Factors Affecting Sustainable Model of Tea Crops, Tea Products and Price in Northern Region of Vietnam, Supply Chain Management Issues - And Marketing Strategy Issues

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Abstract

Tan Cuong tea planting in Thai Nguyen Region in northern region of Vietnam has raised concerns in sustainability in agriculture. Tan cuong green tea has many chemical components such as water, tannins, caffein, vitamin and mineral. Based on the fact that subjects participating in the cognitive

chain are still having very limited recognition in terms of global value chains and requirements international market demand as well as from farmers to processing enterprises, they pay little attention to quality, branding and investment for science and technology for quality improvement and competitiveness enhancement. By using experiences, observation, synthesis, analysis, and OLS regression model, the study findings suggest that good tea value chain requires not only applying VietGAP, GlobalGap, etc. Standards but also using the right inputs at the right time, reducing costs as well as product quality improvement. Additionally, study results show us that in a 3 factor regression model, exchange rate has higher (positively) impact on tea price while trade balance has negative correlation with tea price.

Last but not least, authors stated we need to develop tea product range development and for farmers to apply pricing strategy that can be either competitor-based pricing or psychological pricing, or can apply skimming price or penetration price.

Key words: tea crops, tea value chain, price, northern region of Vietnam, sustainable model, marketing strategy

JEL: M21, G32, G38

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1. Introduction

There are high involvement of farmers in to the value chain of tea production in the norther region of Vietnam, for instance, in Thai Nguyen region.

Thai Nguyen tea specialty has an unmistakable unique feature so that people who enjoy it can feel it when drinking a cup of tea.

Thai Nguyen tea has been a famous specialty for many generations, especially Thai Nguyen Tan Cuong Green tea, which is always appreciated for its delicious and stable tea quality throughout the year.

If we break down chemical components of green tea leaves we will see:

1.Water:

The water in the tea material is the medium where the interactions between the substances present in the tea material occur during processing. Water participates directly in many hydrolysis, redox reactions. Water content is closely related to tea processing. If the tea material is dehydrated too quickly, the biochemical changes take place quickly and not completely, sometimes the enzyme is inhibited if the water content is too low (<10%). More or less water in tea materials will cause the tea leaves to be crushed when crushed. In the process of tea processing, it is necessary to control the evaporation of water, especially in the production of black tea.

2. Phenolic compounds (tannins): (or Tannins)

Phenolic compounds play a major role in the process of creating color and flavor of tea, especially black tea. Tannins have the property of being easily oxidized under the action of enzymes and are supplied with adequate oxygen. Therefore, the more tannins in raw tea, especially soluble tannins, the higher the quality of black tea products. Flavanoids are important components of Tanin, in which Catechin and Flavonol make up a large proportion.

3. Caffeine:

Structure of caffeine:

The main alkaloid of tea is caffeine, which has pharmacological effects, creating a feeling of euphoria for the drinker. Caffeine is a purine derivative named and structurally called 1, 3, 5, and trimethylxanthine, accounting for about 3-4% of the total dry matter in fresh tea leaves.

Caffeine has the ability to bind with tannins and its oxidation products to form caffeine tanates. These salts are soluble in hot water, insoluble in cold water, and create the aroma and color of green tea, reducing bitterness and improving the quality of the finished product.

4. Proteins and amino acids:

Protein in tea buds is unevenly distributed, accounting for about 15% of the total dry matter of fresh tea leaves. Protein can directly combine with tannins and polyphenols, creating insoluble compounds that make black tea cloudy. But in the processing of green tea, protein combines with a part of tannin to make the bitter and acrid taste less, so to some extent, protein is beneficial to the quality of green tea.

Today, 17 amino acids have been found in tea. In which 10 basic amino acids are: Theanine, phenylalanine, leucine, isoleucine, valine, Tyrosine, glutamine, serine, glutamic, aspartic. These amino acids can combine with sugars and tannins to create aldehydes and alcohols that give black tea the aroma, and they also contribute to the taste of green tea.

