



Analysis of Green Tea Leaf Processing Challenges the Viewpoint of Tea Factory Owners in Gilan Province, Iran

Zahra Gharoun

PhD student of Agricultural Development
of Tehran University, Tehran, Iran

Khalil Kalantari

Faculty of Economics and Agricultural
Development, University of Tehran, Iran

Ali Asadi

Faculty of Economics and Agricultural
Development, University of Tehran, Iran

Abstract – Iran's tea industry has gone through several crises at different times and is still grappling with many problems. The purpose of this study was to identify and analyze the challenges of green tea leaf processing in Gilan province, Iran. The statistical population of this research was the tea factory owners in Gilan province (N=1561). 73 tea factory owners were selected as a sample by using Multi-stage sampling method and Cochran's formula. Reliability of the questionnaire was Determined by Using Cronbach's Alpha Test ($\alpha=0.93$). Confirmatory factor analysis and descriptive statistics were used for analyzing data by SPSS 19 and Lisrel 8.8. Reliability of model measured by Construct Reliability (CR) and R2 and validity of model was confirmed by T-Value. Confirmatory factor analysis indicated the various dimensions of green tea leaf processing challenges that include: 1. Processing and storage challenges 2. Economic challenges 3. Marketing and sales challenges.

The results showed that the challenge of marketing and sales is more effective than the other challenges of green tea leaf processing. Among the challenges of processing and storage "The low quality of green tea leaves delivered to the factory" with factor loadings 0.82, among the challenges of economic "Difficulty of obtaining bank credits" with factor loadings 0.95 and among the challenges of marketing and sales "Lack of brand" with factor loadings 0.89 were the most influential factor on the green tea leaf processing markers.

Keywords – Challenges, Green Tea Leaf, Processing, Gilan Province, Iran.

I. INTRODUCTION

Tea is one of the most popular and the cheapest beverages in the world which consumed by a large number of people. By increasing its' demand, tea is considered to be one of the most important beverage market in the world [1].

Asian region produces a varied range of teas and this, together with a reputation in the international markets for high quality, has resulted in her enjoying a share of every importing market in the world. Africa and South America also produce tea. Huge populations of Asia, the British Isles, Middle Eastern countries, Africa, and all the Countries of the former Soviet Union, take tea throughout the day [2].

The history of tea in Iran started at the end of the 15th century. Before it coffee was the main beverage in Iran. Iran's tea industry is more than 110 years old, since Prince Muhammad Mirza, who known as Kashef-al-Saltaneh– Iran's consul in India - learned tea cultivation and processing when he worked in tea plantations in India (about a year and a half) and with the consent of the

government of India two thousand seedlings were sent to Iran.

Gilan province is one of the 31 provinces of Iran. It lies along the Caspian Sea. Lahijan city which is located in Gilan province is the best place to cultivate tea. After tea cultivation in Lahijan, cultivation of this plant became widespread in other northern cities in Iran such as Langerud, Siakhal, Amlash, Tonkabon, Ramsar and other northern cities [3].

Iran's population is about 1 percent of the world but they consumed over 5% of the world's total production of tea so Iran is the second largest consumer of tea in the world. Although Iran produces 6.2% of world tea but only 47.6 percent of its consume provided by domestic production.

At present, the annual consumption of tea in Iran is 110 thousand tons, about 20 to 25 percent of this amount provided through domestic production and the rest of it imported from other countries [4].

Tea production and processing system is a distributed and decentralized in Iran. Tea is produced by the Orthodox method involving withering, rolling, sieving, fermentation, drying and sorting. This type of tea demanded on the market [5].

In 2015, there are 183 tea factories in Iran that are located in Gilan province (151 factories is active from 171 factories) and Mazandaran province (10 factories is active from 12 factories). In Iran, unlike famous countries in the production of tea do not take Packaging tea in tea factories and Tea transported to where they are bundled [6].

