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FARMERS' ADOPTION OF NEW AGRICULTURAL TECHNOLOGY PROGRAMME IN HAMBANTOTA DISTRICT IN SRI LANKA: AN ANALYSIS OF CONSTRAINING FACTORS¹

K. N. Nadeeshani Silva²
Tom Broekel³

ABSTRACT

This paper examines the major factors constraining the adoption of a newly introduced paddy improvement technology programme by farmers in the *Hambantota* district, as seen from the perspective of Agricultural extension officers. Further, the adoption pattern of those technological programmes by farmers was analyzed. A structured interview schedule was used to collect data from a purposively selected sample of 30 AI officers. Data was analyzed using the principal factor model with iteration and Varimax rotation, and simple linear regression analysis was done to explain any relationship between the adoption levels of farmers in each of the adoption stages. The results showed that a majority of AI officers perceived that only 40-60 per cent of farmers actually adopted the new technology programme. As for the percentage of farmers who proceeded to adopt each stage of the multi-stage process, the majority of the farmers in the community progressed to the awareness stage but only about 50 per cent of farmers continued until the final adoption stage was reached. Among the factors that could be cited as constraining the adoption: a lack of resources, incompatibility and complexity of new technology, and socio-economic and cultural constraints. Inadequacies in extension intervention, technical training and information were the main constraints that compromised the information and knowledge network. Moreover, the *Yaya 2* programme was hindered by environmental and economic barriers, poor educational competencies of farmers and weak information links with the other actors of the network. These findings suggest that there is an urgent need for researchers, policy makers and administrators of the extension service to consider these constraints seriously so as to overcome them to increase the adoption rate by farmers of the new paddy technology programme in *Hambantota*.

Keywords: Agricultural Technology, Adoption Stages, Adoption, Constraints

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1. Introduction

Technological change has been a major factor shaping agriculture in the last few decades. The rapid development of the agriculture sector may be attributed to technological innovations. Much of the agricultural innovation originated in developed countries and so some of the technologies are difficult to apply in developing countries. Though agricultural technologies are seen as an important route to poverty alleviation, the rate of adoption of these technologies has remained low in most of the developing countries (Mwangi & Kariuki, 2015; Bandira & Rasul, 2002). Nevertheless, the adoption of new technology remains a crucial requirement for the positive transformation of the agriculture sector. Therefore, the literature has focused on the individual adaptations of new technology and on farmers' learning behaviour as seen in many studies (Conley & Udry, 2010).

There exists a vast store of literature dealing with the factors that determine agricultural technology adoption (Katungi & Akankwasa, 2010; Akudugu et al., 2012; Loevinsohn et al., 2012; Adesina & Baidu-Forsen, 1995). Basically, literature on agriculture has highlighted two major driving factors behind successful agricultural technology adoption in developing countries. The availability and affordability of new agricultural technologies and farmers' expectations of long-term profitability promised by the new technology are two major determinants of technology adoption (Foster & Rosenzweig, 2010). Further, the factors that influence the adoption of modern agricultural technologies are categorized into three groups: economic factors, social factors and institutional factors. According to Akudugo (2012), the economic factors included farm size, cost of adoption, access to credit, expected benefits from the adoption and the off-farm income generation activities. The social factors included the age of farmers, the level of education and the gender. The institutional factors included access to extension services.

Technology dissemination is a key vehicle for technology adoption. Efficient dissemination of news about technology requires reliable information and technical guidance. Literature provides evidence of the importance of the technology dissemination process for invigorating the agriculture sector (OECD, 2001; Rogers, 2003).

Farmers who wish to keep abreast of new agricultural technology now have access to multiple sources of information. According to Rogers (1995), farmers may learn from their own experimentation, from agricultural extension services in the area, and from neighbouring farmers. In the case of developing countries, farmers often learn through the social learning approach. Further, traditional farmers were assumed to be passive recipients of knowledge that is provided to them by change agents. Those change agents in rural communities are the extension officers or sales agents representing producers of new technologies (Rogers, 1995).

The effect of social networks on technology adoption and the knowledge dissemination process has been discussed in previous literature. Uaiene et al. (2009) have claimed in their study that the social network enhances trust among actors of the network and promotes exchange of ideas and information. Learning through the social network is now a prominent feature of technology adoption in the rural agriculture sector in many developing countries. One of the most important models for social learning is the 'learning from others' model, where information about new

technologies is transferred by word of mouth. This model emphasizes learning from others through collective experimentation, discussion and persuasion or through direct observation of neighbours' experiments (Foster & Rosenzweig, 1995). Despite this, social learning is considered to be a weak learning process. Further, diffusion rates of social learning will be slow if the individual farmer is unable to study his neighbours' experiences perfectly (Munshi, 2004; Stunding & Zilberman, 1999).

In view of the social aspects of the network, farmers can learn about new technologies and their practicability from their peer farmers in the network. Conley and Udry (2010) have explained the effect of farmer organizations on technology adoption. The literature describes both the positive and negative impacts of the social network on technology adoption (Katungi & Akankwasa, 2010; Foster & Rosenberg, 1995; Bandiera & Rasul, 2002). Moreover, Muwangi and Kariuki (2015), Genius et al. (2010), and Uaraeni et al. (2009) have explained the impact of the extension service on technology adoption in their studies. Availability and access to extension services was found to be a key aspect of technology adoption. Anyhow, only a limited number of studies have analyzed the role of the extension workers in the technology adoption process. This research gap might have crucial implications since the extension officers directly contact the farmer in the technology dissemination process. Further, much of the literature has explained the different factors that affect the individual decisions on technology adoption (Akudugo, 2012; Adesina & Baida-Forsen, 1995; Ngoc Chi & Yamada, 2002). In addition, many studies have analyzed farmer perceptions regarding effectiveness of extension service on technology adoption (Agbarevo, 2013). Moreover, extension workers conduct awareness programmes and field demonstrations about new technology. Therefore, the perceptions of extension workers regarding how farmers adopt new technologies being introduced to them and the factors that affect technology adoption are deemed worthy of study. Further, this analysis would pinpoint the exact factors that drive the technology adoption. Additionally, drawing on an extensive review of the literature on adoption of agricultural technologies, analysing the perception of extension officers would be an alternative approach for determining the motivating factors behind the technology adoption process. Hence, the study will attempt to analyze the technology adoption pattern of paddy farmers in *Hambantota* district through the Agricultural extension officers' perception.

Though a number of studies have been conducted across the world on technology adoption and these have identified various factors that determine technology adoption, there is a dearth of literature on the specific factors that influence modern agricultural production technologies, especially among small scale paddy farmers in Sri Lanka. This is an acknowledged research gap that is going to be bridged through this study, which is based on the perception of AI officers in the *Hambantota* district in Sri Lanka.

1.1. Purpose and Objectives of the Study

The purpose of this study was to determine the factors influencing adoption of new agricultural technology by paddy farmers. In addition, the factors constraining farmers' adoption of new technology will be analyzed based on the perception of Agricultural Extension officers in *Hambantota* district. The study has mainly considered two paddy technological programmes. The specific objectives were:

1. To determine the percentage of paddy farmers who readily adopt the new technology as perceived by AI officers
2. To determine the level of adoption of the technology by farmers at each stage of adoption
3. To examine the factors which constrain farmers from adopting major paddy technology programmes

2. Literature Review

2.1. Technology Adoption

Adoption and diffusion are the processes governing the utilization of innovations. Diffusion can be interpreted as aggregate (widespread) adoption. There is a significant time lag between the invention of new technology and its adoption by farmers. Adoption behaviour of new technology may be affected by many factors. The vast literature on this topic mentions several different factors that influence technology adoption (Ngoc Chi & Yamada, 2002; Adebisi & Okunlola, 2013; Adesina & Baidu-Forsen, 1995; Akudugo, 2012).

There are a number of factors that determine the extent of adoption of technology, such as attributes of the technology, objective of the farmer, characteristics of the change agent as well as the socio-economic, biological, and physical environment in which the technology is introduced. Socio-psychological traits of farmers such as their age, educational attainment, income, family size, tenure status, credit use, value system, and beliefs are positively related to adoption (Stunding & Zilberman, 1999). Apart from that, the personalities of extension officers in the area too can influence the farmers' adaptation. The credibility, good rapport with farmers, and communication ability of extension officers acting in combination with effectiveness of the technology transfer mechanism affect the adoption. In addition, the biophysical environment of the farming area such as infrastructure facilities and resources availability to the farm positively influence the farmers' social network.

Further, Rogers (2003) has drawn attention to an adoption category based on the innovation-decision period. The innovation-decision period is the length of time required to pass through the innovation-decision process. The time that elapses between awareness-knowledge of an innovation and the decision made to adopt it by an individual is measured in days, months, or years. Moreover, the innovation decision model of Rogers (1983) shows the stages through which the decision making process proceeds from first knowledge of an innovation to the decision made to adopt or reject it, to implement the new idea if accepted, and to confirm this decision (Rogers, 2003).

2.2. Technology Diffusion and Dissemination to Farmers

Diffusion can be interpreted as aggregate adoption (Stunding & Zilberman, 1999). Further, Rogers (1983) has defined Diffusion as the process by which an innovation is communicated through certain channels over a period among the members of a social system. An OECD (2001) study has defined diffusion as the process by which a new idea, practice or technology spreads in a given population. Similar to technology adoption, the characteristics of technologies, such as relative advantage, complexity, divisibility, and compatibility affect their diffusion (OECD, 2001). In respect of the technology diffusion process, Rogers in 1957 and other rural sociologists found in their studies that generally this process followed an S-shaped function of time.

Dissemination of information relating to technology among farmers is crucial for technology adoption. In general, farmers have conservative attitudes and need much time and information to be persuaded to adopt new technologies (OECD, 2001). Efficient promotion of new technology/ innovation requires reliable information and technical guidance. Therefore, demonstration plots and neighbouring farmers who have already converted are more persuasive to those who are debating whether to adopt new technology. Demonstration plots can provide practical information to guide farmers to make a smooth transition to new technology.

2.3. Determinants of Agricultural Technology Adoption

Foster and Rosenzweig (2010) mention that availability, affordability and farmers' expectations of long-term profitability of new technology are the major determinants in respect of technology adoption. Education level and income level of the farmers also affect the decision. An OECD (2001) study has identified further reasons for adopting new technologies. Progressive farmers who believe in science and technology adopt the new technologies more quickly than hidebound, non-progressive farmers. Similarly, educated and younger farmers also tend to adopt new technologies more readily compared to less educated and older farmers (Katungi & Akankwasa, 2010). Age of the farmer and size of the farm are other important determinants of technology adoption. Age was found to positively influence adoption of sorghum cultivation in Burkina Faso (Adesina & Baidu-Forson, 1995). According to Adesina and Baidu-Forson (1995), larger scale commercial farmers adopted new high-yielding maize varieties more readily than smallholders. Further, a few studies have classified these factors under different categories. For example, Akudugu *et al.* (2012) grouped the determinants of agricultural technology adoption into three categories, viz. Economic, social and institutional factors. Further, according to Loevinsohn *et al.* (2013), farmers' decisions about adopting new technology are determined by characteristics of the technology itself and the various restrictions and circumstances faced by farmers.

The OECD (2001) has identified the reasons for not adopting new technologies based on farmers' perceptions of technologies and farmers' attributes. Many farmers do not trust new technologies until they can see the demonstration field because they fear the risk of low yields. Particularly, conventional farmers do not like to change the methods based on their own experiences obtained through traditional farming experiences.

2.4. Effect of Knowledge and Information Network on Technology Adoption

More recently, economists have started to investigate how knowledge and information networks affect farmers' technology adoption. Their research findings have explained a range of potential externalities that have a bearing on technology adoption.

Social capital has been considered as the institutional factor which affects technology adoption (Akudugu *et al.*, 2012). Technology adoption can be enhanced through the social network by building trust among actors of the network, allowing them to share ideas and exchange information among themselves. Particularly, farmers within a social network can learn from each other by discussing and observing new technology. Moreover, social networking can assist the individual to make decisions on technology adoption (Uaiene *et al.*, 2009). Further, Uaiene (2009), Ostern and Thornton (2012), and Conley and Udry (2010) have explained the three major ways in which interactions between peer farmers can promote agricultural technology adoption: 1) individuals can profit by acting like friends/ neighbours; (2) individuals can gain knowledge of the benefits of technology from their friends; and (3) individuals can learn how to use new approaches from their peers.

Farmer organizations can serve as social capital in networks that provide official entitlement to the farmers as members of a farmer group and improve information sharing within the farmer group. Katungi and Akankwasa (2010) found that farmers who participated in farmer organizations engaged more in social learning about the technology and were therefore more likely to adopt the technologies. Although there are many positive impacts that social groups have on technology adoption, Foster and Rosenzweig (1995) have found there is some negative impact too due to the free riding behaviour of some actors of the social network. Based on both the positive and negative effects of social networks, Bandiera and Rasul in 2002 proposed an inverted U-shaped individual adoption curve, implying that network effects are positive at low rates of adoption, but negative at high rates of adoption.

2.5. Extension Services and Technology Adoption

The extension service is the key driving factor behind technology development in the agricultural sector in developing countries. Availability and access to extension services has also been found to be a key aspect in technology adoption (Mwangi & Kariuki, 2015). Akudugo (2012) has explained that access to extension services can counteract the negative effect of lack of formal education of farmers which hinders technology adoption. Thus, extension services create the platform for acquisition of the relevant information that promotes technology adoption. Moreover, information received through the extension services reduce the uncertainty about a new technology's performance, helping to make a positive change in the individual's decision on adoption. Therefore, access to extension services was also found to be positively related to the adoption of modern agricultural production technologies (Mwangi & Kariuki, 2015; Akudugo, 2012). Farmers usually become aware of new technologies through the extension officers in developing countries.

In addition, the extension agent acts as a link between the innovators of the technology and end users of that technology. Therefore, extension services help reduce the transaction cost associated with information sharing among the larger

heterogeneous farming population (Genius et al., 2010). In developing countries, extension agents usually select a particular contact farmer who is recognized as the most influential agent to deliver new technology. Many authors have reported a positive relationship between extension services and technology adoption (Mwangi & Kariuki, 2015; Uaiene et al., 2009).

3. Methodology

The study was conducted in *Hambantota* district in Sri Lanka. Two major technological programmes that were considered in this study were named Farmer Field School (FFS) and *Yaya 2*. 30 Agricultural Instructors (AIs) were purposively selected for the data collection and semi-structured questionnaires were used using interview method. To determine the magnitude of the constraints as perceived by the AI officers, a five point Likert-type scale was used. The response options ranged from “not at all” to “a very great extent,” scaled from -2 to +2.

