



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search  
<http://ageconsearch.umn.edu>  
[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

# The Overview and Prospects for Production and Marketing of Cashew Nut in the World

Shujuan ZHENG<sup>1</sup>, Jinhui LUO<sup>2\*</sup>

1. Institute of Scientific and Technical Information, Chinese Academy of Tropical Agricultural Sciences, Haikou 571101, China; 2. Analysis and Testing Center, Chinese Academy of Tropical Agricultural Sciences, Haikou 571101, China

**Abstract** In this article, we analyze the cultivation and production of cashew in the world during the period 2005 – 2010, and make a concrete analysis of the import and export trade of cashew nut in the world in recent years. In particular, we give an overview of the production and trade in major producing countries of cashew such as Vietnam and India. Finally, we analyze the nutritional value, pharmaceutical and industry role of cashew nut, and look into the future of development of the cashew nut industry in the world.

**Key words** Cashew nut, Production, Export, Import, World

The cashew, *Anacardium occidentale*, is a tree in the family Anacardiaceae. Its English name derives from the Portuguese name for the fruit of the cashew tree, caju, which itself is derived from the indigenous Tupi name, acajú. Originally native to Northeastern Brazil, it is now widely grown in tropical climates for its cashew apples and nuts. While native to Northeast Brazil, the Portuguese took the cashew plant to Goa, India, between the years of 1560 and 1565. From there it spread throughout Southeast Asia and eventually Africa. Nigeria was the world's largest producer of cashew nuts with shell in 2010. Cashew production trends have varied over the decades. African countries used to be the major producers before the 1980s, India became the largest producer in 1990s, followed by Vietnam which became the largest producer in the mid 2000s. Since 2008, Nigeria has become the largest producer<sup>[2]</sup>. Cashew nuts are produced in tropical countries because the tree is very frost sensitive; they have been adapted to various climatic regions around the world between the latitudes of 25 – deg. north and south. The cashew nut is one of the world's four famous nuts<sup>[1]</sup>. The fats and oils in cashew nuts are 54% monounsaturated fat, 18% polyunsaturated fat, and 16% saturated fat. Cashews, as with other tree nuts, are a good source of antioxidants. Alkyl phenols, in particular, are abundant in cashews. Cashews are also a good source of dietary trace minerals copper, iron and zinc. The cashew nut per 100 g contains 5.9 g of water, 21.2 g of protein, 46.9 g of fat, 22.3 g of carbohydrates, 450 mg of phosphorus, 590 mg of potassium and 38 mg of calcium<sup>[2]</sup>. Europe and the United States import large quantities of cashew nuts from the main producing countries of cashew nut, such as Vietnam and India, to process them into a variety of palatable food, drugs and other industrial supplies. From the growing area, harvest conditions, import and export volume of cashew nuts in the world, this article analyzes the development prospects and conditions of

cashew nut.

## 1 Overview of the origin of cashew nut in the world

**1.1 The current situation of planting in the main producing countries** During the period 2005 – 2010, the harvest area of cashew nut in India was in the leading level in the world, followed by Brazil, Cote d'Ivoire, Indonesia, Nigeria, Vietnam, Seoul Republic of Guinea-Bissau, and Benin. The harvest area of cashew nut in India was 0.82 million hm<sup>2</sup> in 2005, and reached 0.923 million hm<sup>2</sup> in 2010, with the annual growth rate of 2.39%. The main origin of cashew nut in India includes Orissa, Karnataka, Andhra, Goa and Tamil Nadu<sup>[3]</sup>. In cultivation, India Research Center for Cashew Nut places more emphasis on the research and collection of varieties of cashew nut, with careful study on the tree shape, leaf shape, branch shape, leaves color, fruit color, fruit shape, fruit weight, adhesion degree of nuts and hardness of nuts; at the same time, it pays attention to the improvement of varieties and cultivation management, and adopts fertigation technology to improve the quality of management of fruit trees<sup>[4]</sup>. Therefore, during the period 2005 – 2010, it was always in a leading position in terms of harvest area in the world. But in 2012, the cashew nut production in India's Goa was reduced by 50% over 2011, which was caused by adverse weather<sup>[5]</sup>.

