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# Purchase Frequency of Roots and Tubers in Trinidad and Tobago.

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**Abstract**

Many of the non-communicable diseases (NCDs), such as obesity, colon cancer, diabetes and heart diseases being experienced in the Caribbean today can be attributed to changing lifestyles and urbanization. Roots and Tubers have been identified as having a beneficial role in the human diet against some of these diseases. Efforts to increase the purchase frequency and ultimately their consumption in the Caribbean with a view of reducing the current food import bill require the input of researchers. This study focuses on the socioeconomic variables that influence the purchase frequency of roots and tubers in Trinidad and Tobago. The results obtained indicated that the statistically significant variables were age, employment status and marital status. It is therefore concluded that income, gender, educational level attained, ethnicity, and household size does not influence the purchase frequency of roots and tubers in Trinidad and Tobago.

**Keywords:** Socio-demographic variables, Trinidadian and Tobagonians, Purchase frequency, Roots and Tubers

## Introduction

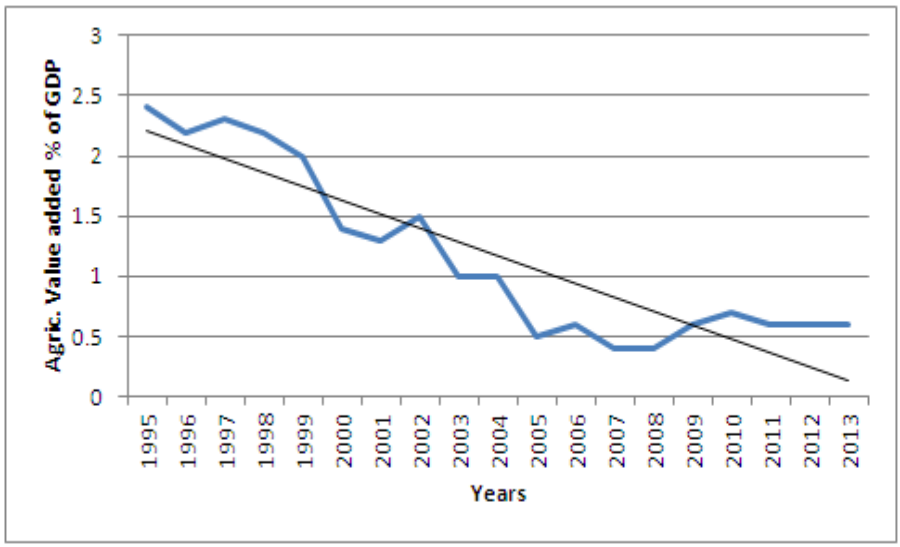
Many of the non-communicable diseases (NCDs), such as obesity, colon cancer, diabetes and heart diseases being experienced in the Caribbean today can be attributed to changing lifestyles and urbanization. The health benefits of the inclusion of roots and tubers, fruits and vegetables in the diet are widely documented in the health-diet literature. For example (Trinidad, P. T., R. S. Sagum, A. C. Mallillin and M. S. Borlagdan, 2013) suggested that sustainable intake of sweet potato and cassava may be helpful in prevention of risk of cardiovascular diseases as well as obesity and type 2 diabetes mellitus. Despite the clear advice from the scientific community of the benefits to be derived from the consumption of R&Ts, intake levels still appear to be below desired levels in many Caribbean islands, where there is supposedly an abundant supply.

Traditionally, in the Caribbean R&Ts has been a major source of carbohydrates in the diets of the Region's people. However, it is a well known "law" of economics that as income rises the per capita consumption of starchy food staples – R&Ts – falls. (Durrant 1987) recognized this declining trend when he wrote "Generally, the production and consumption of indigenous root crops have been declining over the last two decades and this trend has been ascribed to a wide variety of factors. Among these factors, the most important would seem to relate to limited forms in which root crops may be consumed – given the low levels of processing technology. In addition, there is the relative inconvenience involved in the preparation of these foods when compared with other high-energy staples such as rice and wheat flour". So how does socio-demographics characteristics such as employment status, income level and educational level influence purchases of R&Ts in the contemporary T&T food market?

