trust in product quality signals); Signal_ser (Trust in service signals); Conv (Feel the convenience of online shopping); Amount (Quantity of cosmetics purchased/year); Grow (The percentage of purchases increases as customers believe the product is of good quality).

In particular, Risk_health, Risk_ser, Signal_health, Signal_ser, Conv result from analyzing EFA factors of variables on the level of risk apprehension, trust in signals, and feeling convenience. This step is intended to avoid multi-line problems due to high correlated variables with each other. Moreover, variables like Amount, Grow are the quantities that the respondents answered with such numbers.

Scale model:

$$L(\alpha, \beta) = \prod_{i=1}^N \prod_{j=1}^9 \frac{e^{\alpha_j + \sum_{i=1}^N \beta_j x_i}}{\sum_{k=1}^9 \delta_{ijk} e^{\alpha_k + \sum_{i=1}^N \beta_k x_i}}$$

In which:

- + α_j is the blocking system
- + x_i vector of characteristic variables of the i person (including Risk_ser, Risk_health, Signal_ser, Signal_health, Conv, Amount, Grow)
- + β_j is the vector of the system corresponding to the j signal x_i

Table 5. ROL result

Var (1)	Coef. (2)	Std. Err (3)	z -value (4)	Pr(> z) (5)	Var (6)	Coef. (7)	Std. Err (8)	z - value (9)	Pr(> z) (10)
Intercept					Signal: Signal_health				
Signal2	-0.81	0.14	0.43	0.664	Signal2	-1.75	0.16	- 11.05	0.000

Signal3	1.56	0.15	10.14	0.000	Signal3	-0.18	0.17	-1.07	0.287
Signal4	1.47	0.15	9.66	0.000	Signal4	-0.01	0.17	-0.04	0.972
Signal5	0.07	0.15	-5.64	0.000	Signal5	0.20	0.18	1.13	0.257
Signal6	-1.48	0.16	-9.38	0.000	Signal6	-1.30	.	.	.
Signal7	0.09	0.15	-6.06	0.000	Signal7	-0.15	0.17	-0.88	0.379
Signal8	-0.86	0.14	0.59	0.558	Signal8	-1.67	0.16	10.61	0.000
Signal9	-0.10	0.14	-9.76	0.000	Signal9	-0.94	0.16	-5.85	0.000
Signal: Risk_ser					Signal:Conv				
Signal2	-0.40	0.16	2.52	0.012	Signal2	0,38	0,13	-2,9	0,004
Signal3	0.27	0.15	1.89	0.058	Signal3	0,32	0,14	-2,31	0,021
Signal4	0.24	0.14	1.65	0.099	Signal4	0,47	.	.	.
Signal5	0.01	.	.	.	Signal5	0,12	0,13	-0,89	0,371
Signal6	-0.24	0.16	-1.48	0.138	Signal6	0,31	0,13	-2,43	0,015
Signal7	0.08	0.15	0.53	0.599	Signal7	0,39	0,14	-2,72	0,007
Signal8	-0.41	0.16	2.64	0.008	Signal8	0,24	0,13	-1,89	0,058
Signal9	-0.27	0.15	1.8	0.072	Signal2	0,38	0,13	-2,9	0,004
Signal: Risk_health					Signal:Amount				
Signal2	0,37	0,14	2,66	0,008	Signal2	-0,04	0,02	-2,33	0,02
Signal3	0,47	0,14	3,28	0,001	Signal3	-0,03	0,02	-1,98	0,047
Signal4	0,39	0,15	2,67	0,008	Signal4	-0,02	.	.	.
Signal5	-0,13	0,14	0,88	0,381	Signal5	0,00	0,02	-0,13	0,895
Signal6	0,08	0,14	0,57	0,566	Signal6	-0,01	0,02	-0,35	0,728
Signal7	0,00	.	.	.	Signal7	0,00	0,02	0,2	0,839
Signal8	0,07	0,14	0,53	0,596	Signal8	-0,01	0,02	-0,54	0,589
Signal9	0,29	0,14	2,04	0,041	Signal9	-0,04	0,02	-2,23	0,026
Signal: Signal_ser					Signal: Grow				
Signal2	1.32	0.15	8.54	0.000	Signal2	0,01	0,02	0,59	0,556
Signal3	-0.16	0.17	-0.94	0.347	Signal3	0,03	0,02	1,45	0,146
Signal4	-0.51	0.17	-2.96	0.003	Signal4	0,00	.	.	.
Signal5	-0.27	0.17	-1.6	0.109	Signal5	-0,04	0,02	-2,19	0,029
Signal6	0.92	.	.	.	Signal6	-0,07	0,02	-3,3	0,001
Signal7	-0.03	0.17	-0.19	0.849	Signal7	-0,06	0,02	-2,45	0,014
Signal8	1.15	0.15	7.58	0.000	Signal8	-0,06	0,02	-2,86	0,004
Signal9	1.22	0.15	8.31	0.000	Signal9	-0,02	0,02	-1,02	0,307

From table 5 can explain the result as follows:

+ The above parameters compared to the reference category (Signal1 – store displays specific address).

+ Value - 0.81 in column 2, the first line shows the importance of signal 2 compared to signal 1 for customers. A few times, the respondents believed in signal 2 less than the 1-time $e^{0.81}$ signal. However, the corresponding P_value in the 4th column is 0.664, so this difference has no statistical significance.

+ Column 2 figures show that the difference between signal 3 (1.56) and signal 4 (1.47) is the largest, proving that these are the two most important signals for customers when buying cosmetics online. Moreover, signal 6 has the most negligible impact on consumer confidence (-1.48).