Vietnam is the second largest producing country of cashew nut in Asia. The growing area of cashew nut in Vietnam was 0.223 7 million hm<sup>2</sup> in 2005, and increased to 0.39 million hm<sup>2</sup> in 2011, mainly distributed in Chennai<sup>[6]</sup>. The growing areas are mainly in the eastern regions and central highlands of southern Vietnam. In order to develop the cashew nut industry, Vietnam implements the following measures: encouraging cashew growers to increase investment, and introducing new technologies to increase income; cooperating with Cambodia and Laos in growing cashew nut; increasing technology input to improve the cashew processing, packaging quality and competitiveness<sup>[7]</sup>. It cooperated with Cambodia and Laos to grow 0.2 million hm<sup>2</sup> of cashew nut. Since

then, the annual growth rate of harvest area in Vietnam reaches 8.75%. But the hot and arid climate in 2012 severely affected the 3 500 hm<sup>2</sup> of growing areas of cashew in southern Vietnam. Bad weather leads to occurrence of pest and disease, thereby making gum anthrax spores, bugs and thrips emerge<sup>[8]</sup>.

Mozambique is a major producing country of cashew in Africa. In 1970, Mozambique became the world's largest cashew producer. The cashew production once reached 0.216 million t, and severely affected by the war, fungi and insects, the production in the producing areas was reduced in 1980. In addition, the aging of cashew affects the yield and quality of cashew. To restore the cashew processing industry, the government proposed capital subsidies, and sprayed pesticides on the cashew in the producing areas. After five years, the cashew production reached 0.112 t<sup>[9]</sup>. The harvest area of the main producing countries of cashew in the world can be seen in Table 1.

**Table 1 The harvested area of cashew nut in the main producing countries during the period 2005 – 2010** Unit: 10<sup>4</sup> hm<sup>2</sup>

Country	2005	2006	2007	2008	2009	2010
India	82.00	83.70	85.40	86.80	89.30	92.30
Brazil	70.04	71.02	73.14	74.74	75.81	75.90
Côte d'Ivoire	52.00	65.00	76.50	85.00	85.00	86.00
Indonesia	57.97	56.99	57.04	57.37	57.29	57.44
Nigeria	30.90	32.00	33.00	33.00	33.00	33.00
Vietnam	22.37	27.68	30.28	32.11	34.05	34.03
The Republic of Guinea-Bissau	21.30	21.20	21.56	21.50	21.80	24.05
Benin	19.00	21.00	21.36	45.00	60.00	24.39
Mozambique	12.00	7.50	12.00	10.20	7.70	7.70
Tanzania	9.12	9.00	9.00	9.40	8.00	8.00
Ghana	5.20	5.90	6.20	5.20	5.90	5.90
Thailand	3.40	2.73	2.59	2.51	2.45	2.38
World	402.76	420.99	442.27	485.99	500.91	471.50

**1.2 Output of the main producing countries** By focusing on the cashew germplasm breeding, India's cashew production has been ranking second or third in the world. The cashew production was 0.544 million t in 2005, 0.695 million t in 2009, but reduced to 0.613 million t in 2010. Due to the global decline in cashew production and climate effects in 2011, the cashew production was only 0.5 million t. The cashew production in Vietnam was 0.960 8 million t in 2005, 1.092 4 million t in 2006, and reached the world's highest point of 1.249 6 million t in 2007. The cashew production was 0.308 5 million t in 2008, only 0.289 8 million t in 2010, and reached its peak during the period 2005 – 2007. However, since cultivation area is limited, the reduction of fine cashew seedlings results in production decrease. The main reason for the reduction of cashew production in 2010 is the impact of high temperature during flowering. The cultivation area of cashew was about 0.4 million hm<sup>2</sup> in Vietnam in 2011, with the annual production of 0.35 million t. Although the production is increased, all the cashew enterprises still face many difficulties, such as sources of capital, and increasing raw material costs<sup>[10]</sup>.