Factor analysis using the principal factor model with Varimax rotation was used to determine major variables constraining the use of two improved paddy technologies. The loading under each factor represents a correlation between the identified constraint factors and has the same interpretation as any correlation coefficient. Simple linear regression analysis was done to explain any relationship between the adoption levels of farmers in each of the adoption stage.

3.1. Regression Analysis with the Level of Adoption with the Constraining Factor

The goal of regression analysis is to describe the relationship between two variables based on the observed data and to predict the value of the dependent variable based on the value of the independent variable. Even though regression analysis can make such predictions, this doesn't claim any causal relationship between the independent and dependent variables.

Regression analysis can measure how well the regression model fits with the data using the R , R^2 , and adjusted R^2 . R represents the multiple correlation coefficients and R can be considered to be one measure of the quality of the prediction of the dependent variable. The R^2 represents the value (call as the coefficient of determination), which is the proportion of variance in the dependent variable that can be explained by the independent variables (technically, it is the proportion of variation accounted for by the regression model above and beyond the mean model). Adjusted R-square is an adjustment of the R-squared that penalizes the addition of extraneous predictors to the model.

The statistical significance of the regression analysis will be measured using F and significance value of Anova table. The F-value is the Mean Square Regression divided by the Mean Square Residual. The p-value is compared to some alpha level in testing the null hypothesis that all of the model coefficients are 0. These values are used to answer the question "Do the independent variables reliably predict the dependent variable?" If the predicted p-value is smaller compared to typical value of 0.05, study can conclude that the independent variables reliably predict the dependent variable. If the p-value is greater than 0.05, it says that the independent variable does

not show a statistically significant relationship with the dependent variable, or that the group of independent variables does not reliably predict the dependent variable.

The coefficient table use to predict the Y using x value in following table. The first coefficient, “(Constant)”, is the intercept term. The regression equations are in following format:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4$$

Each of the other coefficients is b variables, or the slope of the line. For each 1-unit change in X, Y will change by b units.

3.2.Determining Relative Importance of Factors Constraining Technology Adoption

If two independent variables are measured in exactly the same units, it can assess the relative importance in their effect on Y using the coefficient value. Larger regression coefficient value represents the stronger effect on Y by independent variables. Often, explanatory variables are not all measured in the same units, making it difficult to assess relative importance. This problem can be overcome for quantitative variables by using standardized variables.

Two major technological programmes that were considered in this study were named Farmer Field School (FFS) and *Yaya 2*. To determine the level of constraints as perceived by Extension agents, five point Likert-type scales were used. The responses ranged from ‘not at all’ to ‘a very great extent’ along the scale. The FFS programme and *Yaya 2* Programme were used as the new paddy technology programmes in this study. Further, two major categories of variables were used for analysis. Eight variables were included under socio-economic and cultural constraints and six variables were included under the constraints associated with the knowledge and information network.

Factor analysis, using the principal factor model with iteration and Varimax rotation was used to determine major variables constraining the use of improved paddy technologies. The loading under each factor represents a correlation of the identified constraint factor. Kaiser’s criterion using factor loading above 0.5 was adopted in naming and interpreting the factor and constraint variables (Agwu & Anyanwu, 1999). Later, the simple linear regression analysis was done to explain any relationship between the adoption levels of farmers in each of the adoption stage. The study has converted the dependent variable into a binary variable: 1 for all stages in which at least a certain percentage of the farmers have reached a threshold level and 0 if not reach that level. Depending on the percentage of the adoption level at different stages of the study, different values were used as the threshold level.

4. Results and Discussion

4.1. Measurement of Adoption of New Technologies

Measurement of the rate of adoption of agricultural innovations is essential for ensuring effective knowledge transfer process by extension officers. The perceptions of AI officers concerning the percentage of farmers who adopt the given technology were measured. Table 01 shows the percentage of farmers who adopted new technology as perceived by AI officers.

TABLE 01
Farmers' Technology Adoption and Knowledge Dissemination Process

Percentage of Farmers who Effectively adopt New Technology and Share Information	Mean Response of AI Officers (Percentage)
Almost all farmers	0
80-100 % of farmers	3
60-80 % of farmers	10
40-60% of farmers	37
20-40 % of farmers	27
10-20 % of farmers	23
Only wise farmers	0

Source: Authors' own data (2015).

According to Table 01, nearly 37 per cent of AI officers have perceived that 40-60 per cent of farmers in the district effectively adopted the given technologies. None of AI officers had an experience of 100 per cent adaptation by farmers of the given technologies. Further, 27 per cent of AI officers in *Hambantota* district have perceived that only 10 per cent of farmers in their area have adopted the given technology due to several issues and constraints which are identified later in this study. The adoption rate of the farmers was greatly influenced by the socio-economic factors of the farming community. In addition, the effect of the knowledge and information network invariably influences the adoption rate of the farmers.

4.2. Stages of Adoption of New Technology

The adoption of agricultural technologies is a dynamic process and follows hierarchical or pyramidal stages, namely awareness, interest, evaluation, trial and adoption. George and Bohlem as cited by Ovwigho (2013) have explained those five steps in detail in their study.

Awareness simply means the individual's awareness about the existence of the innovation. When the individual wants more information about the new technology to assess if the innovation can help him, then that is interest. The evaluation stage implies the mental examination of the information gathered by the individual, who tries to determine whether it will really impact his work. In the trial

stage, the individual tests the innovation to see if it actually measures up to his expectations. Finally, the individual reaches the adoption stage when he decides he really likes the innovation and wants to adopt the new technology and use it for his work. Though the individual could go through this adoption process steadily, some people are slower to transition between steps (Ovwigbo, 2013).

The study intends to analyze each stage of the adoption process for two major technological programmes in *Hambantota* district and so the percentage of farmers passing through each stage as perceived by AI officers in the district will be recorded. After the initial awareness of new technology, extension offices in the areas will follow the progress of the farmers through each stage of adoption to get an idea about the individual adoption process. Based on that, Table 02 shows the percentage of farmers reaching each adoption stage as perceived by AI officers in the district.

TABLE 02
Percentage Distribution of Farmers by the Level of Adoption as Perceived by AI Officers

Adoption Stage	Percentage of Farmers	
	FFS Programme	Yaya 2 Programme
Unaware	0	0
Aware	80	83
Interest	60	76
Evaluation	57	71
Trial	54	64
Adoption	45	50
Discontinuance	16	9

Source: Authors' own data (2015).

The differences in farmer participation for each stage have been explained in previous literature. Onweremad and Njoku (2007) reported that low participation in some stages were caused by poor field contact between the extension agents and farmers. Efficacy of any agricultural extension is judged by the level of mass adoption by farmers and scientific practices among farmers.

4.3. Regression Analysis with the Level of Adoption with the Constraining Factor

The following Table 03 and 04 show the model summary of regression analysis of each adoption stage of both technological programmes. *FFS 1* and *Yaya 1* represent the eight independent variables under socio-economic and cultural constraints and *FFS 2* and *Yaya 2* represents the six independent variables under the constraints associated with the knowledge and information network.

TABLE 03
Model Summary of FFS Programme

Model	Threshold Adoption Level	R		R Square		Adjusted R Square	
		FFS 1	FFS 2	FFS 1	FFS 2	FFS 1	FFS 2
Adoption Stage							
Awareness	75 %	.718	.502	.515	.252	.330	.057
Interest	60 %	.607	.643	.369	.413	.129	.260
Evaluation	50%	.465	.438	.216	.192	-.083	-.019
Trail stage	50%	.473	.281	.224	.079	-.072	-.161
Adoption	40 %	.506	.555	.256	.308	-.028	.127
Discontinues	20%	.625	.494	.394	.244	.156	.047

Source: Authors' own data (2015).

TABLE 04
Model Summary of Yaya Programme

Model	Threshold Adoption Level	R		R Square		Adjusted R Square	
		Yaya 1	Yaya 2	Yaya 1	Yaya 2	Yaya 1	Yaya 2
Adoption Stage							
Awareness	75 %	.502	.408	.252	.167	-.033	-.051
Interest	60 %	.642	.444	.413	.197	.189	-.012
Evaluation	50%	.243	.472	.059	.223	-.299	.021
Trail stage	50%	.475	.464	.226	.215	-.069	.011
Adoption	40 %	.530	.511	.281	.261	.007	.068
Discontinues	20%	.506	.406	.256	.165	-.028	-.053

Source: Authors' own data (2015).

The threshold adoption level has mentioned in above table. Indicators of the above tables measure the quality of the prediction of the dependent variable. Anyhow, only few models shows significant values showing a good level of prediction and two models indicate poor level of prediction showing lowest value. (0.281 at trail stage of Table 03 and 0.243 at evaluation stage of Table 04). Further, following two tables (Table 05 and 06) show the statistical significance of the model at each stage using F value and significant value. Based on those tables the independent variables do not reliably predict the dependent variables of many models except awareness and Interest stages of FFS programme.

TABLE 05
Anova Table for FFS Programme

Adoption Stage	F Value		Significance Level	
	FFS 1	FFS 2	FFS 1	FFS 2
Awareness	2.789	1.294	.028	.299
Interest	1.198	2.696	.347	.039
Evaluation	.723	.909	.670	.506
Trail stage	.756	.329	.643	.915
Adoption	1.687	1.706	.160	.165
Discontinues	.901	1.237	.533	.324

Source: Authors' own data (2015).

TABLE 06
Anova Table for FFS Programme

Model	F Value		Significance Level	
	Yaya 1	Yaya 2	Yaya 1	Yaya 2
Awareness	.885	.767	.545	.603
Interest	1.843	.942	.125	.485
Evaluation	.165	1.101	.993	.392
Trail stage	.765	1.051	.636	.419
Adoption	1.025	1.354	.448	.275
Discontinues	.901	.759	.533	.609

Source: Authors' own data (2015).

The general form of the estimated model will be measured using the coefficient table and regression equation will be derived using the unstandardized coefficients. Unstandardized coefficients indicate how much the dependent variable varies with an independent variable when all other independent variables are held constant.

4.4. Prediction of Regression Equations

The following regression equations developed using the correlation coefficient of regression analysis. The following two equations are for the FFS programme:

Socio-economic and Cultural Constraints

$$1. Y(\text{Awareness}) = 1.130 + (-.092)V1 + (.057)V2 + (-.403)V3 + (-.034)V4 + (.014)V5 + (-.083)V6 + (-.108)V7 + (-.208)V8$$

(Where, V1-High cost of using new technologies, V2-Lack of adequate technical knowledge about new technologies, V3-Lack of resources to carry out necessary activities associated with new technologies, V4-Difficulty of integrating new technologies into the existing farming system, V5-Cultural incompatibility of technology adoption, V6-Complexity in carrying out associated practices related to new technologies in the field, V7-Environmental barriers against using new technologies, V8- Lack of adequate educational qualifications and experiences).

Constraints Associated with the Knowledge and Information Network

$$2. Y(\text{Awareness}) = 0.671 + (.011)V1 + (-.088)V2 + (.203)V3 + (.069)V4 + (.178)V5 + (.050)V6$$

(Where, V1-Unavailability of important information associated with new technologies, V2-Lack of influence of extension services and social learning, V3-Lack of technical training and meetings with technical specialist, V4-Poor information links and sharing with other actors of the network, V5-Lack of adequate information sources on new technologies, V6-Lack of trust in available information and information sources).

Based on the above two equations, the adoption level of the awareness stage are greatly affected by Lacking resources to carry out necessary activities associated with new technologies and Lacks adequate educational qualifications and experiences. Negative value of coefficient indicates that the adequate level of resources and qualified extension workers help increase the adoption level at awareness stage. In respect to constraints associates with the knowledge and information network, two major factors could be highlighted. Lacks technical training and meetings with technical specialist and Lacks adequate information sources on new technologies affect the adoption level at the awareness stage.

Following two equations shows the regression equation for *Yaya* programme:

Socio-economic and Cultural Constraints

$$1. Y(\text{Awareness}) = 0.627 + (-.042)V1 + (-.061)V2 + (-.084)V3 + (-.115)V4 + (.003)V5 + (.128)V6 + (-.080)V7 + (-.090)V8$$

Constraints Associated with the Knowledge and Information Network

$$2. Y(\text{Awareness}) = 0.458 + (-.193)V1 + (.096)V2 + (-.030)V3 + (-.080)V4 + (.108)V5 + (.033)V6$$

Similar to above explanation, following regression equations show the relative importance of constraining factors for FFS and *Yaya* programme for the rest of stages. The Table 05 shows the relatively importance of each factor which affecting to the adoption level of each stage.

Socio-economic and Cultural Constraints Affecting the FFS Programm (FFS 1)

1. $Y(\text{Interest}) = .795 + (-.005)V1 + (-.032)V2 + (.121)V3 + (.054)V4 + (-.011)V5 + (-.054)V6 + (.132)V7 + (.003)V8$
2. $Y(\text{Evaluation}) = .770 + (-.035)V1 + (-.054)V2 + (.162)V3 + (-.036)V4 + (-.081)V5 + (-.050)V6 + (.010)V7 + (.102)V8$
3. $Y(\text{Trail}) = .471 + (.119)V1 + (.140)V2 + (-.019)V3 + (-.105)V4 + (-.113)V5 + (-.114)V6 + (-.054)V7 + (-.065)V8$
4. $Y(\text{Adoption}) = .323 + (.095)V1 + (.151)V2 + (.114)V3 + (.058)V4 + (-.197)V5 + (.012)V6 + (-.031)V7 + (-.167)V8$
5. $Y(\text{Discontinues}) = .401 + (-.259)V1 + (.083)V2 + (-.063)V3 + (.065)V4 + (.078)V5 + (-.092)V6 + (.131)V7 + (-.146)V8$

Constraints Associated with the Knowledge and Information Network (FFS 2)

1. $Y(\text{Interest}) = .219 + (-.144)V1 + (.242)V2 + (-.007)V3 + (-.080)V4 + (.006)V5 + (.224)V6$
2. $Y(\text{Evaluation}) = .888 + (.044)V1 + (.076)V2 + (-.101)V3 + (-.093)V4 + (-.103)V5 + (.038)V6$
3. $Y(\text{Trail}) = .663 + (.059)V1 + (-.017)V2 + (-.069)V3 + (-.048)V4 + (-.034)V5 + (.080)V6$
4. $Y(\text{Adoption}) = .541 + (-.090)V1 + (.132)V2 + (-.143)V3 + (.203)V4 + (.108)V5 + (.014)V6$
5. $Y(\text{Discontinues}) = .249 + (-.044)V1 + (.217)V2 + (-.063)V3 + (.042)V4 + (.154)V5 + (-.007)V6$

In respect to above regression equations, Table 07 figured out the significant factors affecting the adoption of different stages of FFS Programmes.