The declining contribution of agriculture to the Gross Domestic Product (GDP) of many Caribbean countries in the last decade or two and the recently estimated food import bill of over four billion US dollars annually have been and continues to be an area of concern for Regional leaders. Figures 1 and 2 illustrates agriculture's contribution to GDP for the period 1995 to 2013, for two Caribbean countries, Trinidad and Tobago (T&T) which is primarily an oil and gas based economy and St. Vincent and the Grenadines (SVG) an agricultural based economy. As is observed in both graphs there was a downward trend for the period.

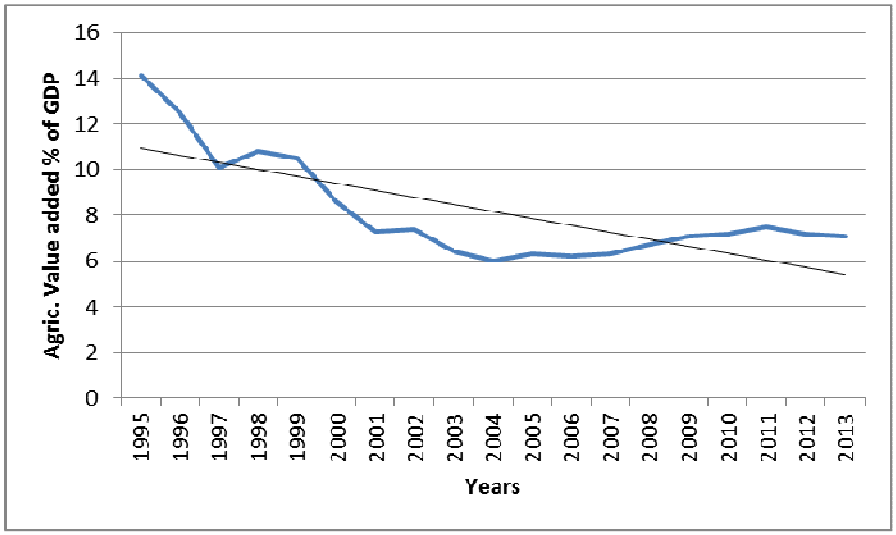
 

**Figure 1:** Agriculture value added % of GDP 1995 to 2013, T&T




Source: World Bank Data

**Figure 2:** Agriculture value added % of GDP 1995 to 2013, SVG

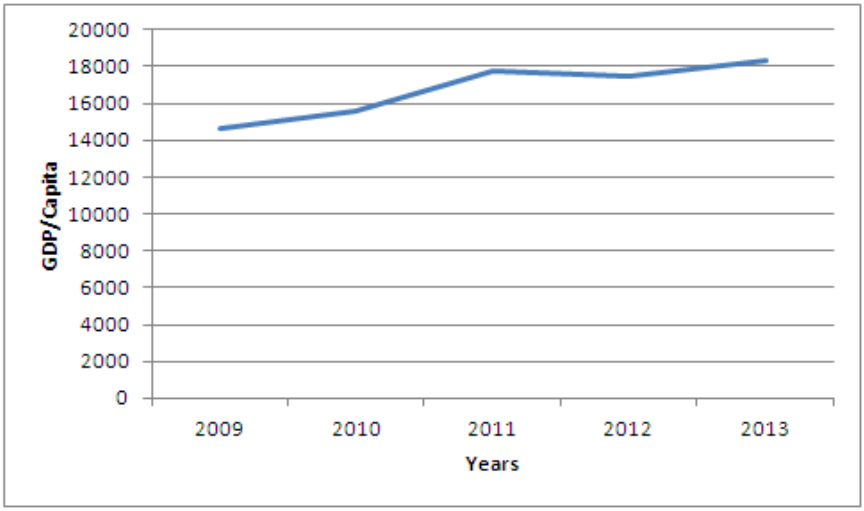



Source: World Bank Data

T&T unlike many of its Caribbean neighbors is considered a high income island nation. Figure 3 illustrates the Gross Domestic Product per Capita (GDP/Capita) for the period 2009 to 2013, in current US dollars. As is observed in this figure the GDP/Capita displayed an increasing trend over the five year period, with the GDP/Capita in 2013 being 26% greater than the 2009 level. In 2012 T&T ranked 64$^{th}$ on the Human Development Index. As a high income country one might expect a "westernization" of the diet and as a result the purchase frequency of R&Ts would be low.