Mozambique's cashew production was only 0.104 3 million t

in 2005, 0.067 2 million t in 2010, which was due to pests and diseases and aging, seriously affecting the country's cashew industry, also affecting cashew growers' income in Mozambique.

The cashew production in Nigeria is the highest in the African cashew producing countries, but because of lack of proper storage methods and processing methods, it suffers the loss of 50% of production annually. The domestic cashew consumption rate is less than 10%<sup>[11]</sup>. The annual growth rate of production during the period 2005 – 2010 was 1.82%; the cashew production in 2010 ranked first in the world, accounting for 23.57% of the world production.

**Table 2 The output of cashew nut in the main producing countries during the period 2005 – 2010** Unit: 10<sup>4</sup> t

Country	2005	2006	2007	2008	2009	2010
Vietnam	96.08	109.24	124.96	30.85	29.19	28.98
Nigeria	59.40	63.60	66.00	72.76	65.00	65.00
India	54.40	57.30	62.00	66.50	69.50	61.30
Brazil	15.28	24.38	14.07	24.33	22.05	10.43
Indonesia	13.51	14.92	14.61	15.67	14.74	14.51
Côte d'Ivoire	18.50	23.50	28.00	33.00	35.00	38.00
The Republic of Guinea-Bissau	8.90	9.50	9.80	9.90	9.95	9.11
Benin	5.25	5.50	6.00	8.60	11.70	6.97
Mozambique	10.43	6.28	7.44	8.50	6.40	6.72
Tanzania	9.00	7.74	9.26	9.91	7.91	8.00
Ghana	2.90	3.40	4.05	2.20	2.70	2.84
Thailand	6.05	4.64	4.30	4.06	3.82	3.79
World	320.94	351.52	369.29	307.52	297.39	275.76

## 2 The trade of cashew nut in the world

### 2.1 Export

**2.1.1 Export volume.** As can be seen from Table 3, the export volume of cashew nut in Vietnam were in the leading position in the world for the first time from 2006 (0.128 million t), closely followed by India. In five consecutive years, the exports of cashew in Vietnam ranked first in the world. The cashew production was 0.1946 million t in 2010, and the annual growth rate of cashew nut export volume was 12.29% during the period 2005 – 2010. The cashew nut exports in Vietnam accounted for 44.65% of total exports of cashew nut in the world in 2010. The Vietnam's cashew nuts are mainly exported to the United States (40%), China (20%) and the European Union (20%)<sup>[12]</sup>. Vietnam is the world's largest exporter of cashew nut, but it still imports large quantities of crude cashew to increasingly improve the rough processing efficiency of cashew. The original cashew production can only meet 60% of processing plants' demand for raw materials, so Vietnam needs to import 0.2 – 0.30 million t crude cashew<sup>[13]</sup> to meet domestic demand for cashew processing.

But in recent years, the quality of the cashew in Vietnam has been decreased, mainly due to the fact that the small companies do not have processing plants, only collect cashew, and ignore the quality standards to sell poor quality cashew, making the cashew industry mired into a vicious cycle<sup>[14]</sup>. In addition, the export goal of cashew in Vietnam was \$ 1.5 billion in 2012, but the

Vietnam's cashew enterprises were facing many difficulties, such as sources of capital, raw materials, labor, and especially the increasing raw material costs<sup>[15]</sup>. In order to create well-known brands of cashew in the international market, the Vietnamese Ministry of Agriculture and Rural Development decided to reduce the small-scale cashew processing base, establish well-funded cashew production group with high technology, and breed high-yielding varieties<sup>[16]</sup>, to improve the quality of exporting cashew of Vietnam.