TABLE 07
Significance Factors Affecting the Adoption Level at Different Stages of FFS Programme

Significance Factor		
Adoption Stage	FFS 1	FFS 2
Awareness	Availability of resources to carry out necessary activities associated with new technologies, Adequate level of adequate educational qualifications and experiences	Lack of technical training and meetings with technical specialist Lack of adequate information sources on new technologies
Interest	Lack of resources to carry out necessary activities associated with new technologies, Environmental barriers against using new technologies	availability of important information associated with new technologies, Lack of influence of extension services and social learning, Lack of trust in available information and information sources
Evaluation	Lack of resources to carry out necessary activities associated with new technologies, Lack of adequate educational qualifications and experiences	Adequate technical training and meetings with technical specialist, Adequate information sources on new technologies
Trail stage	High cost of using new technologies; Lack of adequate technical knowledge about new technologies; Easy of integrating new technologies into the existing farming system; Cultural compatibility of technology adoption. Easiness of carrying out associated practices related to new technologies in the field.	Lack of trust in available information and information sources
Adoption	Lack of adequate technical knowledge about new technologies, Lack of resources to carry out necessary activities associated with new technologies, Cultural compatibility of technology adoption, adequate educational qualifications and experiences.	Lack of influence of extension services and social learning, sufficient technical training and meetings with technical specialist, Poor information links and sharing with other actors of the network, Lack of adequate information sources on new technologies
Discontinues	High cost of using new technologies, Environmental barriers against using new technologies, adequate educational qualifications and experiences.	Lack of influence of extension services and social learning, Lack of adequate information sources on new technologies.

FFS 1- Socio-economic and cultural constraints affect to FFS programm.

FFS 2 - Constraints associated with the knowledge and information network.

Source: Authors' own data (2015).

Socio-economic and Cultural Constraints Affecting the Yaya Programm (Yaya 1)

1. $Y(\text{Interest}) = .570 + (.097)V1 + (-.026)V2 + (-.334)V3 + (-.079)V4 + (-.046)V5 + (.004)V6 + (-.039)V7 + (-.166)V8$
2. $Y(\text{Evaluation}) = .812 + (.025)V1 + (.058)V2 + (.019)V3 + (.035)V4 + (.020)V5 + (.053)V6 + (-.031)V7 + (.018)V8$
3. $Y(\text{Trail}) = .471 + (-.025)V1 + (-.128)V2 + (.210)V3 + (-.050)V4 + (-.107)V5 + (.043)V6 + (.096)V7 + (-.067)V8$
4. $Y(\text{Adoption}) = .525 + (-.057)V1 + (.005)V2 + (.166)V3 + (.108)V4 + (-.201)V5 + (.056)V6 + (-.142)V7 + (.055)V8$
5. $Y(\text{Discontinues}) = .426 + (-.087)V1 + (-.154)V2 + (-.042)V3 + (.065)V4 + (-.059)V5 + (.151)V6 + (-.024)V7 + (.044)V8$

Constraints Associated with the Knowledge and Information Network for Yaya Programme (Yaya 2)

1. $Y(\text{Interest}) = .487 + (.120)V1 + (-.124)V2 + (.115)V3 + (.137)V4 + (.136)V5 + (.131)V6$
2. $Y(\text{Evaluation}) = .926 + (.068)V1 + (-.132)V2 + (.024)V3 + (.062)V4 + (-.020)V5 + (.132)V6$
3. $Y(\text{Trail}) = .586 + (.156)V1 + (.117)V2 + (.076)V3 + (.100)V4 + (.031)V5 + (.190)V6$
4. $Y(\text{Adoption}) = .528 + (-.266)V1 + (-.190)V2 + (-.044)V3 + (-.067)V4 + (-.119)V5 + (-.043)V6$
5. $Y(\text{Discontinues}) = .299 + (-.049)V1 + (-.058)V2 + (-.127)V3 + (.025)V4 + (-.140)V5 + (.076)V6$

In respect to above regression equations, Table 08 figured out the significant factors affecting the adoption of different stages of *Yaya Programmes*.

TABLE 08
Significance Factors Affecting the Adoption Level at Different Stages of Yaya Programme

Adoption Stage	Significance Factor	
	Yaya 1	Yaya 2
Awareness	Easiness of integrating new technologies into the existing farming system, Complexity in carrying out associated practices related to new technologies in the field.	Availability of important information associated with new technologies; Lack of adequate information sources on new technologies
Interest	Availability of resources to carry out necessary activities associated with new technologies, adequate educational qualifications and experiences	availability of important information associated with new technologies, great influence of extension services and social learning, and almost all variables
Evaluation	Lack of adequate technical knowledge about new technologies and small effect from all other factors	Great influence of extension services and social learning , trust in available information and information sources
Trail stage	adequate technical knowledge about new technologies, Lack of resources to carry out necessary activities associated with new technologies, Cultural compatibility of technology adoption	Unavailability of important information associated with new technologies, Lack of influence of extension services and social learning, Lack of trust in available information and information sources.
Adoption	Lack of resources to carry out necessary activities associated with new technologies, Difficulty of integrating new technologies into the existing farming system, Cultural compatibility of technology adoption, less Environmental barriers against using new technologies.	Availability of important information associated with new technologies, great influence of extension services and social learning, adequate information sources on new technologies
Discontinues	adequate technical knowledge about new technologies, Complexity in carrying out associated practices related to new technologies in the field	Sufficient technical training and meetings with technical specialist, adequate information sources on new technologies

Yaya 1 - Socio economic and cultural constraints affect to *Yaya* programm.

Yaya 2 - Constraints associated with the knowledge and information network for *Yaya* Programme.

Source: Authors' own data (2015).

5. Discussion and Limitations of the Study

The results of the study have some interesting research implications, of which some are supported by previous studies, while some new facts have emerged in the context of the Sri Lankan scenario. First, the study has shown the perceptions of AI officers concerning the attitudes of farmers who are thinking of adopting new technology. The majority of AI officers perceived that only 40-60 per cent of farmers in their areas effectively adopted a given technology. Anyhow, the adoption rates of new technologies by farmers heavily depend on internal and external determinants of the farmers' network. Irrespective of those factors, the literature also supports the fact that only 40-60 per cent of farmers in the community effectively adopt the given technology (Muange & Schwarze, 2014; Uaiene et al., 2009; Bandiera & Rasul, 2002).

Secondly, the study has shown the percentage distribution of farmers by level of adoption as perceived by AI officers. The seven stages of the adoption process have been described by Ovwigho (2013) and the study used these seven stages for the analysis. Almost all farmers become aware of new technological programmes that are introduced by extension officers. Following up to the subsequent stages, nearly 50 per cent of the farmers finally adapt to the FFS and *Yaya 2* programmes in *Hambantota* district. Importantly, 16 and 9 per cent of the farmers who adopted these two programmes have discontinued. The prevailing constraints and issues have affected the programmes leading to the discontinuation of the technology. Onweremad and Njoku (2007) have pinpointed the specific factors influencing the information network that are responsible for causing the differences in participation at each stage of adoption. Further, the literature has strongly supported the fact that farmers' age, experience, and educational qualification would cause differences in the distribution at each stage. The AI officers in the *Hambantota* district also supported the above findings and have emphasized the importance of personal qualifications of farmers for the variation in adoption at different stages. In addition, active involvement of AI officers in those technological programmes would positively affect the adaptation of farmers at the different stages.

Concerning the constraints affecting the adoption of technology by farmers, the study shows constraints under two major categories separately for the FFS and *Yaya 2* programmes. Socio-economic and cultural constraints which influence adaptation to the FFS programme have been identified. Lack of resources to adopt new technology, incompatibility, complexity of new technology and environmental barriers against adopting FFS programme have been identified by the study. As in the case of the FFS programme, Environmental and economic barriers, poor educational competency, inadequate resources and incompatibility of new technologies with prevailing conditions are the major constraints that were extracted by the study.

Just as in the case of socio-economic and cultural constraints, the constraints associated with the knowledge and information network which impact on the adoption of the FFS programme were also extracted. Inadequate extension intervention, poor technical training and inadequate information on new technologies were major constraints on adoption of FFS programmes. Concerning the *Yaya 2* programme, three major constraints were identified. Poor extension intervention,

limited information access and weak information link with actors were the extracted constraints associated with the knowledge and information link.

The study has a few limitations in respect of its methodological approach. One is the Questionnaire used to measure the adoption of new agricultural technology based on the perception of AI officers who serve as the external influencing agent for adoption. Many of the previous studies have measured the technology adoption based on the farmers' perception. Therefore, the study has limitation of justify the research findings based on limited literature supports which has done using perception of external influencing agent such as extension officers. Moreover, the major data collection approach of the study was based on a field survey using a semi-structured questionnaire. AI officers in *Hambantota* district come under two administrative divisions and mainly work at field level. Therefore, practical problems were encountered during field level data collection. The pre-identified variables were analyzed using the factor loading techniques with Varimax rotation techniques used to extract major subgroups of variables. It is also possible that there might be other important variables that were neglected in this study. Previous literature has also given evidence of similar variables which influence the farmer adoption. Since the study was based on the individual perceptions of AIs in *Hambantota* district, it can only be said that those factors would depend on the subjective opinions of AI officers as well as the location and socio-economic characteristics of the farming community. Also, the results could be different with respect to the other determinants and country specific factors.

6. Conclusion

The results of this study have some interesting research implications. First, the study shows that the adoption of new paddy technology by farmers in *Hambantota* district varied from 40-60 per cent. The study was based on the collective perceptions of AI officers in the district since the major source of knowledge and information for the paddy farmers are the Agricultural extension officers and public extension services in *Hambantota* district. The results showed that distribution of farmers at each stage of adoption were different percentage wise for FFS and *Yaya 2* programmes. Another striking result was that awareness about new technology was high in *Hambantota* district in Sri Lanka implying effective information sharing between extension workers and farmers. Further, this study showed that at all stages of adoption there was active involvement of AI officers while a significant percentage of farmers discontinued the use of new technology after a period due to prevailing circumstances. Another key outcome of the results was in pinpointing the major constraints which influence the farmer adoption for FFS and *Yaya 2* programmes. Those constraints were categorized under two headings; socio-economic and cultural constraints and constraints associated with the knowledge and information network in the district. These findings seem to suggest a few policy implications in the Sri Lankan context. Particularly, the constraints associated with the extension services might lead to a slight change in the extension approach that is currently being used in *Hambantota* district for the two technology programmes. Concerning the adoption stages, the success of the awareness stage has to be followed up until the adoption stage is reached through intervention at every stage of adoption by the extension

officers. Finally, the study has categorized the constraints and barriers facing farmers in *Hambantota* district when adopting any new paddy technology programme. The study has provided strong evidence to prove that it is essential to overcome the constraints which hinder the adoption rate through the intervention of extension services. The study has also shown the need for immediate action to eliminate barriers such as the lack of resources to adopt new technology programmes by introducing certain policy reforms in the agricultural sector.

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IS DIGITAL TAX BITTER OR BETTER FOR AN ECONOMY? REFERRING TO A CASE ON EXPORT DRIVEN INFORMATION COMMUNICATION TECHNOLOGY SECTOR IN SRI LANKA¹

Aluthgamage Hasintha S. Pamerathna²

ABSTRACT

Main intention of this study was to identify the significance of digital taxation on the economy of Sri Lanka. Moreover the study has observed factors such as investment potential, government tax collectability and citizen to government responsibility; referring to the export driven Information Communication Technology of Sri Lanka. Digital taxation policies and practices in other countries including USA, UK and India were reviewed under the literature review. Inductive method was followed in the study and the qualitative data was gathered through interviews and open-ended questionnaires. Results indicate that in the export driven ICT sector tax rates are comparatively low in Sri Lanka. Further, foreign investors' investment motives are increased as a result. Majority of the investors agreed that their investment motives are backed by a no tax environment; especially in sectors such as B2B Telecommunication, web design and development. This study reflects the existing tax policy on digital products. Further, areas of inefficiencies are highlighted indicating policy gaps in this sector. Moreover, this research contributes to the business fraternity by highlighting the benefits on tax savings in this industry.

Keywords: Government Policies, Digital Taxation, Digital Goods, Taxation Regimes, Digital Markets, Taxation Framework

1. Introduction

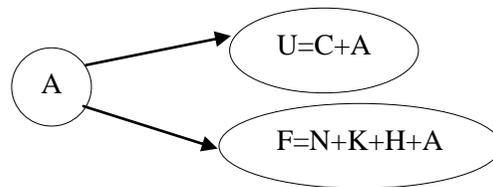
Intervention of digital economy has influence both the civil society and the business environment in a similar magnitude. It is known to be the most observed study area for many inventors and politicians. Digital products are in accordance of 0s and 1s that contains economic values; also known as bit strings. Due to the wider range of applicability, these products are demanded by both entrepreneurs and the end consumers. Greenstein, (2011) explains that despite having the risk of a spill over impact on the regarded economy, digital economy would increasing the aggregate macro-economic performance of that country. According to Danny Quah (2004) Traditional view of ICT, only as a facilitating platform to boost the production processors and business system is obsolete. Further, he explained that digital products are recipes that allow those entities to be produced and consumed isolated and separated from any form of significant physical sustains. West and Lakhani, (2008) argues that the business arrangements and efforts are in an increasing trend to create

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such products more often due to the increasing demand. Christopher and Holweg, (2011) explain that manufacturing technology embedded with digital processors has created new trends and widened the business opportunities for the industrial sector. Moreover, the study claims that findings like manufacturing resource planning has allowed the manufacturers to increase the scope of economies while reducing the wastage and the average cost. Danny quah, (2003) has created an economic function incorporating the digital products.

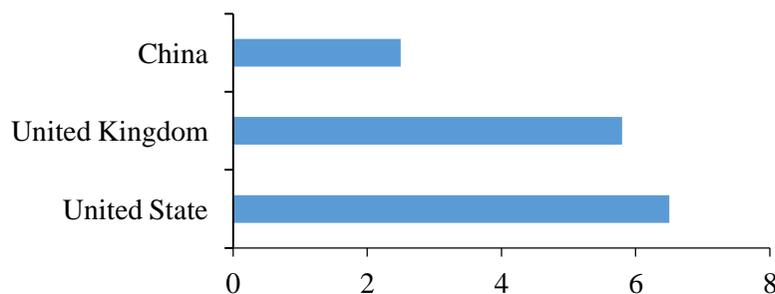
FIGURE 01
Contemporary Definition of Digital Goods



Source: Centre of Economic Performance; Digital Goods and the New Economy

Figure 01 elaborates a conceptual framework of the research carried out on digital products and their impact on the UK Economy. Further, in this model “F” denotes the production function while “U” denotes the Consumption Function. Moreover, letter “C” denotes the ordinary consumption while letters K & H represents the inputs of physical and human capital accordingly. Labour function is denoted with “N”. Further, as depicted in the function, digital goods would be used to produce both ordinary and digital goods for the end consumer. Hence it is evidential that the digital products would have a direct contribution on the production and the consumption function of the economy. Following chart demonstrates the spread of digital economy in the world.