**Figure 3:** GDP/Capita for T&T in current US dollars, 2009 to 2013.




Source: World Bank Data

A search of the marketing literature for the Caribbean reveals that there have been limited studies on purchase frequency and consumption of R&Ts. An understanding of factors influencing frequency of purchase and consumption of R&Ts is a must as Regional leaders try to reduce the food import bill and replace a percentage of the imported carbohydrates by domestically produced starchy R&Ts. This study attempts to contribute to our knowledge in this area by looking at the influence of socio-demographics on the frequency of R&Ts purchasing in Trinidad and Tobago. For purposes of this research the R&Ts that are being considered are the starchy ones – Cassava (*Manihot esculenta*), Dasheen (*Colocasia esculenta*), Edo (eddoe) (*Xanthosoma spp.; Colocasia spp.*), Potato (*Solamum tuberosum*), Potato, sweet (*Ipomoea batatas*), Yam (*Dioscorea spp.*) Tannia (*Xanthosoma sagittifolium*).

The rest of the paper is organized as follows. The next section provides a brief review of some relevant literature to this study. This is followed by a statement of the problems addressed in the study and the hypotheses developed to try and address the research problems. Thereafter the analytical approach and data used in the study is described. This is followed by the results and discussion, and finally some conclusions are made.

## Literature Review

A foundation article by (Applebaum 1951) examining customer behavior in retail stores opined that customer buying behavior patterns can be grouped in relation to:

(a) Place of purchase;
(b) Items purchased;
(c) Time and frequency of purchase;
(d) Method of purchase and
(e) Response to sales promotion devices.

Looking at time and frequency of purchase (Applebaum 1951) stated that store operators must mesh with customer's time of purchase pattern and that frequency of purchase depends primarily upon the type of commodity involved. However, frequency of purchase also varies among customers, with some shopping for food for example, daily while others only once a week.

(Bawa and Ghosh 1999) in their model of household grocery shopping behavior focused on shopping trip frequency and expenditure per trip. Explanatory variables in their trip frequency model included socio-demographic variables such as, household income, employment status, home ownership, family size, age of head of household and number of stores shopped. The results suggested that household with working adults have a lower frequency of shopping compared to households in which no adults are working. Family size has a positive

relationship with trip frequency. Households headed by older individuals, 55 and over, tend to make more frequent trips. Home ownership was not significant and the results for the income variables were not definitive. Income 1, which is income of $15,000 to $34,999, was negative but not significant while Income 2, that is income of $35,000 and over had a significant and positive coefficient.

In a study titled "Demographics and patronage motives of supercenter shoppers in the United States" (Carpenter 2006) examined the shopping frequency for apparel, health and beauty products, home furnishings and consumer electronics. In this study Stepwise Regression was used to analyze the effect of the continuous demographic attributes of shoppers on the three levels of frequency – frequent, occasional, and infrequent, while "One Way Analysis of Variance" was used for marital status and ethnicity. Age, income, education and household size were significant for apparel, home furnishings, and consumer electronics. The ANOVA models for ethnicity and marital status produced non-significant results. He concluded that age, income, education and household size may be useful in predicting supercenter shopping frequency in some product categories.

Yoo et al (2006) examined food purchasing patterns for the home. One big weekly shopping trip for food was the preferred pattern for their sample (34.9%). They also suggested that African American families shopped for food least frequently and Asian American families were the most frequent shoppers for food. The Statistical Portal in 2013 reported that households with income of less than $40,000.00 tend to shop less frequently, with 19% of this group purchasing grocery items once per month. This suggests that income could be a major influence on the frequency of grocery shopping.

