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Consumer Preference and Price Behavior Analysis for Selected Rice Varieties in Sri Lanka

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ABSTRACT

Price of agricultural commodities acts as a significant driving force in any economy. In many developing countries price of agricultural commodities creates food insecurity hence, this is more prominent in countries that depend on agriculture. Agriculture has been identified as the backbone of the Sri Lanka and rice is considered as the staple food in the country. Therefore, continuous analysis and monitoring of rice price is a must to identify potential market behavior for rice price and to take necessary actions to maintain stability. In light of that, this study aims to analyze the price behavior of most common rice varieties (Samba, Nadu, Raw White, and Raw Red) in Sri Lanka, linking it with consumer preference. Both nominal market price (NMP) and real market price (RMP) was analyzed. NMP of all rice types had increased continuously. However, RMP from 2008 to 2013 had gradually decreased. The average price of Samba always retained LKR 15.00/kg higher than Nadu, LKR 18.00/kg higher that Raw Red and LKR 21.00/kg higher than Raw White. Further, NMP of Samba had increased by eight per cent, Nadu by nine per cent, Raw White by 11 per cent and Raw Red by 10 per cent annually. Time series plots were derived for each rice types separately. Price increment or decrement of different rice varieties demonstrated a strong positive relationship with each other. Also, 60 percent of Sri Lankans are preferred to consume Samba, Nadu and Raw White. Raw Red consumption is mainly concentrated in the Southern Province of Sri Lanka. Few large scale millers scattered within the major paddy producing areas exercise an oligopolistic behavior and, as a result sudden variations in prices were observed in off-seasons.

KEYWORDS*:* Consumer preference, Price behavior, Rice varieties

Introduction

Prices of agricultural commodities are playing a pivotal role in any given economy around the world. When considering the agricultural commodity prices, there are numerous factors to be considered and price variations result from different interactions of those factors including basic aggregates of market supply and demand (Borychowski and Czyzewski, 2015). Moreover, prices of agricultural commodities tend to fluctuate in a wide range. Frequent fluctuations are highly risky hence; it causes issues for both consumer and producer. Therefore, the countries and regions those are highly depend on agriculture will suffer negative consequences from time to time (Backman and Sumelius, 2009; Huka *et. al.,* 2014). This could lead to a less production

in agricultural products from the point of producer as well as the less purchasing preference from the point of consumer. Suli and Xhabija (2013) in their study described that, agriculture markets face various problems, which arise from the producer but also by lowering the purchasing power of consumers. Hence, to measure the impact, it is always recommended to monitor price behavior of domestic agricultural products continuously with linking it with consumer preference.

Further, frequent price fluctuations do not form a conductive environment for farmers to plan the production for the coming year. Besides, it is observed that rise in agriculture commodity prices result price rise in other commodities as well, causing inflation. Therefore, in many developing countries stabilization of prices become a key concern of the government. Consequently, price is one of the most important macro environmental factors for economic development and policy implementation (Xie and Wang, 2017). Price is also considered as one of the key driving forces that increases and decreases consumer demand for agricultural commodities. Further, several studies revealed that price is the utmost concern of consumers when deciding agricultural commodities. These studies also disclosed that this phenomenon mostly applied in developing countries specifically concentrated within the African and Asian continents. Jayasuriya *et. al.,* 2012 revealed that in late 2007 and by the first half of 2008 world food prices rose very sharply and this created food insecure population of the world by about 9 per cent, bringing the number of undernourished people to over one billion.

Agriculture has been identified as the backbone of the Sri Lanka for many centuries with one-third of the population being dependent on agriculture. In present agriculture sector contributes 7.1 per cent of the country's GDP (Central Bank Annual Report, 2016). Paddy cultivation is done based on the water availability and for two seasons per annum namely: yala and maha. There are mainly four common rice varieties that can be found in Sri Lankan agricultural markets namely; Samba, Nadu, Raw White and Raw Red. Rice is the principal food commodity in Sri Lanka with per capita consumption around 114 kg per year. It is also estimated that demand for rice will increase by 1.1 per cent per year (Senanayake and Premaratne, 2016). Further, Food Production National Program 2016-2018, published by the Presidential Task Force on Food Production has illustrated that, annual rice consumption requirement in Sri Lanka is 2.27 million metric tons. As a predominant agricultural crop, paddy is cultivated in almost all parts of the country, except in few areas with high altitude. Therefore, rice is considered as an important food commodity in Sri Lanka. Many Asian countries including Sri Lanka view rice as a strategic commodity for its importance in the diet of the poor as a living and income generation of farmers (Wijesooriya *et. al.,* 2017). In light of this, study attempts to analyse the price behaviour of selected rice verities over a period of 15 years and to derive possible price forecasting models for each rice variety. Further, study aims to elicit the changes in consumer preference in relation to rice price in Sri Lanka.

Methodology

Secondary data was used for this study and data consisted of year-wise nominal retail market prices for Samba, Nadu, Raw White and Raw Red, period starting from 2002 to

2016. Prices were obtained from the Hector Kobbekaduwa Agrarian Research and Training Institute of Sri Lanka. Further, Colombo Consumer Price Index (CCPI) was used to calculate the real market prices of different rice varieties. Base year of the CCPI was considered as 2002 (Base 2002=100). CCPI is constructed to measure changes over time in the general level of prices of consumer goods and services and it's a prominent social and economic indicator in Sri Lanka (Gunawardhana, 2009). CCPI was obtained from annual reports of the Central Bank and also via Department of Census and Statistics Sri Lanka. Different secondary source such as journals, research papers, reports and agrarian publications related to paddy and rice prices in Sri Lanka were also used to elicit valuable insights. Time Series (TS) plots were initially used to elicit the major price patterns and behavior of four different rice types against the time factor. Subsequently, both Nominal Market Price (NMP) and Real Market Price (RMP) of rice varieties were plotted and analyzed with the time. RMP was calculated via CCPI (Base 2002=100) and derived through employing the equation [1] (Sandika, 2009; Hadley, 1969).

$$\text{RMP} = (\text{NMP} \times 100) / \text{CCPI} \quad [1]$$

Further, correlation between price increment and decrement over the past years (from 2002 to 2016) of four different rice types was analyzed by deploying Karl Pearson's product movement correlation coefficient. The correlation coefficient was defined in the equation [2].

$$r = \frac{N\varepsilon xy - (\varepsilon x)(\varepsilon y)}{\sqrt{[N\varepsilon x^2 - (\varepsilon x)^2][N\varepsilon y^2 - (\varepsilon y^2)]}} = \frac{\text{cov}(x, y)}{\sqrt{\text{var}(x).\sqrt{\text{var}(y)}}} \quad [2]$$

Where,

r = Correlation Coefficient
N = Number of Observations
εxy = Sum of the Prices of Paired Scored
εx = Sum of Prices of One Type of Rice
εy = Sum of Prices of Second type of Rice

Correlation can take on any value in the range minus one to plus one. Further, value zero implies there is no any relationship between the two variable and minus one or plus one implies perfect relationship between two variables. In addition, time series plots were derived for each rice types separately to find out the best fit model.

Results and Discussion

Figure 1 illustrates the Nominal Market Price (NMP) behavior of four selected rice varieties over the period of 15 years. According to the Figure 1, NMP had increased

continuously over the last few years. Among four varieties the highest price was applied for Samba rice type. The second highest price was applied for Nadu variety. The lowest price was observed for Raw White rice type. Results revealed that, average price of Samba always retained LKR15.00/kg higher than Nadu, LKR18.00/kg higher that Raw Red and LKR21.00/kg higher than Raw White. Average retail rice prices of Samba, Nadu, Raw White and Raw Red rice types in year 2016 were LKR101.00/kg, LKR78.00/kg, LKR70.00/kg and LKR67.00/kg respectively. Interestingly, three distinct regions could be identified from the TS plot for NMP. Period starting from 2002 to 2007 illustrates a stabilized price range for all four rice types and average prices for all four varieties ranged between LKR20.00/kg and LKR43.00/kg. However, later part of year 2007 prices of all four rice types had increased significantly. This increment had prevailed until mid-2008. This was mainly due to the world food prices crisis in 2007 to 2008. Mok, 2009 explained in his report, food price index had increased 57.8 per cent during the first few months of 2008 when compared to the same period of the previous year. Consequently, inflation rates of China, Malaysia and Philippines have also increased considerably with the increased food prices.

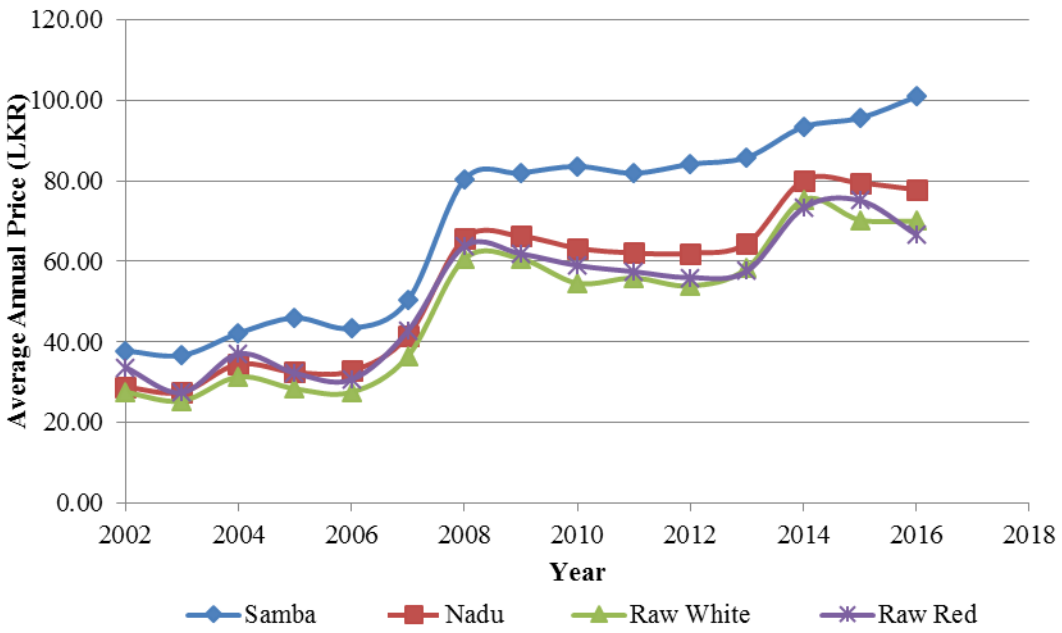

Figure 1: Nominal Market Price of Different Types of Rice Varieties

Wiggins *et. al.,* 2010, revealed that even though there were numerous reasons for the 2008 food price spike, lower grain stocks, widespread inflation resulting from rapid growth of the world economy, rise in oil price, tight export policies and depreciation of the US dollar caused this situation. However, from the later part of 2008 to 2014 prices were again behaved in a stabilized pattern. With the 2008 price shock, there was no any down ward trend in prices for different rice types. Further, Samba rice types had continuously increased in an increasing pattern and widen the

price gap with the other three rice types. Third region starts from 2015 to present. Prices of all three varieties had again increased. This was mainly due to unfavourable weather pattern. Sri Lanka and several South Asian countries had undergone a severe drought condition during this period. Hence, as a result of water scarcity, drastic reduction in paddy yield has been experienced by Sri Lanka for three seasons namely: 2016 yala, 2016.17 maha and 2017 yala. Interestingly, price of Samba rice had increased continuously without any drop. In overall, RMP of Nadu, Raw White and Raw Red behaved almost in a same pattern.

Figure 2 exhibits the Real Market Price (RMP) of four different rice types. In there also three different regions could be observed. First region started from 2002 and ended in 2008.

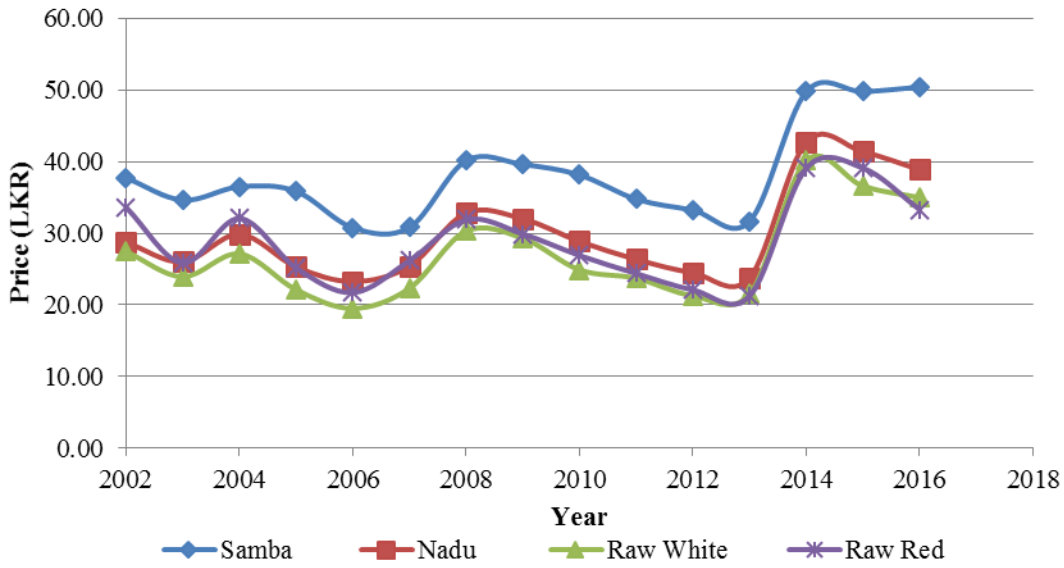

Figure 2: Real Market Price of Different Types of Rice Varieties

In that period RMP of all four rice types had fluctuated continuously. However, in between 2008 and 2013 RMP had been declined gradually. This decreasing trend in RMP was supported by the studies of Hathurusinghe and Ravichandran 2004; Rupasena *et. al.,* 2008 and Sandika, 2009. Therefore, the period starting from 2008 to 2013 has identified as the second region. In 2014 real market prices had increased drastically. Therefore, from 2014 to present could be stated as the third region. Department of Census and Statistics of Sri Lanka has introduced a new price index in 2013 which is National Consumer Price Index (NCPI) instead of CCPI. NCPI covers all provinces in Sri Lanka and consisted of 12 major groups and 105 sub-groups in the market basket. Also, percentage of 44.04 was dedicated for food and the rest (55.96%) for non-food (Department of Census and Statics, 2013). This was a major change compared to the previous indexes of 2002 and 2006. Conversely, base year of 2013 was used to derive the CCPI of 2013 to 2016. In fact, derived CCPI values from 2013 to

2016 are not in line with previous years' values. This could be the possible reason for this sudden surge.

According to the Table 1, price increment or decrement for different rice varieties presented a positive relationship with each other. The best correlation was formed between Nadu and Raw White. The second best correlation had formed between Nadu and Raw Red. The least correlation had formed between Samba and Raw red. However, all rice types showed strong relationship in relation to price increment or decrement. In other words, this means that increment or decrement of one type of rice price leads to an increase or decrease of other varieties. Even though, an increment in price of Samba rice type affected somewhat less for other varieties compared to correlations between other three varieties. When considering the origins of these four rice varieties, Raw Red rice production mainly concentrated in the Southern region in Sri Lanka. Productions of other three varieties are concentrated in the Northern, Eastern and Western regions in Sri Lanka. Most of the time, consumers in the Southern region of Sri Lanka consume Raw Red rice type. Studies revealed that approximately 60 per cent of Sri Lankans are consuming Samba, Nadu and Raw White rice types due to their palatability. It is envisaged that, origin of rice type is irrelevant for price increment or decrement. Further, NMP of Samba had increased by eight per cent, Nadu by nine per cent, Raw White by 11 per cent and Raw Red by 10 per cent annually.

Table 1: Correlation Matrix for Price Increment / Decrement in Different Rice Types

	Samba	**Nadu**	**Raw White**	**Raw Red**
Samba		r = 0.89 (p=0.00)	r = 0.87 (p=0.00)	r = 0.76 (p=0.00)
Nadu	r = 0.89 (p=0.00)		r = 0.98 (p=0.00)	r = 0.94 (p=0.00)
Raw White	r = 0.87 (p=0.00)	r = 0.98 (p=0.00)		r = 0.93 (p=0.00)
Raw Red	r = 0.76 (p=0.00)	r = 0.94 (p=0.00)	r = 0.93 (p=0.00)	

The second best correlation had formed between Nadu and Raw Red. The least correlation had formed between Samba and Raw red. However, all rice types showed strong relationship in relation to price increment or decrement. In other words, this means that increment or decrement of one type of rice price leads to an increase or decrease of other varieties. Even though, an increment in price of Samba rice type affected somewhat less for other varieties compared to correlations between other three varieties. When considering the origins of these four rice varieties, Raw Red rice production mainly concentrated in the Southern region in Sri Lanka. Productions of other three varieties are concentrated in the Northern, Eastern and Western regions in Sri Lanka. Most of the time, consumers in the Southern region of Sri Lanka consume Raw Red rice type. Studies revealed that approximately 60 per cent of Sri Lankans are

consuming Samba, Nadu and Raw White rice types due to their palatability. It is envisaged that, origin of rice type is irrelevant for price increment or decrement. Further, NMP of Samba had increased by eight per cent, Nadu by nine per cent, Raw White by 11 per cent and Raw Red by 10 per cent annually.