FIGURE 02
Country-wise Digital Share of Gross Domestic Products (GDP), 2015-2020



Source: Accenture strategy and oxford economics, Country-by-country digital share of gross domestic product (2015 and 2020).

According to Figure 02, the United States is expected to have more than 6.5% of their GDP from digital product creation in 2020, while the United Kingdom would have 5.8% of GDP from the same. While countries like China also had more than 12% growth in their digital economy, continuously over the last five years. Accenture Strategy (2015) reveals that the American economy benefited from an increased economic value of \$368 billion in their gross domestic production mainly due to the rise in the digital economy. Further, the financial services market in the USA has the highest digital value addition in the world with a cumulative contribution of 58% through digital products. The report further claims that the UK has recorded 7.2% growth in this sector in 2014 while the total value creation stands at 118.3 billion pounds. Around 1.4 million job opportunities were created as a result, while contributing to the export industry by 43 billion pounds (World Economic Forum, 2015).

TABLE 01
Gross Value Addition from Digital Sector, 2009-2014

Year	2009	2010	2011	2012	2013	2014
Item						
Gross Value Addition (£ Millions)	93,666	96,946	102,834	104,622	110,387	118,288
UK Total	1,348,507	1,397,744	1,443,281	1,485,776	1,546,914	1,618,346
% Share of UK Total	6.9	6.9	7.1	7.0	7.1	7.3

Source: Annual Business Survey, Department of Culture Media and Sport (2015).

When programming, consultancy and software development work recorded a high growth rate entertainment, filming and TV sectors scored even higher growth. Further, there is a significant increase in the telecommunication sector from 2013 to 2014 (Department of Culture Media and Sport UK, 2015). As indicated by the literature findings, many organizations in the contemporary environment are focused on creating e-products also referred to as non-tangible products in their product portfolio. This trend is spreading in Asian and East Asian countries. With the projected increase in population and labor force, Sri Lanka is planning to increase the number of IT parks and BOI projects to contribute to the IT export sector. According to the budget allocation for 2016 more than 42 million rupees were reserved to build district wise IT resource centres. The investment value of the Jaffna IT Park is 8.9 million rupees (Ministry of finance Sri Lanka 2016). Private telecommunication giants like Dialog Axiata has shown keen interest in investing in this field. The company has invested 25.6 billion rupees in a project to enhance the IT infrastructure of the country. Partnering up with the Board of Investment of Sri Lanka (Colombo Page, 2014). The life style of Sri Lankans is leaning towards dependence on E-

products. E-products like the “OTT Entertainment Platform”, launched by Sri Lanka Telecom shows the enthusiasm for this sector by the business sector and the ICT sector. The product has many options such as access to a vast pool of PlayStation games, TV series, movies and songs. Further SLT’s CEO Mr. Dileepa stated that they are expecting this product to be a success considering the high demand by the people for similar kinds of products (SLT Home, 2016). According to Techinasia (2015) Director of E-commerce for Google India has once acknowledged that Sri Lanka is ahead of India in digital penetration; with an internet penetration of 22% compared to the 16% internet penetration in Indian. According to the same source the country’s projected penetration on internet is 50% in five years. The Intrusion of smart phones is regarded as the main reason for high internet penetration in Sri Lanka.

1.1. Problem Statement

At time where Digital subsistence of the Sri Lankan economy is thriving, the need of suitable tax system is increasing. Estimated interest on investment and the forecasted growth rate of Information Communication Technology would ascertain the need for a more suitable digital tax system in Sri Lanka. Such a system would be associated with economic benefits like time saving, less documentation, less pollution and more tax revenue (Swardt & Oberholzer, 2006; Lejeune, 2002).

1.2. Problem Significance

With high expected growth in digital products and related digital economic activities in Sri Lanka, the country is aiming towards a digitally driven economy. However, most of the offline businesses are sheltered with online and digital value creation. Moreover, these improved economic environments have not alarmed the policy makers to rethink about the current tax policies. However, India has stepped ahead in the policy making process for digital tax, where the Indian Income Tax Act was amended with a mandatory requirement for E-filing income tax for corporates. The amendment made in Section 44AB was the first step in moving towards a holistic online tax system in India where individuals are provided with the option to fill online tax (Gupta, 2009). The United States aligned their tax policy with the digital economy in 2011 with their “Digital Goods and Services Tax Fairness Act”. The principle intention of this act was to protect its large IT sector from paying repeated tax, hence reduce the financial cost as much as possible. As a country with a high number of operation activities outside the territories, this policy movement seems timely and essential for their developing offshore multinational business sector. Further this would mimic the IT related export endeavours from the country due to reduction in total tax obligations (Avalara, 2015). The European region has also adjusted their economic activities parallel to their digital economy. The VAT MOSS system also known as Mini One-stop Shop scheme would enable the tax payers to refile for refund and correctly adjust the tax records with minimum effort. According to the new system the buyers’ location is taxed instead of the sellers’ location, reducing the possibilities of double counting of tax. This method is expected to have a favourable impact on the economy of the EU as the foreign sellers and multinational corporations would have to bare the tax liability instead of the local customer in Europe. It is a known fact that book online businesses like E-bay have largely

benefited from the previous tax system. However, with the new implementations those undue advantages will be waived off, leading to a high VAT income collection for governments from digital imports. In this sense this act has stipulated the digital payment records of the taxes and the identification of taxes on digital products (SelzBlog, 2015). Therefore, it is eminent that Sri Lanka is behind many countries and their policies on e-taxation or digital taxation. However, the Inland Revenue Department has taken measures to make online portals for tax payments but with a lack of policies and rules to back up the utility such systems are questionable. Another significance is that there was no Sri Lankan based literature found on this subject matter or any expert opinion, discussion for that matter. Hence the main intention of this research is to identify the suitability of a digital taxation system on business systems In Sri Lanka.

1.3. Objectives of the Study

- To generate qualitative findings on economic repercussions of implementing a digital taxation system.
- To identify the countries with the best practise on digital taxation through reviewing the relevant literature.
- To diagnose suitable digital taxation strategies that can be utilized in the digital economy of Sri Lanka.
- To make recommendations to amend the administration of the existing tax system.

The literature review analysis helped in identifying the best practices in this field by probing policies related to various Asian and European countries. While the data collection and analysis would focus on the positive ontology.

2. Literature Review

In this section, the researcher has used many related journals and papers from various authors published in various countries. Further the best practices of digital taxation and negative impacts of digital taxation on certain economies around the world has been investigated.

2.1. Digital Tax Policy as an Extension of National Economic Policy

Many economic liberal policies are introduced to the world for the first time by the United States of America (Feng et al., 2001). Business model superiority is the main aim of all those policies. Further the country has implemented many policies including their tax policy which favours the multinational organizations owned by the United States. In 2011 the country has introduced “Digital Goods and Services Tax Fairness Act” where the main intention of the policy introduction was to ease the tax burden on their companies that operates on foreign soil (Mazerov, 2001). In the European region a new implementation, called VAT MOSS Mini One Shop Stop, where the VAT is charged not on the point of supply but on the point of purchase, has been introduced. This implementation is mainly focused on the Big Non EU companies, who are listed and operate in minimum taxed member countries like

Luxemburg, to avoid large tax payments (Vatlive, 2016). These conditions will include companies like Amazon and e-bay, who operate mainly through the functioning of web sites and e- trading platforms. However, under the guideline of the UK government, the new tax impose is applicable for even the non-business customers who are also considered in this method (HM revenue and customs, 2016). Some specialists have claimed that there are positive aspects to the new amendment where the previous threshold on Vat of 81,000 pounds turnover is used in tandem with the bottom up VAT impose. Some claim that the new VAT MOSS would reduce the ambiguousness on VAT in the EU region, while others claim that it is a barrier for E-entrepreneurs who are increasingly performing well in the modern EU economy. Further, it is argued that the innovation of such entrepreneurs would hinder due to passing of this new law (Rob Carney, 2015). In India the focus and the intentions are somewhat differing from the above-mentioned criteria where the Indian government has made it compulsory for all the corporate firms to register online and claim the tax refund online. In this method, the involved intermediary would make arrangements for refund. Moreover, the individual taxpayers are not required to submit to this process since they are given the option to use this service. The government has given three main options to the tax payers and the first option involves the tax payer to possess a digital signature, where after filling those refund papers individuals are required to digitally sign on the document. In the final option the tax payer would have the service of an E-return agent to obtain refund and tax paying information. Further, the taxpayers would have to visit the tax office if they do not possess a digital signature (Gupta, 2009).

A marked difference can be seen between Asian and developing world digital tax policies and the western and developed world tax policies. Indigenous industries and local business are mainly focused on by many developed countries in their digital tax policies; the .EU region and the USA referred above are classical examples for that. While adopting their tax bases to face the boom in the digital sector these countries would also consider possible tax increases on the rival foreign industries. The developing world, on the other hand, have focused on more functional strategies, like filling tax papers online, online tax registration and return, and online tax payments. Many developing countries lack the focus and aptitude to maximize the opportunities and protect their indigenous industries through their digital tax policy. Hence, many multinational ventures have easily penetrated to the digital economies of those countries.

2.2. Digital Taxation and Economic Consequences

The concept of Government-to-citizen (G2C) service can be extensively practiced with an efficient digital tax system. Due to availability of necessary information, tax authorities are able to practice good governance more frequently (Saha et al., 2012). Hence, the business ethical practices on tax payment would increase as a result. It is explained that digitalization of tax would increase the accountability of both the tax payer and the government to be obliged to both pay the tax and to give an effective service. However, this practice would pave the way to increase the quality of the service given by the authorities as well as the possibility of introducing new practice would increase (Heeks, 2001; Irani et al., 2005). E-taxation is seen as one of the

prominent tools in implementing e-government services. Further, the paper argues that the practice of mandating tax payers to function online would bring about media discussions and vibe. Further, it would arouse the discussion on ICT utility hence contributing to reduce the digital divide of third world countries Zhou (2007). Hong Kong online Tax system has brought about a high e-government satisfaction rate on citizens. The researchers found out that the number of complains e-government had was dropping which has a direct link with E-taxation system. In the same research, it was found out that there is an improvement in collection of tax amount by the authorities. Brazil has introduced their own system of digital taxing through the project SPED which is a comprehensive accounting platform that would enable the TAX authorities to collect tax in a more accurate manner. Total tax collection was R\$9 million from R\$6.2 million last year; resulting in a total increase in 12.46% of total federal taxes collected per year. This rise was mainly due to digitalization of tax collection, recording and refund process that paved the way to increase in tax income without increase in number of tax payers. American tax policy on the other hand has a contradicting direction to that of many countries in the developed world. According to EY, (2015) US authorities have not made sufficient cooperate tax cuts unlike other economic unions like EU. However, the United State Tax system makes sure that the profit generated on foreign soil by national companies are being taxed less. This is evidential when you compare the tax collection rate of Hewlett Packard of 20% and to that of General Electrics which amounts to 3.6% mainly due to their operations flexibility in foreign lands. In the same research, it was found out that tax heavens compensate 1% of the global economy where 24% of united profits are generated from the United States' own companies listed in those countries. This condition is assured with their new Digital Goods and Services Act, which would focus on lenient tax policy on profit generated in foreign soil. Another study from Sweden has proven that increase of VAT on digital artwork would hinder the entrance of new individual artists. In the same research it was found that Spain has also practiced this practice by increasing the VAT on online and offline art work in 2012, amended soon to 10% to maintain the industry functioning capacity.

According to Du Plessis (2001) digital products are the hardest products to tax as the physical presence of the product is a necessary component in determining the source of tax. In another researcher Fridensköld (2004) pointed out that due to the increased digitalized economic environment the increase in utilization and imposing of digital tax would result in increase of tax income without any economic damage. if planned properly. Government spending would increase as a result while the opportunity to achieve social welfare has increased. In another research, it was found out that digital certification has increased the effectivity on identifying such taxes and improved the effectivity on paying the taxes. Digital certification is one of the main methods to identify the jurisdiction of the tax source. Governments with high online enabled economic systems should facilitate a proper process to generate and exchange such certificates (OECD 2003).

The previous research findings suggest that digital taxation proves to be a mainstream tool in implementing government policies. Further, compliance on such policies by the public has increased due to the growing interest about those policies. Moreover. many economists believe that a proper digital tax system would bring

about a set of economic benefits like increase in total tax collection and improvement in good governance practices.

3. Methodology

3.1. Population of the Study

ICT related digital products have the most complex characters that would make those products difficult to capture in a value chain (Danny Quah, 2004). According to the analysed data in the literature review, the ICT sector promises to have a high growth rate (World Economic Forum, 2015). Hence, the target population of this study is the ICT industry.

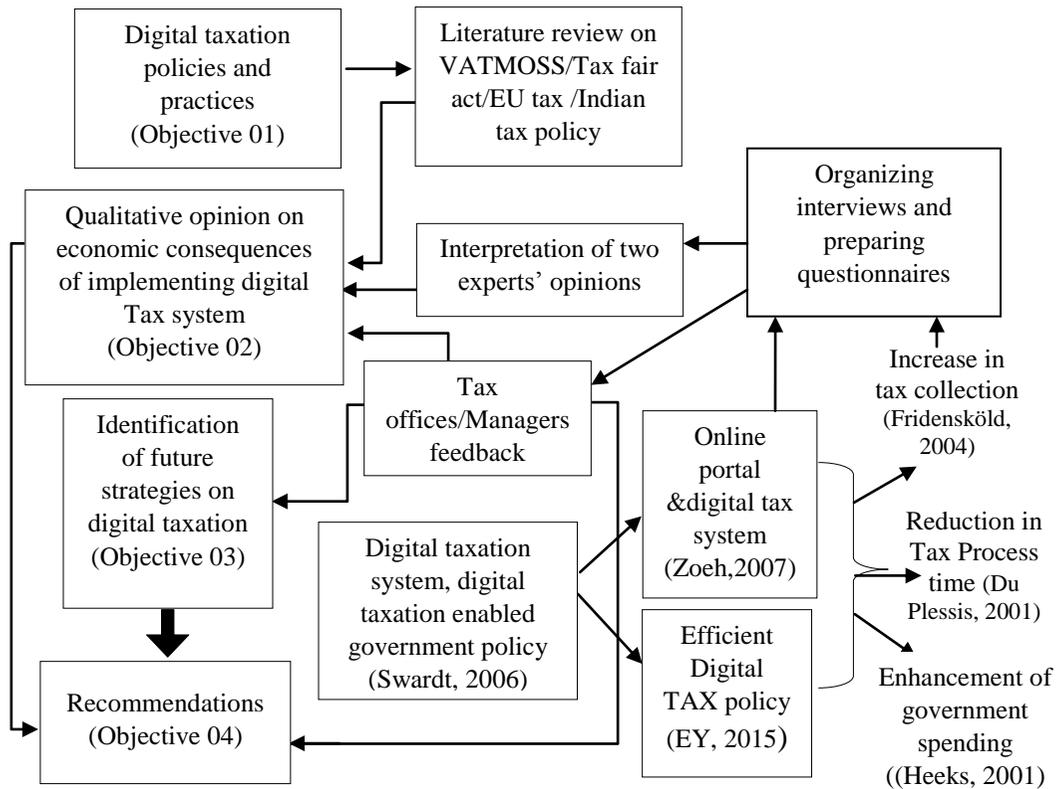
3.2. Sampling Method and Sample

Sampling method would be judgmental sampling as many qualitative studies have adopted this sampling method as a successful method (Trotter, 2012). This Sampling method would be more suitable as the set of people involved are unique and need to be sorted. Tax officers who make tax adjustments and calculations at organizations were interviewed along with finance managers who makes decisions. Further, two economic specialist were used in the study; one person is an assistant senior director of the Central Bank and one Deputy Commissioner in the Inland Revenue Department. The study involves 10 sample units, basing the company as the main sample unit. There are namely two observers in each sample unit; one tax officer and one finance manager. According to Schensul, & LeCompte, (2010) qualitative research with judgmental sampling would rarely exceed 15 observations. Collectively, 10 Tax offices, 10 Finance managers and two experts were interviewed in the study, culminating in a sample size of 22. Hence, the sample is more than the average sample size for this nature of study.