(Maruyama and Trung 2009) investigated the high shopping frequency of Vietnamese consumers. The independent variables in their model were an importance rating of freshness, a rank of distance, ownership of a refrigerator, sex, present of children in family, age of respondent, income and number of members in family. Positive and significant coefficients were obtained for freshness, children in family, and age. Negative and significant coefficients were obtained for sex and distance. Ownership of a refrigerator, income and family size were not significant.

(Ting Meng et al 2014) in a study titled "Consumer's Food Shopping Choice in Ghana: Supermarkets or Traditional Outlets?" looked at purchase frequency at supermarkets, open-air markets, and hawkers. The explanatory variables used in the ordinal logit regression model included household income, education, occupation, age, marital status, household composition and regional location. They stated "Food retail outlets play a significant role in affecting consumers' diet-related health and nutrition by the foods they sell and prices they charge." In that study they found that supermarkets are preferred by high income and well educated households. However, the appeal of supermarkets varied by location. Open-air markets are attractive to large households, and location did influence the shopping frequency to open-air markets. Hawkers appear to be more attractive to households of a lower socio-economic status than households of the better educated or higher income. Again, location did influence the shopping frequency from hawkers. They suggested that high income and well educated households, who shop regularly in supermarkets, are more likely to consume healthy food items including imported fruits and vegetables.

Recently, (Nambiar et al 2015) used a Multivariate Probit Model to investigate shopping outlet choice and frequency in urban areas of the Republic of Uganda. They examined shopping in five types of outlets, namely grocery stores, open air markets, street vendors, supermarkets and garden sales outlets. The results reveal that income, education, employment status, household composition and location influenced shopping frequency at supermarkets. An increase in the monthly household income increases the likelihood of making more than once a month shopping trip to the supermarket. This result was supported by (Bawa and Ghosh 1999). If the respondent if male, the likelihood of shopping frequently at garden sales outlets is more compared to female shoppers. An increase in the respondent's age also increases the frequency of shopping at garden sales outlets. The authors are of the opinion that the results provide rare insights about shopping format choice by consumers in lesser developed countries.

In an attempt to increase our knowledge on food marketing in the Caribbean, and more specifically on R&Ts marketing in Trinidad, this study focuses on whether the socio-economic profile of Trinidadian and Tobagonians influences their frequency of purchasing R&TS. To a certain extent R&Ts are considered to be "poor peoples' food "by some Caribbean residents, especially with the rising influence of fast foods on the television.

**Research Problems, conceptual framework and hypotheses**

Based on the brief review provided above the problems that will be addressed in this study are as follows:

(1) Identify the percentages of regular, occasional and rare R&Ts purchasers in T&T;
(2) To identify the socio-demographic factors that influences the frequency of purchasing R&Ts in T&T;

Figure 4 illustrates the conceptual framework used in the study. The demographic variables, gender, income, age, employment status, education, marital status, household size and ethnicity are hypothesized to have an influence on being either a regular, occasional or rare purchaser of R&Ts.

The primary data was collected in Trinidad and Tobago, where respondents were asked to classify themselves as regular, occasional or rare R&Ts purchasers where:

Regular purchasers: were those that bought R&Ts at least once every week,

Occasional purchasers: were those that bought R&Ts at least once every two weeks; and

Rare purchasers: were those that bought R&Ts less frequently than once every two weeks.