Table 2 represents best fit time series models for each rice types separately. Accordingly, results revealed Winters' Additive model was the best fit model for price forecasting of Samba, Nadu and Raw Red rice types. Subsequently, analysis revealed ARIMA (0,1,8) model was the best fit model for price forecasting of Raw White rice type. In other words, it utilizes one differencing and eight moving averages in forecasting of Raw White rice price. Further, table 2 represents respective R-squared and Mean Absolute Percentage Error (MAPE) values for each model. Maximum Absolute Percentage Error (MaxAPE) represents the largest forecasted error expressed as a percentage. Figures 3, 4, 5 and 6 illustrate times series plots with observed and fitted values for each rice type. Also, rice price forecast was done for the next six-month time duration.

Table 2: Best Fit Time Series Models For Different Rice Types

Rice Type	Best Fit Model	Stationary R-squared	R-squared	MAPE	MaxAPE
Samba	Winters' Additive	0.55	0.99	2.53	15.22
Nadu	Winters' Additive	0.56	0.99	2.70	18.52
Raw White	ARIMA (0,1,8)	0.70	0.95	5.73	29.33
Raw Red	Winters' Additive	0.51	0.98	3.33	17.16

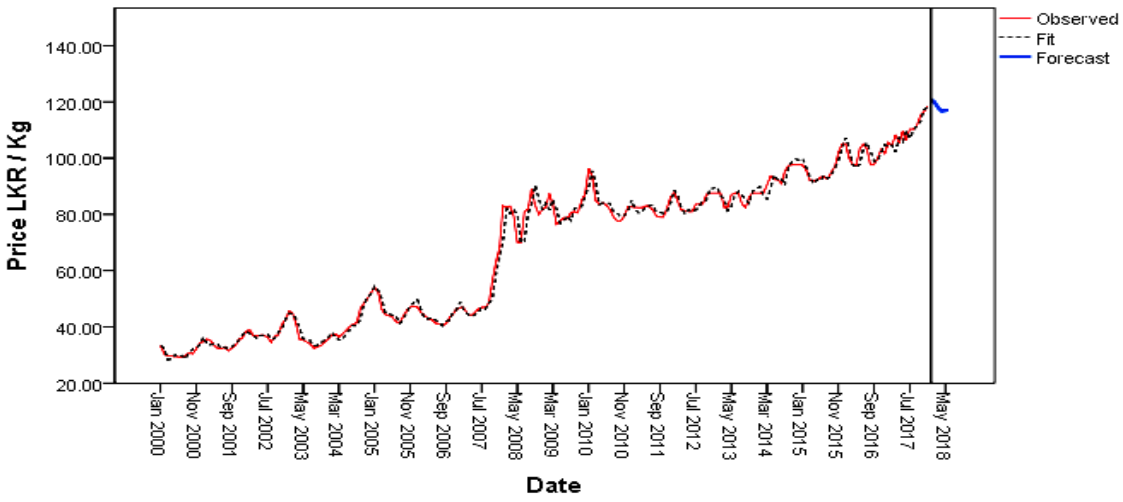

Figure 3: Time Series Plot for Price of Samba Rice

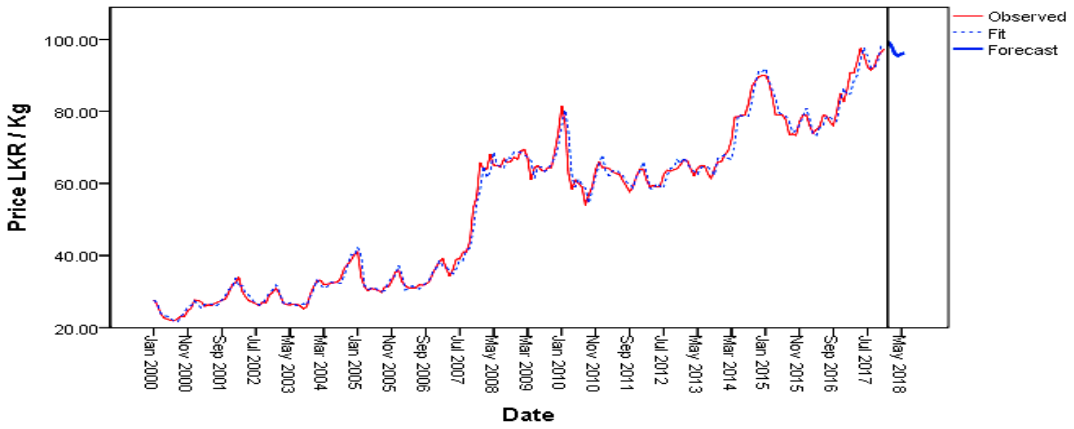

Figure 4: Time Series Plot for Price of Nadu Rice

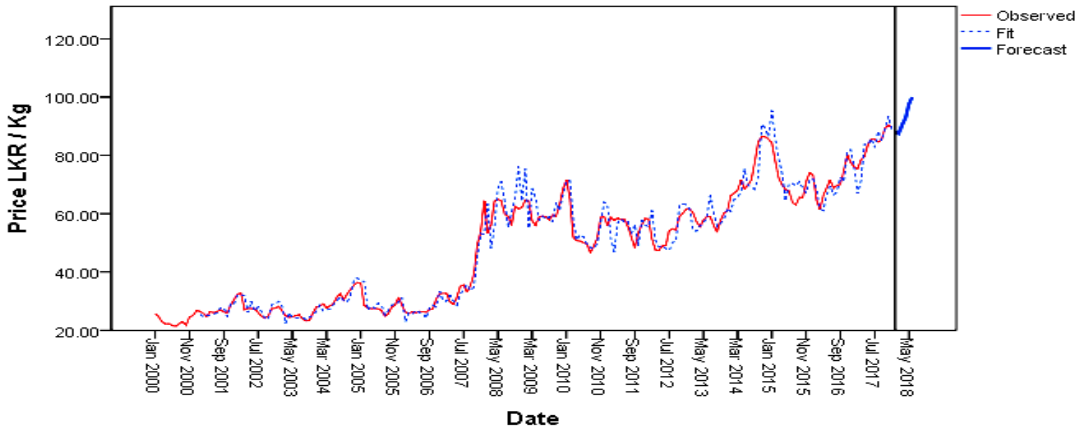

Figure 5: Time Series Plot for Price of Raw White Rice

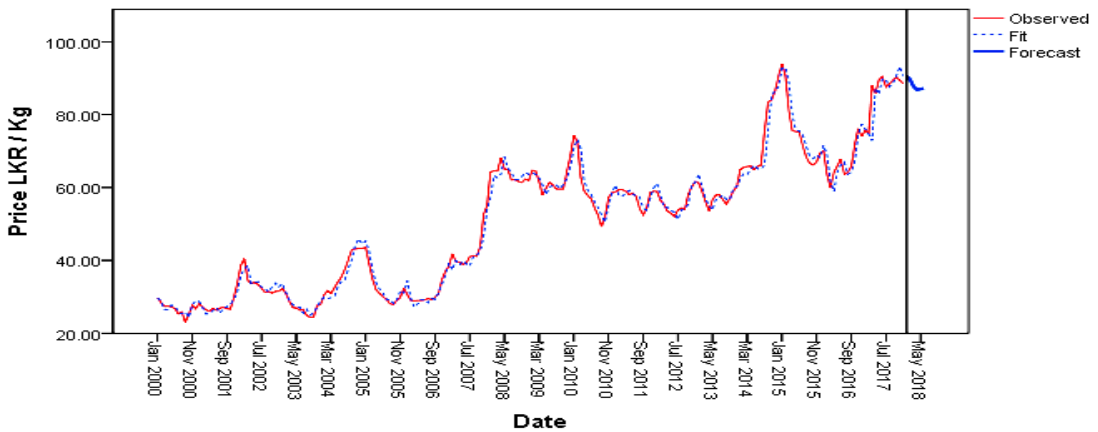

Figure 6: Time Series Plot for Price of Raw Red Rice

According the forecasted results, prices of Samba, Nadu and Raw White were demonstrated an increasing trend, while the price of Raw Red was illustrated an increasing trend for the next six-month time period. However, paddy harvesting in 2017/18 maha season in Sri Lanka will be expected to initiate in mid-February to April in 2018. Therefore, when the peak harvesting period starts prices of all the rice varieties would decrease. However, final retail rice price would be reduced by only few percentages due to monopolistic market behaviour of rice distribution in Sri Lanka. Referring to rice imports, in 2016 Sri Lanka had imported 29,524 metric tons of rice to the country. However, in 2014 and 2015 Sri Lanka had imported 599,718 metric tons and 285,604 metric tons of rice respectively. As a result of a prolonged drought period in 2014, extent of paddy cultivation decreased drastically. Therefore, rice production was sufficient to cater the domestic consumption only for 11 months. This directly resulted an increment in retail rice price. To maintain a stabilized price Sri Lanka had to import nearly 600,000 metric tons in the year of 2014. However, Sri Lanka is facing the same issue in 2017 as well. Due to prolonged drought, Sri Lanka had imported 653,161 metric tons of rice so far between January and November 2017 (Hector Kobbekaduwa Agrarian Research and Training Institute, 2017). Currently, this quantity is identified as the highest rice imports ever recorded in the Sri Lankan history. Even though there are many reasons to facilitate this issue, mainly inadequate storage facilities yield this vicious cycle of rice price increment in Sri Lanka.

Rambukwella *et. al.,* 2017 described world rice consumption can be categorized into three distinct groups namely: habitual consumers, consumers who change their diet regular basis and consumers who consume rice occasionally as a special diet. Sri Lanka could be categorized under first group; people who rely on rice most of their nutritional intake. Further, study also revealed that, approximately, 60 per cent, 30 per cent and 10 percent rice consumption made up of long grain white rice, short grain white rice and parboiled red rice and other local rice varieties respectively. In addition, Sri Lanka imports basmati rice varieties from India and Pakistan. Increased wheat flour prices, increased age of the household head and increased household size positively impact on local rice consumption in Sri Lanka. However, urbanization has a negative impact on rice consumption. Furthermore, inelastic price demand for rice stresses the importance of having a strong policy related to supply management, buffer stock maintenance and storage potentials at farm level (Wijewardana *et. al.*, 2017).

Conclusions

Study analysed year wise NMP and RMP of four most common rice types (Samba, Nadu, Raw White and Raw Red) in Sri Lanka starting from 2002 to 2016. Results revealed that NMP of all types of rice had increased continuously. Among the four varieties the highest average rice price was observed for Samba variety. The lowest average price was observed for Raw White rice type. The average price of Samba always retained LKR15.00/kg higher than Nadu, LKR18.00/kg higher that Raw Red and LKR21.00/kg higher than Raw White. However, when considering the RMP of all rice types, gradual decrement was observed particularly from 2008 to 2013. This implies that the increment in farmer income level was not maintained during these years. Price

increment or decrement for different rice varieties presented a strong positive relationship with each other. Further, NMP of Samba had increased by eight per cent, Nadu by nine per cent, Raw White by 11 per cent and Raw Red by 10 per cent annually. Quadratic model was the most appropriate model to forecast NMP of Samba, Nadu, Raw White and Raw Red. Winters' Additive model was the best fit model for price forecasting of Samba, Nadu and Raw Red rice types. Subsequently, analysis revealed ARIMA (0,1, 8) model was the best fit model for price forecasting of Raw White rice type. Apart from the natural causes, both farmers and consumers are assumed that main reason for sudden price increment occurs as a result of oligopolistic behaviour of few large scale paddy millers located in the major paddy producing areas in the country. Inelastic price of rice behaviour further intensified this situation. Therefore, government has to focus more on viable policy concerns related to paddy supply and marketing process to maintain price stability.

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Obstacles for the Growth and Development of Small and Medium Enterprises in Sri Lanka: Case of North Western Province

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ABSTRACT

The backbone of the Sri Lankan economy is formed by Small and Medium Enterprises (SMEs) which is an essential component in a competitive and efficient market. New SMEs' role in the economy is vital as it addresses the issues of sustainable development; job creation, economic growth, competitive market pressure and the overall stimulation of the country's economy. SME failure rate in Sri Lanka is quite as high as 45%. Therefore, the primary objective of this study was to examine both internal and external organizational factors which are acting as obstacles for the growth of new SMEs in Sri Lanka. Thirty four major variables were identified as obstacles through Focus Group Discussions and literature review. Principal Component analysis (PCA) with Varimax Rotation was used to reduce the identified variables into five components. The most perceived obstacle was termed as Finance which is largely internal to the firm with an Eigen value of 8.17 and a percentage variance of 24%, while the other obstacles determined by PCA were Management (internal), Market (external), Infrastructure (external) and Economic (external) in descending order. The PCA has emphasized the stringency of providing collaterals/guarantees to obtain bank loans as the most impeding obstacle for the growth of new SMEs in Sri Lanka. Therefore, the study suggests that it is needed to revisit the micro finance accessibility of SMEs in the North Western Province (NWP) and to support them in formulating effective financial management plans within their early years from the inception to avoid failures.

KEYWORDS: Micro finance, New small and medium enterprises, Obstacles

Introduction

Entrepreneurs are the change agents in economies. SMEs play a dynamic role in almost all economies throughout the world, especially in the evolving countries such as Sri Lanka while serving as stepping stones for large enterprises and most of the large enterprises have begun as SMEs at their inception. Small and medium enterprises have gained recognition as a major player of employment, income generation, poverty alleviation and regional development in Sri Lanka (Anon, 2002). Furthermore, they play a vital role in developing entrepreneurial skills and innovation, promoting economic growth and in wealth creation of the nation. The Government of Sri Lanka recognizes

SMEs as the backbone of the economy since they accounts for more than 75% of the total number of enterprises, providing 45% of the employment and contributing 52% to the GDP (Anon, 2015).

The term SME is used to denote micro, small and medium enterprises. Different countries use different definitions for SMEs based on their level of development. The commonly used yardsticks are total number of employees, annual turnover and total investment. In the Sri Lankan context, the SME policy framework defines SMEs (Table 1) based on the number of employees and annual turnover (Anon, 2015).

Table 1. SME Definition in Sri Lanka

Sector	Criteria	Medium	Small	Micro
Manufacturing Sector	Annual Turnover	Rs. Mn. 251-750	Rs. Mn. 16-250	Less than Rs. Mn. 15
	No. of Employees	51-300	11-50	Less than 10
Service sector	Annual Turnover	Rs. Mn. 251-750	Rs. Mn. 16-250	Less than Rs.Mn.15
	No. of Employees	51-200	11-50	Less than 10

The Table 2 shows that the predominant sector is trade representing around 41% of the total establishments with 33% in service while the industry represents only 26%. Scale wise micro enterprises constitute 935,736 (91.8%) of the total while micro, small and medium added together represent 99.8% and the large sector is only 0.2%. (Anon, 2016).

Table 2. Economic Sector Wise Distribution of Establishments

Scale of the Establishment	Total No. Est.		Industry %	Trade %	Service %
Total	1,019,681	100	25.6	41.0	33.4
Micro	935,736	91.8	25.3	42.0	32.7
Small	71,126	7.0	28.8	31.3	39.9
Medium	10,405	1.0	32.0	19.6	48.4
Large	2,414	0.2	31.6	36.9	31.5

Source: Report on listing stage Economic Census 2013/14 page 27

It is vital for Sri Lankan SMEs to look beyond Sri Lankan boundaries in order to gain sustainability and growth. The study is built on the start-up culture of SMEs. There are specific reasons which cause business failure among the SMEs. It explores the major question of why some businesses prosper while others fail under similar economic conditions. Most of the SMEs fail at their start-up stage itself. At present, the Sri Lankan government provides various services through a large number of public

institutions which are directly involved in the development of SMEs in Sri Lanka. Even though, they provide various assistance such as providing loans, training, technology marketing, and management, the principal issue in the SME sector is its poor performance against the large scale enterprises in the national economy (Priyanath, 2014).Contribution of the SME sector is vital for the Government's efforts in the promotion of a balanced regional growth and development of the rural economy. The SME sector is a perfect platform for the government to build up human investment to a level where the latent benefits of a state-led SME drive could be fully realized (Weerakkody, 2015). For an example, in 1983, 98% of small enterprises accounted for 48.6% of the total employment and 31.1% of value added products. In 2008, 91.6% of small enterprises accounted for 29.6% of total employment and 20.3% of value added products (Priyanath, 2014).

It is observed that the statistics show a downward trend in SMEs in Sri Lanka. The Sri Lankan entrepreneur is culturally different from his/her western counterpart. Social power is a key motivator for the Sri Lankan entrepreneur. Studies have suggested that entrepreneurial motivation in Sri Lanka is entrenched not in the need for individual achievement, but in a conscious or unconscious need to satisfy a sense of social intimacy. Studies have also recognized business failure upon the exit, bankruptcy, or liquidation of the enterprise. The rate of business failure among SMEs in Sri Lanka is 45% (Bandara, 2016).

According to statistics published by the Small Business Administration, seven out of 10 new employer establishments survive at least two years and 51 per cent survive at least five years (Anon, 2011). Business start-ups often fail because founders and investors surge forward without taking time to realize that base assumption of their business plan is wrong. They believe that they predict the future accurately, rather than trying to create a future of their own. Entrepreneurs tend to be single-minded with their strategies wanting the venture to be all about the technology or all about the sales, without taking time to form a balanced plan. It is crucial to overcome these shortcomings.