The following result is a difference in the ranking of how important the signals are to groups of customers who have a different level of trust in signals and varying degrees of risk apprehension. Again, the result of the number explained compared to the store shows the specific address.

After controlling variables such as trust in health and service signals as well as the level of fear of risks, convenience, ... we can see that trust in signals, level of risk apprehension, sense of convenience, the quantity of consumption, and growth of purchasing volume when ingesting different product quality affects the ranking of the importance of signals.

More specifically, first, we look at the group of customer service risk apprehensive levels (Risk_ser).

+ The above Risk_ser for Signal5, Signal6, Signal7 is not statistically significant. This implies that the percentage of customers who trust "products reviewed by well-known Beauty Bloggers", "stores that respond to customers quickly", "stores that receive good feedback from customers" compared to "stores that show specific addresses" is the same for those with different levels of service risk.

+ For Signal2, the Risk_ser-to-negative and statistically significant ratio demonstrates that the higher the level of risk apprehensive, the smaller the trust rate in the "store that displays the communication method" according to the "store that shows the specific address". In other words, those who are more afraid of service risks tend to believe in "specific addresses" than "communication methods."

+ Mathematically, the factor - 0.4 in signal2 implies that: When other factors are constant, if the level of fear of service risk increases by 1 unit, the ratio between customers believing to "store display communication method" compared to believe in "store showing specific address" decreases times $e^{0.4}$

Similarly, we can explain the estimated values of the system to the group "level of apprehensive of product risks", "signals to help customers believe in service", "signals to help customers believe in product quality", "feel about convenience", ...

When controlled with the variable "sense of convenience" (Conv), the result is quite remarkable when the estimates are optimistic and almost statistically significant (column 7). This means improving the convenience of online shopping that can help increase the reliability of signals.

4. Discussion and Conclusion

This article evaluates the importance of the signals provided by businesses. The reason for the cosmetic products is chosen because these products inhibit information asymmetry at a high level. Furthermore, the market for the products is expanding rapidly.

Rank Ordered Logit results showed that the signals rated by consumers as the most important include: "The store is a genuine agent", "The store is a store on Shopee Mall", "The product is reviewed by the famous Beauty Blogger", "The store regularly receives good feedback from customers", and "The store has a commitment to return". Meanwhile, the least popular signals for customers include "Quick Customer Feedback Store", and "Store for Order Tracking".

Increasing the convenience of the website can increase consumer confidence in buying cosmetics online.

From here, the study makes some recommendations for businesses, the state, and consumers as follows:

- + Enterprises can set some policies to attract and increase customer trust such as publicity of business certificates and legal product quality certifications; legalization of return commitments; collaboration with famous Beauty Bloggers; actively ask for feedback from customers after use, to control and improve the quality of products and service quality of the company regularly.

- + Businesses need to regularly approach and update new utilities and features of online sales websites such as proposing items that are of frequent interest to customers; 3D product display makes it easier for customers to observe and evaluate products that minimize the information asymmetry of products, or in other words, increase customer trust in product quality; set up utility programs such as 2-hour delivery with customers in the same province/city as big websites (Shopee, Tiki) are implementing.

- + Signals that are not so important such as "Quick customer feedback" and "Let customers track orders" if they cost too much to operate, may consider not signaling.

+ On the stateside, to develop this market, the state needs to stand up to ensure the authenticity of the information provided by the store such as addresses, return commitments, certifications, ... make these information security factors a legal issue and provide appropriate penalties for fraud and information creation so that consumers have more basis to believe in the signals given by the business.

+ Customers can also rely on these signals to base their trust when deciding to buy cosmetics online because the people in our survey are all people who have bought cosmetics online and made an objective assessment.

5. References

1. Akerlof, G. (1970). *The market for 'lemons': Qualitative uncertainty and the market mechanism*. Quarterly Journal of Economics, 84, 488–500.

2. Beggs, S., Cardell, S., & Hausman, J. (1981). *Assessing the potential demand for electric cars*. Journal of econometrics, 17(1), 1-19

3. de Morais Watanabe, E. A., Torres, C. V., & Alfinito, S. (2019). *The impact of culture, evaluation of store image and satisfaction on purchase intention at supermarkets*. Revista de Gestão.

4. Kim, J. H., & Ha, J. K. (2010). *Purchase behavior and risk perception in cosmetics purchases at online shopping malls*. Korean Journal of Human Ecology, 19(6), 1003-1012.

5. Moriuchi, E, I Takahash (2016), *Satisfaction trust and loyalty of repeat online consumer within the Japanese online supermarket trade*, Australasian Marketing Journal (AMJ), 2016

6. Spence, M. (1973). *Job market signaling*. Quarterly Journal of Economics, 87(3), 355–374.

7. Stiglitz, J., & Weiss, A. (1983). *Alternative approaches to analyzing markets with asymmetric information: reply*. The American Economic Review, 73(1), 246-249.

8. Tamilla Mavlanova, Raquel Benbunan-Fich & Marios Koufaris (2012), *Signaling theory and information asymmetry in online commerce*. Information & Management, 49(5), 240-247.

9. Troops, T. H.M., – Germany, T. H. A. (2020). *Factors affecting the trust of customers in e-commerce in Vietnam*. Journal of Economic Development, 51-69.

10. Z Liu (2020), *Research on Information Asymmetry in C2C E-Commerce: Based on the Case of Alibaba*, 5th International Conference on Financial Innovation and Economic Development (ICFIED 2020)