3.3. Research Process

Theoretical framework of the study is illustrated in Figure 03.

FIGURE 03
Theoretical Framework



Source: Author created.

4. Findings

Two main streams of input were analysed in the findings, namely the Tax officers in the respective organizations and the economic experts who have given a qualitative opinion on the selected economic incidents.

TABLE 02
Economic Rewards of Online System

Question 01 (Tax Officers)	What is the most useful feature of the online tax system? (Testing Objective 01)
Rationale	To identify the perceived value of online tax system
Relation to the literature	Increase in online interaction will increase revenue collection of the government (Horst et al., 2007)

Source: Research data/Literature review.

This question was directed at both the categories including officers and the experts. Some of the officers' opinions were as follows:

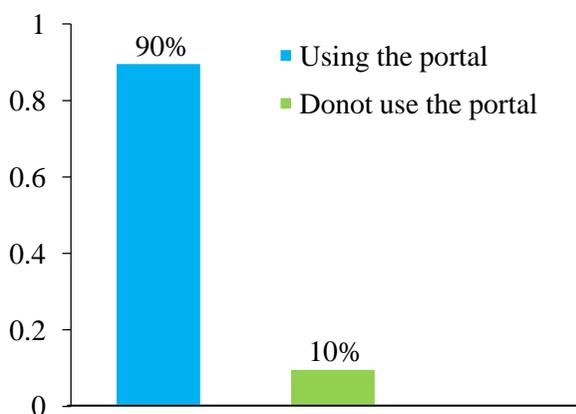
We use this system as it consumes less time and some auto corrections are included like VAT rate, etc. Therefore, it corrects our mistakes. And our timely payments are also high.

Another officer has mentioned that:

To be frank, I prefer the new system but it needs to improve the consistency, sometimes, going to the Inland Revenue and getting the job done makes it a onetime effort.

Figure 04 will give information on that utility of online tax portal system by ICT companies.

FIGURE 04
Utility of Online Tax Portal System by ICT Companies



Source: Research data.

More than 90% of the ICT companies have already adopted the online tax payment system, according to this data. Therefore, it can be concluded that the ICT companies in Sri Lanka heavily use the online tax payment system. Overall, all the officers agreed that the system would increase the filing, recording and submitting information related to taxes. However, a few companies who do not use the new online Inland Revenue site had the following response:

I am the one who pays this VAT and everything; it's convenient for me to visit the branch and do it since I have been doing it for a long time; and since I know people from there.

Another person gave a similar opinion to the above; as they believed, easy filling is not the case, which they cite as a misinterpretation. The economic specialist however had a parallel view on this regard, one claimed:

It is difficult to identify the direct relationship between implementing this new online tax system and government spending. But given the macroeconomic behaviour most of the tax increases has resulted in

increase in government spending, paving the way to boost aggregate demand.

Other specialist also claimed that, even though increase in tax collection might not increase government spending over time this correlation will increase. Therefore, it can be argued that the interaction of online behaviour would increase the possibility of improving overall tax collection and hence has a tendency to improve government spending.

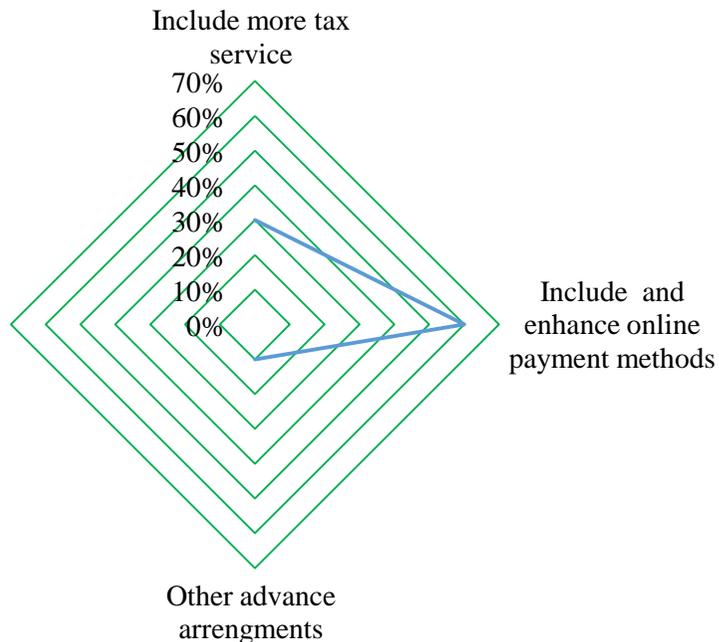
TABLE 03
Service Expectancy of Online Digital Tax System

Question 02 (Tax Officers)	What would you like to add or change in this system? (Objective 03)
Rationale	To identify potential future strategies
Relation to the literature	Online Tax collection portal should be a comprehensive one with fullest interaction and maximum government to citizen service G2C (Terrance Sanchez, 2009)

Source: Research Data/Literature Review.

Feedback on this question is demonstrated in Figure 05.

FIGURE 05
Service Expectancy



Source: Research data.

As the figure clearly shows most of the ICT export, oriented firms would like to have enhanced online payment options. Most of them argued that the other services like comprehensive Tax assessment and informative and guided services would be a good improvement. Another few sets of officers claimed that tax advance services like direct feed in apps and usage of computer would make it a comprehensive paper less system from the beginning. One CFO of App development company claimed that:

If the system can allow software plug-ins and integrate with the main ERP of the company the process will be much automated and faster, as the system would do everything.

Expert opinion on the final discussion point however questioned its ability on certain grounds as:

What is if the system is hacked? The economic loss will be billions?

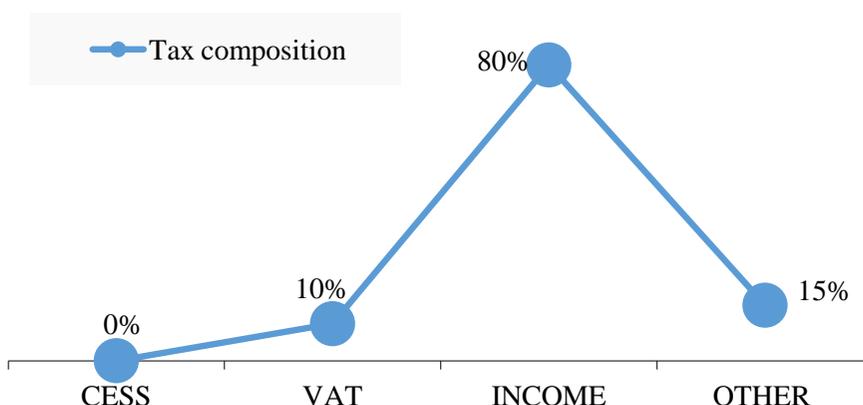
Further, both of the experts agreed on the fact that there needs to be an improvement in the level of service and the online payment option in a way to improve Government to citizen service satisfaction.

TABLE 04
Composition of Taxation of ICT Export Sector

Question3 (Tax Officers)	What are the tax types you are obliged to pay? (Testing Objective 02)
Rationale	To identify the tax rate on digital products
Relation to the literature	Reduction in tax level would have a positive impact on the digital industry (Oberholzer, 2006)

Source: Research Data/Literature review.

FIGURE 06
Nature of Tax Liability



Source: Research data.

According to Figure 06, only 80% of the ICT export companies pay the VAT and 80% pay income tax. While other taxes like Economic Service Charge for withholding tax is paid by only 15% of the ICT export companies.

According to the experts, this tax rate is comparatively less than the USA. Where in the USA the average corporate tax rate is around 38.9%, while in Sri Lanka that value is around 28% (Trading Economics, 2016). However, the average tax rate for export ICT are less than the average, as exports on software and web-based services are exempted from VAT (KPMG, 2015). However, some software companies and web development companies had to import software platforms and tools for which this 10% VAT is applicable. Further, the corporate income tax is paid by 80% of the companies, while the rest of the 20% have BOI or Ministry of Finance exceptions on corporate Tax. Other charges includes PAL charge and surcharges incurred during documents, equipment, and other imports. Further, the United States has imposed a sales tax for software and digital products based on the server download and upload activities (taxrates, 2015). EU tax on VAT remains to be imposable if the trade is happening outside the EU Zone (Europa, 2015) unlike Sri Lanka where both tax types are exempted from the ICT industry.

4.1. Movements of Foreign Direct Investment

According to expert opinion, one of the reasons for high FDI flow for the ICT export industry is the lower wage rate and high professionalism in the ICT industry in Sri Lanka. However, the experts also pointed out that the lower TAX rates on ICT Exports have attracted more forging investors to Sri Lanka despite their cost on establishment. One expert explained:

The ICT Exports and BPO sector is showing high growth perditions. I believe that one of the main reason is that our tax reduction over the years along with increase in technical knowhow of the country. We are expecting the ICT sector to surpass other export dominant industries near soon.

The other expert commented:

Policy makers do not worry about the loss of income through taxing export ICT products and services; as the future potential benefits aimed are high.

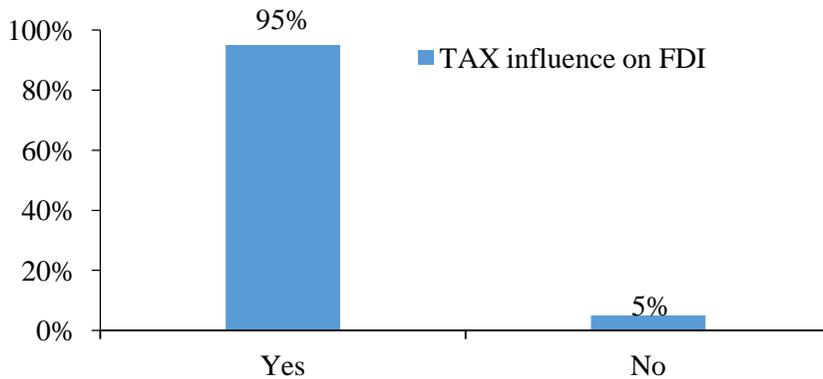
Overall, this analysis indicates that the Reduced TAX rate on ICT industry has a direct impact on the FDI flow for that industry.

TABLE 05
Relationship between Tax and Foreign Direct Investment

Question 04 (Tax Officers)	Do you believe Low TAX rates Attracted foreign investor to Sri Lanka? (Testing Objective 02)
Rationale	To identify the tax rate on digital products.
Relation to the literature	Reduction in tax level would have a positive impact on the digital industry (Oberholzer, 2006)

Source: Research Data/Literature review.

FIGURE 07
Foreign Direct Investment Flow and Tax



Source: Research data.

This answer is collected from the finance managers of these ICT companies and the data further confirms the arguments made by experts on the relationship between low tax rates and high FDI flow in the ICT sector in Sri Lanka.

4.2. Analysis of the Findings of Expert Opinion

In this section, analysis related to the findings of two expert opinions are elaborated. Further, the economic consequences of the digital taxation of the country are also reviewed.

Ability to create trade barriers: With the second Silicon Valley in the world as its neighbour, Sri Lanka has a huge threat posted from India and its growing work force towards IT. Sri Lanka recorded 700 Million US Dollars of revenue from IT exports, being the third largest export industry in Sri Lanka (Central Bank Report, 2015).

Our digital tax system is not policy aligned like the American policy where they continue to find ways to tax less for offshore or export oriented businesses while tax more on local traded business.

Other expert would also bare the same attitude towards to problem:

We have a great opportunity to create a good online tax policy, which will increase the international competitive advantage of the country's digital products.

Both the experts agreed on the fact that policy and digital tax can be aligned parallel to each other. However, the implementation of such policies is far from consideration in the national policy framework of Sri Lanka. Expert opinion is that the country has necessary resources and the scope to create such a pool of policies.

Connection between Macroeconomic Performance and Digital Tax System: Once again, both the economic experts argued that this is positively correlated as:

As I mentioned there are a number of researches done on online tax payment systems that have increased the collected tax income without increasing the number of tax payers.

This directly tallies with the literature review finding in this research, where the same facts were explained in the case of Brazil (OECD 2003). The other expert also had the same opinion:

I believe that when the tax collection is increased and swift it has a direct impact on the economy and the pattern of government spending FDI Rate of the country hence would result in the increased aggregate demand of the country.

However, when confronted by the Tax officers it was told that the benefit of attracting FDI due to utility of E-tax system is not a concurrent reality as most of the organizational tax officers claimed that Investors would not consider whether you are online TAX registered or not. However, they commented positively on the experts' suggestion that the government's ability to collect the tax faster would increase the efficiency of government spending.

5. Discussion

According to the feedback from question 02, ICT corporate TAX payers have higher expectation on the existing Digital Tax system. According to the interpretation of question 03 and 04, it is evident that the Tax rates of the ICT export sector in Sri Lanka is Low in comparison to other regions like the USA and the EU (Tax Rates, 2015). However, expert opinion clarifies that the reduction in the Tax rate of the ICT export industry in the country is favourable for the development of the economy and the industry itself. As discussed in question 01, findings corporate taxpayers are more enthusiastic about the online tax system given the expected benefits. Further, the study reflects that the tax service for online tax system should be improved.