The business environment is crucial for innovation and entrepreneurial development. It governs whether there are strong encouragements for individuals to identify market openings and generate wealth, jobs and economic growth. An aiding environment that makes it easy for individuals to startup businesses, run them, sell them and fold them if they are not successful is one that fosters national economic growth. It is clear that Sri Lanka needs to improve its business environment – the question for policy makers is, "where to start on this challenging agenda?" Sri Lanka's three most problematic factors for doing business are policy instability, access to finance and the inadequate supply of infrastructure according to the World Economic Forum's Global Competitiveness Report for 2006/7. This view is supported by the World Bank's earlier work on the investment climate in 2005 which highlighted electricity, policy uncertainty and access to finance as the key issues confronting formal sector businesses in Sri Lanka ("National Human Recourses and Employment Policy," n.d.)

Business Environment can be defined as the combination of internal and external factors that influence a company's operative situation. Business Environment literally means all those aspects that have a bearing on the business such as its strengths, weaknesses, internal power relationships and orientations of the organization; government policies and regulations; nature of the economy and economic conditions; socio-cultural factors; demographic trends; natural factors; and, global trends and cross-border developments. Business environment plays a key role in shaping the business decisions and strategies of a firm. The opportunities and threats for a business come mainly from its external environment which includes factors like economic, political, technological and social. Similarly, the internal factors like managerial capabilities, efficiency in resource utilization etc. make and organization strong or weak (Figure 1).

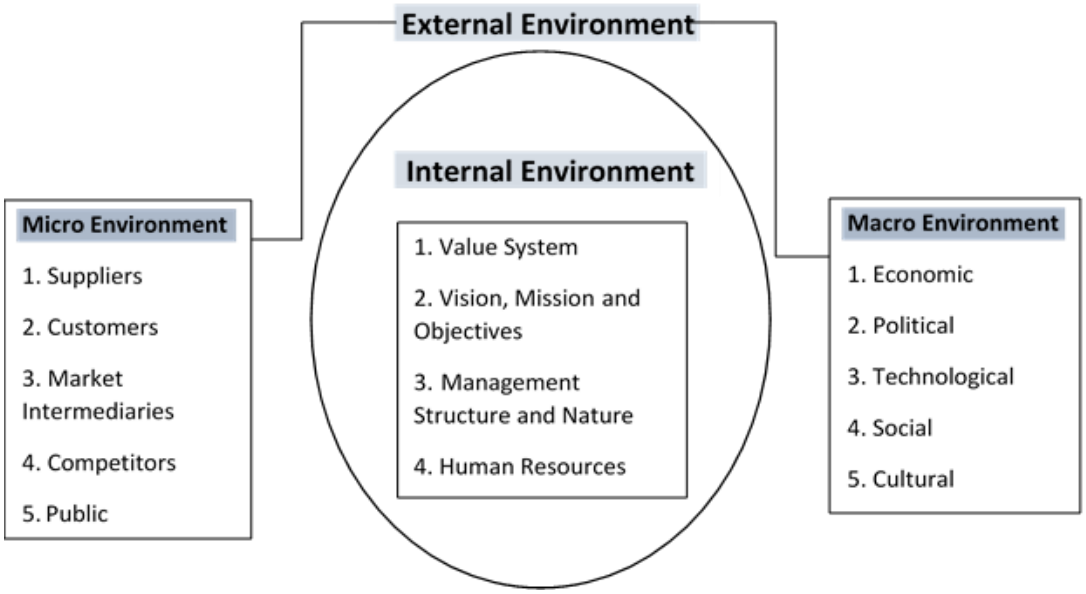

Figure 1. Components of Business Environment

New SMEs are seen as a significant component of the solution to Sri Lanka's development issues, but most of the new SMEs fail during the first few years of operation. The objectives of this study are to identify major causes for such failures and to evaluate both internal and external environmental factors that stand as obstacles for the growth of new SMEs in Sri Lanka.

Methodology

Data Collection

Consequent to a comprehensive survey of literature and several Focus Group Discussions with SME owners, 34 obstacles were identified as major ones that impede the growth of new SMEs. North Western Province was the study area which is consisted of two districts, Kurunegala and Puttalam. Primary data were collected using a pre-tested structured questionnaire from a randomly selected sample of 170 newly

established SMEs in the area. Collection of data was carried out during the period from 01st March to 09th April 2016.

Principal Component Analysis

Principal Component Analysis (PCA) is the general name for a technique which uses sophisticated underling mathematical principles to transforms a number of possibly correlated variables into a smaller number of variables. The origin of PCA lie in multivariate data analysis, the PCA has been called one of the most important results from applied linear algebra and perhaps its' most common use is as the first step in trying to analyze large data sets. Some of the other common applications include; de-noising signals, blind source separation, and data compression. In general terms, PCA uses a vector space transform to reduce the dimensionality of large data sets. The large number of internal and external variables make data analysis more difficult and complicated. The PCA is often used to overcome this obstacle by grouping together variables that are highly correlated into principal components. As a result, bring a simplification to analysis. The decision about which principal components to retain depends on the percentage of the variance accounted for the variable, the absolute variance accounted for by each principal component and whether the component can be meaningfully interpreted (Olawale et al., 2010).

Data Analysis

The use of five point Likert scale enabled respondents to indicate their opinion on a variety of factors of the business environment that have an impact on the start-up of new SMEs. A pilot study had been carried out to pre-test the viability of the questionnaire while its reliability was ensured by using Cronbach's Alpha. The large number of internal and external variables related to the obstacles for the start-up of new SMEs made the analysis of data more difficult and complicated. The PCA was used to avoid grouping of highly correlated variables together, instead of dividing them into principal components and, as a result it brought a simplification to the analysis. Bartlett's Test of Sphericity (BTS) and the Kaiser-Meyer-Olkin (KMO) were accommodated to measure the sampling adequacy and used to determine the factorability of the matrix as a whole. High values (between 0.5 and 1.0) indicate factor analysis is appropriate (Olawale et al., 2010). SPSS 23 statistical package was used for the analysis.

Results and Discussion

The study comprises of two analysis methods as descriptive and inferential analysis. The PCA resulted five components which were named as Finance, Management, Market, Infrastructure and Economic based on the statements included in each component.

Descriptive Analysis

The socio demographic characters of the sample revealed that majority of the SME owners were female (72.4%). Higher percent of female representation of SME owners

must be due to the type of business, milk based products and coir based products, which are dominated mainly by the female owners. The majority of the SME owners were between the range of 36-50 years of age (48.7%) (Table 1). This may be mainly due to the fact that younger generation prefers to employ in other occupations than being a SME owner. Further, it revealed that the most of the owners had completed both G.C.E. O/L and G.C.E. A/L examinations (40.1%) and the highest educational level observed was bachelors' degree (3.9%). However, young people with no proper educational background tend to join SME sector by their own dedication and commitment without staying unemployed.

It was observed that more than half of the owners (54.6%) had not registered their businesses with relevant government authorities. This may be due to reason that the fear of the SME owners to get involved with such authorities. Thirty eight percent of the SMEs were between one to three years in operation and nineteen percent of the SMEs were of less than one year. More than half of the owners had obtained loans (63.2%) while the majority had obtained loans from formal financial institutions (93.7%). Sixty eight percent of the loan obtained owners had provided government personnel as collaterals when obtaining loans from banks (Table 3).

Table 3. Descriptive Statistics of the Sample

Parameter	Category	Percentage (%)
Gender	Male	27.6
	Female	72.4
Age distributions	Less than 20	0.7
	21-35	30.3
	36-50	48.7
	More than 50	20.4
Education level	Below Grade 10	13.8
	Up to Ordinary Level	40.1
	Up to Advanced Level	40.1
	Graduates	3.9
	Diploma	2.0
Business registration	Registered	45.4
	Not registered	54.6
Time of establishment	Less than one year	19.1
	One to three years	38.2
	Four to six years	15.1
	More than six years	27.6
Loan obtained or not	Obtained	63.2
	Not obtained	36.8
Sources of loan	Bank	93.7
	Family	5.2
	Friends	1.1
Collaterals to obtain loans	Land	25.0
	Government Personnel	67.7
	Building	1.0
	Vehicle	6.3

Inferential Analysis

To ensure the appropriateness to use PCA, the KMO and BTS tests were carried out. BTS 2.700E3 and the level of significance P<0.000 indicated that data were appropriate for the purpose of PCA. The results showed that KMO measure of sampling adequacy was 0.797 which indicated that there were sufficient items for each component (Table 4).

Table 4. Kaiser-Meyer-Olkin and Bartlett's Test

KMO Measure of Sampling Adequacy		0.797
Bartlett's Test of Sphericity	Approx. Chi-Square	2.700E3
	df	561
	Sig.	0.000

Table 5. Variance Explained

Component	Initial Eigenvalues		Extraction Sums of Squared Loadings		Rotation Sums of Squared Loadings	
	Total	Cumulative variance %	Total	Cumulative variance %	Total	Cumulative variance %
1	8.17	24.04	8.17	24.04	4.79	14.09
2	3.42	34.10	3.42	34.10	4.51	27.36
3	2.93	42.73	2.93	42.73	3.30	37.06
4	2.26	49.36	2.26	49.36	3.29	46.75
5	1.81	54.67	1.81	54.67	2.69	54.67

Most Crucial Obstacles for New SMEs

Finance

The first component had an Eigen value of 8.17 and a percentage variance of 24.04% (Table 5). The component consisted seven statements. The statement with the highest factor loading was collateral/guarantee requirements to obtain bank loans which is said to be too stringent (0.838) (Table 6).

Usually bankers expect answers to five conditions when obtaining a loan, as; the amount of money requested, the way the money is being used for, the way the loan is collateralized, when the loan is going to be paid back and the way the loan is going to be paid back. If the owner fails to answer any of these questions properly, the red flag will be raised. Unwillingness of banks to lend money without collateral is the biggest problem.

This is because SME owner suddenly thinks to obtain a loan from a bank even without a bank account or a business plan. Therefore, the bankers do not have the trust that the loan will be paid back within the given period of time and they ask for trustworthy collateral. The other statements used to determine the extent of finance as an obstacle were, time consuming for processing loan application (0.833), lack of interest in obtaining loans from banks (0.792), too much restrictions from the money lenders (0.719), insufficient time for loan repayment (0.711), high interest rates for

loans (0.664), and difficulty of access to finance (0.503) (Table 6). The fact that the loan applications were time consuming since bankers take about three months for processing a loan. The lack of interest in obtaining loans from banks is due to various reasons such as fear of going to bank, inability to fill forms, reluctance to take risks and high interest rate. Component one was labeled as Finance.

Table 6. Rotated Component Matrix

Component	1	2	3	4	5
1. Collateral/guarantee requirements to obtain bank loans are too stringent	0.838				
2. The process of loan applications is time consuming	0.833				
3. Not interested in obtaining loans from banks	0.792				
4. Too much restrictions from the money lenders	0.719				
5. The repayment of the loan is not enough.	0.711				
6. Interest rates are high	0.664				
7. Access to Finance is difficult	0.503				
8. Poor knowledge about government rules and regulations		0.770			
9. Application of ICT is low		0.724			
10. Lack of awareness about quality certificates		0.661			
11. Lack of planning for the next stage of the business		0.642			
12. Lack of information about new technology		0.620			
13. Lack of knowledge in business planning/management		0.618			
14. Lack of higher education		0.603			
15. Cost for obtaining quality certificates are high		0.546			
16. Poor account management		0.496			
17. Difficulty in obtaining information on markets		0.402			
18. Difficulty in obtaining business registration		0.358			
19. Bad credit history		0.308			
20. Insufficient government support			0.704		
21. High production costs			0.680		
22. Infiltrations are high			0.657		
23. Decline of demand for the products			0.568		
24. Nonpayment risk on credit sales			0.566		
25. Lack of novel business opportunities based upon new technologies			0.523		
26. Interruption of water supply				0.813	
27. Poor roads				0.790	
28. Breakdown of electricity supply				0.782	
29. Poor communication facilities				0.770	
30. Location of the business is less pivotal now				0.482	
31. Inflation is high					0.684
32. High tax rates					0.652
33. Deterrent rules & regulations of the government					0.613
34. Political instability					0.499
Cronbach's Alpha	0.889	0.845	0.774	0.812	0.728

Extraction Method: Principal component analysis. Rotation method: Varimax with Kaiser Normalization

Management

The component had an Eigen value of 3.42 and percentage variance of 10.06% (Table 5). The component consisted of 12 items. The item with the highest factor loading was poor knowledge about government rules and regulations (0.770). This may be because SME owners do not have much knowledge about government rules and regulations when registering and continuing their business. The other statements included were

poor application of information and communication technology (0.724), lack of awareness about quality certificates (0.661), lack of planning for the next stage of the next stage of the business (0.642), lack of information about new technology (0.620), lack of knowledge in business planning/management (0.618), lack of higher education (0.603), high cost for obtaining quality certificates (0.546), poor account management (0.496), difficulty in obtaining information on markets (0.402), difficulty in business registration (0.358) and bad credit history (0.308) (Table 6). The obstacle was labeled as management which is also internal to the firm.

Market

This component had an Eigen value of 2.93% and a percentage variance of 8.63 % (Table 5).This component was consisted of six statements. Insufficient government support to find the market (0.704), high production cost (0.680), high Infiltrations (0.657), decline of demand for the products (0.568), non-payment risk on credit sales (0.566), and lack of novel business opportunities based upon new technologies (0.523) (Table 6) were also included to measure the market component as an obstacle. This component is external to the firm and labeled as market which revealed that most of the SME owners are unable to find their target market. It was revealed that most of the SMEs have limited access to larger markets terms of market linkages, transport and information exchange.

Infrastructure

The component had an Eigen value of 2.26% and a percentage variance of 6.63% (Table 5). This component consisted of five items as; interruption of water supply (0.813), poor roads (0.790), breakdown of electricity supply (0.782), poor electricity supply (0.782), poor communication (0.770), and location of the business is less pivotal (0.482) (Table 6). This component is also external to the firm. Expanding and constantly upgrading of infrastructure facilities, and thereby bridging the disparity in facilities between the rural and urban areas may prevent failures at start-up stage

Further, location is critical to the success of a business at the start-up stage whereas a good location may enable a struggling business to survive and thrive ultimately while a bad location could spell disaster to even the best managed enterprise. Some factors to consider are customer base, traffic, and accessibility, location of competitors, the history, community flavor and receptiveness to a new product.

Economic

The final component with least importance consisted of 1.81 Eigen value and a 5.31% of variance with four items (Table 5). The component was labeled as economic which consists of high inflation (0.684), high tax rates (0.652), deterrent rules and regulations of the government (0.613) and political instability (0.499) (Table 6). The final component is largely external to the firm.

Conclusions

The PCA discovered that the most crucial obstacle for business start-up of new SMEs in NWP is largely internal to the firm (Financial issues). Surprisingly, the second most critical obstacle, management, is also an internal factor to the business environment.

Small and Medium Enterprises are a vast developing sector and it is the backbone of Sri Lankan economy. Starting up a business in Sri Lanka is not a frightening task. A recent report gathered by the World Bank Group indicates an improvement in Sri Lanka's ranking as a potential destination to do , having risen to the 111th spot out of 190 countries in the 'Doing Business Index' for the year 2018. Accordingly, the start-up process in Sri Lanka now features only eight relevant steps, all of which take ten days (on average) to complete. The first eight steps are: (1) reserving a name; (2) appointing directors and a company secretary; (3) registering with the Registrar of Companies; (4) giving public notice of incorporation; (5) registering with the tax authorities; (6) registering for VAT; (7) payment of stamp duties; and (8) registering with the labor department (World Bank Group, 2018). Most of the respondents in the survey (55%) have not obtained their business registration under government authorities. This is mainly because they find that business registration is a costly, time consuming and unimportant activity.

SME owners do not have a specific plan for their business. However, they start the business and get stuck at the middle without being able to grow to the next stage of its life cycle. Hence, most of the enterprises get shut down and do not grow into large scale businesses. Many SMEs are of first time entrepreneurs, and they do not have sufficient bandwidth in all the functional areas. They are not able to estimate their own short-term and long-term needs accurately with all the uncertainties they encounter. Sri Lankan SMEs have not made great progress in the past.

They still struggle with tapping financial management. In most cases, SMEs are founded by entrepreneurs who are not managers themselves but they struggle to manage them due to the sole fact that they are the founders. Care must be taken often to study, organize, plan and control all activities of business operations. Most SMEs rely more on mental records and therefore, unable to prepare proper or up-to-date financial statements that can be used as evidence of profit and loss earned/occurred and wealth of the business including the working capital. This problem is even made worse where the entrepreneur, as the founder, manages their firm/company without necessary managerial skills.

Therefore, the study suggests that it is needed to provide up to date training programs to SME owners, government SME supporting agencies (such as National Enterprise Development Authority) should be vigorously marketed to create awareness among the public, introduce lower interest rate plans for loans, introduce new technology, improve infrastructure facilities and revisit the micro finance accessibility of SMEs and formulate effective financial management plans through closely monitoring and supporting SMEs in NWP within their early years from the inception to avoid failures.