In India, the raw cashew processing industry is also facing a situation of insufficient supply of goods, with the annual deficit of 0.2–0.3 million t, but the domestic production is 0.5 million t<sup>[17]</sup>. India's Cashew Export and Promotion Committee urged the government to allocate sufficient funds on the necessary programs for improving cashew production in 2011. The annual processing capacity of the India's raw cashew processing industry is 1.5 million t, but the supply is less than half the amount of processing. The domestic production can not meet the processing needs of the country<sup>[18]</sup>, but import cashew from Congo, Tanzania, Indonesia and Thailand to meet the demand<sup>[19]</sup>. India's cashew is mainly exported to the United States, Britain, Japan, the Netherlands, Australia, Canada, Germany and Hong Kong, the United States with the share of more than 40%<sup>[20]</sup>.

Mozambique's cashew processing enterprises are small-scale processing plants, using manual and semi-manual processing methods. Nampula located in northern Mozambique has 18 cashew processing plants, providing a lot of jobs. Before 1990, the World Bank destroyed the cashew processing factory in Mozambique, and the processing plants restored now are small-scale factories, with primitive processing methods and low production capacity. During the period 2010–2011, the country's farmers sold 0.079 million t of cashews, 39% of which were exported to India, 37% of which were sold to processing plants, 8% of which were used for informal processing, and 12% of which were used for storage<sup>[21]</sup>.

Guinea-Bissau is the world's 7th largest supplier of cashews, and it produced 0.14 million t of cashews in 2010, most of which were exported to India. Guinea-Bissau's cashew production was 0.3 million t in 2011, but exported 0.17 million t of cashews. In 2011, the United States funded \$ 3.5 million to help the country to improve the quality and yield of cashew. Cashew is the main product for export in Guinea-Bissau<sup>[22]</sup>.

**2.1.2 Export value.** From the export value of world's leading exporter of cashew (Table 4), Vietnam's cashew export value was \$ 503 million in 2005, \$ 1.135 billion in 2010, with the annual growth rate of 17.68%. The countries with the export value of more than \$ 100 million include Vietnam, India, Brazil, and the Netherlands. From Table 3 and Table 4, we know that the world cashew market demand in recent years is increased year by year, and the annual growth rate of export reaches 6.10%.

## 2.1 Import

**2.2.1 Import volume.** Since cashew nut has high nutritional value, it is deeply favored by people in Europe and the United

States. The import volume of cashew nut in the United States were 0.114 million t in 2005, and 0.1191 million t in 2010, ranking first in the world, accounting for 32.95% of the total world imports. The Netherlands is the world's second largest importing country of cashew, and the imports of cashew have been more than 0.04 million t for five consecutive years. It is followed by Germany, which becomes the world's third largest importer of cashew after its cashew import volume surpassed that of Britain for the first time in 2009.

The countries with the import volume of over 0.01 million t include the United States, the Netherlands, Britain, Germany, Australia, the United Arab Emirates and other countries. In 2010, the world's total import volume of cashew were 0.3615 million t, while the exports of cashew were 0.4358 million t.

**Table 3 The export volume of the leading exporter of cashew nut in the world during the period 2005–2010** Unit: 10<sup>4</sup> t

Country	2005	2006	2007	2008	2009	2010
Vietnam	10.90	12.80	15.47	16.08	17.72	19.46
India	12.50	12.11	11.08	12.55	11.74	9.26
Brazil	4.19	4.32	5.16	0.35	4.78	4.21
Netherlands	2.02	1.91	2.67	0.27	2.98	3.51
Belgium	0.33	0.33	0.28	0.33	0.31	0.28
Indonesia	0.35	0.69	1.17	1.04	0.76	0.71
United States	0.23	0.09	0.25	0.18	0.20	0.22
Britain	0.12	0.13	0.13	0.14	0.10	0.22
United Arab Emirates	0.36		0.66	0.94	0.94	0.94
Tanzania	0.17	0.38	0.60	0.77	0.49	3.02
Germany	0.07	0.13	0.45	0.49	0.39	0.42
Mozambique	0.09	0.22	0.32	0.33	0.39	0.37
World	32.41	33.99	39.06	40.34	42.13	43.58