6. Conclusion

The export driven ICT sector promises to have healthy growth in the future economic environment of the country. Moreover, the study findings indicate that the proper establishment of the digital tax system would enable the economy to increate Government to Citizen Service and relationships, increasing the social wellbeing of the country. Further, the study concludes that many corporations are positively

responding to this change in the tax system. However, some improvements need to be made to the system itself to convert the non-users in to regular users of this service. The expert opinion and the industrial survey results are parallel where both the parties are on a consensus on the notion that existing tax system needs to be improved for it to ripen more economic benefit to the country, while the experts believe that such a tax system should align with the countries protectionism mechanism.

7. Recommendations

According to the findings of the study, the following recommendations are made:

The first recommendation would be to enhance the tax service by allowing the online payment methods for the various corporates as discussed in question number two. The next recommendation would be to improve other tax services like tax validation services and various tax advisory services for the users that would increase the usage rate of this new system. Further, the new system can include tax validation services on the corporates tax obligations. Another important recommendation would be to continue to grant the same level of tax benefit for the considered industry (ICT Export sector) enabling that industry to have a competitive advantage among rival countries. Another recommendation would be to re-invent another accurate online tax policy that would capture these online transactions triggered from offshore locations. The final recommendation would be to identify a strategy to publicize online tax filling among the general public in Sri Lanka.

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WHAT DETERMINES RECREATIONAL TELEVISION BEHAVIOUR OF PEOPLE? A STUDY WITH REFERENCE TO THE GAMPAHA DISTRICT¹

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ABSTRACT

Although the television industry carries great importance in micro and macroeconomic aspects and supports a great demand as a recreational or leisure source among people, it seems that the television industry is lagging behind its actual capacity and is widely contributing to the domestic GDP. Less effective management and poor identification of choices of people has driven the industry toward poor conditions. Therefore, this study contributes to identify the factors that support the television program preferences of people, selection of public or private channels and time spent in front of the television. These identifications would indeed help the television industry to achieve maximum capacity while competing effectively in an oligopolistic market and achieving higher contribution to the national GDP.

In order to obtain the statistical analysis, primary data has been gathered from four Grama Niladari Divisions of the Gampaha Divisional Secretariat in the Western Province, Sri Lanka. Simple random sampling procedure has been carried out in the sample selection process and data has been gathered from 609 individuals in 168 households; from February 2015 to April 2015, to identify determinants of programme preferences and public/private channel choices, the binary logistic regression model has been applied. The semi log regression model is used to identify the determinants of television watching hours of the people.

Results in the binary logistic model of programme preferences emphasize that old, male, married and employed individuals are showing more interest in news and knowledge related programmes while creating positive significant relationships with the news and knowledge based programme demand. When a person is being employed, public channels were mostly preferred creating significant positive relationship while when a person is having specific political norm, they prefer mostly private channels and create significant negative relationship in the model. Regarding the hours allocated for watching television by the people, age, marital status and employment status shows positive relationships within the model. Considering the employed segment; when a person has more than 8 hours of working time, it shows a significant negative relationship with television watching hours. In descriptive statistics, it shows that old and middle aged people are more interested in watching news and politics related

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programmes while females mostly prefer programmes containing soft content such as tele-dramas and religion based programmes.

Considering news preference in separate, Hiru TV was leading among other channels. “*Atapattama*” on ITN was the most preferred knowledge based programme followed by “*Doramadalawa*” on ITN. “*Satana*” programme on Sirasa TV was the mainly preferred political programme among individuals. On the other hand, when it came to tele-dramas, the largely favoured Indian mega dramas were “*Me Adaraya*” and “*Sapna*”, telecast by Sirasa TV. “Hiru Countdown” was leading among the respondents when it came to their most preferred musical programmes.

Keywords: Demand for Watching Television, Hours Spent Watching Television, Programme Specific Demand, Public/Private Channel Choices

1. Introduction

Television, in modern times cannot be considered a mere electronic instrument since it has become the dominant indoor recreational source among people. As evident by the Nielsen Television Audience Report, 2011 and Nielsen State of the Media Trends in TV Viewing Report 2011, the household tuning of television is recorded as an average of 59 hours and 28 minutes per week and nearly 8 ½ hours of tuning per day all over the world (Nielsen Television Audience Report for Universe, 2011) and for the Asian region, people watch television on average for 3 hours and 14 minutes per day (Nielsen State of the Media Trends in TV Viewing, 2011) emphasizing the importance given by the people to the television. Even though people tend to access many digitalized instruments due to the ever changing technology, people mostly prefer television to spend their leisure time (Viewing on Demand: The Cross-Platform Report, 2013).

In the Sri Lankan context, many data sources emphasize the importance given by people to the television. As revealed by the Sri Lanka Demographic and Health Survey 2006/2007, watching television is ranked as the first (77.6 percent) amongst the recreational sources enjoyed by people in Sri Lanka (Demographic and Health Survey of Sri Lanka, 2006/2007). 77.4 percent of the total households in the country have televisions and is ranked as the second among other durable goods available in a Sri Lankan household (Demographic and Health Survey, 2006/2007). In exact values 3.8 million households own a television out of a total of 5.2 million households in Sri Lanka with a recorded 73 percent TV penetration³ (Sri Lankan Television Market-2012/2020, 2013).

Not only as a recreational source, television holds a significant economic value in both micro and macro level aspects. Considering the Cultural and Creative Industries (CCI) in the world, the television industry generates the most revenue as 477 bn US \$ and generate 3,527,000 employment opportunities across the world (Cultural times: The First Global Map of Cultural and Creative Industries, 2015). The massive demand for television annually generates considerable income in the broadcasting sector while holding a noticeable importance in microeconomics; the behavior of which could be explained separately for individual firms and persons.

³ Television penetration: Available number of television viewers.

Currently the Sri Lankan broadcasting sector operates under an oligopolistic market structure and functions under both public and private partnership. Most importantly the television industry performs a dualistic action; (i) providing content for the viewers towards information and entertainment and (ii) earning profits through broadcasting advertisements of other firms (Kind et al, 2006; Wilbur, 2008) which generates contradiction between viewers' interest on advertisements and television programmes. To avoid that matter, service providers are always tending to practice different strategies to attract a wider viewer base as well as to maximize profit through advertisements while maintaining fair balance between these two dissident components (Kind et al, 2006).

Under that fact, it is important to deeply consider about the viewers' television behaviour. Zillmann and Bryant (1986, cited in Gillespie, n.d.) have found that people pay little attention to their preferences of television programmes and reasons for watching those. While some people are aware of the reasons for their watching preferences, a majority of the people do not produce actual reasons behind their watching preferences. Therefore, the watching behaviour among people could be varied according to long term factors such as demography, employment characteristics, and other inborn individual characteristics; as well as short term factors such as mood of the viewer in a given period of time. Further, according to Tavakoli and Cave (1996), gender differences, age differences and occupational differences lead to considerable effect on utility behaviour in watching television.

In the macro aspect, many broadcasting sectors in many economies now target the outside world and produce television contents and earn large incomes through exporting those contents.

Even though the television industry dwells in the world of broadcasting and generate high income to the global economy, the Sri Lankan television industry does not show significant influence even towards the national GDP over time. In the past year, the information and communication sector along with the broadcasting sector contribution to the national GDP records as 0.5 per cent which is extremely inadequate with the massive demand generated through the people. But as a plus point, the growth of programming, broadcasting activities and audio video production sector has increased from 3.8 percent to 5.5 percent during the period of 2014-2015 (Central Bank Annual Report, 2015) and evinces a growth potential in the industry. However, it seems that the domestic television industry had been neglected for a long time and still does not show substantial contribution towards the economy and is lagging behind in its actual capacity for development.

As mentioned above, currently the domestic television market functions under public and private partnership. The private sector is currently performing in a preferable manner along with the utilization of new technology. However, the public sector, which could be used as a worthy component to capture higher government income is showing feeble behaviour in the industry.

Considering all the above matters it seems that the television industry holds significant value in the domestic economy as a key sector with higher growth potential but has not achieved the expected development yet. Under that fact, finding new and effective ways to enhance the capacity of the television industry may achieve its actual growth potential while contributing to the national GDP as

expected. In the micro aspect, providing more accurate and valid contents to the viewers would attract more viewers while attracting more advertisers. For that clear identification of viewers' preferences is a must as advertisers and producers also tend to know the viewers' preferences to put their advertisements on trending programmes at the most suitable time. This would help to increase the value addition of the television industry to the country's GDP.

On the macro aspect, enhancing the value addition of domestic television programmes would help to earn export income through domestic television contents as practiced in many other countries. To verify the possibility of increasing the domestic value addition in the television industry it is necessary to study the viewers' preferences regarding television programmes. Therefore, this study provides answers to the following questions:

- Does personal behaviours affect television preferences of viewers? Which components are leading among these behaviours?
- What are the failures of government owned channels in attracting a wider viewer base with maximum profit?
- What would influence the viewers to spend longer time in front of the television?
- These three will provide better guidance to the suppliers of television programmes and advertisers for the profit maximization while the helping consumers maximize their utility.

The main objective of the study is focused on identifying the television viewing behavior as a recreational component. There are three sub-objectives and they are:

- to identify the factors associated with the watching preferences of television programmes;
- to identify the factors associated with the number of hours spent watching television; and
- to identify the factors associate with the public/private channel choices among viewers.

2. Literature Review

Literature review of this study is arrayed under three sections; determinants of the watching preferences of television, determinants of public/private television channel choices among people and determinants of the number of hours of watching television.

2.1. Determinants of Watching Preference of Television

Wilbur (2008) has noted that the broadcasting industry has a two sided market where it demands from the viewers as well as from advertisers or business firms. According to Wilbur's findings, the viewer's demand for programmes are mostly captured and divided into categories such as action drama, news, psychological drama, reality, movie, and scripted comedy.

According to a research on people's preference for News Vs Entertainment by Prior (2005), people who watch news are more knowledgeable in politics and current affairs and are showing more participation in voting. However, the people

who prefer entertainment than news were less knowledgeable in politics and was showing less interest to vote. As a conclusion, Prior (2005) points out that having more content for people to select, widens the knowledge gap when the knowledge and resources are unequally distributed.

According to Nangong (2011), the Chinese people watch news channels to keep updated with the current knowledge and maintain it as a daily habit. Zillmann and Bryant (1986, cited in Gillespie, n.d), have noted that, when a person selects a programme, he/she is pays little attention to what they select and why they select that content; simply without “selective exposure.”⁴ However, even though people pay little attention on their programme selections, there is always a specific reason to select that content according that person’s current mood or emotions which is a temporary/ short term phenomenon or a demographic/inborn characteristic which leads to creating long term preferences. Under demographic characteristics which create long term preferences, males are more likely to watch violence related content like war related contents while the females prefer mostly to watch programmes that relate to peace and justice, (Zillmann and Bryant 1986, cited in Gillespie, n.d).

Madni et al (n.d.) noted in their study that females showed a higher demand for television dramas. According to Tavakoli and Cave’s (1996) study on television viewing patterns of the British, it shows age variations as a leading factor to increase the viewing variations among people. In other words, programmes like news, chat shows, quiz shows, art, current affairs, and documentaries are watched mostly by older viewers while pop music or entertainment shows are mostly watched by younger viewers. According to Guest (2013), television watching is the leading entertainment media among UK citizens and recorded as the most favorite entertainment source among nearly 63 percent of the total respondents of which majority were females and youngsters.

2.2. Determinants of Public/Private Channel Choices among Viewers

As emphasized by Bacha and Norris (2000) after the 1980’s all the countries in the world allowed the private sector to participate in broadcasting through commercialization of mass media to increase the media choice of the viewers, where the public sector held a monopoly except in UK and Italy before the 1980’s. Further, the common aim of the public television channel was laid on providing entertainment with serious information in related to the common issues.

In most of the countries, people mostly prefer commercial channels than traditional public channels. According to their findings, the knowledge of the people was positively correlated with the higher watching of public channels; especially the regular exposure to the news. They measured the exposure to the programmes in two methods as selection effect and media effect. According to the selection effect people select the private or public channel according to the prior social and attitude effects. People who are more knowledgeable tend to regularly watch public channels because, in general, public channels mostly telecast things about politics, current issues, world trends and etc.

⁴ “Behavior that is deliberately performed to attain and sustain perceptual control of particular stimulus events” (Zillmann and Bryant, 1986, cited in Gillespie, n.d)

“In most countries, better knowledge is positively and significantly correlated in general with preferences for public broadcasting, and in particular with preference for public TV combined with regular exposure to news” (Bacha and Norris, 2000, 8). Here they emphasized that private channel growth may compliment, not replace, public channels. People may increase the demand for both public and private channels during a given leisure time as per the requirement of exposure to both knowledge and entertainment. Heap et al (2005) pointed out that, within a decade, the available channel choice of a viewer increased from 3 channels to nearly 100 channels in most countries worldwide. Although public sector broadcasting or Public Service Broadcasting (PSB) highly intervened in the broadcasting industry, the considerable reason of lack of competition continuously reduced over time due to multi-channel availability within households. They suggest the supply side policies as to encourage public broadcasting while reducing fully commercializing the public broadcasters. Enabling competition to generate efficient outputs in both public sector and the fully commercialized private sector. According to the Nangong (2011) Chinese graduates were willing to watch government oriented news channels as China’s more educated population were more interested in government jobs.

Noam (n.d) have developed a model regarding the political influence on the channel broadcasting and emphasized government intervention in private channels. When government intervention increased on programme diversification, unusual political biases were raised. But on the other hand, when the government reduced intervention in the industry, the advertising captured television market tend to reduce the quality of the programmes. So, proper a management process should be introduced for the public and private channels in the television market.

According to the Grunnet, et al (2005), the Assessment of the need for a Radio and TV Journalist Training Unit in Sri Lanka report, emphasized the high political influence on the media editorial positions and that they cannot make proper decisions in allowing licenses for the private broadcasters. Mahsud et al (2011) have found out that the people were watching more private channels to gain knowledge regarding issues of national importance like politics and economics, terrorism, poverty and etc. The reason for the preference was identified as private channels were providing insight and balanced information regarding the above facts. Also the results revealed that, young generation was highly depended on private channels than the older generation.

In the Sri Lankan context, Devenesan (2006, 5), emphasizes the political influence on the private participation allowance to the industry.

Most private TV and radio stations are affiliated with politically influential private groups, and their ability to obtain licenses from the government sometimes relies more on this influence and the discretion of the Media Minister than their potential to produce better quality programming.

But allowing the private satellite and cable TV providers, like CBNSat⁵, to the industry given the huge competition between both private and public sector broadcasters encouraged quality and diversified output of media content.