5. Carbohydrates:

In the carbohydrate composition of tea, the most interesting is the soluble sugar. Under the effect of heat and other factors, the sugars will change to create a characteristic flavor for the finished product. In addition, the sugars also work with proteins and amino acids to create the aroma of tea.6. Các chất màu:

Các chất màu trong lá chè gồm có: Anthocyanidin (Cyanidin, Delphenidin), Carotenoid, Chlorophyll. Các hợp chất màu có vai trò quan trọng trong tạo màu cho thành phẩm.

7. Vitamins and Minerals:

In tea buds contain most vitamins such as vitamin A, B1, B2, PP, especially Vit C is abundant in tea, 3-4 times higher than oranges and lemons. During the processing of black tea, the vitamin C content decreased significantly, while in green tea, the decrease was not significant. Therefore, the vitamin C content in green tea is usually 10 times higher than that of black tea.

(source: tancuonggreentea.co,m access date 8/12/2021)

2. Literature review

First, it is necessary to develop more activities for value chains of tea products in the northern region of Vietnam, esp. In Thai Nguyen region as well as more discussion on marketing mix solutions needed.

A number of studies have analyzed policy barriers for some specific commodity sectors as well as for business participation. According to Dao The Anh and Thai Van Tinh (2015), the lack of close policy coordination between the Ministry of Agriculture and Development rural areas and the Ministry of Industry and Trade affect the rice value chain. With changes institutions and policies within the framework of agricultural restructuring and agricultural product value chains Vietnam will develop quickly and sustainably.

Next, Thi Thanh Huong, L., Quynh Nam, V., Tran Ngoc Huy, D., Van Tuan, P. and Van Hong, P. (2021) stated Among results is relating to coffee seeds and technique planting of farmers with suitable land area and the solutions and ways for farmers to earn profits after they invest into coffee and tea crops.

Moreover, Dinh Tran Ngoc Huy et al (2021) stated To ensure sustainability in tea and coffee crops as two main crops in the northern region of Vietnam, for instance in Son La and Thai Nguyen Provinces, we need to explore changing traditional production methods (manufacturing according to own experience) by a new way of production according to the production process cleaner, safer (VietGAP, GlobalGap, ..). This production process helps households, Farmers use the right inputs at the right time, reducing costs as well as product quality improvement.

Then, We summarize previous studies in below table

Table 1 - Summary of related studies

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Wenner	2011	Agriculture will play a key role in future development as nearly 70 percent of the population participates directly in agricultural work. Each crop that is produced

		and exported in Vietnam will play a different and integral part in development as the face of agriculture changes with Vietnam's increased global presence.
Ngo Thi Hong Hanh	2012	focuses on comparing and evaluating the economic efficiency of varieties of tea (midland tea and branch tea)
Nguyen Thi Phuong Thao, Do Thuy Linh	2015	show that the poor difficult to join the chain and receive negligible benefits. The poor are productive, yield per unit of cultivated area and total product income tea is lower than that of the average and well-off households
Nguyen Hong, & Yabe, M	2015	increasing the utilization of resources in the study site was inappropriate. The study also revealed that the average input-oriented TE of tea farms was lower than that of output-oriented TE, 82.21% versus 92.29%, suggesting that the farmers had more ability to reduce resource use than to increase current output level. The results showed that the tea farmers could use resources more efficiently by reducing 17.79% of the current application level without compromising the output. The study also indicates that concerted efforts from government to increase farmers' accessing extension service, widening soil and water conservation practice, and spreading farmers' awareness on water scarcity is the key to improve farmers' resource use efficiency.
Ha, N. T. T., Van, P. N., & Huy, D. T. N.	2021	There are Opportunities and challenges for Vietnam society and labor market when signing evfta agreement.
Tinh, D. T., Thuy, N. T., & Ngoc Huy, D. T. (2021).	2021	We need more resources to support for Vietnam universities in Business Research and Teaching Methodology

		for Undergraduate, Postgraduate and Doctoral Students
Thuy Dung, T. V., Huy, D. T. N., Trang, N. T. H., & Thach, N. N.	2021	Human education is vital for emerging markets
Le Thi Thanh Huong et al	2021	In the northwest region, tea and coffee crops have been increasing in both quality and quantity and scientists are trying to find ways to increase productivity, as well as eliminate damaging insects and coffee berry borer, etc in order to reduce damages for farmers. The fact in agriculture is that when farmers are in good crops, the coffee price is going down and vice versa
Huy, D.T.N et al	2021	next solution is to replace gradually chemical pesticides (at least reduce proportion) in agricultural using, with insect traps such as insect alcohol traps or bottle traps in order to eliminate female insects (Coffee berry borer- CBB) that are harmful and their next generation as well.