Recent developments in global, technological advances, increasing the daily concerns and changes in lifestyle and tastes and taste of people, food and packaging industry has caused a great development, so that companies and factories have been operating in this industry requires, in order to grow and survive in this field are always trying to get the best result [7]. In Iran, tea industry has gone through several crises at different times and is still grappling with many problems. So that, unfortunately, domestic produced tea lacks require desirability and quality which leads to the fact that Iranian produced tea fails to compete with the well-known and high quality foreign tea and reduces its market share every day. So that not only the foreign markets but also the major parts of domestic ones have been lost and also domestic consumers prefer to use the high quality foreign tea [8]. Among the major problems of tea industry in Iran is seeds of tea bushes, small size and land fragmentation, insufficient incentive to farmers to produce, Noncompliance with standards, Oldness of equipment and machinery, a lot of waste and so on [9]. However, tea



production in Iran is not performed based on standard and scientific principles, and its strategies are mostly old and lack of innovation. Furthermore, due to deterioration of most of the machinery and tea making equipment and lack of using a mechanized system in tea gardens, in addition to rise of production and final cost, produced dried tea does not have required quality [8]. Therefore, in this study, green tea leaf processing challenges from the viewpoint of tea factory owners were analyzed.

II. MATERIAL AND METHODS

The present study is quantitative in terms of its nature and non – experimental in terms of the degree of the variables and practical in terms of its goals. It has been carried out in the form of descriptive- correlative. The factory Owners of Gilan province in Iran constitute the statistical population of this research (N=151). A number of 73 factory Owners were selected as a sample by using randomized sampling method. Sampling was Multi-stage random sampling method. Factory Owners in the study were interviewed by using a questionnaire which was the main tool for data collection. The survey instrument was designed in several parts such as demographic characteristics of factory Owners, the facilities, buildings and equipment tea factories and green tea leaf processing challenges. Content and face validity of the instrument was accomplished by a panel which consisted of the experts and professors of Tehran University and Tea Organization of Iran. A pilot test was conducted to determine the reliability of the questionnaire, and Cronbach's Alpha coefficient was confirmed for the scales of the questionnaire ($\alpha = 0.88$) Spss 19 and Lisrel 8.8 as Well as Confirmatory factor analysis and descriptive statistics items (mean, mode, frequency, percentage, and standard deviation) were used for data Analysis.

III. RESULTS

A. Personal and Professional Characteristics of Factory Owners

According to the findings in this study, the mean age of factory Owners was 53 and more than half of them (79.5%) were in the age group 46 to 60 years, which showed that the population under study was almost elderly. The majority of the understudy factory Owners, (97.3%) were men. Their work average experiences of Tea processing was 21 years.

B. The Facilities, Buildings and Equipment in Tea Factories

According to the findings in this study, the average age of Tea factories was 31 years old and the most frequent tea factories in the range of less than 15 years old.

27.4% from Tea factories had a Tea quality control laboratory and 11% from Tea factories had a Research and development units. Average daily production capacity is about 20 tons. Average annual production of black tea in the factories was 172.6 tons and Average production of black tea was 109 tons in 2014.

In 76.7% Tea factories were producing only black tea and the rest (23.3%) were producing the different types of tea. 87.7% of the tea factory owners are reluctant to produce different kinds of tea and just want to produce black tea.

C. Confirmatory Factor Analysis of Green Tea Leaf Processing Challenges

Latent variable of green tea leaf processing challenges is composed of three structures, including the Processing and storage challenges (5 markers), Economic challenges (4 markers) and Marketing and sales challenges (5 markers) (see Figure 1 and Table 1).