The Sri Lanka Broadcasting Corporation Act states, quite simply, that the Minister in charge of Media is empowered to issue licenses for the establishment of private stations^{ll}. The discretionary broadcast licensing system has completely lacked transparency, accountability and consistency. As a consequence of this, some editorial positioning risks to become dictated by the business and political priorities of media owners and editors (Devenesan, 2006, 5).

2.3. Determinants of Watching Hours of Television

Considering the recreational demand for television, the number of hours spent watching television holds a significant importance. According to Rop (2013), during the available leisure time, about $\frac{3}{4}$ of his total sample were watching television and were showing less preference to engage in other indoor or outdoor recreational activities.

According Csikszentmihalyi and Kubey (1981, 320), 344 respondents out of the total sample were watching television as the primary activity; recording 7.2 percent of the time. While 136 respondents recorded it as their secondary activity with 2.8 percent of the time. Importantly, a majority of the sample were watching television after 5.00 pm. US Time Use Survey (2013) and State of the Media Trends in television viewing (2011) also presented the same results related to television watching hours. In the Sri Lankan context, the television penetration among people was recorded as 77.3 percent (Department of Census and Statistics, 2007) which provide evidence to the greater demand to the television industry.

Tavakoli and Cave (1996) conducted a study on television viewing patterns of people and found that time, age and gender factors as factors affecting the variations in television viewing patterns. Considering age as an influential factor, older people showed higher demand for watching television compared with the younger age groups. On the gender aspect, females showed higher preference to watch television than males (Tavakoli and Cave, 1996). However, Wendy Rop (2013) has recorded quite different result in her study among undergraduate youth in Kenya as males are more addicted to watching television and videos contents than females. Irby and Tolman (2003) have also presented the same results.

According to the study of Fahey et al (2005) which was conducted in Ireland, one in five Irish boys and almost one in six Irish girls are watching television for more than four hours per day within a week while during the weekend, it records an increasing trend. According to Dennison et al (2002), almost 40 percent of the US child population who are having own television sets in their bedrooms watch television approximately for 4.6 hours per week than the children who do not have a television set in their bedrooms. Zimmerman et al (2007) conducted a research on

⁵ CBNSat is one of the two prior private television broadcasters in Sri Lanka as it abbreviation of Communique Broadband Networks which providing direct to home satellite TV operation in the television industry owned by the Dialog Telekom Ltd.

television watching behavior of babies who are below the age of 2 years and found out that the watching time increases as they become older increases.

According to the USA Time Use Survey – 2013, television viewing time is highest among American retirees and it is lowest among young adults. Nielsen Cross Platform Report (2013) and Robinson and Godbey (1999, cited in Kind et al., 2006) also cited the same results. A study on viewers' preference on programmes was conducted by Wilbur (2008) and found out that, Friday night was the most preferred time for watching television among people. As the reason for this preference, Wilbur (2008) has mentioned that Friday was the day that people enjoyed freedom after going to work or school for a whole week and the next day which is a holiday thus allow people to consume extra leisure time.

Rust et al (1992) have conducted a research on measuring viewers' preference on television watching. According to their results, many people do not prefer late night programmes due to busy schedules during day time. As found by the Ericsson Consumer Insight Summary Report (2013), evening is the time that people are most likely to watch television as it is the time which people spend leisurely after returning home from work. According to Corneo (2002), each and every decision of a person depends not only on the time they have but also on the mental-energy they have. Thus it creates positive correlation between the number of working hours and the number of hours watching television from the available leisure time. Simply, as people who spend more hours working tend to avoid engaging in activities which require more mental-energy and move to activities which require less mental-energy like watching television.

3. Research Methodology

The Study is mainly based on primary data. Using structured questionnaire. Relevant data has been gathered under four sub-sections as basic information, details about watching TV, respondents' willingness for recreation and respondents' interest in the promotion strategies on TV.

Data were collected in four Grama Niladari Divisions which were selected randomly as Indigolla, Medagama III, Embaraluwa I and Bandiyamulla North at the Gampaha Divisional Secretariat Division of the Western province. Using purposive sampling technique, the Western Province and the Gampaha Divisional Secretariat were selected. For the final sample random sampling technique was applied.

3.1. Method of Estimation

Binary Logistic Regression Model has been used to identify programme specific demand preferences and determinants of public/private channel choice while semi log regression model was used to analyse the watching hours of television.

Binary Logistic Model

The logit function is typically based on the linear probability model which was introduced to reduce the limitations of LPM. The basic function of logit model was referred in equation (1) (Gujarati, 2004).

$$P_i = E(Y = 1 / X_i) = \frac{1}{1+e^{-\alpha}} = \frac{e^{\alpha}}{1+e^{\alpha}} \quad (1)$$

If $Y = 0$, the equation would be as in equation (2).

$$P_i = E(Y = 0 / X_i) = \frac{1}{1+e^{\alpha}} \quad (2)$$

The basic equation for Binary Logistic Model was mentioned as follows (equation 3):

$$\ln\left(\frac{p}{(1-p)}\right) = \beta_0 + \beta_1 X_1 + \dots + \beta_n X_n + \varepsilon \quad (3)$$

Where,

Ln = Natural logarithm

P = Probability of dependant variable that equals a case

β_0 = Intercept

$\beta_1 X_1$ = Regression Coefficient multiplied by some value of the predictor

ε = Exponential function / Error term

Taking the people's preferences on television programmes into consideration, it seems that although people watch different programmes in different channels, some programmes and channels were given special preference and priority. Thus the watching preferences of television programmes and channels were estimated under two categories, i.e., demand for knowledge (1) and demand for entertainment (0) to measure the demand for television watching. The model identifies demand patterns for knowledge based programmes/News over entertainment programmes such as tele-dramas and musical programmes. Through measuring the number of hours allocated to each segment, the most preferable programme category was selected. If a person allocated more hours to watch knowledge related programmes than entertainment programmes the viewer is identified as, 'the knowledge based programme viewer' and as the vice versa as an 'entertainment programme. Therefore, it shows mutual exclusion among viewers even though they are showing significant preferences over other programmes. To estimate the relationship of programmes preferences on television watching demand a model was constructed under demographic factors and employment factors. Finally, the influential factors for the model was identified and applied as, X_1 ; Age of the respondent, X_2 ; Gender of the respondent, X_3 ; Marital Status of the respondent and X_4 ; Employment Status of the respondent, X_5 ; Educational level of the respondents.

In identifying public / private channel choices among people, the model was constructed by categorizing the dependent variable as demand for public channels (1) and demand for private channels (0). If the viewer prefers public channel than watching private channel, the viewer is identified as a 'public channel viewer'; while if the viewer prefers private channels than public channels, the viewer is identified as a 'private channel viewer'. As same as in the previous model, employment factors and political preference details were considered to measure the relationships with the television watching demand. For the public/private channel choice model, the influential variables were applied as, X_1 ; Employment nature of the respondent and X_2 ; Political norm of the respondent.

Semi - Log Regression Model

Considering the third objective of measuring demand for watching television; the effect of number of hours spent watching television seems a rather important factor. To identify the certain effects on television watching demand by the number of television watching hours, Semi Log Regression model was used as the analytical tool.

Here, the basic equation for Semi-Log regression model was mentioned in equation 4.

$$\ln \text{Hrs} = \beta_0 + \beta_1 X_1 + \dots + \beta_n X_n \quad (4)$$

X_1 ; Gender of the respondent, X_2 ; Age of the respondent, X_3 ; Marital status of the respondent, X_4 ; Employment Status of the respondent, X_5 ; Level of Education of the respondent, X_6 ; Respondents not spending time for another leisure activity, X_7 ; Working hours of the respondents, X_8 ; Employment nature of the respondent were identified as influential factors to the relationships. Importantly, two separate models were constructed for a common sample under demographic factors and for an employed sample under employment factors.

4. Results

4.1. Determinants of Programme Preferences of Television

According to the descriptive results, it shows that females mostly prefer tele-dramas (46.6 percent) while males mostly prefer news (53.4 percent). The same result was mentioned in the findings of Zillmann and Bryant (1986, cited in Gillespie, n.d.) as females mostly demand soft content programmes like tele-dramas while males mostly prefer violence related content like news.

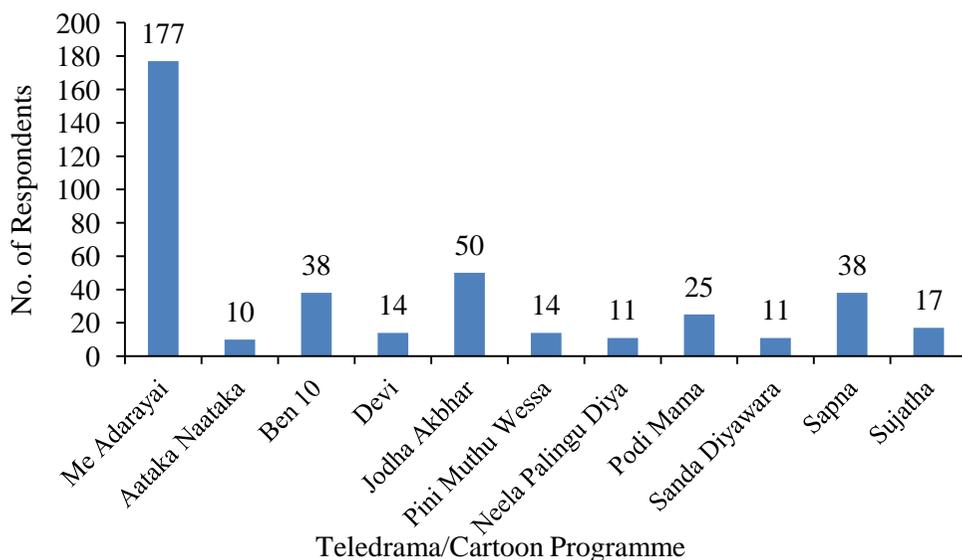
Considering programme preferences under age variations, it shows that tele-dramas/ cartoon programmes preferences are mostly captured by 0-14 year age group (64.7 percent) while the preferences for news are captured by the people whose age is above 55 years. With the increasing of age, it shows a decreasing preference trend for the tele-drama/cartoon programmes. As exact values, the demand for tele-dramas reduced from 50 percent in the 15 – 29 year age group to 23.9 percent in the 30-54 year age group. Then, finally it reduced to 22.9 percent within the group of people whose age is above 55 years. Same result appeared in the findings of Tavakoli et al (1996) as young viewers mostly preferred to watch operas, films and pop music shows while the older population showed a tendency to watch news, art, current affairs and documentary shows (Tavakoli et al, 1996).

Considering the Marital status under programme preference variations, it shows that the married segment mostly prefer watching news (41.9 percent) while the unmarried segment show more preference to watch tele-dramas (41.8 percent). With the educational level variances, in the secondary and the tertiary educational levels, 38.2 percent and 34.3 percent from total sample are showing more preferences in watching knowledge related programmes. The least demand for news was recorded by the people whose educational level is only up to primary level or no educational attainment as 6.3 percent and recording higher demand for tele-dramas and cartoons. Importantly, it emphasises an increment in demand for knowledge with the increasing educational level.

On the other hand, Demand for musical programmes is high among the people whose education level is up to the primary level. The people with secondary education level record the highest demand for knowledge related programmes. The same findings were interpreted in the study of Nangong (2011) as most demand for news telecasts were generated by the employed segment with a 54.3 percent contribution while unemployed and economically inactive persons were demanding more tele-dramas.

Considering the exact programme preferences of the people under the news/knowledge programme preference category, *Satana* political programme is the most preferred political programme by the people followed by *Balaya* and *Rathu Ira* programmes. Hiru TV ranked as the 1st which people mostly prefer to watch news. Considering knowledge and religion based programmes, *Atapattama* and *Doramadalawa* programmes captured the highest preference among related programmes and the most preferred channel for watching knowledge and religion based programmes is the Independent Television Network (ITN).

FIGURE 01
Mostly Preferred Programme Distribution Regarding Drama/ Cartoon Watching



Source: Author constructed based on research data.

In the Entertainment category, *Me Adarayai* teledrama on *Sirasa TV* recorded the highest preference among tele-dramas. Considering the mostly preferred musical programme, *Countdown* in *Hiru TV* ranked 1st. Under overall channel preference, *Sirasa TV* and *Hiru TV* achieved 1st and 2nd place in peoples' preference for watching any kind of programme respectively.

4.2. Statistical Analysis for Identifying Factors Affecting Programme Specific Demand for Television Watching

Identifying Factors Affecting Programme Specific Demand for Television Watching

The SPSS statistical package was used to analyze data and final results were tabulated as follows:

TABLE 01
Programme Specified Demand - Binary Logistic Model

Variable	B	Wald	Exp(β)
Age of the respondent (X_1)	0.727	8.194	2.070
Gender of the respondent(Male) (X_2)	0.598	9.184	1.819
Marital status of the respondent (X_3)	1.061	24.746	2.891
Employment nature of the respondent (X_4)	0.567	7.435	1.763
Educational level (X_5)	-0.096	0.147	0.909
Intercept	-1.443	33.782	0.236
Nagelkerke R^2	0.216		
Number of observations	609		
Reference Categories	Below 55 years in age, Female, Unmarried, Unemployed, and Secondary and above educational level		

Source: Author constructed based on research data.

According to Table 01, the demand for news and knowledge related programmes are 2.070 times higher among the people whose age is above 55 years than the people whose age is below 55 years. Considering the Sri Lanka, Age of 55 is the 1st boundary for retirement and where people start to consume more time in leisure. With having more time for leisure, people require more recreational and leisure activities. But the thing is, after the age of 55 years, the physical ability of the people starts to depreciate while limiting them to engage in activities which require less energy; i.e., indoor recreational activities. As Television watching dominates among indoor recreational activities, elderly people show a higher tendency to watch television for a longer time period.