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An Investigation into the Dynamic Nature of Food Security Using Markov Switching Models

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ABSTRACT

People are considered to be food secured when they have adequate access to food which helps to maintain their health lives. Food availability, access, utilization and stability are the four main facets of food security. Rather than dropping over time, food insecurity has become a repetitive problem. This research was led to study the state transition behaviors in the four dimensions of global food security (Availability, Access, Utilization and Stability) by creating a two state (Crisis and Success) Markov-switching model. Markov Switching Model is a method applied to explore structural changes of nonlinear time series. In this study Markov Switching Auto Regressive Model was used because the data used were lower frequency data. Secondary data were obtained for five main regions in the world (Africa, America, Asia, Europe, and Oceania) and one sub region (South Asia). Results highlighted that growth rate of food availability was high in developing regions than developed. America, Asia, and South Asian regions showed longest time period in crisis state in accessibility to food. Utilization of food in South Asian region was in the crisis state and in European region it was in the success state. Asian region showed the highest stability in other three dimensions of food security. African region has to face a long-lasting food insecurity in all four dimensions. American, Asian, European and South Asian regions have to face food insecurity not critically in terms of food availability, but in the case of access, utilization and stability. Therefore, this study emphasizes that to eradicate food insecurity all four dimensions should be considered and appropriate policies and investments should be made.

KEYWORDS: Food security, Markov switching model, Transition behavior

Introduction

Food security is a crucial component of overall well-being and it "exists when all people at all times have physical, social and economic access to satisfactory, safe and nutritious and adequate food to provide the basis for lively and healthy lives" (World Food Summit, 1996). Food security is a multi-dimensional occurrence and the first dimension is physical availability of food and it emphasis the supply side of food and is determined by the level of food production and net trade. Second one is economic and physical

access to food and it concerns about the ability to produce one's own food or buy it. Third one is food utilization and it is understood as reassurance of safe and nutritious food which meets their dietary needs. Fourth is the stability and it must be present at all times in terms of availability, access and utilization for food security to exist (World Food Summit, 1996).

Food insecurity can be transitory, seasonal, or chronic. Transitory food insecurity is temporary and occur when there is an unexpected drop in the ability to produce or access to adequate food to sustain good healthy lives. Chronic (or permanent) food insecurity occur when people are incapable to meet their minimum food necessities over a sustained period of time. The concept of seasonal food security falls between chronic and transitory food insecurity (FAO, 2015).

There are many multifaceted reasons which prevent achieving global food security. These complications include extreme poverty, concerns in food distribution, and issues in food supply, food waste, population growth, climate change, water scarcity, price volatility and government policies that constrain trade. Policy makers should give equal importance to both transitory and chronic food insecurity because if transitory food insecurity is neglected it can transform into a chronic food insecurity.

Regional Overview of Food Security in World

Africa has made some development towards halving the percentage of its population suffering from hunger which was proposed in Millennium development goal 1.C target. Overall, the prevalence of hunger in the region declined by 31 percent by 2015 (FAO, 2015a). Although, Asia and pacific region has achieved the largest reduction in the number of undernourished people, this was not sufficient to meet the target set by the World Food Summit (WFS) of halving the number of undernourished people by 2015 (FAO, 2015b).

In America, although most of the households have a steady access to sufficient food, minority of American households face food insecurity (Jensen et al., 2014). European region has been undergoing a decrease in the prevalence of undernourishment since 2000 (FAO, 2015c).

Though food security has improved in almost every region of the world during the past, it is still a major concern around the world. Millions of money and lot of time are spent annually on food aid programs projected to minimize food insecurity. For these programs to work effectively there is an urgent need to identify current and future states (crisis state or growing state) and the movement of all four food security dimensions (availability, access, utilization and stability) with time, because food insecurity occur with the lack of all these four dimensions. Therefore, the objective of this study is to identify these four dimensions of food security, so that the appropriate food aid programs can be directed to where it needs most.

Methodology

Theoretical Framework

Markov Chain

When we have a set of states as S = $\{s_1, s_2 \ldots s_t\}$ the process starts in one of these states and moves consecutively from one state to another and each move is called a step.

Transition Probability Matrix

By a matrix, named as the transition probability matrix (P_{ij}), the transition probabilities of a stationary Markov chain can be represented.

$$\begin{pmatrix} P_{11} & P_{12} \\ P_{21} & P_{22} \end{pmatrix} \quad P_{ij}$$

Where:

$$P_{11} + P_{12} = 1$$
$$P_{21} + P_{22} = 1$$

P_{11} is the estimated probability of staying in state one in next period given that the state the process is in the current period. And P_{22} denotes the probability of staying in state two.

Markov Switching Autoregressive Model

This study used the simplest form of the model, where the transition was determined by a two state Markov chain. A time series (Y_t) following a Markov Switching Auto-Regressive (MSA) model (with two regimes) was used because these models are often applied to lower frequency data (quarterly, yearly, etc.). The function derived for Markov Switching Auto Regressive model was expressed as,

$$Y_t = C_1 + \varphi_t : s_t Y_{t-1} + \varepsilon_t$$

Where,

Y_t - Average value of variable related to food security given in Table 1

C_1 - State-dependent intercept which denotes growth rates as the data series is in the differenced form

$\varphi_i; s_t$ - i^{th} AR term in state s_t

t - 1, 2... T

ε_t - Error

Variable Selection

As the food security is measured with four main dimensions such as availability, accessibility to food, utilization of food and stability of these three, several indicators to represent these variables are used in the analysis as given in Table 1.

Data Collection

All the data in this study was obtained from the database available in the suite of food security indicators of "Food and Agriculture Organization" (FAO) and from United Nations Statistics division-National Accounts Main Aggregates Database (unstats.un.org). Data covered the period from 1960 to 2014 for four dimensions except for Utilization (which had data from 1990-2014 only) for five main regions (Africa, America, Asia, Europe and Oceania) and one sub region of Asian region.

Table 1. Variables Used in the Study

Dimensions of Food Security	Indicator	Description
Food availability	Average value of food supply	The total value of annual food production expressed in international dollars per head.
Accessibility to food	Gross Domestic Product per capita($)	Average income per person in a region.
Utilization of food	Access to improved water sources (%)	Percentage of the population with access to an adequate amount of water from improved water source
Stability of other Dimensions	Percentage of arable land equipped for irrigation (%)	Share of land irrigated over total land area

Data Analysis

A nonlinear time series model known as Markov Switching Autoregressive Model proposed by Hamilton (1989) and available in STATA (version 14) was used in modeling the movement of states (crisis or growing) of dimensions of food security in each region , transition probabilities between two states and the expected duration that one state last for each and every region. This model can be used for time series that are in transition over a set of finite states. States are unobserved and the process can switch among states throughout the sample. The time of transition between states and the duration in a particular state are both random. Such a Markov switching model uses the idea of the Markov process (Hamilton, 2008).

Results and Discussion

Outcome of Markov Switching Autoregressive Model

Estimated means (The average growth rates) of two states Markov Switching Auto regressive model are given in Table 2. The lower p-value reported in the test implied that two states were significant for all the regions except the state two in Europe region. All the regions showed low mean for state one than the mean of state two (Table 2). Hence, state one was termed as the 'crisis' state while state two was named as the 'success' state.

Table 2. The Average Growth Rates of Two States Obtained From Markov Switching Auto Regressive Model

Region	Food Availability		Accessibility to Food		Utilization of Food		Stability of Other Dimensions	
	Mean		Mean		Mean		Mean	
	S_1 Crisis	S_2 Success	S_1 Crisis	S_2 Success	S_1 Crisis	S_2 Success	S_1 Crisis	S_2 Success
Africa	-0.54*	0.24*	-16.9*	163.1*	0.65*	1.10*	0.01*	0.06*
America	-0.52*	0.42*	405.6*	394.6*	0.45*	0.53*	0.02*	0.102*
Asia	-1.19*	0.38*	57.2*	2299*	0.26 *	0.55*	-1.50*	0.112*
Europe	-0.54*	0.49*	269.3*	5509.5*	0.07 *	0.01*	-0.04*	0.105
Oceania	-0.55*	1.03*	349.7*	211.64*	0.15*	1.92*	0.006*	0.06*
South Asia	-0.01 *	0.01 *	23.19*	211.69*	0.79 *	0.90*	0.38*	0.02*

**Significant at 5%*

Availability of Food

The average growth rate of crisis state in food availability was negative and it is positive in the success state for all regions (Table 2). The lowest average growth rate of the crisis state (-1.19) of food availability was seen in the Asian region and the highest growth rate (-0.52) was in the American region. It implied that growth rate of food availability was high in developing regions like Asian and African than developed regions like America.

African and Oceania regions showed high probability of being in the crisis state in the next period of food availability (Table 3) and the estimated duration of crisis period was 22 and two years respectively (Table 3). Meanwhile, the duration of the success state is one year. The American, Asian, and South Asian regions showed a high probability of being in the success state in the next period and the estimated durations were 15, 2.7, and 1.2 years respectively. In the European region, the probability of being in both crisis (0.38) and success state (0.34) in next period was high, so both states were persistent. The estimated duration was two years. Therefore when compared with the other regions, African region showed longest period in the crisis state in food availability.

Accessibility to Food

With respect to accessibility of food, both the lowest average growth rate of being in crisis state (-16.9) and success state (163.1) was shown in the African region and highest average growth rate of crisis state (405.6) was shown in the American region (Table 2). And highest growth rate of success state (5509.5) was shown in the European region. So for African, Asian and South Asian regions, although the growth rate of crisis state of GDP was decreased the growth rate of the success state has not improved. It implied that these regions have to face fluctuations in accessibility to food. For America, Europe and Oceania regions growth rates of both states have improved. All six regions showed high probability of being in the crisis state in the next period and estimated durations were eight, 19, 19, 16, 12 and 20 years respectively. Therefore according to the results America, Asia, and South Asian regions showed longest time period in crisis state (Table 3.).

Table 3. Transition Probabilities and Expected Duration

Region	Food Availability		Accessibility to Food		Utilization of Food		Stability of Other Dimensions	
	S_1	S_2	S_1	S_2	S_1	S_2	S_1	S_2
Africa								
Probability	0.95	10^{-8}	0.88	0.75	0.95	10^{-8}	0.98	0.005
Duration	1.2	1	8	4	20	1	48	1
America								
Probability	10^{-8}	0.93	0.95	0.64	10^{-8}	0.49	0.96	0.83
Duration	1	15	19	2	1	2	23.5	1.5
Asia								
Probability	10^{-8}	0.64	0.95	0.49	0.91	0.47	10^{-8}	0.97
Duration	1	2.7	19	1	11.2	1.9	1	49
Europe								
Probability	0.38	0.34	0.94	0.69	0.82	0.68	0.97	0.97
Duration	2	2	16	3	5.8	3.2	35	36
Oceania								
Probability	0.31	10^{-8}	0.92	0.38	0.90	10^{-8}	0.98	10^{-8}
Duration	2	1	12	1	10	2	11	1
South Asia								
Probability	0.12	0.17	0.95	0.32	0.34	0.28	0.98	10^{-8}
Duration	1.14	1.2	20	1	1.5	1.4	40	1

S_1- Crisis State, S_2-Success State

Utilization of Food

The lowest average growth rate of crisis state (0.07) in utilization of food was shown by European region, and the highest (0.79) was shown by South Asian region. The highest average growth rate of success state (1.92) was shown by Oceania region. For American region, average growth rate of both states showed a moderate value. The utilization in South Asian region was in a low state and high state in European region. Except for American region, other regions showed high probability of being in the crisis state in the next period was and the estimated duration of crisis period was 20, 10, 1.5 years respectively. For American region the probability of being in the success state in the next period was higher and the estimated duration of crisis period was two years. Though the estimated probability of being in the crisis state was high, it will not last for a longer time in the American region.

Stability of Other Dimensions

Asia and Europe regions showed the lowest (negative) average growth rate of crisis state and that of the state of success was positive for all regions. South Asia showed the highest growth rate of crisis state (0.38) in stability and Asia showed lowest growth rate (-1.5). Because that, the growth rate of success state is higher in Asian region than other regions, it showed the highest stability in other three dimensions of food security. Except for Asian and European, other regions showed high probability in the crisis state in the next period. Africa and Oceania regions showed longest period in crisis state. It implied that Africa and Oceania regions have to face critical problems in the aspect of utilization of food.

Conclusions

Outcome of the Markov Switching Auto Regressive Model revealed that there are diverse regimes in the dimensions of food security (Crisis State and Success State) as identified by the predicted regimes. Therefore, as believed, food insecurity is a recurring problem rather than reducing over time.

In the African region, although the availability of food has slightly increased, stability of other dimensions will be in a crisis for a long time. Therefore, all four dimensions of food security will remain on the crisis state for a longer period when compared with other regions. Consequently, Africa will have to face a critical problem in food security (Chronic food insecurity) and food aid and assistance should be prioritized as a concern of all four dimensions. In the American and the Oceania regions, food availability is not a big problem. But there is concern on other dimensions. So America should put more emphasis on accessibility, utilization of food and stability of other dimensions.

For Asian and European regions most critical problem is the accessibility to food. Thus, the assistance should be prioritized on increasing economic and physical access to food. South Asian region also face problems in accessibility and, utilization of food and also stability of other dimensions.

To improve food availability, increasing domestic food production and import capacity may be some options. To improve physical access, transport and market

structure can be improved. To improve stability of supply and access, price fluctuations and political instability should be minimized. To improve food utilization, options would be improving food safety and hygiene in manufacturing practices applied and increasing dietary diversity. The options for food insecurity which has long term effects maybe limiting global warming, develop climate- friendly agricultural production systems and land-use policies which helps to mitigate climate change and raise awareness of the pressures of increasing population growth and consumption patterns.

Finally, food security is a multi-dimensional phenomenon, where, all four dimensions have to be in a favorable state to eradicate insecurity. Therefore, all four dimensions should be considered and by understanding, which dimension is critical in each region, a proper mechanism to eradicate food insecurity can be put in place.

Acknowledgements

The data were downloaded from official websites of Food and Agriculture Organization and United Nations statistics Division.

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Economic Valuation of Urban Coastal Ecosystem Services and Scenic Beauty

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ABSTRACT

A lagoon ecosystem provides a variety of ecological functions that directly or indirectly translate to economic services and values. The impact of the loss of cultural services is scarce in literature and particularly difficult to measure. This study generates monetary value for urban ecosystem services specifically the aesthetic value of a natural asset according to the perception of the adjacent community. The data were gathered by using a pre-structured, questionnaire-based personal interview carried out with 300 households representing 15 'Thotupola' areas adjacent to the estuary. Choice Experiment (CE) was used to determine the preferences and the willingness to pay for conservation of urban ecosystem services and natural view. Highest value (530.75) was recorded for provisioning services. Marginal willingness to pay (MWTP) for prawns (272.25) was higher than the value of (258.50) crabs. Second highest MWTP (309.50) was acquired by recreation attribute, scenic beauty of the lagoon. Moreover, local fishing community does not willing to pay for regulatory services such as reduction of flood damage by mangrove and cleaning of polluted lagoon water. Understanding the degree and order of importance of ecosystem non-use values for its direct users is critical for planning for optimum and sustainable management, as properly managed ecosystem can provide continued returns to future generation without diminishing its productivity. The study generates information for decision makers with regard the monetary values for conservation of different ecosystem services and estuary view, to protect the estuary ecosystem through implementing policies and management plans, on urban estuaries and mangrove environment protection.

KEYWORDS: Choice experiment, Ecosystem services, Scenic beauty

Introduction

An ecosystem is a dynamic complex of living and nonliving environment interacting as a functional unit. Ecosystem services are the benefits from ecosystems to support sustainable human well-being (Barbier and Strand, 1998). According to the ecology and economy the ecosystem services can be classified in to four major categories namely; 'Provisioning', 'Regulating', 'Cultural' and 'Supporting' services.

In literature the researchers have attempted to value the ecosystem as a bundle of services where they ignored the value of some attributed services separately. Impact

of the cultural services is scarce in literature and particularly difficult to measure. But it is especially important as they are the nonmaterial benefits people obtain from ecosystems.

Different habitats provide different types of ecosystem services. Therefore, general classifications need to be adapted to specific types of ecosystems. Services provided by the urban ecosystems have direct impact on human health and security such as air purification, noise reduction, urban cooling and run off mitigation. Negombo is a major city in Western Province Sri Lanka, on the West coast of the island and at the mouth of the Negombo lagoon. The Negombo lagoon was selected for this study as there is a clearly defined cultural landscape, i.e. the lagoon at the heart of the city have cultural and religious significance for the fishing community and symbolize the spiritual links between this community and its environment. The local community demand for lagoon view is not just for aesthetic purposes, but essentially for cultural purposes.

The valuations of ecosystem services assess the relative contribution of ecosystem services towards sustainable human well-being. Human have changed the ecosystems extensively to meet the rapidly growing demand for augmented goods and services. The changes that have been made to ecosystems have contributed to substantial fulfillment of human well-being while the gains have been achieved at an increasing cost in the form of the degradation of many ecosystem services. Some of these assessments are based on individual's perceptions of the benefits they derive. But support towards sustainable human well-being is a much larger goal. Therefore, it is essential to improve valuation methods to assess benefits to individuals that are not well perceived and incorporate benefits to whole communities and to sustainability (Costanza, 2000).

Market fails due to incapability of identifying these costs and benefits and it has been a major problem in managing the estuary. Understanding the degree and order of the non-use value of an ecosystem for its direct beneficiaries is critical for planning for the sustainable environment management (Wattage and Mardle, 2005). Therefore when implementing policies rules and regulations for environmental conservation, it is necessary to consider the perception of the adjacent community.