**Table 4 The export value of the leading exporter of cashew nut in the world during the period 2005–2010** Unit: U. S. \$ 10<sup>8</sup>

Country	2005	2006	2007	2008	2009	2010
Vietnam	5.03	5.04	6.45	9.16	8.47	11.35
India	5.86	5.47	5.33	6.70	5.78	5.62
Brazil	1.87	1.88	2.25	1.96	2.31	2.30
Netherlands	1.08	0.95	1.27	1.54	1.65	1.74
Belgium	0.19	0.16	0.14	0.18	0.21	0.17
Indonesia	0.13	0.15	0.25	0.11	0.20	0.23
United States	0.12	0.04	0.12	0.11	0.10	0.13
Britain	0.04	0.06	0.08	0.09	0.07	0.15
United Arab Emirates	0.13		0.27	0.44	0.44	0.44
Tanzania	0.06	1.50	0.22	0.27	0.22	0.27
Germany	0.05	0.09	0.26	0.30	0.27	0.28
Mozambique	0.04	0.09	0.12	0.14	0.18	0.17
World	14.87	14.35	17.09	21.57	20.24	23.32

**2.2.2 Import value.** During the period 2005–2010, the import value of cashew in the United States ranked first in the world, and the import value also ranked first in the world, with the annual increase of 4.55%. The countries with the annual import value of more than \$ 0.2 billion are the United States and the Netherlands. The cashew import value in Britain declined from \$ 0.101

in 2008 to \$ 0.082 in 2010; the import volume and import value in Germany increased by 15.42% , 17.14% , respectively; the import value in Australia increased by 7.05% annually (Table 5).

**Table 5 The import volume of the leading exporter of cashew nut in the world during the period 2005 – 2010** Unit:  $10^4$  t

Country	2005	2006	2007	2008	2009	2010
United States	11.40	11.51	12.54	11.24	11.69	11.91
Netherlands	3.62	4.24	5.15	4.93	4.66	4.13
Britain	2.14	2.14	2.47	1.93	1.64	1.29
Germany	1.24	1.45	1.81	1.92	2.29	2.54
Australia	1.26	1.41	1.47	1.47	1.40	1.50
Canada	1.08	0.94	1.02	1.02	0.92	0.94
Japan	0.59	0.47	0.57	0.62	0.61	0.66
France	0.53	0.63	0.69	0.66	0.63	0.56
Belgium	0.48	0.58	0.53	0.63	0.61	0.56
United Arab Emirates	0.76	1.07	1.39	1.81	2.01	1.53
China	0.31	0.25	0.60	2.69	3.75	2.34
World	28.47	29.91	34.50	36.34	37.06	36.15

**Table 6 The import value of the leading exporter of cashew nut in the world during the period 2005 – 2010** Unit: U. S. \$  $10^8$

Country	2005	2006	2007	2008	2009	2010
United States	5.66	5.25	5.79	6.51	5.97	7.07
Netherlands	1.70	2.06	2.36	2.81	2.72	2.49
Britain	0.93	0.85	1.02	1.01	0.84	0.82
Germany	0.68	0.73	0.89	1.10	1.46	1.50
Australia	0.64	0.61	0.65	0.88	0.68	0.90
Canada	0.53	0.41	0.47	0.61	0.46	0.57
Japan	0.38	0.22	0.28	0.40	0.35	0.43
France	0.28	0.29	0.34	0.38	0.35	0.35
Belgium	0.27	0.26	0.26	0.36	0.36	0.33
United Arab Emirates	0.24	0.52	0.52	0.82	1.15	1.07
China	0.14	0.10	0.20	0.81	1.06	0.77
World	13.54	13.56	15.53	19.70	18.74	20.49

### 3 Development prospects of cashew nut in the world

Cashew nut is of rich nutritional value, and cashew apple is also of rich nutritional value, which is delicious refreshing summer fruit containing carbohydrates, protein, calcium, phosphorus and iron, loved greatly by the people.