**Research Hypotheses**

***$H_{o1}$:*** *There is no relationship between age and purchase frequency of R&Ts;*

***$H_{o2}$:*** *There is no relationship between income and purchase frequency of R&Ts;*

***$H_{o3}$:*** *There is no relationship between gender and purchase frequency of R&Ts;*

***$H_{o4}$:*** *There is no relationship between employment status and purchase frequency of R&Ts;*

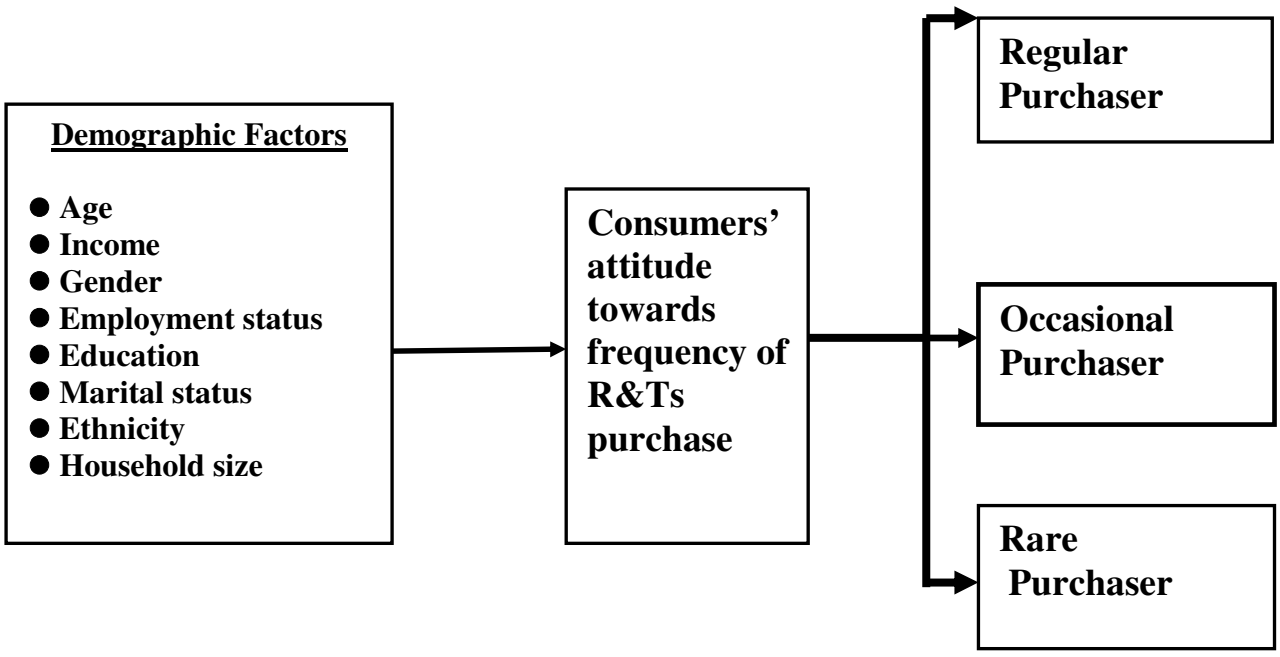
***$H_{o5}$:*** *There is no relationship between education and purchase frequency of R&Ts;*

***$H_{o6}$:*** *There is no relationship between marital status and purchase frequency of R&Ts;*

***$H_{o7}$:*** *There is no relationship between ethnicity and purchase frequency of R&Ts;*

***$H_{o8}$:*** *There is no relationship between household size and purchase frequency of R&Ts;*

**Figure 4:** Conceptual framework for the study



## Analytical Approach and Data

To investigate if there was a relationship between the socio-demographic variables outlined above and purchase frequency of R&Ts a questionnaire was developed and pretested in January 2015. The questionnaire tried to identify the main choice of retail outlet used by respondents when purchasing R&Ts and their demographics, such as gender, age, income, educational level attained, marital status, household size and employment status. The outlet attributes that influenced the choice of shopping at the different outlet formats were also ranked on a scale from 1 to 5. However, this paper focuses on the relationship between purchase frequency and socio-economic variable.

A convenience sampling method was used to collect the data. Questionnaires were administered to prospective respondents who were willing to participate at banks, hospitals, outside supermarkets and in public markets during the months of February and March 2015. Data collection was in both islands, Trinidad and Tobago. A total of 600 questionnaires were administered of which 498 were fully completed and returned, giving a response rate of 83 percent. The relevant data was analyzed using SPSS version 21.

The data collected was mainly nominal and ordinal, as such, the analytical approach used was primarily descriptive. In marketing research the use of contingency tables or cross-tabulation analysis is very common, and this study used this approach to test the stated hypotheses. Pearson Chi Square tests were employed to test relationships between purchase frequency and all the demographic variables. The decision rule employed in this study is as follows: reject the null hypothesis if the probability of the test statistic is less than or equal to alpha 0.05.