Monetary valuation of natural resources can be easily understood by all the residents to initiate conservation activities from the adjacent community.

The specific objective of this study was to determine monetary value for urban ecosystem services according to the perception of the adjacent community, to assess the importance of diverse ecosystem functions. The general purpose of this research is to generate information for decision makers with regard to the costs and benefits to protect the estuary ecosystem through implementing policies and management plans, on urban estuaries and mangrove environment protection.

Methodology

Choice Experiment (CE) was carried out to estimate the stated preferences where the conservation of these ecosystem services was priced. Choice experiment is a technique

that provides respondents with multiple choice sets, in which each choice set usually contains two or more management options. The options in each choice set contain common attributes, which can be at various levels. The respondents were asked to choose their most preferred option.

Theoretical Framework to Assess the Value of Ecosystem Services (ESS)

Choice Experiment is based on two fundamental building blocks: Lancaster's characteristics theory (Lancaster 1966) and random utility theory (Adamowicz et al. 1994, Boxall et al. 1996). Lancaster's theory posits that choices can be modelled as a function of attributes of the alternatives relevant to a given choice problem. Random utility theory assumes that the alternative with the highest overall utility is selected. The utility function for a representative consumer can be decomposed into a systematic component or observable component and a random component or unobservable component by the analyst. The random utility function is shown as follows:

$$u_i = v_i + \varepsilon_i \quad [1]$$

Where;

Utility of the option $i = (u_i)$

Utility of the other option $j = (u_j)$

However, since the overall utility is random and $p\{i \text{ chosen}\} = p\{V_i + \varepsilon_i > V_j + \varepsilon_j\} c$

The probability of an individual choosing an alternative such *i* as;

$$p_{[i]} = e^{vi} \Big/ \sum_{j \in c} e^{vi} \quad [2]$$

V_j is assumed to be linear and additive functions in the attributes and then V_j can be written as;

$$V_{iq} = \sum_{k=1}^{K} \beta_{jk} X_{jkq} \quad [3]$$

β_{jk} = Estimates of the weight of attribute in the utility expression v_j of alternative j and v_{iq} estimates of the (relative) utility u_{iq} of the individual.

The marginal value of an attribute change could be given by the ratio of the coefficients of the attribute in question and that of the monetary attribute, holding all else equal. This can be conceptualized as the part-worth or marginal willingness to pay (MWTP) for the attribute calculated as;

$$\text{MWTP attribute} = -\frac{\beta_{attribute}}{\beta_{monetary\ attribute}} \quad [4]$$

Where MWTP represent the marginal rate of substitution between the monetary attribute and the attribute in question, and β refers to the parameter estimates of the attribute levels.

Data Collection

The lagoon area is geographically segregated in to areas known as 'Thotupola' where the fisherman can easily launch their fishing boats in to lagoon (Figure 1).

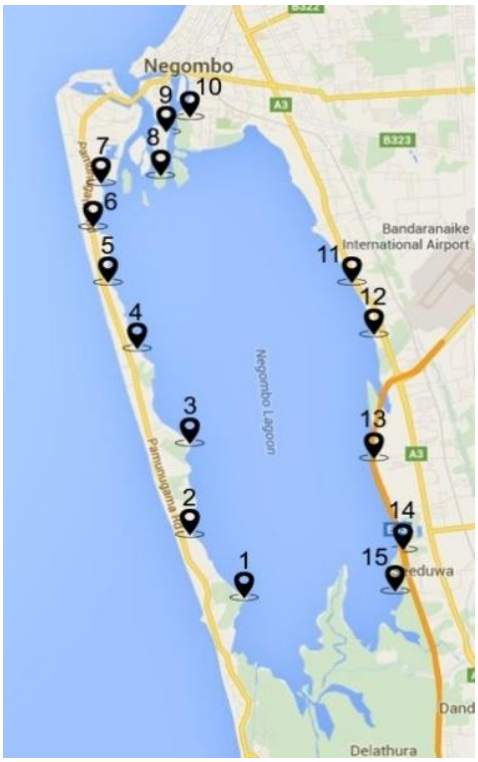


Figure 1. Fifteen "Thotupola" Areas in Negombo Lagoon

Note: 1-Kepungoda, 2-Settappaththuwa, 3-Dungalpitiya, 4-Thalahena, 5-Basiyawatta, 6-Aluthkuruwa, 7-Pitipana South, 8-Siriwardana Pedesa, 9-Munnakaraya, 10-Telwatta, 11-Katunayaka, 12-Katunayaka South, 13-Liyanagemulla, 14-Mukalangamuwa, 15-Bandarawatta.

Data collection was done within two phases. During the first phase of this research program; a pilot survey was conducted to identify the levels of ecosystem services which are crucial for households around Negombo lagoon. Questions were asked from 30 respondents representing five 'Thotupola' areas for the pilot survey. According to the pilot survey findings; five attributes and three levels for each attribute, were selected as crucial for this study (Table 1).

Table 1. Findings of the Pilot Survey

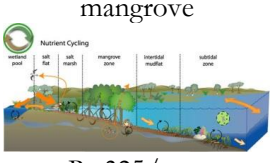
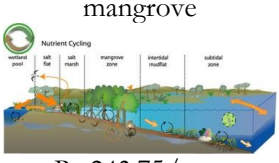
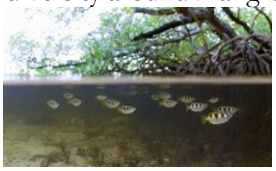
Attributes	Level I	Level II	Level III
Provisioning	Fish	Crabs	Prawns
Recreation	Full view	Partial view	No view
Regulating	Prevention soil erosion	Water purification	Flood reduction
Supporting	Sediment stabilization	Nutrient recycling	Biodiversity
Annual Payment	Rs. 243.75	Rs. 325.00	Rs. 162.50

The pilot survey participants also identified the minimum (Rs.162.50 per year) and maximum (Rs. 325 per year) they could contribute for the lagoon ecosystem conservation activities.

Since each of the four ecosystem services and "Annual Payment" has three levels, these were combined in to a limited number of choice sets made up of optimal combinations of attributes and their levels. For this purpose, Statistical Package for the Social Sciences (SPSS 16.0) was used. Orthogonolization procedure was adopted to identify the main effects.

A complete factorial design including all possible combinations of attributes and levels would use 243 (3*3*3*3*3 = 243) choice tasks. From the 243 possible combinations, 18 lagoon profiles were randomly blocked into six different versions, each with three different lagoon alternatives (Table 2).

Table 2. An Example of a Choice Card

Choice A	Choice B	Choice C
Full view	No view	Partial view
		
Prawns	Fish	Fish
		
Reduction of flood damage by mangrove	Reduction of flood damage by mangrove	Cleaning of polluted lagoon water by mangrove
		
Nutrient recycling by mangrove	Nutrient recycling by mangrove	Biodiversity around mangrove
		
Rs.325/year	Rs.243.75/year	Rs.162.50/year
		
☐	☐	☐

During the second phase, respondents were asked to select their best choice out of three alternatives present in one choice card. The data collection was conducted by using 300 respondents, representing 15 'Thotupola' areas adjacent to the lagoon during February to April 2016.

Data Analysis

For assessing the value of the ESS, Conditional Logistic (CL) Regression was employed when all the assumptions were met.

Results and Discussion

Out of 300 participants, 55% of the respondents were males and 22% of the respondents were in the age category of less than 35 years. Fifty seven percent of the sample was educated above the 11th grade (Table 3).

Table 3. Descriptive Statistics of the Sample

Parameter	Percentage (%)
Age (Years)	
< 35	22.00
36 – 50	37.67
50 <	40.33
Education (Grade)	
< 5	2.33
5 – 10	40.67
11 <	57.00
Monthly Wage (Rs.)	
< 10,000	9.00
10,000 - 20,000	40.67
20,000 <	50.33
Gender	
Male	55.00
Female	45.00

According to the survey, Flood control (92%), coastal protection (87%) and lagoon fisheries (85%) ranked as the major services provided by the lagoon. Scenic beauty of the lagoon was categorized as very important (42%) and important (46%) by the adjacent community (Figure 1). Therefore, 88% of the respondents around the Negombo lagoon have clearly identified the scenic beauty of the lagoon as a major services provided by the lagoon ecosystem and the benefits that they would receive through the well maintained lagoon ecosystem (Figure 1).

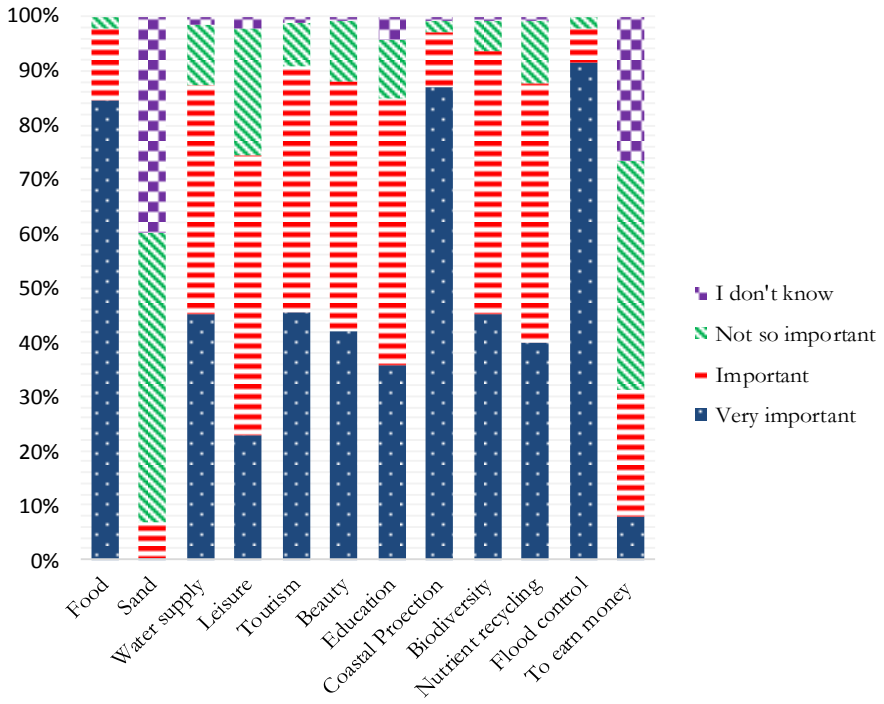


Figure 1. Importance Given by Residents to Main Functions of the Lagoon

The residents of Negombo lagoon are more willing to provide participatory contribution (49%) than monetary contribution (20%) to conserve the lagoon for the future generation (Figure 2).

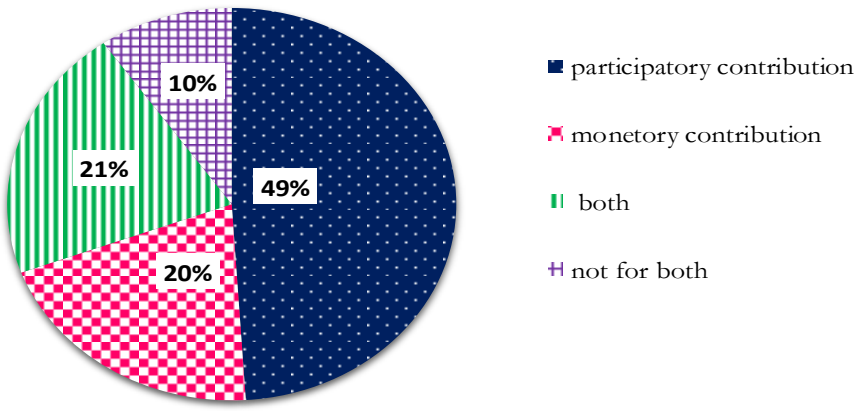


Figure 2. Contribution for Conservation

Twenty one percent of them were willing to give contribution in both ways while 10% of them were not willing to take part in any conservation activities. Ninety

percent of the fishing households willingly contribute for the proper functioning conservation programs.

Because adjacent fishing community becomes the major stakeholder who directly deals with the ecosystem services provided by the lagoon and they have clearly recognized the direct benefits that they would receive through a conservation program.

Outcomes of CE

According to the results (Table 3), seven out of eight levels of ecosystem services considered in the analysis (i.e. crabs, prawns, partial view, full view, cleaning polluted water, reduce flood damage and biodiversity) were significant at 95% of significant level. Positive coefficients for the attribute imply that respondents' willingness to pay for conservation of those ecosystem services. According to the results of CE, respondents' are willing to pay for all ecosystem services except regulating services such as cleaning of polluted lagoon water and flood control (Table 3).

Table 3. Outcomes of CE Model

Attributes	Levels	Coefficients	Standard Error	P value	MWTP	MWTP for Whole Attribute
Provisioning (PS)	Fish (PSF)[a]	-	-	-	-	530.75
	Crabs (PSC)	1.034	0.272	0.000	258.50	
	Prawns (PSP)	1.089	0.307	0.000	272.25	
Cultural (Recreation) (CS)	No view (CSN)[a]	-	-	-	-	309.50
	Partial view (CSP)	0.594	0.193	0.002	148.50	
	Full view (CSF)	0.644	0.193	0.001	161.00	
Regulating (RS)	Prevention erosion (RSP)[a]	-	-	-	-	-
	Cleaning polluted water (RSC)	-0.653	0.277	0.019	-	
	Reduce flood damage (RSR)	-0.674	0.285	0.018	-	
Supporting (SS)	Sediment stabilization (SSS)[a]	-	-	-	-	222.50
	Nutrient recycling (SSN)	0.377	0.461	0.413	94.25	
	Biodiversity (SSB)	0.513	0.211	0.015	128.25	
Contribution to conservation		-0.004	0.001	0.005		

Note: MWTP in Rs. per perch per year, a–reference category, Log likelihood -516.07645, Pseudo R^2 0.0732, N. Observations 900

According to the MWTP values, the fishing households around Negombo lagoon ranked the highest value (530.75) for provisioning services. Because their main

livelihoods attached with provisioning services and nowadays majority of the aquaculture farms are either non-functioning or abandoned due to low yields. Marginal willingness to pay for prawns was (272.25) higher than the value of (258.50) crabs. Second highest MWTP was (309.50) acquired by recreation attribute, scenic beauty of the lagoon (Figure 3).

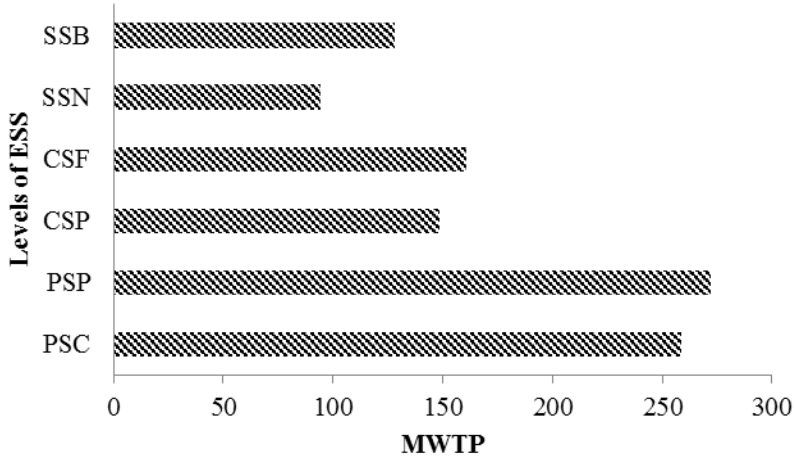


Figure 3. Marginal Willingness to Pay Values for Levels of Ecosystem Services
Note: PSC- crabs, PSP- prawns, CSP- partial view, CSF- full view, SSN- nutrient recycling, SSB- biodiversity

Although the flood control was appeared as very important service in community ranking order, people were not willing to pay for that service due to the following reasons. Majority of the local fisher community stated that development activities and illegal constructions took place in this area are the major reasons behind these flood damages. Further they stated that flood damage can be reduced only by implementing proper functioning policies, rules and regulations.

The overall implicit price for the ecosystem services was derived as Rs. 1062.75. Scenic beauty of the lagoon acquired solely 30 percent from whole ecosystem value that cannot readily provide a substitute to the indigenous people in community. Therefore in formulating conservation policies and exploiting land development activities the policy makers must account the fact and importance of scenic beauty of lagoon ecosystem to the indigenous people in community.

Conclusions

Economic valuation of ecosystem services and natural resources has become popular over the last two decades. But the focus towards urban ecosystems and their cultural services are lack in literature. Further the conservation of urban ecosystems means that the land cannot be put into alternative uses. Therefore in formulating conservation policies one must account for the fact that the benefits to the local communities who

are being asked to conserve must outweigh the costs to them. Otherwise it is unlikely that the policy will be accepted.

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Factors Influencing the Business Success of MSMEs in Sri Lanka: The Empirical Evidence from Kurunegala District

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ABSTRACT

The Micro, Small and Medium Enterprise (MSME) sector plays a major role in Sri Lankan economy. It immensely contributes to regional development, employment generation and poverty alleviation and hence, this sector has been identified as the backbone of the Sri Lankan economy. The focus of this study was to identify the factors affecting the business success among MSMEs in Sri Lanka. Based on the survey of 150 entrepreneurs, the study discloses that marketing, technology, access to capital, government support and infrastructure affect the business success significantly and positively. The results of the ANOVA and t-test revealed that origin of enterprises and the education level significantly affected the business success. It further explained that the educational background did not give applicable skills for running the business. These findings suggest that, to be a successful MSME, the owner of the MSME should pay more attention to improve their marketing strategy, to acquire and demonstrate advanced sophisticated technology, and to get capital access. Other interested parties with development of MSMEs such as government agencies, business development services, and business supporting institutes should also be prepared to offer the assistance with relate to those aspects.