(source: author synthesis)

3. Methodology

In this study, authors not only use experiences and observations, but also qualitative analysis with inductive and synthesis methods, combined with dialectical materialism method.

We also analyze previous related studies on same topics.

Authors mainly use qualitative analysis based on descriptive statistics and Authors also make SWOT analysis and recommendations for marketing mix strategies

4. Main findings

4.1 Labor division in Tea production in northern region of Vietnam and SWOT analysis

In Thai Nguyen region both male and female could become tea planting farmers.

The planting and tending of tea has a fairly clear division of labor. Most activities

This movement is mainly performed by women. Female participants (in terms of time, number of days working) compared with men is because tea picking is mainly done by hand, these jobs more suitable for women. In contrast, spraying pesticides for tea is mainly due to done by men (69% of pesticide spraying is done by men in the household).

Table 2- Division of labor in tea growing and processing

	By stage (%)	By gender (%)		
DIY	100	Male	Female	Ratio
Planting and caring for tea	92.3	34.1	65.8	100
Tea processing	7.7	34.4	65.5	100
Hire labors	100			

Planting and caring for tea	88.3	6.7	93.2	100
Tea processing	11.7	0.7	99.2	100

(source: Le Manh Hung, Phan Van Hong project, 2019)

Figure 1 - Planting tea in Thai Nguyen Region In the North of Vietnam

(source: author collection)

Next we can make SWOT analysis for tea products as below:

Table 3 - SWOT analysis for tea crops

Opportunities	**Threats**
- When Vietnam enter free trade agreements such as EVFTA and UK agreements, Tay Bac provinces will have more agricultural development opportunities - Vietnam is increasingly integrating deeply with increasing requirements, especially when implementing new-generation free trade agreements (CPTPP, EVFTA...). Generational free trade agreements create great opportunities for Vietnamese agricultural products to access markets and promote comparative advantages as well as participate in global value chains, especially when the level of agricultural products is high. Export tax on agricultural products will be reduced to 0%. However, in today's international trade, while tariff barriers are decreasing.	- High competition from other countries and markets (India, Japan, Thailand, Israel) - Research on bad or negative effects of drinking too much tea - Demanding markets (USA, EU, Japan) to set policies in the tea value chain of Thai Nguyen province in particular and Vietnam's tea industry in general
Strengths	**Weaknesses**
- tea is a traditional agricultural tree with high economic values - farmers having lots of experience in planting and harvesting tea - Tan cuong tea gain advantages in geographical area, climate, land, etc.	- It will cost some money for farmers to follow VIETGAP/GLOBALGAP process. - Need to organize better linkage in production value chain

(source: author analysis)