## Results

Table 1 provides an overview of the sample. As is observed in this table over 50% of the respondents had incomes of $10,000 and below, while only 12% had income levels above $20,000. The majority of the respondents were females (over 60%), while 60% of the respondents were employed. 48% of the respondents were of African descent, 29% mixed, 22% Indian and only 1% Chinese. 55% of the respondents were single, 29% married and the remaining 16% being in the divorced and other category. Tertiary level trained respondents accounted for 53% of the sample, with the remainder attaining primary and secondary level education. The sample can be considered to be relatively young with 68.5% being 45 years and younger. 58% of the sample had a household size of 4 persons and less.

**Table 1:** Socio-demographic characteristics of the sample.

| Variable | Percent |
|---|---|
| **Income** | |
| <$5,000 | 27.5 |
| $5,001-$10.000 | 30.7 |
| $15,001-$20,000 | 13.5 |
| $20,001-$25,000 | 4.8 |
| >$25,001 | 7.2 |
| **Gender** | |
| Female | 62.7 |
| Male | 37.3 |
| **Marital status** | |
| Single | 55.2 |

| | |
|---|---|
| Married | 28.7 |
| Divorced | 5.6 |
| Other | 10.4 |
| **Education** | |
| Tertiary level | 53.0 |
| Secondary | 36.5 |
| Primary | 10.4 |
| **Occupational status** | |
| Employed | 60.0 |
| Unemployed | 40.0 |
| **Age** | |
| ≤25 years | 38.0 |
| 26-35 years | 15.9 |
| 36-45 years | 14.7 |
| 46-55 years | 17.1 |
| ≥56 years | 14.5 |
| **Members in household** | |
| ≤4 persons | 57.8 |
| ≥5 person | 42.2 |
| **Ethnicity** | |
| African descent | 48.2 |
| Indian descent | 22.3 |
| Chinese descent | 1.0 |
| Mixed descent | 28.5 |

Figure 5 illustrates the proportion of the sample that purchased R&Ts in the three categories. As is seen in this chart the occasional category dominated followed by the regular category. Rarely was selected by less than a third of the sample.

**Figure 5:** Percent of sample purchasing R&Ts, rarely, occasionally and regularly.

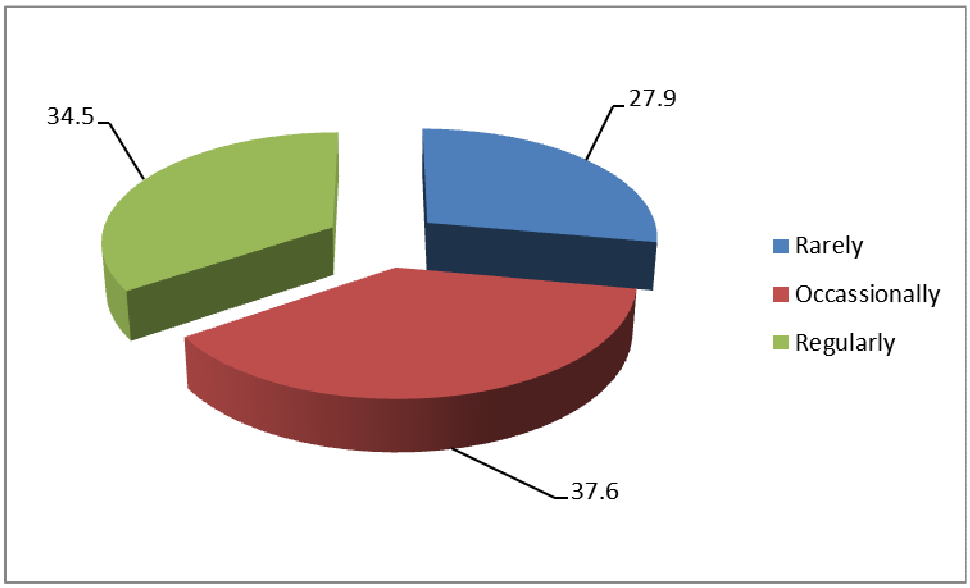



Table 2 shows the Pearson Chi-Square test results and the decision to accept or reject the null hypotheses based on the decision rule. The null hypotheses were rejected for age, employment status and marital status, so the results suggest:

***$H_{A1}$:*** *There is a relationship between age and purchase frequency of R&Ts;*

***$H_{A4}$:*** *There is a relationship between employment status and purchase frequency of R&Ts;*

***$H_{A6}$:*** *There is a relationship between marital status and purchase frequency of R&Ts;*

**Table 2:** Pearson Chi-Square test and hypotheses test results

| Hypotheses | Asymp. Sig.(2-sided) | Accept or reject null hypothesis |
|---|---|---|
| **$H_{o1}$:Age** | 0.000 | Reject |
| **$H_{o2}$:Income** | 0.564 | Accept |
| **$H_{o3}$:Gender** | 0.379 | Accept |
| **$H_{o4}$:Employment status** | 0.004 | Reject |
| **$H_{o5}$:Education** | 0.398 | Accept |
| **$H_{o6}$:Marital status** | 0.002 | Reject |
| **$H_{o7}$:Ethnicity** | 0.709 | Accept |
| **$H_{o8}$:Household size** | 0.159 | Accept |

**Discussion and Conclusions**

As the food retailing landscape is transformed in Trinidad and Tobago, retailers would need to keep abreast of the factors that influence patronage behavior and shopping frequency. This study offers an insight into the influence of socio-demographic characteristics of a convenience sample on the frequency of purchase of R&TS. The results indicate that age, employment status and marital status does influence the frequency of purchase of R&Ts. As was found by Maruyama and Trung (2009) income and household size (family size) did not influence

the frequency of purchase. Also, gender, education and ethnicity did not influence the frequency of purchase in the present study.

Consumption of R&Ts is dependent upon both the availability of produce in the customer's environment and personal and household characteristics. Supply and demand theoretically determines price. Any attempt by policy makers to influence the consumption of R&Ts in the Caribbean requires a thorough understanding of the intricate link between these factors. In the Caribbean there is a belief that the R&Ts are too expensive in comparison with imported sources of carbohydrates such as wheat flour. Ensuring an adequate year-round supply of a competitively priced basket of R&Ts is a necessary but not sufficient condition to boost the replacement of imports.

As more women find employment out of the homes, the opportunity cost of their time increases. Many of the traditional R&Ts are time intensive, requiring long preparation times by the food preparers in the household (Senauer et al 1986). As was alluded to by (Durrant 1989) the inconvenience in the preparation of the R&Ts must be addressed for their consumption to increase. The transformation of the traditional R&Ts into value-added microwaveable, nutritious, tasty, and competitively priced products is a must in today's "fast food" oriented society in T&T.

A particularly important finding of this research is the strong influence of age on the frequency of purchase. In the Caribbean there is a belief that the younger generation, less than twenty five years old, did not grow up eating R&Ts. Further, given the time consuming nature of preparation, and more women being employed out of the home R&Ts might not be readily available at mealtime, hence the low level of consumption today. The strong influence of age on purchase frequency might be capturing this phenomenon. As a result any attempt to boost the consumption of the R&Ts in the Caribbean must focus on increasing the consumption by the younger generation. Finding innovative ways to make these products more user-friendly while exploiting their nutritional and functional food benefits is of paramount importance in the Caribbean. To accomplish this further research on the benefits of R&Ts in maintaining and lowering of cholesterol levels in humans and the identification of other bioactive compounds they contain is needed. The estimation of demand elasticities will be helpful in an attempt to predict consumer responsiveness to income and price changes.

**References**

Applebaum, W. 1951. STUDYING CUSTOMER BEHAVIOR IN RETAIL STORES. *Journal of Marketing*, Vol. 16 (2): 172-178

Bawa, K., and A. Ghosh. 1999. A model of household grocery shopping behavior. *Marketing letters*, Vol. 10 (2): 149-160.