KEYWORDS: Business success, Micro enterprises, Small and medium enterprises

Introduction

The Micro, Small and Medium Enterprise (MSME) sector has been identified as the backbone of the Sri Lankan economy. It is identified as a driver of change for inclusive economic growth, regional development, employment generation and poverty alleviation. They also play a prominent role in developing appropriate technology, entrepreneurship and business innovations. It covers broad areas of economic activities such as agriculture, mining, manufacturing, construction, and service sectors.

The Micro, Small and Medium Enterprises are defined differently by different countries and multilateral agencies based on different parameters such as number of employees, business turnover and capital investment. Different definitions are also

being used by different organizations within the same country to define MSME for different purposes which is a fact that practiced in Sri Lanka.

In the Sri Lankan context, the definition of a MSME is based on the annual turnover of the enterprise and under the latest credit line for MSMEs from the World Bank, MSMEs were defined as an enterprise with an annual turnover of less than RS.350 million. For the purpose of taxation, the 2012 budget proposal defines small industries as an enterprise with an investment of less than Rs.25 million. (Somaratne, 2012). The SME policy framework in Sri Lanka defines MSMEs based on the number of employees and annual turnover (Anon, 2015). According to the survey of non-agricultural economic activities in Sri Lanka conducted by Department of Census and Statistics (2013/2014), 91.8% of the establishments in the country are micro enterprises where as 7% are small, 1% are medium and the balance 0.2% are large enterprises (Anon, 2014).

The MSME sector has enormous potential in generating high level of socio-economic benefits to a developing country with a low level of investment. However, according to the Department of Census & Statistics of Sri Lanka, "investment to generate employment" or "investment per employee" is said to be the low. The MSME sector is an ideal platform for the Government to invest and support to reduce the gap between the haves and the have-nots (Weerakkody, 2015).

According to the national policy framework for small medium enterprises, MSME accounts for more than 75% of the total number of enterprises, provides 45% of the employment and contributes to 52% of the Gross Domestic Production (GDP). However, in developed countries the contribution by the SME sector to the GDP and employment is as high as 65% and 70% respectively (Weerakkody, 2015). Hence, these statistics reveal that there is immense potential to enhance the present level of contribution made by the MSMEs to the economy when compared with the GDP contribution in other countries in small-scale industries compared to large entities.

From the inception of industrialization of the Sri Lankan economy micro and small business sector was recognized as an important to be developed. But the progress of this sector is not up to expectation. The empirical evidence shows that 45% of the start-ups entering to the market in Sri Lanka disappear at their first year after establishment (Bandara, 2016).

Running a micro, small and medium business is a difficult and risky matter. The path from starting a business to launching continually is operating with challenges and issues. The Banking Survey of the SME Market in Sri Lanka (2006-2007) of the International Finance Corporation (IFC) listed five principal constraints faced by the MSME sector. They were difficulties in obtaining bank finance, absence of technical and management skills, marketing constraints, inadequate infrastructure facilities for production, and outdated technologies (Nanayakkara, 2011).

Causes for business failure differ from country to country, region to region, and business to business, but there are common factors such as lack of managerial skills, lack of improper accounting, lack of financial control, lack of internal control systems, lack of business experience etc. Apart from these mentioned causes, integrity and business policies as disciplines are critical. The lack of these critical factors can bring

misfortune to business. Therefore, business success cannot be expected without practicing integrity and business disciplines (Bandara, 2015).

In Sri Lanka, despite the fact that some MSMEs have been declined or stagnant, some others have been growing and successful. Even though there were lots of studies regarding constraints and barriers for the MSME failure in Sri Lanka, there are a few of studies on business success factors among MSMEs. Therefore, it is an essential need to conduct a research regarding the factors affecting the business success among MSMEs in Sri Lanka.

The aim of this study was to identify the factors affecting the business success among MSMEs in Sri Lanka. It further examined the relationship between the identified factors and the Business Success.

Methodology

Theoretical Framework

Storey (1994) identified key components to be important in analyzing the growth of MSMEs; the characteristics of the entrepreneur, characteristics of the MSME, and the type of the strategy associated with the growth. Instead of the last component, contextual elements of MSME development have been added. The theoretical framework was developed by using these three adjusted components shown in the Figure 1.

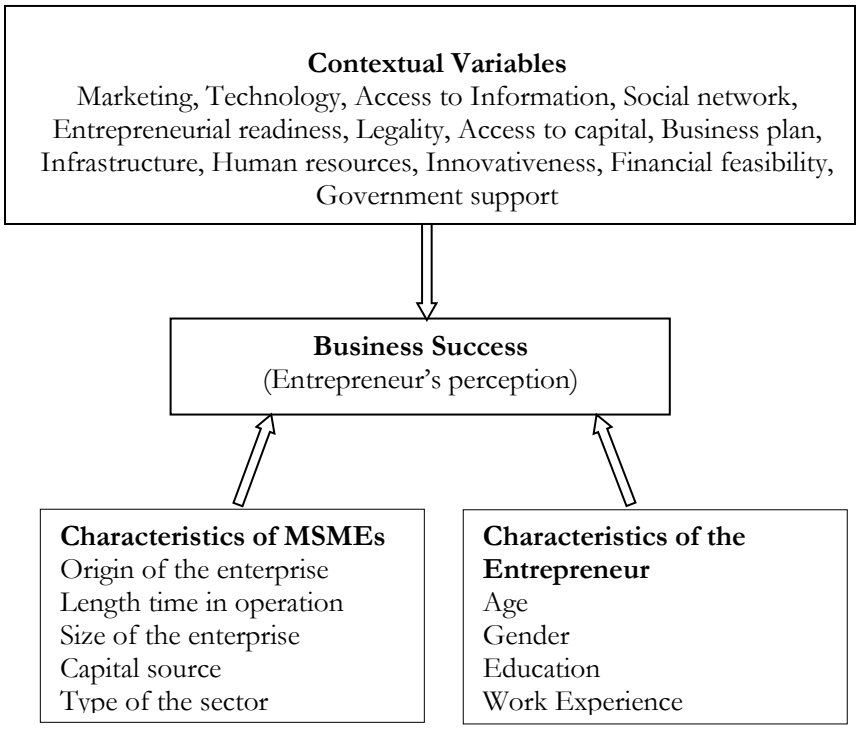

Figure 1: Theoretical Framework

Note: MSMEs- Micro, Small and Medium Enterprises

Multiple Linear Regression Model

The relationship between the Perceived Business Success and the Contextual Variables has been developed using a Multiple Linear Regression Model, which is expressed as,

$$PBS = \beta_0 + \beta_1 MKT + \beta_2 TEC + \beta_3 ATC + \beta_4 ATI + \beta_5 SCN + \beta_6 LGL + \beta_7 ERS + \beta_8 BP + \beta_9 GS + \beta_{10} INF + \beta_{11} HR + \beta_{12} INV + \beta_{13} FL + \varepsilon$$

Where,

PBS	= Perceived Business Success	ERS	= Entrepreneurial Readiness
β_0	= Constant	BP	= Business Plan
β_1-β_{13}	= Regression Coefficients	GS	= Government Support
MKT	= Marketing	INF	= Infrastructure
TEC	= Technology	HR	= Human Resources
ATC	= Access to Capital	INV	= Innovativeness
ATI	= Access to Information	FL	= Financial Literacy
SCN	= Social Network	ε	= Error term
LGL	= Legality		

Index Construction

Responses for contextual variables and the perceived success were obtained through a set of statements rated on five-point Likert scale ranging from strongly disagree to strongly agree. For the analysis, fourteen indices were prepared using these statements. The developed indices are ranging from point two to one. The business success index (BSI) was developed as follows.

$$BSI = \frac{\sum_{k=1}^{K} X_k}{K * X_{\max}}$$

Where,

X_k - score given to the statement by the k^{th} respondent

X_{max} - maximum score that could be given by a respondent

K - Total number of statement in a group

Similarly, indices for contextual variables were developed.

Data Collection and Analysis

Primary data were collected using a pre tested questionnaire from a randomly selected sample of 120 owners of the MSME in the Kurunegala district covering all the divisional secretariats during the period from March to April 2016.

As a basis for developing the questionnaire, focus group discussion and in-depth interviews with business owners, and officers of some business development institutes were used to identify the factors affecting the business success. The questionnaire was comprised of demographic information of the respondents and a set of items to measure business success. Five-point Likert scale anchored by strongly disagree and strongly agree were applied to measure perceived success. Under the demographic information, age was categorized according to the survey conducted for

non-agricultural economic activities in Sri Lanka by the department of Census and Statistics.

Next, the respondents were asked to score the importance of thirteen factors (contextual variables) considered to take part in determining business success using five-point Likert scale anchored by very unimportant to very important. The respondents were asked to rank the statements on contextual condition related to each success factors faced by the respondents.

Data were analyzed using both descriptive and inferential statistics with the statistical package SPSS version 16. In addition to descriptive statistics, correlation analysis and regression analysis were employed. Before applying the regression analysis, the reliability of the research instrument was examined using factor analysis and value of Cronbach's alpha. The t-test and ANOVA were used as appropriate tests to examine the relationship between characteristics of entrepreneur and MSMEs and business success, while regression analysis was employed to look at the relationship between contextual variables and the business success. Post hoc test using LSD (least significant differences) method was also applied when ANOVA revealed significant difference among group compared.

Results and Discussion

Descriptive Statistics

As depicted in the Table 1, the majority of entrepreneurs (69.2%) were male and the female enrolment in the businesses was 30.83%. Most of the entrepreneurs (60.8%) were within the age range of 25-44 years. According to their education, the vast majority of respondents (87.5%) had secondary or tertiary education. However, the business engagement of the respondents who were having higher education was considerably low (8.3%).

These results revealed that the entrepreneurs with secondary or tertiary education tend to do business more than the others. Despite the general education level, 62.5% of the entrepreneurs had business education. A large percentage (62.5%) of entrepreneurs had former work experience prior to run the business which was mostly (92.5%) established by themselves.

Obviously, personal savings (64.2%) and the banks (25%) were the dominant source of capital. Most of the MSMEs (58.3%) were running in agricultural industries. In terms of employee, the higher percentage (80.8%) of establishments in Kurunegala district was micro enterprises.

Relationship between Demographic Information and Business Success

Characteristics of the Entrepreneur

The results revealed that age of the entrepreneur had no any significant relationship with business success. Similarly, there was no any significant impact in terms of gender for business success. Previous employment of the entrepreneur had no significant relationship with business success. Neither previous experience nor business education had significant effect on business success.

Table 1: Background Information of MSMEs

Variable	(%)	Variable	(%)
Gender		Previous experience	
Female	30.8	Yes	69.2
Male	69.2	No	30.8
Education of the entrepreneur		Sources of capital	
No school education	1.7	Personal savings	64.2
Primary education (grade 1-5)	2.5	Joint ventures	2.5
Secondary education (grade 6- G.C.E. O/L)	40.8	Family investment	8.3
Tertiary education (G.C.E A/L)	46.7	Bank	25
Higher education (university etc.)	8.3	Other	-
Size of the business (in terms of employee)		Age	
Micro (1-4)	80.8	18-24 years	1.7
Small (5-24)	13.3	25-44 years	60.8
Medium (25-199)	5.8	45years<	37.5
Business education		Type of the sector	
Yes	62.5	Agricultural	58.3
No	37.5	Nonagricultural	41.7
Origin of enterprise			
Established	92.5		
Inherited	7.5		

The results of the ANOVA test found that there was a relationship (p value= 0.02) between education level and business success at the significant level of 0.05. Surprisingly, entrepreneur with university education was significantly less successful than those with secondary and tertiary education. The appropriate p values were 0.004 and 0.011 respectively. It reveals that education up to secondary or tertiary level enough for running the business to success. Another possible explanation is that the Sri Lankan Education system does not cater for entrepreneurial skill development.

Characteristics of MSMEs

The relationship between origin of the enterprise and business success was statistically significant at the level of 0.1 (p value=0.066).Comparing the mean values of success related to the origin of the enterprise, inherited businesses were more successful than businesses which were established by themselves. Business which inherited from family were already existed and established in the market. The market for those establishments was developed up to some extent. Therefore, the expenditure on those activities may be minimum with compared to the enterprises which were established by themselves.

There was no difference in business success in terms of size of enterprise, length time in operation and source of capital. The study examined that whether there was any relationship between business success and type of enterprise as agricultural and nonagricultural. However, there was no significant relationship between business success and type of the enterprise. It further reveals in other way that, whatever the type of enterprise, research findings related to business success were common for all enterprises.

Reliability Analysis

The results of the Cronbach's alpha were depicted in the Table 2. As seen in the Table 2, each variable consisted of at least 3 items. The value of the Cronbach's alpha are greater than 0.6 for each variable and hence considered acceptable (Nunally, 1978). The results conclude that the research instrument used in the study is valid and reliable.

Mean Ratings of Perceived Importance of Contextual Variables

The Table 2 also summarizes mean ratings that indicate perceived importance of variables related to business success. Marketing (mean= 4.53) was considered to be most important factor in running the business, while government support (mean= 3.96) was perceived to be less important in business operation.

Table 2: Cronbach's Alpha Values of Contextual Variables, Perceived Business Success and Results of the Mean Ratings of Perceived Importance of Contextual Variables

Variable	No. of Items	Cronbach's alpha	Mean Rating	Std. Deviation
MKT	4	0.760	4.53	0.62
TEC	4	0.796	4.34	0.77
ATI	5	0.824	4.36	0.68
ATC	3	0.768	4.28	0.70
FL	5	0.778	4.16	0.81
SCN	3	0.691	4.12	0.86
LGL	2	0.792	4.25	0.66
BP	2	0.888	4.06	0.99
ERS	4	0.867	4.23	0.73
GS	3	0.808	3.96	0.99
INF	4	0.892	4.09	0.91
INV	3	0.826	4.28	0.83
HR	2	0.789	4.26	0.81
PBS	4	0.872	-	-

Result of the Multiple Linear Regression Analysis

Using the multiple linear regression, the impact of contextual variables on business success were examined (Table 3). It was revealed that the regression model was significant (probability value =0.000) and the model explains 73% of the variables.

Table 3. Result of the Multiple Linear Regression

Variable	Coefficient	Probability
MKT	0.470	0.000*
TEC	0.156	0.018*
ATI	0.067	0.349
ATC	0.198	0.003*
FL	-0.023	0.750
SCN	0.032	0.633
LGL	-0.050	0.378
BP	-0.096	0.114
ERS	0.067	0.322
GS	0.116	0.076**
INF	0.116	0.081**
INV	0.015	0.788
HR	0.063	0.330

*Note: *Significant at 5% level, ** Significant at 10% level; Adj.R^2=73%; Probability value of the model<0.000*

The Table 3 indicated that, marketing, technology and access to capital affected business success significantly and positively at the significance of 0.05 level.

The probability value of the government support and infrastructure were 0.076 and 0.08 at 0.1 significant level and it was found that they affected the business success in positive direction. However, in the mean ratings of perceived importance of contextual variables, it showed that the government support was less important for success of a business (Table 2).

According to the results, marketing, technology, access to capital, government support and the infrastructure were the determinants of the business success.

However, access to information, social network, legality, business plan, entrepreneurial readiness, human resources, innovativeness, and financial literacy were not found to be statistically significant (Table 3), even though they were depicted as important in the Table 2.

Conclusions

The analysis revealed that origin of the enterprise was significantly related to business success while education also positively significant with business success. However, the higher education level was not significantly impact for running a business. It further explains that the education system in Sri Lanka does not cater for developing entrepreneurial skills. The success of a business does not depend on the type of the sector as agriculture or non-agriculture.

The regression analysis implied that marketing, access to capital, technology; government support and infrastructure were the determinants of the business success of MSMEs. These findings have to be taken into consideration in programmes designed to develop MSMEs.

Infrastructure

Lack of adequate infrastructure, particularly in the field of power, water, telecommunication and road access affect production, its cost, delivery and finally market competitiveness of any enterprise irrespective of its size. The MSMEs specially, find it difficult to compete with existing firms when they do not even have access to essential common facilities that are required for a business to run efficiently. The severity of this need issue needs to be analyzed in terms of availability, quality, reliability and cost of supply. Obviously, solutions to infrastructure problems need to be worked out at the national level.

The introduction of industrial park for MSMEs in rural areas is a good strategy to provide infrastructure facilities for industrial development. Another possible strategy is to improve facilities of existing industrial estates and industrial parks.

Technology

Technological under development is widely recognized as a key determinant of narrow and vulnerable industrial base of many developing countries. This is of particular relevance to MSMEs as they are at the lowest end of technological learning process compared with their counterparts in the large scale sector. The majority of MSMEs are ignorant of the need to improve and upgrade the quality of their product on a regular basis. They seem to be content with to continue production according to traditional, time-honored techniques and methods instead of adopting new, technologically more advanced methods. This is because; MSMEs are largely family- based enterprises and have limited access to information and technology. Hence, the majority of them do not recognize the need for modern technology as vital for growth and expansion of their business activities. Among those who realize the need for adopting new technology, the majority face significant problems in accessing technology. Moreover, technologies adopted by many small-scale enterprises are not appropriate. Inappropriateness occurs through long delays in recouping the investment in new technologies, high initial investment required to technology and lack of suitable technology related to the specific needs.