In order to analysis of green tea leaf processing challenges, Confirmatory Factor Analysis was performed on 14 items. Evaluating fitness of the model suggested for *green tea leaf processing challenges* shows that based on the information obtained about the green tea leaf processing challenges the ratio of Chi Square to the Degree of Freedom ($X^2/df < 3$) is 1.46, which is Less than (3) and P-Value = (0.008) which is Larger than (0.05); RMSEA = (0.080), Indicating the Significance of the Fitness test. Therefore our Model has a good fitness. Model-Fit Criteria and Acceptable Fit Interpretation [10] shows that table 1. The results in Table 2 shows that for all latent variables (structures), construct validity (CR) is more than 0.6 and Average Variance Extracted (AVE) is more than 0.5. Also T Values Obtained for each item of the table, are larger than (2). Thus, all items listed are significant and in general the model explained is significant. The amount reported for the index (RMSEA)¹ shows that measurement error in the model is well controlled. Therefore, it is concluded that the markers used with the conceptual model shows reasonable agreement (see Table 1 & 2).

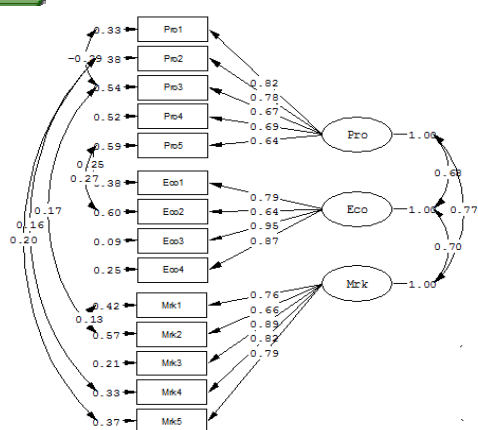
Table 1. Model-Fit Criteria and Acceptable Fit Interpretation

Model-Fit Criterion	Acceptable Level	The research model values
Chi-Square (Df) Degrees of freedom	P>0.05	97.91 67
Root-mean-square error of approximation (RMSEA)	0.08≤	0.080
Goodness-of-fit index (GFI)	0.90≤	0.97
AGFI (Adjusted GFI)	0.90≤	0.95
NFI (Normed fit index)	0.90≤	0.93

¹. Root-mean-square error of approximation



Fig.1. Confirmatory Factor Analysis of green tea leaf processing challenges



Chi-Square=97.91, df=67, P-value=0.00821, RMSEA=0.080

Table 2. Results of Confirmatory Factor Analysis of green tea leaf processing challenges

Latent Variables	COD	Markers	Standard coefficient	T value	R ²	Standard error	
Processing and storage challenges	Pro1	Low quality of green tea leaves delivered to the factory	0.82	11.58	0.67	0.33	CR=0.84 AVE=0.53
	Pro2	Top wastes	0.78	13.86	0.62	0.38	
	Pro3	Skilled labor shortage	0.67	6.09	0.46	0.54	
	Pro4	The old processing machinery	0.69	6.46	0.48	0.52	
	Pro5	Unsuitable storage warehouses Tea	0.64	5.57	0.41	0.59	
Economic challenges	Eco1	The high cost of machinery update	0.79	7.46	0.62	0.38	CR=0.89 AVE=0.67
	Eco2	Increase in wages	0.64	5.22	0.40	0.60	
	Eco3	The difficulty of obtaining bank credits	0.95	19.31	0.91	0.09	
	Eco4	High rates of loan repayment	0.87	10.29	0.75	0.25	
Marketing and sales challenges	Mrk1	Lack of motivation to promote teas produced	0.76	10.63	0.58	0.42	CR=0.89 AVE=0.62
	Mrk2	Changes in consumer tastes	0.66	6.30	0.43	0.57	
	Mrk3	Lack of brand	0.89	22.65	0.79	0.21	
	Mrk4	Tea middlemen	0.82	9.30	0.67	0.33	
	Mrk5	Lack of research and development unit	0.79	11.45	0.63	0.37	

Table3. The correlation factor with another factors

Factor (Latent Variables)	Processing and storage challenges	Economic challenges	Marketing and sales challenges
Processing and storage challenges	1	0.68	0.77
Economic challenges	0.68	1	0.70
Marketing and sales challenges	0.77	0.70	1
Total operating correlation	1.45	1.38	1.47

IV. DISCUSSION

As the results showed the 27.4% of tea factories had a tea quality control laboratory and 11% of them had a Research and Development units (R&D). Other studies [9]-[11]-[12] in this direction as indicated that lack of research and development (R&D) is one of the main problems in the tea factories. Due to the low percentage of factories with R&D units and tea quality control laboratory, it is

suggested that establishment of research and development and quality control laboratory be in priority in Iran's tea factories. R&D can help to find the new needs of consumers and factories. Other finding of the research showed that average production of tea in Iran was 109 tons in 2014. In 2014 compared to previous years, the production decreased because of drought and lack of rain.