4.2 Sustainable value chain concept in agriculture

Nguyen Ke Tuan (2004) assesses the current situation of the rice, tea, coffee, rubber,
vegetables and fruits for Vietnam's export and indicate the production and processing level of these products this item is still low; As a result, umbrellas are produced in large quantities and participate exported but mainly in raw form or just preliminarily processed. Research by
Pham Ngoc Tram (2006) analyzes the connection of small agricultural producers with
global value chain, analyzing the characteristics of some agricultural products in Vietnam from chain approach, difficulties (due to competitiveness) when participating in
value chain of small and medium enterprises.
Agricultural value chain studies from the global value chain participation approach, green supply chain, so far, there are quite a few studies on the value chain of agricultural products,
The research focuses on analyzing the main export agricultural products of Vietnam
Vietnam or specifically mention the industry in a certain locality, notably
research:
Studies on value chains of agricultural products: Bui Quang Tuan and Le Van Hung (2014); Bui Quang Tuan and Nguyen Dinh Hoa (2015) study the current situation of value chains of Vietnam's key export products such as coffee and cashew. Nguyen Phu Son and Le Van Gia Nho (2013) analyze the green apple product value chain in Ninh Thuan province. A study by GTZ and MOIT (2006) analyzes the dragon fruit value chain in the province-Binh Thuan and grapes of Ninh Thuan province. Overall, these studies have focused analysis and evaluate actors participating in the value chain, costs and profits of Links in the value chain, linkage models in the value chain and the role of government at all levels in the development of the agricultural sector. The studies all have the same rating of The current status of agricultural value chains in Vietnam despite the development of agricultural production output, but the value brought in the value chain of agricultural products is very small, Vietnam's agricultural products are mainly at low value-added stages
competition in the international market is not high.
Studies on Vietnam's tea value chain
Ngo Thi Hong Hanh (2012) focuses on comparing and evaluating the economic efficiency of varieties of tea (midland tea and branch tea). Research results show that tea branches have higher criteria than midland tea trees, effective in production activities.
Exporting tea branches brings higher economic efficiency than midland tea.
New planting, investment in renovating old tea, switching to intensive farming on Kinh tea area, Business is being carried out by farmers at all levels. However, in practice the process of transformation is still facing many challenges that need to be solved, especially for with tea growers.
Nguyen Thi Phuong Thao, Do Thuy Linh (2015) research on the participation of the poor into the tea value chain. Research results show that the poor difficult to join the chain and receive negligible benefits. The poor are productive, harvested yield per unit of cultivated area and total product income tea is lower than that of the average and well-off households. Cause of the problem:
This is because poor households lack production conditions or harvested tea is only preliminary processed for sale.
Meanwhile, well-off households have conditions to invest in tea production at all stages
more fruitful.
The author Nong Thi Dung (2018) focuses on research on linkages in the supply chain
tea of small and medium enterprises participating in the tea supply chain of Thai Nguyen province. Research shows the link between subjects in the above tea product chain
In Thai Nguyen province, tea is almost absent, or if there is, it is also very small and not practiced tightness.

Research by MCG (2014) evaluates the tea value chain under the impact of climate change Queen. Research shows that tea growing areas are mainly located in areas with topographical conditions difficult (hilly) and extreme

weather conditions. Meanwhile, adaptive capacity of tea growers is still limited, the support policies are still inadequate.

As a result, tea growers face many risks and find it difficult to participate in the value chain, if participation is also only at the low value-added stage.

Do Thuy Ninh (2015) studies the value chain of tea industry in Thai Nguyen province. The author has analyze the status of the actors involved, the linkage between actors in the price chain tea treatment in Thai Nguyen province. The study has in-depth economic analysis of the stages in value chain, the added value of each stage and how the chain is managed. However, This study starts with the tea grower as a starting point and skips the supply chain supply chain inputs (inputs for agricultural production, science and technology for tea growers) and thus the chain analysis lacks comprehensiveness. The author only episode focus on value chain research with limited domestic market (economic analysis for consumers is the domestic market, not to mention the requirements and possibilities entering the world market).

4.3 Tan Cuong Special Tea products in Thai Nguyen Northern Region Of Vietnam

First of all, Tan Cuong tea is a special brand in Thai Nguyen region, Vietnam.

Figure 2 - Tan Cuong tea products

(source: author collection)

In terms of appearance, Tan Cuong tea is dark green, silver gray, and after processing, the tea wings are twisted, compact, and crispy. There is a lot of white powder on the surface of tea petals. The tea is very clear, the green turns pale yellow like the color of young nuggets. Tea has a sweet, pleasant, harmonious, happy taste, almost no bitter taste. The smell of tea is sweet and pleasant. The quality, including the criteria of appearance, water color, taste and especially the aroma of Tan Cuong tea, is not derived from the characteristics of the tea variety but is the result of a very meticulous and elaborate processing process. The characteristic aroma of Tan Cuong tea is mainly the aroma generated by heat treatment.

Distinguishing good tea

According to the traditional experience handed down by the elders of the tea country, whether or not tea is good or not is evaluated according to four standards: Thanh, Sac, Taste, and God. Delicious tea is a kind of tea with a honey-yellow green color (Thanh); wings curved like a hook, regular, black straight, blue side view (Sac); When you drink it, it has a rich, fleshy, greasy taste, with the smell of nuggets in your mouth, when you first drink it, it has a smooth chat, after drinking it has a sweet taste that lingers for a long time (Taste); Charming aroma, only found in tea, cannot be mixed with other drinks, bringing refreshment and sublimation to tea drinkers (Gods). After a pot of tea, people enjoying tea feel warmth in their hearts, human affection sublimate, spiritual refreshment, lightness and serenity.