The purpose of establishing a Technology Development Fund is to provide assistant in the development of new products and technologies and supporting the individual or joint R&D effort of MSMEs. Initial funding for this purpose should be met by the state in view of potential welfare benefits to the national economy. The NGOs and donor agencies should also be encouraged to intensify their efforts to build up such a fund in addition to transfer technologies. The fund should be managed jointly through a public-private partnership. A voucher scheme should also be introduced for effective implementation of the proposed R&D project.

As a remedial measure it is better to encourage universities and other technical institutions to participate in MSME development by providing access to information and appropriate technology. Introduction of an annual award scheme for the "Best Innovative firm" and Best MSME Friendly Innovations" would also contribute towards creating a market for local R&D.

Access to Capital

Problems related to capital were identified as the foremost affecting MSMEs. This broadly includes four sub-sets of problems: availability of funds and other credit instruments, access to equity and loan capital, cost of borrowing and management of finance. These problems are more serious for MSME as they do not have access to other sources of finance such as the capital market.

With respect to remedial measures for increasing availability of funds, the state has to encourage equity providers to MSMEs. Such providers could be Venture Capital companies, Fund Managers or even private individuals. Legislative protection and incentives for such risk takers need to be provided. Legislative protection even for those investing on partnership basis must be provided. Legislative protections suggested are that such investments be regarded as personal liability of the main entrepreneur and quick and economical legal process to recover such investment. Additionally, the liability of partnerships too should be limited.

The banking and related sector should be encouraged to extend loans and other financial instrument to MSMEs. Obviously, serving MSME is costlier for them and such costs cannot be passed over to the MSME sector too. However, considering the broad socio-economic benefits associated with MSME development, the government should encourage the banking and related sectors such as leasing, factoring, bill discounting companies, by reducing the tax on profit on the lending to the MSME sector.

Access to finance is primarily due to lack of collateral. In a developing country such as Sri Lanka it is not many MSME owners who will have the assets to provide the collateral. Neither can the banks, who too are commercial enterprises, be called upon to risk their depositors' money. They are also burdened with heavy overhead costs. Even the land owned by MSMEs is not bankable due to Title problems. In fact, the land market in Sri Lanka is virtually closed and the volume of business the land market generates is minimal for both private and state lands. The lack of development orientation on the part of both commercial banks and development banks has also been cited as a factor relating to limited access to finance. As viewed by MSME owners, Sri Lankan banking institutions are traditional and collateral conscious in their lending practices and hence, making the MSME sector less attractive for credit support. The MSMEs are also not in a position to prepare bankable project proposal for bank finance due to lack of knowledge and skills in project feasibility studies. In addition, the area wise-outreach of existing banking institutions is inadequate to fulfill funding requirements of MSMEs located outside the Western Province.

In order to overcome this problem, State Lands need to be leased out for minimum periods of 50 years and leaseholds made transferable. The Registrar of Companies requires mortgages of movables and immovable of Companies to filed with him. This facility needs to be extended to Partnership and Proprietorship and stricter rules applied so that movables too could have greater security for the lender. Industrial Estates referred to earlier should be encouraged to provide Bonded Warehouse as to enable Banks to operate Pledged loan facilities.

Credit and advice are mutually inclusive factors in SME development. The latter refers to advice and guidance on project feasibility studies, project reports, technology and product quality, financial management, human resources development and marketing. Obviously, such services have to be provided by business development service (BDS) providers jointly with the bankers. Accordingly, disbursement of funds and allied facilities will be provided with the assistance of BDS providers, Management Companies so that they closely supervise the financial aspects of the MSME thus securing the position of the Banks. In addition to those amendments of loan recoveries act, provision of opportunities for sick industries to reconstruct and installation of good financial discipline in MSMEs are also important remedial measures in developing MSMEs.

Access to Market

Linked with technology upgrading and quality control is the issue of availability of timely information and services that enhance the market access to MSMEs. Information is expensive and not widely available and yet it is the most powerful competitive edge for business success. More specifically ,this refers to information and suppose services required for selecting target market ,product development , and packaging ,distribution and sales promotion . This is yet another obstacle affecting the growth and expansion of MSMEs in developing countries. In addition to domestic completion from large-scale enterprises, presence of completion pressure from foreign sources clearly demonstrates the need for an efficient, timely and affordable information system for MSME development.

Small firms virtually have no sources of information on other market or opportunities outside their immediate surroundings. The lack of knowledge and limited access to information on market opportunities have caused small- sector enterprises to depend on judgment and speculation. In a competitive business environment, this is very costly and limits there ability expand the market. Existing arrangement to supply such information to MSMEs are grossly inadequate and the lack of access to modern information technology (IT) has further aggravated the situation.

Most MSME services regional or local markets. Their market information is often limited to their specific market segments. Quite often, information relating to developments in market demand and innovation is received through word of mouth. Moreover, the information requirements of MSMEs depend on the size of the enterprise, stage of growth and type of business. The diversity in needs and the sheer number of MSMEs makes it difficult for any government organization to fulfill the information requirement of MSME sector enterprises in the national economy.

In addition to those, the absence of marketing skills at enterprise level has led to MSMEs being more production oriented rather than becoming more market oriented. Many of the MSMEs especially small-scale enterprises lack skills on product design, packaging and sales promotion which are vital for being attractive and competitive in the market. The typical selling method of MSMEs especially small-scale enterprises is to operate through their own outlets. Many of them are also not in a position to promote their products and service through advertising and sales promotion mainly due to lack

of skills and high costs. In fact, the absence of marketing skills has resulted in the early demise of business enterprises.

As a strategy appropriate for MSME development. This broadly include providing opportunities for MSMEs participate in trade promotion exhibitions in local and foreign markets, identification of export oriented projects, and introduction of low cost advertising and sales promotion. Considering the budgetary constraints and the national level and pro-private sector orientation of development activities, it is recommended that these activities be carried out jointly by government, non-government, private sector and donor organizations

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An Index Based Approach to Assess the Development of Small and Medium Enterprises: A Case from 32 Asian Countries

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ABSTRACT

Small and Medium Enterprises (SMEs) have been recognized as important to the economy in terms of their considerable contribution to GDP, employment generation, regional development and poverty reduction. Firms in SME sector are less dynamic and underdeveloped as against large scale enterprises in the Asian Countries. This creates the need for more efficient and professional government policies for SMEs to upgrade and strengthen this sector to meet the expectations of the countries in the region. In this study, the levels of SME development in Asian countries were measured under six core policy intervention areas; enabling environment, modern appropriate technology, culture and skills development, access to finance, market facilitation and infrastructure development, by developing six indices. Secondary data for SMEs in 32 Asian countries were collected from the World Bank's Enterprise Survey and indices were constructed using Principal Component Analysis. Results mainly highlighted that most of the Asian countries have well developed business enabling environment, infrastructure and satisfactory levels of access to finance However, the usage of modern technology by SMEs was found wanting. Culture and skills development and market facilitation were critical in most countries. On that account, the governments of developing nations in the Asian region should conceive better policies for SMEs to uplift marketing facilities, to strengthen the culture and skills of employees working in SMEs and also to provide better knowledge on modern technology. When considering the overall development of SMEs, China was the leading country closely followed by Thailand and Malaysia. Yemen was the country with least developed environment for the SME to thrive.

KEYWORDS: Asian region, Principal component analysis, SME policies

Introduction

Small and medium enterprises (SMEs) have been recognized as important to the economy in terms of their considerable contribution to GDP, employment generation, regional development and poverty reduction. With the globalization trend, the SME sector is not merely seen as a sector for "protection and promotion" but, more importantly as driving force for "growth and development" (Anon, 2015). Small and Medium Enterprises are perceived as the seedbed for indigenous entrepreneurship, and

thus, must be nurtured to ensure they blossom into vibrant enterprises (Atawodi and Ojeka, 2012). The SME sector is envisaged to contribute to transform lagging regions into emerging regions of prosperity. Therefore, enhancing national and international competitiveness is fundamentally important for this sector to face the emerging challenges and develop SMEs as a thriving sector.

Nations and governments all over the world, whether developed, developing or underdeveloped have continuously shown keen interest in entrepreneurship development. This is done through public policy. Public policy is an effective tool for business and economic planning. These policies are attempts by the relevant actors in a political system to cope with and to transform their environment by deliberate measures which may involve the commitment of physical or symbolic resources (Dibie, 2000). Government policies on development of SMEs and economic growth are positively related with each other. Therefore, policies to promote the development of SMEs are common in both developed and developing countries (Storey, 1994; Levitsky, 1996; Hallberg, 2000). In the case of developing economies, policies designed to assist SMEs have been an important aspect of industrial policy and multilateral aid programmes (Levitsky, 1996). The SME policy framework aims to improve business environment of SMEs by accessing to modern technology, developing skills, accessing to finance and market facilitation, allowing them to realize their full potentials in today's globalized economy. Although SMEs are critical for the growth of countries, firms in the SME sector are less dynamic and underdeveloped as against large-scale enterprises in the Asian Countries (Wignaraja, 2013). The development of SMEs in Asian region has not been studied previously in comparison. This study was carried out with the aim of providing monitoring tools to see whether the broad environment within which the SMEs are supportive for the development of SMEs in the Asian region.

Methodology

Theoretical Framework

The major areas of government policies on entrepreneurship development are: enabling environment (EE), modern appropriate technology (MAT), culture and skills development (CSD), access to finance (AF), market facilitation (MF) and infrastructure development (ID). It was hypothesized that the policies under these six policy dimensions are equally responsible for the development of SMEs in Asian countries.

Data Collection

Secondary data were collected from the World Bank's Enterprise Survey (enterprise.org) for the base year 2011, which provides homogeneous data on 145 SME development indicators for all the selected 32 Asian countries. The Enterprise survey uses a common definition for Small and Medium scale enterprises based on the number of employees; 5 – 19 employees as "Small scale" and 20 – 99 employees as "Medium scale" enterprises. As all the data were collected from the Enterprise survey, these same definitions were used for defining small and medium scale enterprises in this research.

Indicator Selection

From a comprehensive survey of literature the study was able to identify 29 development indicators under six major policy intervention areas (Table 1).

Table 1: Selected Indicators under the Major SME Policy Intervention Areas

Policy Area	Indicators
EE	Cost of business start-up procedures Time required to start a business Senior management time spent in dealing with requirements of government regulations Percent of firms identifying tax rates as a major constraint Days to obtain operating license Days to obtain construction-related permit Days to obtain an import license
MAT	Percentage of firms using technology licensed from foreign companies Percentage of firms having its own website Percentage of firms using E-mail to communicate with clients/ suppliers Percentage of firms with annual financial statement reviewed by external auditor
CSD	Percentage of firms offering formal training Percentage of skilled workers Years of the top manager's experience working in the firm's sector Percentage of firms with female participation in ownership Percentage of firms with a female top manager
AF	Percentage of firms with a bank loan/line of credit Percentage of firms with a checking or savings account Percentage of loans not requiring collaterals Percentage of firms not needing a loan
MF	Percent of firms with internationally-recognized quality certification Percentage of total sales that are exported directly Percentage of firms using material inputs and/or supplies of foreign origin
ID	Losses due to electrical outages Days to obtain an electrical connection Percentage of firms identifying electricity as a major constraint Number of water insufficiencies in a typical month Proportion of products lost due to breakage or spoilage during shipping to domestic markets Percentage of firms identifying transportation as a major constraint

Note: EE – Enabling Environment, MAT – Modern Appropriate Technology, CSD – Culture and Skills Development, AF – Access to Finance, MF - Market Facilitation, ID – Infrastructure Development

When values of selected indicators under MAT, CSD, AF, and MF increases they cause positive impacts on SME development while values of indicators selected under EE and ID increase they cause negative impacts on SME development. Most of the selected indicators were expressed as an average percentage and average wait, in days. To calculate the cost of business start-up procedures, cost to register a business was normalized by presenting it as a percentage of gross national income (GNI) per capita. Number of calendar days needed to complete the procedures to legally operate a business was taken as the time required to start a business. Average percentage of senior management's time that is spent in a typical week dealing with requirements imposed by government regulations (eg. taxes, customs, labor regulations, licensing and registration), including dealings with officials, completing forms, etc. was taken as the

senior management time spent in dealing with requirements of government regulation., to obtain operating license, construction-related permit and import license was calculated by the indicator percentage of firms not needing a loan, can be defined as the percentage of firms in a country that did not apply for a loan in the last fiscal year because they did not need a loan as the establishment had sufficient capital. The denominator is the number of firms who did and did not apply for a loan. The numerator is the number of firms who did not apply for a loan and also stated that they did not need a loan. Losses due to electrical outages were also expressed as a percentage of total annual sales. Days to obtain an electrical connection was counted as average wait, in days, experienced to obtain electrical connection from the day this establishment applied for it to the day it received the service. Proportion of products lost due to breakage or spoilage during shipping to domestic markets was calculated as an average percentage of products shipped to supply domestic markets lost due to breakage or spoilage.

Data Analysis

Collected data were subjected to a Principal Component Analysis (PCA) using the statistical software Minitab 17 and the resultant principal components were used to construct six different indices which can be used to explore the levels of SME development under the six major policy dimensions.

Principal Component Analysis

Principal Component Analysis is the general name for a technique which uses sophisticated underlying mathematical principles to transform a number of possibly correlated variables into a smaller number of variables called principal components (Richardson, 2009). In PCA, each component is a linear weighted combination of the initial variables. For example, from a set of variables X_1 through to X_n,

$$\begin{aligned} PC_1 &= a_{11}X_1 + a_{12}X_2 + \ldots + a_{1n}X_n \\ PC_2 &= a_{21}X_1 + a_{22}X_2 + \ldots + a_{2n}X_n \\ &\ldots \\ PC_m &= a_{m1}X_1 + a_{m2}X_2 + \ldots + a_{mn}X_n \end{aligned} \quad [1]$$

Where, a_{mn} represents the weight for the m^{th} principal component and the n^{th} variable. Weights for each principal component (PC) are given by the eigenvectors of the correlation matrix and the variance (λ) for each principal component is given by the eigenvalue of the corresponding eigenvector (Vyas and Kumaranayake, 2006). The first principal component accounts for the maximum possible proportion of the variance of the set of *X*s, the second principal component accounts for the maximum of the remaining variance and so on until the last of the principal component absorbs all the remaining variance not accounted for by the preceding components. Principal component analysis works best when variables are highly correlated but also when the distribution of variables varies across countries.

Index Construction

The six indices namely; Enabling Environment Index (EEI), Modern Appropriate Technology Index (MATI), Culture and Skills Development Index (CSDI), Access to Finance Index (AFI), Market Facilitation Index (MFI) and Infrastructure Development Index (IDI) were constructed using the equation [2], with the use of principal components having λ greater than one.

$$I_i = \frac{PC_1\lambda_1 + PC_2\lambda_2 + ... + PC_n\lambda_n}{\lambda_1 + \lambda_2 + ... + \lambda_n} \quad [2]$$

Where,

I_i – Index score for i^{th} Asian country
PC_1, PC_2, PC_n – Principal Component values
$\lambda_1, \lambda_2, \lambda_n$ – Eigen values
n – No. of principal components with Eigen values greater than one

Normalization

It was important to express all the six indices in a homogeneous and comparable way. Therefore each and every index score was expressed as a value between 0 and 100 by applying the following general formula:

$$Index\ Value = \frac{I_i - Min}{Max - Min} \times 100 \quad [3]$$

Where,

I_i – Index score for i^{th} Asian country
Min – Minimum index score
Max – Maximum index score

According to this formula, the country with the lowest performance will get an index value of zero, the country with the best performance will get value of 100 while all other countries will have values reflecting their relative distance from the best and worst performer. As the increase in selected variables under EE and ID cause negative impacts on SME development, when lower the index value for EEI and IDI, the SME sector was more developed. In this case, the index value was reversed to make the interpretation of the value the same as that of others using the formula:

$$Index\ Value = 1 - \frac{I_i - Min}{Max - Min} \times 100 \quad [4]$$

With this approach all indices bear the same meaning: the higher the index value, the SME sector was more developed. Values for six indices were calculated separately for 32 Asian countries and the results were taken for further analysis.

Ranking Countries by SME Development

As all the six policy dimensions are equally responsible for the development of SMEs, the SME Development Index (SMEDI) was constructed by aggregating values of all the six indices using the equation [5].

$$SMEPI = \frac{\Sigma^{n}_{i=2}\ \chi_{i}}{n} \quad [5]$$

Where,

X_i = Value of i^{th} index

i = 1, 2, … , n

n = No. of indices

Results and Discussion

Values for EEI, MATI, CSDI, AFI, MFI, IDI and SMEDI were obtained for all the 32 Asian countries to explore the levels of SME development comparatively (Table 2).