First of all, in health care, the cashew apple can generate three kinds of cashew acid, which can inhibit cancer cell; fresh cashew apple juice plays a role in curing stomach disease, pharyngitis, hypertension and chronic dysentery; the fat content of cashew nut is unsaturated fatty acids, which can well soften blood vessels<sup>[23]</sup>.

Secondly, in the food processing, 73.6% of the oil extracted from cashew nut is excellent edible oil, which can reduce fatigue, and enhance people's physical vitality after eating. Meanwhile, cashew nut can be used for making chocolate, dessert, candied fruit and other foods. Cashew oil is edible oil rich in unsaturated fatty acids, with good development prospects. Cashew apple can also be used for producing fruit juice, wine and preserved

fruit<sup>[24]</sup>.

In other industrial aspects, cashew shell can be used in the development of drugs, paper, ink, textiles, cosmetics, paints, etc.<sup>[25]</sup>. Therefore, the developed countries with leading scientific research and food processing industry, such as the United States, the Netherlands, Germany, Australia and Japan, have increased cashew imports.

As the world demand for cashew is rising, the growing area of cashew continues to increase, and the research and development of cashew is constantly deepened. The research workers should collect fine germplasm varieties of cashew and cultivate new varieties resistant to pests. The major producing countries in Asia such as Vietnam and India are also major exporters, but the domestic production can not meet their needs, needing to import cashew nut from African countries to process for re-export. The cultivation mode of African countries lags behind, with low yield and low processing capacity, so it is necessary to strengthen the scientific management of cashew cultivation, to improve the productivity of cashew; promote the technical staff to research cashew in food, medicine and various industrial aspects, to enhance the healthy development of the world cashew industry.

### References

- [1] JIANG SB, DENG SS. The potential productivity and division suggestions of Hainan cashew nut[J]. Tropical Plant Research, 1981(5): 96 – 103. (in Chinese).
- [2] HUANG M, CAO QG. The good prospects in cashew nut industry[J]. Food Engineering, 2009(1): 27 – 29. (in Chinese).
- [3] LI YP. The production and marketing of India cashew nut and its processing[J]. World Tropical Agriculture Information, 2005(12): 2 – 6. (in Chinese).
- [4] LIN C. Brief work reports of India cashew nut research center[J]. World Tropical Agriculture Information, 2006(6): 26 – 27. (in Chinese).
- [5] ZHENG SJ. Prediction of the reduction of India cashew nut output in 2012[J]. World Tropical Agriculture Information, 2012(5): 10. (in Chinese).
- [6] The export of Vietnamese cashew kernel hold number one in the world for 4 years continuously[J]. World Tropical Agriculture Information, 2010(12): 22. (in Chinese).
- [7] Vietnamese cashew nut account for 37% of the worldwide market[J]. World Tropical Agriculture Information, 2010(5): 23. (in Chinese).
- [8] ZHENG SJ. Vietnamese cashew nut attacked by diseases and insect pests[J]. World Tropical Agriculture Information, 2012(5): 10. (in Chinese).
- [9] Prediction of Mozambique cashew nut output reached  $11.2 \times 10^4$  t in 2011[J]. World Tropical Agriculture Information, 2011(6): 18 – 19. (in Chinese).
- [10] The export goal of Vietnamese cashew nut was  $15 \times 10^9$  dollars in 2012[J]. World Tropical Agriculture Information, 2012(3): 23. (in Chinese).
- [11] ZHU SP. Nearly half of Nigeria cashew nut was wasted[J]. China Fruit News, 2010(6): 34. (in Chinese).
- [12] Vietnamese cashew nut industry developed stably[J]. World Tropical Agriculture Information, 2007(12): 15. (in Chinese).
- [13] The export of Vietnamese cashew kernel hold number one in the world for 4 years continuously[J]. World Tropical Agriculture Information, 2010(12): 22. (in Chinese).
- [14] HUANG Y. The export of Vietnamese cashew nut should ensure the quality[J]. World Tropical Agriculture Information, 2012(3): 20. (in Chinese).
- [15] The export goal of Vietnamese cashew nut was  $15 \times 10^9$  dollars in 2012[J]. World Tropical Agriculture Information, 2012(3): 23. (in Chinese).