(source: wikipedia.org, access date 08/12/2021)

4.4 Tea crops and tea planting technology

About 30 years ago, Tan Cuong tea growers have put many technical advances into production to increase tea yield, even "pressing" not to let tea plants hibernate as a rule; widely use chemical fertilizers, especially nitrogen fertilizers to increase leaf yield and harvest time.

The use of chemical fertilizers and nitrogen fertilizers helps to make tea leaves very young, attractive to pests and bugs that eat tea leaves. Just like that, people have to spray pesticides to protect tea trees... Excessive farming, following productivity as a habit in production, causes the land to be squeezed dry.

With the way of "tea pot" care, the tea yield is high, but the long-term loss to the soil and health, the tea growers are very clear; Not only that, it also affects the quality and natural flavor of the tea plant.

Figure 3 - Planting tea in Tan Cuong Thai Nguyen region

(source: author collection)

In order to produce delicious Thai Nguyen tea, Tan Cuong Xanh always focuses on the stage of raw tea, which is bud tea, must have enough growth time, grown according to VietGap standards and harvested in the right season. With the advantage of long-term experience in the field of tea production, when Thai Nguyen tea is in the main season, it is autumn, this is the time for Tan Cuong Xanh to harvest and store the largest tea output of the year.

4.5 Regression model for tea production

Figure 4 - OLS for 1 factor exchange rate

Dependent Variable: TEA_PRICE
Method: Least Squares
Date: 12/08/21 Time: 16:36
Sample: 1 9
Included observations: 9

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EX_RATE	840.3676	934.4772	0.899292	0.3984
C	-278.6440	2139.888	-0.130214	0.9001

R-squared	0.103567	Mean dependent var	1645.611
Adjusted R-squared	-0.024495	S.D. dependent var	73.27427
S.E. of regression	74.16627	Akaike info criterion	11.64363
Sum squared resid	38504.44	Schwarz criterion	11.68745
Log likelihood	-50.39632	F-statistic	0.808726
Durbin-Watson stat	1.236312	Prob(F-statistic)	0.398376

(source: author analysis with Eview)

Figure 5 - OLS for 1 factor trade balance

Dependent Variable: TEA_PRICE
Method: Least Squares
Date: 12/08/21 Time: 16:37
Sample: 1 9
Included observations: 9

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TRADE_BALANCE	-0.060040	0.043753	-1.372250	0.2123
C	1633.590	24.77918	65.92589	0.0000

R-squared	0.211984	Mean dependent var	1645.611
Adjusted R-squared	0.099410	S.D. dependent var	73.27427
S.E. of regression	69.53684	Akaike info criterion	11.51472
Sum squared resid	33847.61	Schwarz criterion	11.55855
Log likelihood	-49.81624	F-statistic	1.883070
Durbin-Watson stat	1.211560	Prob(F-statistic)	0.212340

(source: author analysis with Eview)

Figure 6 - OLS for 1 factor VNIndex

Dependent Variable: TEA_PRICE
Method: Least Squares
Date: 12/08/21 Time: 16:37
Sample: 1 9
Included observations: 9

Variable	Coefficient	Std. Error	t-Statistic	Prob.
VNINDEX	0.067448	0.111386	0.605533	0.5639
C	1596.051	85.71258	18.62096	0.0000

R-squared	0.049774	Mean dependent var	1645.611
Adjusted R-squared	-0.085972	S.D. dependent var	73.27427
S.E. of regression	76.35911	Akaike info criterion	11.70190
Sum squared resid	40815.00	Schwarz criterion	11.74573
Log likelihood	-50.65856	F-statistic	0.366671
Durbin-Watson stat	1.343060	Prob(F-statistic)	0.563934

(source: author analysis with Eview)

Figure 7 - OLS for 3 factors

Dependent Variable: TEA_PRICE
Method: Least Squares
Date: 12/08/21 Time: 16:38
Sample: 1 9
Included observations: 9