Bern/Yerevan. 2010. MARKET FOR MEGHRI: Consumption Habits and Purchasing Behaviour Survey Report. Intercooperation and Shen. Retrieved from the Internet November 26th, 2014.

Blaylock, J. R. 1989. An economic model of grocery shopping frequency. *Applied Economics* Vol. 21, (6): 843-852.

Bond, J. K., D. Thilmany, and Bond Craig. 2009. What Influences Consumer Choice of Fresh Produce Purchase Location? *Journal of Agricultural and Applied Economics*, Vol. 41 (1): 61-74

Carpenter, J. M. 2008. Demographics and patronage motives of supercenter shoppers in the United States. *International Journal of Retail & Distribution Management*, Vol. 36 (1): 5-16.

Carpenter, J. and M. Moore. 2006. Consumer Demographics, Store Attributes, and Retail Format Choice in the US Grocery Market. *International Journal of Retail & Distribution Management*, Vol. 34 (6): 434- 452.

Durrant, N. (1987) "The pre-eminence of roots and tubers in the diets of the Caribbean peoples". *The Courier* No. 101: 89-91.

Gorton, M., J. Sauer and P. Supatpongkul. 2009. Investigating Thai Shopping Behavior: Wet-Markets, Supermarkets and Food Quality. The 83rd Annual Conference of the Agricultural Economics Society Dublin, 30th March to 1st April 2009

Gujarati, D. N. and D. C. Porter. 2009., *Basic Econometrics*: McGraw-Hill Publishing Company.

Maruyama M. and L. V. Trung. 2009. High shopping frequency of Vietnamese consumers: theory and measurement. *Applied Economics Letters*, Vol. 16: 411-415

Maruyama, M. and L. V. Trung. 2007. Traditional bazaar or supermarkets: a probit analysis of affluent consumer perceptions in Hanoi. *The International Review of Retail, Distribution and Consumer Research*, Vol. 17 (3): 233-52.

Meng, T., W. J. Florkski, D. B. Sarpong, M. S. Chinan, and A. V. A. Resurreccion. 2014. Consumer's Food Shopping Choice in Ghana: Supermarket or Traditional Outlets? *International Food and Agribusiness Management Review* Vol. 17 Special Issue A: 107 – 129.

Nambiar, P. M., W. J. Florkowski, M. S. Chinnan , and A. V. A. Ressurreccion. 2015. Shopping outlet choice and frequency in urban areas of the Republic of Uganda. Paper presented at the Southern Agricultural Economics Association (SAEA) Annual Meeting, Atlanta, Georgia, January 31-February 3, 2015.

Prasad C. J. S., and A. R. Aryasri. 2011. Effect of Shopper Attributes on Retail Format Choice Behavior for Food and Grocery Retailing in India. *International Journal of Retail & Distribution Management*, Vol. 39 (1): 68- 86.

Prasad C. J. S., and D. R. Reddy (2007). A Study on the Role of Demographic and Psychographic Dynamics in Food and Grocery Retailing. The *Journal of Business Perspective* Vol. 11 (4): 21-30.

Senauer, B., D. Sahn, and H. Alderman. 1986. The Effect of the Value of Time on Food Consumption Patterns in Developing Countries: Evidence from Sir Lanka . *American Journal of Agricultural Economics*, Vol. 68 (4): 920-927

The Statistics Portal (2013). "Grocery shopping frequency of U.S. households in 2013, by income group". http://www.statista.com/statistics/272866/grocery-shopping-frequency-of-us-households-by-income/. Downloaded from the internet April 24th, 2015.

Trinidad, P. T., R. S. Sagum, A. C. Mallillin, and M. S. Borlagdan. 2013. Sweet Potato and Cassava Can Modify Cholesterol Profile in Humans with Moderately Raised Serum Cholesterol Levels. *Food and Nutrition Science* Vol. 4: 491-495

Yoo S., T. Baranowski, M. Missaghian, J. Baranowski, K. Cullen, J. O. Fisher, K. Watson, I. F. Zakeri, T. Nicklas. 2006. Food-purchasing patterns for home: a grocery store-intercept survey. *Public Health Nutrition* 9(3): 384 -393.