(To page 9)

be in a better position to achieve its strategic goals of gaining access to new technology, shortening its lead time, creating improved customer value and enhancing customer satisfaction.

Moreover, this study found that software contributes only to LIS in CLS. Software has become the major element of support in China. This is particularly true where automation, computer application, digital data bases are used in the accomplishment of supportability and maintainability of LIS. Such as Enterprise Resourcing Planning (ERP), Customer Relationship Management (CRM) and other advance software have applied on LIS. Thus, the survey results show software factors have a positive support function in LIS of CLI.

The study found that facility has the significant effect on value growth performance in CLC. Logically, logistics companies would also find facility advantage to be a prerequisite of competitive cost that in turn contributes to facility effectiveness.

Therefore, Consistent with the current situation of Chinese logistics industry, the investigation results perfectly inflect that the main problems of the most logistic enterprises in China and also provide valuable insights into the current status of ELS in CLI.

There are a number of limitations to be approach adopted. For example, although the research demonstrates significant findings, it does not cover all factors related to ELS. Additional research needs to extend the study to other factors and business contexts to reinforce our confidence in the generalizability of the findings of this study. In short, although the study provides theoretical and practical insight into ELS in CLC, future research is needed to extend the proposed model to reinforce our confidence in the findings of this study.

## References

- [1] Armstrong, J.S., and R.S. Overton. Estimating nonresponse bias in mail surveys[J]. *Journal of Marketing Research* 1997, 14(3): 396–402.
- [2] Blanchard, B.S., (1998). *Logistics Engineering and Management*, 5th Edition[M]. Prentice Hall, 1998.
- [3] Bowersox, D.J. and P.J. Daugherty. Logistics paradigms: the impact of information technology[J]. *Journal of Business Logistics*, 1995, 16(1): 65–80.
- [4] Campbell, D.T. The informant in quantitative research[J]. *American Journal of Sociology*, 1955, 60(4): 339–342.
- [5] Chellappa, R. and Pavlou, P. Perceived information security, financial liability and consumer trust in electronic commerce transactions[J]. *Logistics Information Management*, 2002, 15(5): 358–368.
- [6] Cheng Wang and Yue Chen(2006), The Utilizing e-logistics: case studies in Sweden and China, <http://epubl.luth.se/1653-0187/2006/10/LTU-PB-EX-0610-SE.pdf>
- [7] Closs, D.J., T.J. Goldsby, and S.R. Clinton. Information technology influences on world class logistics capability[J]. *International Journal of Physical Distribution & Logistics Management*, 1997, 27(1): 4–17.
- [8] C. William Emory and Donald R. Cooper (1991) [M]. *Business Research Methods*, the 4th Edition.
- [9] Daly & Cui, E-logistics in China: basic problems, manageable concerns and intractable solutions, Available online 4 September 2002.
- [10] Dawe, R.L. (1995). Systems put your house in order[J]. *Transportations Distribution*, Oct. 1995: 102–106
- [11] Li Ling-ye and Gabriel. Effect of export financing resources and supply-chain skills on export competitive advantages: Implications for superior export performance[J]. *Journal of World Business*, 36(3): 260–279.