Table 2: Values of Indices for Small and Medium Enterprises in Asian Countries

Economy	EEI (%)	MATI (%)	CSDI (%)	AFI (%)	MFI (%)	IDI (%)	SMEDI
Afghanistan	77.85	30.76	31.96	24.56	24.32	17.99	34.57
Armenia	86.52	67.07	17.49	70.81	17.36	91.50	58.46
Azerbaijan	84.29	51.79	37.47	37.92	23.74	100.00	55.87
Bangladesh	57.04	11.84	3.17	60.36	12.52	53.97	33.15
Bhutan	92.47	50.69	37.36	74.81	0.00	77.94	55.55
Cambodia	95.30	34.09	78.06	21.05	18.65	73.79	53.49
China	83.03	85.28	89.09	69.09	100.00	99.76	87.71
Georgia	85.11	54.54	25.20	62.24	3.83	74.55	50.91
India	88.19	70.78	30.99	52.63	48.32	80.77	61.95
Indonesia	90.61	0.00	19.47	39.32	15.39	87.49	42.05
Iraq	84.16	20.06	12.03	38.69	7.22	34.47	32.77
Israel	16.69	100.00	0.00	95.26	47.56	89.81	58.22
Kazakhstan	71.55	48.81	25.82	54.27	11.21	86.69	49.72
Korea, Rep.	58.76	66.38	11.38	86.41	30.10	92.16	57.53
Kyrgyz Republic	77.11	60.47	59.37	64.12	31.59	62.52	59.20
Lao PDR	87.61	29.22	38.78	57.77	28.44	81.56	53.90
Lebanon	53.88	89.04	34.85	93.93	21.14	47.63	56.74
Malaysia	80.14	46.91	56.42	100.00	79.17	85.23	74.64
Mongolia	65.04	70.21	62.60	78.12	24.61	78.39	63.16
Myanmar	88.03	14.31	24.31	0.00	8.58	72.34	34.60
Nepal	93.28	57.79	26.01	63.11	14.37	23.81	46.39
Pakistan	86.49	41.85	15.91	32.27	53.03	0.00	38.26
Philippines	91.89	80.80	32.49	77.68	24.93	80.13	64.65
Sri Lanka	78.18	39.39	8.09	77.86	22.50	75.06	50.18
Syrian Arab Republic	0.00	72.83	44.47	62.05	28.92	33.81	40.35
Tajikistan	86.29	49.17	30.82	36.34	19.91	68.65	48.53
Thailand	90.13	77.97	100.00	91.20	20.98	69.94	75.04
Timor-Leste	83.79	20.75	60.85	41.39	0.62	79.78	47.86
Turkey	82.78	76.37	18.85	87.11	65.36	88.70	69.86
Uzbekistan	85.48	34.35	18.30	54.60	7.28	89.72	48.29
Vietnam	82.36	48.76	45.33	78.89	17.79	90.70	60.64
Yemen, Rep.	100.00	22.22	20.48	23.53	11.73	0.13	29.68

Note: EEI – Enabling Environment Index, MATI – Modern Appropriate Technology Index, CSDI – Culture and Skills Development Index, AFI – Access to Finance Index, MFI - Market Facilitation Index, IDI – Infrastructure Development Index, SMEDI – SME Development Index

Enabling Environment Index (EEI)

Yemen showed the highest value for EEI while Syrian Arab Republic showed the lowest value (Figure 1). Although both of them were developing nations in the Middle East Asia, they had contrasting levels of SME development. All the Asian countries showed higher values for EEI except Syrian Arab Republic and Israel. It reveals that the countries with higher EEI values have a business enabling environment which supports the development of SMEs.

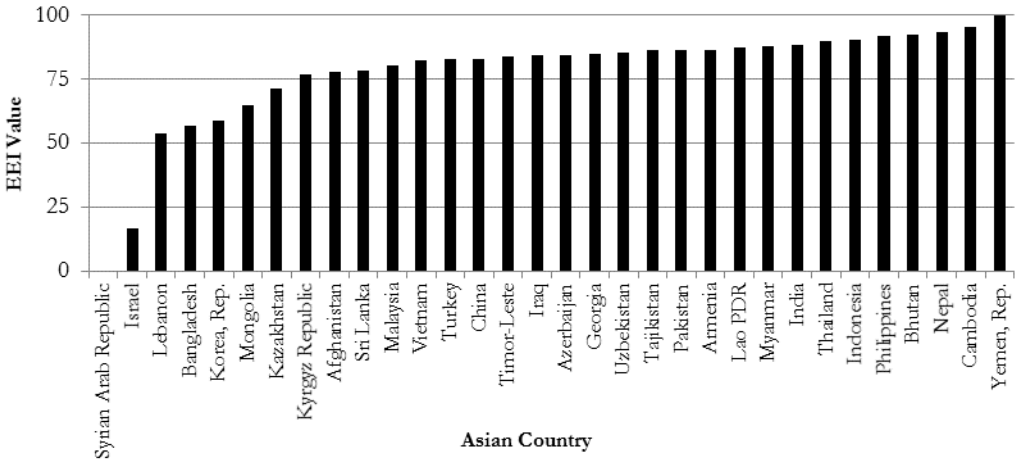

Figure 1: Index Values for Business Enabling Environment

Modern Appropriate Technology Index (MATI)

Israel which is a developed nation in Asia scored the highest value for MATI while Indonesia showed the lowest value (Figure 2).

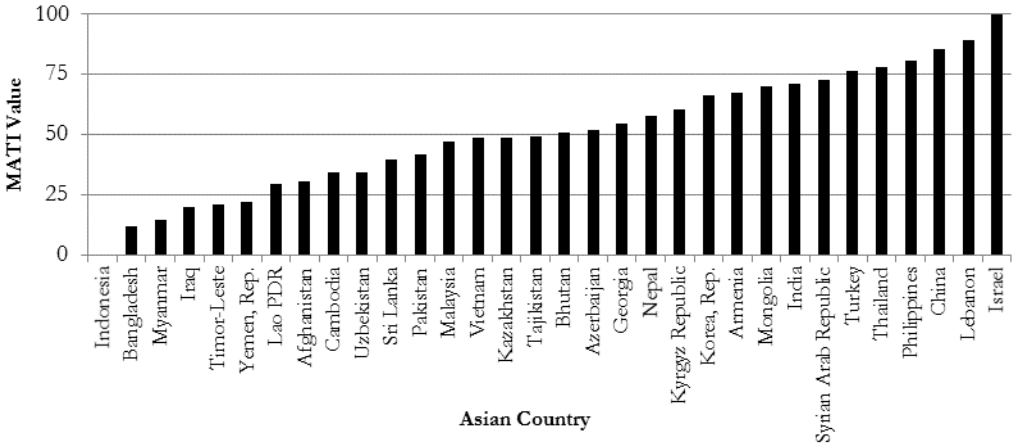

Figure 2: Index Values for Modern Appropriate Technology

Culture and Skills Development Index

Thailand, one of the developing nations in Asia acquired the highest value in CSDI and its lowest value was shown by Israel (Figure 3). Most of the Asian countries scored lower levels of CSDI revealing that their SME culture was not so developed and skills of employees in SME sector were not outstanding due to lack of formal training.

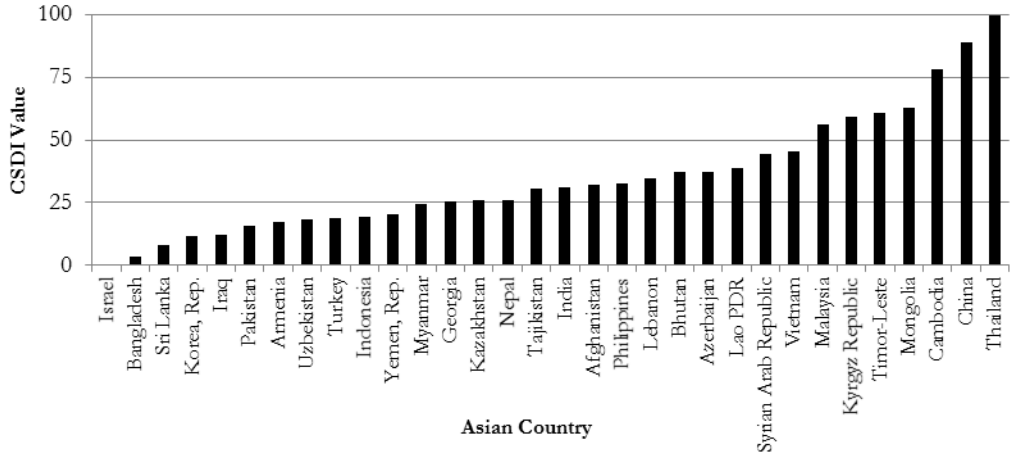

Figure 3: Index Values for Culture and Skills Development

Access to Finance Index (AFI)

Malaysia scored the highest value while Myanmar scored the lowest value in AFI (Figure 4).

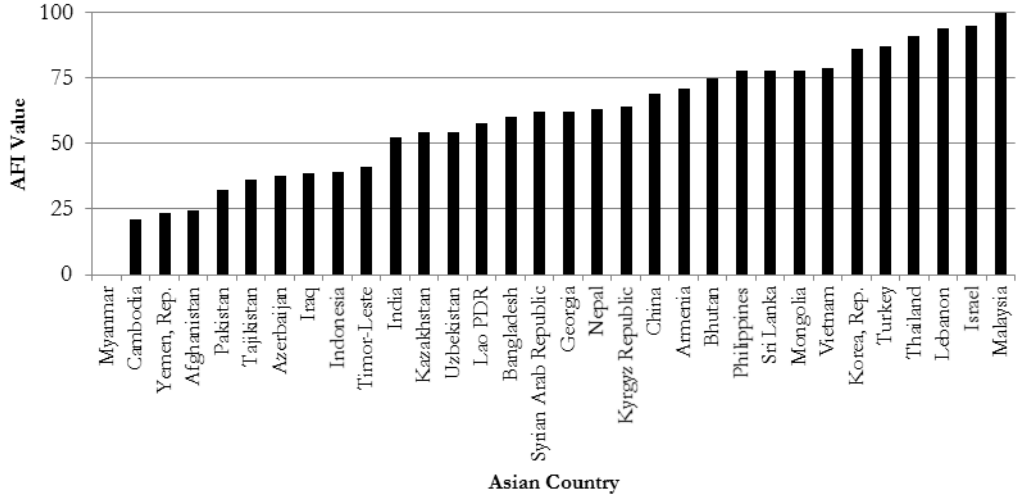

Figure 4: Index Values for Access to Finance

Both of them were developing nations in East Asia but they have contrasting levels of access to finance. Most of the countries showed higher levels of access to finance when running their SMEs while Pakistan, Tajikistan, Azerbaijan, Iraq, Indonesia and Timor-

Leste showed lower levels and Myanmar, Cambodia, Yemen and Afghanistan showed critical levels of access to finance.

Market Facilitation Index (MFI)

China which is a developed nation in East Asia scored the highest value for MFI while Bhutan, a South Asian country resulted the lowest value (Figure 5). All the Asian countries showed critical or lower levels of MFI except China, Malaysia, Turkey and Pakistan. It reveals that proper marketing facilities were not so developed for SMEs in most of the Asian Countries.

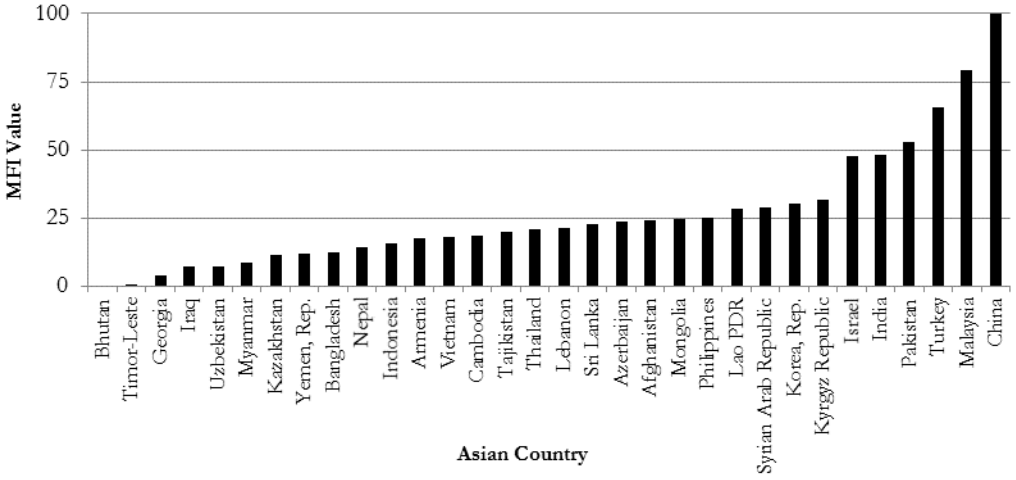

Figure 5: Index Value for Market Facilitation

Infrastructure Development Index (IDI)

Azerbaijan, a developing nation in Central Asia scored the highest value for IDI and its lowest value was acquired by Pakistan which belongs to South Asia (Figure 6).

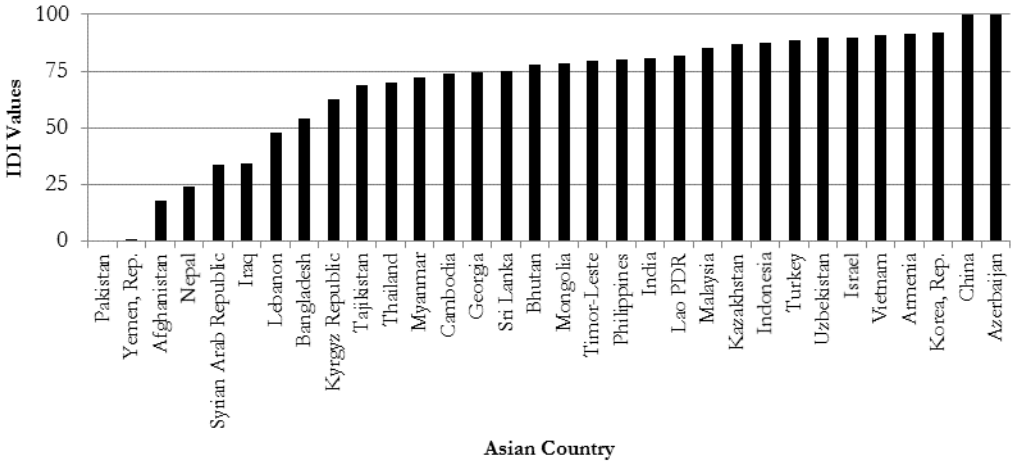

Figure 6: Index Values for Infrastructure Development

Most of the Asian countries showed higher levels of infrastructure development while Syrian Arab Republic, Iraq and Lebanon showed lower levels and Pakistan, Yemen, Afghanistan and Nepal showed critical levels of infrastructure development.

SME Development Index (SMEDI)

SMEDI scores give an overall idea on development of SMEs in each country. Scores for SMEDI were graphically represented in Figure 7.

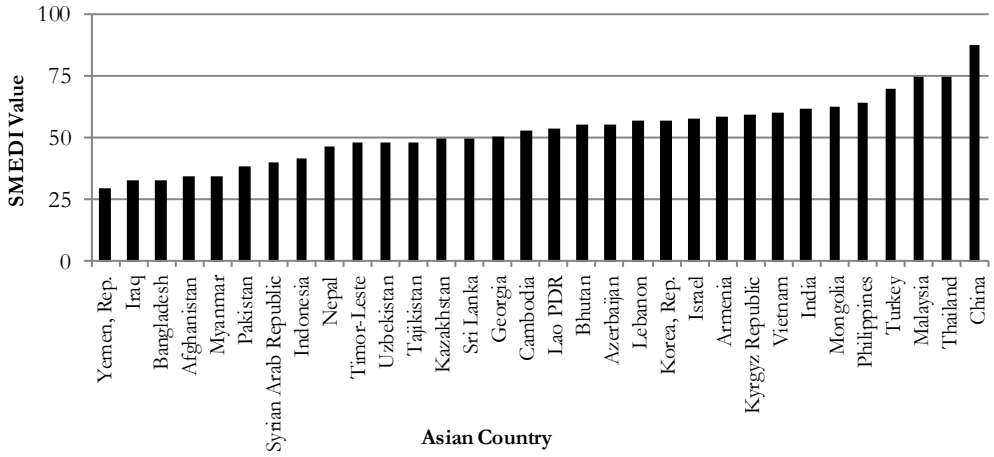

Figure 7: SME Development Index Scores

China was the leading country with the highest SMEDI score (87.71). It was closely followed by Thailand and Malaysia. Development of SMEs in China was outstanding as it has scored higher values for all the six indices and it depicts that China's SMEs have a supportive business environment, good knowledge on modern technology, skilled employees, gender equity, good access to finance, better marketing facilities and well developed infrastructure facilities.

Yemen showed the lowest SMEDI score (29.68). Yemen has scored the highest value for EEI but it has scored lower values for all the other five indices MATI, CSDI, AFI, MFI and IDI. It reveals that although Yemen has a business enabling environment its SMEs have no any interest in gaining knowledge on modern technology, training employees in SME sector, accessing finance for SME development, creating good markets for SMEs and in developing infrastructure which facilitate SMEs.

Conclusions

This study developed six indices to measure the development of SMEs in Asian countries. Those indices could be used as diagnostic tools to see whether the environment within which the SMEs are supportive for the development of SMEs in the Asian region. Weak linkages with external market, weak technological innovation,

and limited skills of employees in SME sector have limited SMEs' growth and development. The governments of developing nations in the Asian region should conceive better policies for SMEs to uplift marketing facilities, to strengthen the skills of employees working in SMEs and also to provide better knowledge on modern technology.

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