As some studies [11]-[13] indicated drought and climate changes are the most important challenges in producing



green leaf tea. In Iran, the bulk of the area under tea cultivation is rain fed and effect of drought on its impressive. Therefore, it is recommended that necessary measures be taken to deal with drought and implement the pressurized irrigation in tea gardens.

As another finding of the research, 87.7% of the tea factory owners are reluctant to produce different kinds of tea and just want to produce black tea. Therefore, it is recommended that to be held extension courses, seminars and meetings to identify the variety of tea products and value-added through the production of these products for the tea factory owners. So this tea factory owners incentive to produce the variety of tea products like green tea, white tea, tea seed oil and so on.

The results of confirmatory factor analysis of green tea leaf processing challenges showed that the challenges of marketing and sales is more effective than the other challenges of green tea leaf processing. Some studies [14]-[15] showed that "inability to sell tea products by tea factories owners", "using traditional channels to sell tea" and "weakness in tea marketing" are the main problems to sell tea. Therefore, it is proposed to create Tea marketing organizations, in order to introduce Iranian tea - As a healthy and organic tea - to domestic and foreign markets, marketing tea and etc.

Other finding of the research showed that "the low quality of green tea leaves delivered to the factory", "difficulty of obtaining bank credits" and "lack of tea brand" were the most influential factors on the green tea leaf processing markers. Other studies [12]-[16]-[17]-[18] in this direction as indicated that poor infrastructure and poor transport makes up to be reduced the quality of green leaf which delivered to the factory. Therefore, it is proposed to improving infrastructure, road and transport. Also, one of the most important problems of tea industry is lack of sufficient funds to update machinery and failure to comply with standards set in the production of tea, as some other studies shown [9]-[12]. Therefore, it is necessary measures to attract capital to update equipment and laboratories such as long-term low-interest loans. Also, it is necessary to enforcing and monitoring compliance with national and international standards in the production of tea and brand registration.

V. CONCLUSION

This paper provides background information on the tea sector in Iran; its performance and contribution to the economy; and categorizes specific challenges facing this sector. The Iranian tea sector has tremendous potential for growth and employment generation, if the relevant enabling steps to overcome the many challenges and inefficiencies are undertaken. This paper has provided various strategies to enhance competitiveness in this sector. Among these strategies are:

- Long-term lending to update equipment and laboratories
- improving infrastructure
- Brand registration by tea factories

VI. ACKNOWLEDGEMENT

This article is extracted from a doctoral thesis which is supported by Tehran University. The authors are grateful to the University of Tehran for providing all the necessary facilities and support during the research done. Also the authors would like to thank all experts of Tea Organization in Iran and the editors and anonymous reviewers for their constructive advices.