- [12] Galloway I.. Design for support and support the design: integrated logistic support the business case[J]. *Logistics Information Management*, 1996, 9(1).
- [13] Gerstle D. Selection/Development of Reliable Power Supplies[J]. *Reliability, Maintainability, & Supportability*, 2004, 8(2).
- [14] Gutierrez, G. and A. Duran. Information technology in logistics: a Spanish perspective[J]. *Logistics Information Management*, 1997, 10(2): 73–79.
- [15] Hardaker, G., R.R. Trick, and A.A. Sabki. The use of IT in freight forwarding in the UK[J]. *Logistics Information Management*, 1994, 7(4): 19–22.
- [16] John J. Coyle, Edward J. Bardi and C. John Langley, Jr. (2003). *The Management of Business Logistics* [M]. A Supply Chain Perspective, the 7th Edition.
- [17] LOGTECH. Life Cycle Management for Design and Maintenance, Monograph Series, Monograph 1, 2002 ([www.logtech.unc.edu](http://www.logtech.unc.edu))
- [18] Miyazaki, J. and Fernandez, K. The antecedents and consequences of trust in online-purchase decisions[J]. *Journal of Interactive Marketing*, 2000 16(2): 47–63.
- [19] Phillips, L.W. and R.P. Bagozzi. On measuring the organizational properties of distribution channels: methodological issues in the use of key informants.
- [20] Piplani, R., S. Pokharel, and A. Tan. Perspectives on the use of information technology at third party logistics service providers in Singapore [J]. *Asia Pacific Journal of Marketing and Logistics* 2004, 16(1): 27–41.
- [21] Sheth, J. (Ed.). *Research in Marketing*, Vol. 8. JAI Press, Greenwich, CT, 1986: 313–369.
- [22] ZHANG LJ, Yadav Pooja, Chang Henry, Akkiraju Rama, Chao Tian, Flaxer David, Jeng Jun-Jang (2001), *ELPIF: An E-logistics Processes Integration Framework: Based on Web Services*, IBM T.J. Watson Research Center. 2001.
- [23] Yung-yu TSENG, Wen Long YUE and Michael A P TAYLOR. The role of transportation in logistics chain[J]. *Proceedings of the Eastern Asia Society for Transportation Studies*, 2005, (5): 657–1672.
- [24] National Bureau of Statistics of the people's Republic of China, 2006.
- [25] ZHENG SJ. The processing industry of Mozambique cashew nut provided 9 000 jobs[J]. *World Tropical Agriculture Information*, 2011(11): 20. (in Chinese).
- [26] HUANG Y. The output of Guinea-Bissau cashew nut increased to  $30 \times 10^4$  t in 2011[J]. *World Tropical Agriculture Information*, 2011(10): 16. (in Chinese).
- [27] HUANG M, CAO QG. The good prospects in cashew nut industry[J]. *Food Engineering*, 2009(1): 27–29. (in Chinese).
- [28] HUANG M, CAO QG. The good prospects in cashew nut industry[J]. *Food Engineering*, 2009(1): 27–29. (in Chinese).
- [29] HUANG M, CAO QG. The good prospects in cashew nut industry[J]. *Food Engineering*, 2009(1): 27–29. (in Chinese).

(From page 4)

- [16] Vietnamese cashew nut industry developed stably[J]. *World Tropical Agriculture Information*, 2007(12): 15. (in Chinese).
- [17] ZHENG SJ. The price of raw cashews riced in 2011[J]. *World Tropical Agriculture Information*, 2011(6): 23. (in Chinese).
- [18] ZHENG SJ. The output of India cashew nut improved in 2011[J]. *World Tropical Agriculture Information*, 2011(11): 15. (in Chinese).
- [19] ZHENG SJ. The output of India cashew nut reduced in 2012[J]. *World Tropical Agriculture Information*, 2012(5): 10. (in Chinese).
- [20] LI YP. The production and marketing of India cashew nut and its processing[J]. *World Tropical Agriculture Information*, 2005(12): 2–6. (in Chinese).