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EX_RATE	408.8593	1063.556	0.384427	0.7165
TRADE_BALANCE	-0.087640	0.048806	-1.795670	0.1325
VNINDEX	0.130975	0.136498	0.959538	0.3814
C	595.6268	2377.177	0.250561	0.8121

R-squared	0.456473	Mean dependent var	1645.611
Adjusted R-squared	0.130357	S.D. dependent var	73.27427
S.E. of regression	68.33166	Akaike info criterion	11.58773
Sum squared resid	23346.08	Schwarz criterion	11.67538
Log likelihood	-48.14477	F-statistic	1.399726
Durbin-Watson stat	2.119208	Prob(F-statistic)	0.345551

(source: author analysis with Eview)

Analysis:

- First of all, we recognize that exchange rate, VNIndex and tea price have positive correlation (see figure 4 and 5) while tea price and trade balance have negative correlation (figure 6)
- In addition, we recognize that in a 3 factor regression model, exchange rate has higher (positively) impact on tea price while trade balance has negative correlation with tea price. (see figure 7)

5. Discussion

How to make a delicious green tea cup

Figure 8 - Making green tea cup

(source: author collection)

We can make delicious green tea without turning red to treat guests.

First step: Prepare ingredients carefully

Fresh tea leaves: 300g

Sugar: 300g

White water: 3 liters

A few slices of ginger

Note: when choosing tea leaves, you should choose fresh tea leaves, not too old to make the tea more fragrant and pure. At the same time, it does not cause the tea to be crushed, the water has a bitter taste.

How to make green tea without turning red and delicious to customers

Second step: gently rub the tea leaves and then put them in the kettle

Third step: Pour boiling water first into the kettle to cover the tea leaves to rinse and then pour that water away.

Fourth step: Pour the second boiling water into the kettle and close the lid.

Fifth step: Put the teapot in the pot to brew for about 1 hour to infuse the tea and change color.

Note: Do not crush tea leaves without pouring boiling water immediately after. Because it can make the tea red, acrid and not long-lasting.

6. Conclusion

Vietnam's agriculture is still facing major obstacles in the process of restructuring and improving global competitiveness.

In our study, there are policy implications for tea production:

First, we need to develop a material (input) concentrating area, as well as create better linkage in supply chain.

Second, because we find out exchange rate has higher (positively) impact on tea price while trade balance has negative correlation with tea price, we need to keep exchange rate not decreasing too much and trade balance can decrease a little.

And Bui Thi Suu, Dinh Tran Ngoc Huy, Nguyen Thi Hoa (2021) also mentioned we can reduce chemical pesticides in agriculture (coffee, tea planting) and use alcohol traps to kill harmful insects.

Next, Dinh Tran Ngoc Huy et al (2021) showed CPI and R (lending rate) have negative correlation with tea export price, whereas G (GDP growth) and Rf (Risk free rate) have positive correlation with tea price. Besides, this study also give out recommendations for reduction in CPI and R and increase in G to push tea export price.

Last but not least, we would like to suggest marketing 4P or marketing mix strategy for tea products and agricultural products as well in below table:

Table 4 - Market 4P strategy

Products	**Price**
- Product range development - Improve quality, characteristics - Positioning products	- can be competitor-based pricing or psychological pricing - apply skimming price or penetration price
Place	**Promotion**
- convenient to buy - combination with tourism (ecotourism) - change distribution channel	- Change advertising or promotional content - Repositioning for the brand (repositioning) - Change communication method - Change approach

(source: made by author)

Last but not least we propose another approach of marketing mix for agricultural products as follows:

Table 5 - Another approach of marketing mix in agriculture

Price	***Product***
- Differentiate pricing or competitor-based pricing strategy	- Adapt to Vietnam or Global standards of quality
Place	***Promotion***
-Build network of suppliers, distribution intermediaries, and consumers/customers. Set up channels(directly sold or delivered to agents, intermediate distributors)We can sell directly at stores, supermarkets or through online sales channels, e-commerce platforms	- Sales staff and Advertising communication activities have to know how to analyze and transfer competitive advantages or characteristics/characteristics of the positioning that the business is pursuing, helping them to stick deeply in the minds of the target audience.

(source: Nguyen Thi Phi Nga et al, 2021)

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