REFERENCES

- [1] A. Basu Majumder, B. Bera, and A. Rajan, Tea statistics: Global scenario. *International Journal of Technology and Science (IJTS)*, January, 2012, pp.121-124.
- [2] A. Hicks, Review of Global Tea Production and the Impact on Industry of the Asian Economic Situation. FAO Regional Office for Asia and the Pacific, Bangkok, Thailand, 2001.
- [3] A. Yazdani, History of tea in Iran (A review of several documents). *Payam-e- Baharestan*, Vol. 3, 2009, pp. 527-534, (In persian).
- [4] N. Radjou, The problems and potentials of rural cooperatives in the guaranteed purchase of green tea leaf (case study: Gilan province). *Cooperatives and Rural*, No. 12 & 13, 2012, pp.167-186.
- [5] M. Hafezi, B. Nasernejad, and F. Vahabzadeh, Optimization of Fermentation Time for Iranian Black Tea Production. *Iranian Journal of Chemistry and Chemical Engineering (IJCCCE)*, Vol. 25, No. 1, 2006, pp 39-44.
- [6] Tea organization in Iran. 2015, [On Line], Available <http://irantea.org/fa/>
- [7] M.H. Tayebisabet, "Tea industry and market developments in Iran". Tehran, Eliah publisher, 2005.
- [8] H. Matazarre, The Effect of the Applying Modern Methods of Tea Cultivation on the Quality of Iranian Produced Tea. *IOSR Journal of Business and Management (IOSR-JBM)*, Vol. 17, Issue 5, Ver. II, May, 2015, pp 58-61.
- [9] M. Ardestani, M. Kazemnejad, A. Amjadi, Gh. Aghaya and O. Gilanpour, Plans of Development and improvement the quality of tea. Ministry of Agriculture, Agricultural planning, Economic and Rural Development Research institute, 2013, pp.1-78, (In persian).
- [10] Kh. Kalantari, "Structural Equation Modeling in Socio-Economic Research (with LISREL and SIMPLIS Software)". *Farhang-e-Saba*, Tehran, Iran, 2013, pp.210-230.
- [11] S.A. Mirhosseinimoghadam, Problems in the Iran's tea industry and proposed strategies (roadmaps) for rescue and upgrade. *Journal of Science of Food and Agriculture*, Vol. 10, No. 93, 2012, pp. 28-29, (In persian).
- [12] H. Palikhe, Draft case study on the tea sector in Nepal. Green Economy and Trade Opportunities, UNEP & International Centre for Trade and Sustainable Development, June, 2012.
- [13] E. Kiarie Kagira, S. Wambui Kimani, and K. Stephen Githii, Sustainable Methods of Addressing Challenges Facing Small Holder Tea Sector in Kenya: A Supply Chain Management Approach. *Journal of Management and Sustainability*, Vol.2, No.2, 2012, pp.75-89.
- [14] M. Manaii, The need to develop strategies for the tea industry. *The world of economy*, No. 3108, January, 2014, p. 5.
- [15] M. Malakoutikah and A. Soukhtesaraii, Check the status of production and the purchase of green leaf tea in Iran. *Journal of Barnameh*, No. 268, 2010, pp. 15-20.
- [16] M. Allahyari, H. Rezadost, A. Noorhosseiniaki, and F. Keshavarzshal, Defining effective strategies for the development of tea industry in the province of Gilan. *National Conference on Rural Development*, Gilan, Iran, Jul, 2012.
- [17] H. Matazarre, The vulnerability affects the quality of tea leaves during transport (In Iran). Islamic Azad University Lahijan branch & Tea Research Center of Iran, *First National Conference on Tea*, March, 2014.
- [18] P. Owuor, J.E. Orchard, J.M. Robinson, and S.J. Taylor, Variations in the chemical composition of clonal black tea due to



delayed withering. *Journal of the Science of Food and Agriculture*, Vol. 52, 1990, pp. 55-61.

AUTHORS PROFILE



Zahra Gharoun(1982)

PHD student of agricultural development in Department of agricultural development and management, College of Agriculture & Natural Resources, University of Tehran, Iran. Major research: Agricultural Development.
E-mail: gharoun@ut.ac.ir



Khalil Kalantari (1964)²

Professor in Regional Planning, University of Tehran, Iran. Major research: Agricultural Development and Management.

URL: <http://utcan.ut.ac.ir/member/kalantari.aspx>
E-mail: khkalan@ut.ac.ir



Ali Asadi(1968)

Professor in Agricultural Extension & Development, University of Tehran, Iran. Major research: Agricultural Development and Management.

URL: <http://utcan.ut.ac.ir/member/asadi.aspx>
E-mail: aasadi@ut.ac.ir

². corresponding Author