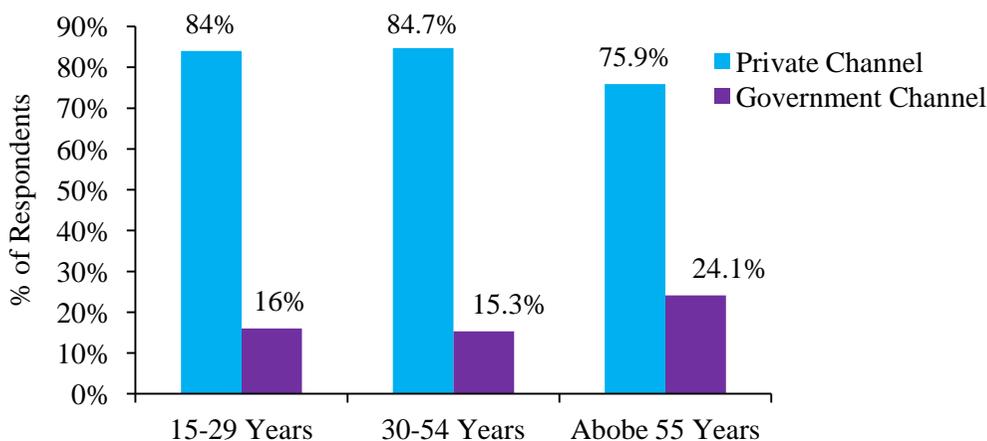
On the other hand, as people get more life experiences with maturity they prefer more actual and realistic contents like knowledge based programmes than entertainment programmes and this was also mentioned in the findings of Tavakoli et al (1996). Considering gender variances, the demand for news and knowledge related programmes are 1.819 times higher among males than females. Staying on the basis of natural preferences, males seem to mostly prefer political, economic, knowledge and current affair related programmes while females mostly prefer soft content

programmes. Zillmann and Bryant (1986, cited in Gillespie, n.d) also have proven the same fact in their study as males demand more for violence related content such as news, political programmes and documentaries while female mostly prefer soft programmes and justice reinstating programmes like tele-dramas and music programmes.

Taking the marital status of the respondents in to consideration, married people demand 2.891 times more news and knowledge based programmes than unmarried respondents. As many married respondents are above 30 years in age, spending their middle age and experiencing maturity, married person demand more news and knowledge based programmes than unmarried people. When the demand for news and knowledge based programmes are considered along with the employment nature of the respondents, the demand of employed persons on news/knowledge related programmes was 1.763 times higher than the demand by unemployed persons. As employed people are more aware of current affairs and political concerns it shows a higher preference for news, knowledge and political programmes than the unemployed/economically enactive segment who lack knowledge of current affairs and political situations and demand more entertainment based programmes.

5. Trends in the Public/Private Channel Choices among People

FIGURE 02
Public/Private Channel Preference According to Age



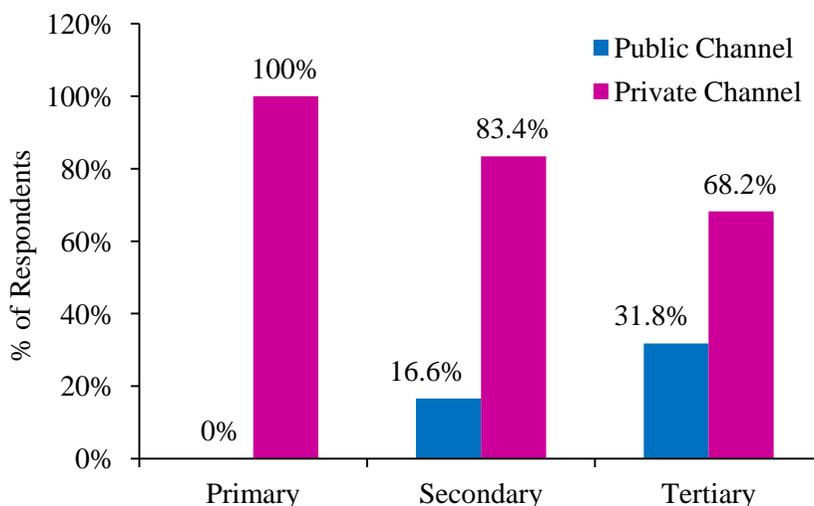
Source: Author constructed based on research data.

According to Figure 02, the preference for government channels was highest among the above 55 years old age group, as 14 out of 168 respondents prefer government channels than private channels. As the government channels mostly broadcast knowledge/religious based programmes as they are concerned with social responsibility, young and schooling respondents mostly preferred government channels. With the effect of profit maximizing, private channels always tend to

broadcast entertainment based programmes. Thus in the schooling ages and the matured ages, people tend to watch more government channels.

Considering the private channel preference within age groups, respondents who were 21 years of age, and 72 middle aged respondents and 44 old aged respondents preferred private channels than government channels. Middle aged group showed the highest demand for private channels. Overall, within every age category, the private channel demand dominated.

FIGURE 03
Public/Private Channel Preference According to Educational Level



Source: Author constructed based on research data.

As shown in Figure 03, when the educational level increased, the preference on private channels reduced and preference for government channels increased. The result was according to the general fact, that, people prefer more knowledge and information based programmes when they are more educated as government channels mostly offer programmes of this kind.

5.1. Statistical Analysis for Identifying Factors Affecting the Public/Private Channel Choice among People

TABLE 02
Public / Private Channel Choice - Binary Logistic Model

Variable	B	Wald	Exp(β)
Employment nature of the respondent	0.960	3.809	2.611
Political norm of the respondent	-0.984	2.936	0.374
Constant	-1.989	20.651	0.137
Nagelkerke R ²	0.070		
Number of observations	168		
Reference categories	Unemployed, Not having specific political norm		

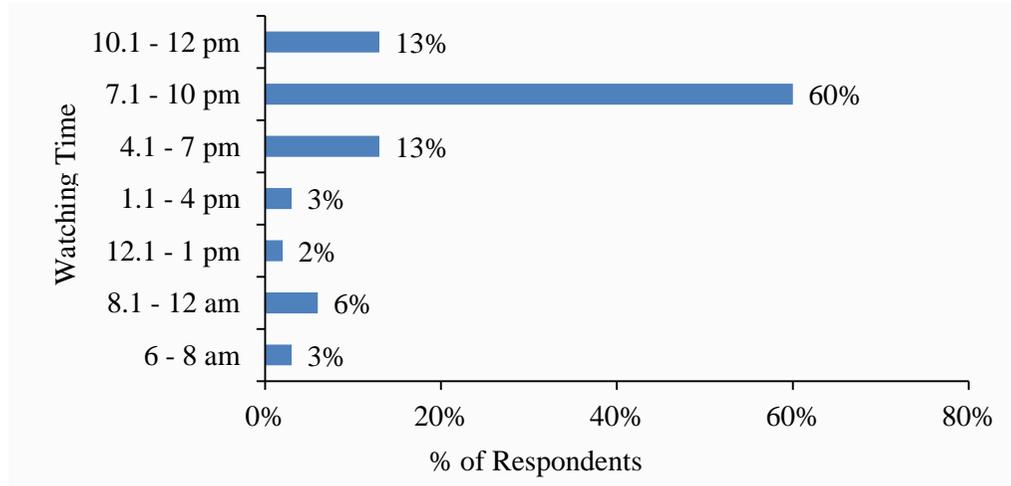
Source: Author constructed based on research data.

Considering the public channel preference in relation to the employment nature, employed people preferred public channels 2.611 times more than the unemployed people. As emphasized in the programme preference demand model for television watching, employed people were more knowledgeable regarding current affairs and the knowledge on common society. Thus they prefer more knowledge related programmes. Considering that public channels provided more knowledge based programmes those programmes were mostly preferred by the employed people. Considering working hours, most employed people have leisure time nearly after 7.00 pm. During the time, many public channels provide knowledge based programmes than private channels.

If a person had a specific political norm, such people tend to watch public channels 0.374 times lesser than the people who did not have that specific political norm; considering the public channels', political biases could be seen up to some extent. People who were strictly interested in politics, seek factual information which was free from biases, regarding the current political situation, thus more private channels were preferred, that offer less political biased information.

6. Trends in the Number of Hours Spent Watching Television

FIGURE 04
Television Viewing Time Trends



Source: Author constructed based on research data.

According to Figure 04, many people prefer to watch television during 7.00 p.m. and 10.00 p.m., as many channels broadcast many knowledge related and entertainment related programmes during this time. During the time between 12.00 noon to 1.00 pm, people show less preference to watch television as this time was the lunch time for many people.

Overall, people mostly prefer to watch television in the evening as many of the respondents spend their leisure time after school, work or other day to day activities during this time. Considering residential sector variances in watching hours of television, people from rural areas watch television for more hours than the people from the urban sector, denoting 2.8 and 2.5 mean television watching hours respectively.

Considering the urban sector, female respondents recorded more mean television watching hours than urban sector males. In the rural sector, males dominate in the watching hours of television than rural females. Overall, females recorded greater numbers of mean television watching hours than males, presenting 2.6 and 2.3 mean television watching hours per day respectively.

When taking in to consideration the age-wise distribution on television watching people who are 55 years and above, recorded the highest number of mean watching hours, as 2.9 mean watching hours per day, followed by the 15-29 year age group with 2.4 mean watching hours per day.

Under the level of education, it showed that people with primary education recorded the highest contribution in the category, as 3.2 mean watching hours per day. Economically enactive persons watch television for more hours than the employed, with 3.2 mean watching hours per day. The employed category records the least mean hours of television watching as 2.3 mean hours per day.

Considering the unemployed category separately, females show higher mean watching hours than unemployed males. In the economically inactive segment, males show a greater number of watching hours than the economically enactive females. Under the employed category, married males watch television for more hours than the married females as employed and married females have to carry a triple burden and hav less time to be at leisure. However, single females seem watch television for more hours than single males as single females consume more hours at leisure.

The number of hours that respondents engage in their earnings work show a direct influence on the number of leisure hours spent by them. As proven by the Labour-Leisure Model of Labour Economics, when the number of working hours increase, the number of hours remain to spend in leisure reduces. When television watching dominates the leisure activities of the people, it automatically reduces the television watching hours of the employed people since they are have more working hours. Under the employment segment, self-employed people consume more hours in leisure and show a higher watching hours, while employed segment records the least number of television watching hours.

6.1. Statistical Analysis for Identifying Factors Affecting the Number of Hours Spent Watching Television by People

Using the one-way ANOVA test, the relationships between the independent and dependent variables were estimated and variables were selected for the model under a 10% significant level. As the dependent variable, the number of hours spent watching television was used by converting it into log values to keep the normal distribution of continuous watching hours.

Setting the Model for Determining the Factors Affecting the Number of Hours of Television Watching

TABLE 03
Semi Log - Regression Analysis for Television Viewing Hours
(Demographic Factors)

Variable	B	S.E	t	Sig
Intercept	0.640	0.075	8.565	0.000
Male Respondents (X_1)	-0.031	0.059	-0.524	0.600
Old age respondents (X_2)	0.208	0.074	2.825	0.005
Married respondents (X_3)	0.091	0.062	1.475	0.141
Unemployed/Economically Inactive respondent (X_4)	0.207	0.063	3.262	0.001
Respondents having tertiary level education (X_5)	0.064	0.073	0.877	0.381
Not spending time on other leisure activity (X_6)	-0.383	0.310	-1.234	0.218
R^2	0.038			

(Table 03 continued)

(Table 03 continued)

Number of observations	609
Reference categories	Female, below 55 years in age, single, employed, below tertiary level education, spending time on other leisure activities

Source: Author constructed based on research data.

Under the 10% significant interval there was a 90% chance to say that age, marital status and the employment status of the respondents were influencing the number of television watching hours.

TABLE 04
Semi Log - Regression Analysis for Television Viewing Hours
(Employed Sample)

Variable	B	S.E	T	Sig
Intercept	0.798	0.094	8.501	0.000
Male respondents (X ₁)	0.016	0.080	0.202	0.840
Married respondents (X ₃)	-0.052	0.098	-0.529	0.597
Respondents having high working hours (X ₆)	-0.260	0.087	-2.993	0.003
Non professional workers (X ₇)	0.057	0.084	0.681	0.497
R ²	0.043			
Number of observations	245			
Reference categories	Female, Unmarried, below 8 hours of working, professional workers			

Source: Author constructed based on research data.

For 10% of the significant interval there was a 90% chance to say that only a high number of working hours variable was influencing the number of television watching hours of the employed respondents.

Interpretation of the Regression Results for Hours of Watching Television

The regression line on hours of watching television for total sample is shown in equation (7).

$$\text{Ln}(Y) = 0.640 - 0.031X_1 + 0.208X_2 + 0.091X_3 + 0.207X_4 + 0.064X_5 - 0.383X_6 \quad (7)$$

(0.075) (0.059) (0.074) (0.062) (0.063) (0.073) (0.310)

The above regression equation supports the effective identification of the factors that affect the number of hours spent watching television by people. Age as the first factor that affects television watching hours, which is denoted by X_1 , is creating a positive relationship with the number of hours spent watching television. Tavakoli and Cave (1996) also cited the same result in their study as the older age population watching television for more hours than the younger population. According to the Nielsen Cross Platform Report (2013), the younger age group watches television for the least number of hours as the younger age group utilizes more hours for education and employment; as they are getting the least number of leisure hours. Importantly, the older age population, who are mainly above 55 years in age and retirees, records the highest number of watching hours out of all the other age groups as they occupy more leisure time and engage in leisure activities that require less physical energy. Marital status of the respondent is also another important factor that shows a positive relationship with the number of hours spent watching television; as unmarried respondents consume more leisure hours and have more choices to spend leisure time, unmarried segment recorded a lesser number of television watching hours than the married segment.

Considering the employment status of the respondents, when a respondent is unemployed or economically enactive the hours spent watching television increases by creating a positive relationship as they are consuming more leisure hours than the employed people. Basically, the economically enactive category mainly consists of the retirees and children who consume more leisure time. According to the USA Time Use Survey (2013), American retirees recorded the highest television viewing time while it was the least among young adults.

Considering the employed fraction of the sample, following the regression line in the equation (8) shows the factors affecting television watching hours among employed people.

$$\ln(Y) = 0.798 - 0.016X_1 + 0.052X_3 + 0.260X_7 + 0.057X_8 \quad (8)$$

(0.094) (0.080) (0.098) (0.087) (0.084)

Considering the number of hours spent on work by a person, it shows a negative relationship with the number of television watching hours; which was also proven by the Labor-Leisure Model in Labor Economics. Simply when a person works for more than 8 hours per day it eventually reduces the leisure time available for that person and lowers the television watching hours. According to Corneo (2002), a positive correlation has been noted between working hours of a person and the hours allocated for television watching from the available leisure time (Corneo, 2002, 21).

Considering the gender variations in television watching hours among employed people, even though it does not create a significant relationship with the hours for watching television, the sign is acceptable. The reason is that, when a female is employed, she has to bear a triple burdens, engaging in market activities, non-market activities and dedicating her time to her family. That condition automatically reduces the available leisure time for employed females. Employed

males, most of them, only engage in market activities and consume more time in leisure.

7. Conclusions and Policy Recommendations

Using the Binary logistic statistical model, factors associated with the demand for television programmes were identified. Considering the results, age, gender, marital status and employment status appeared to be positively correlated with the demand for news and knowledge related programmes. Tavakoli et al (1996) and Zillmann and Bryant (1986, cited in Gillespie, n.d.) have also presented the same results in their studies.

As recommendations for people's preferences on programme and channel choices; channels can broadcast advertisements that are of interest to men during the broadcasting of news or political programmes like advertisements on finance services, vehicle parts, gents' clothing and cosmetics etc. On the other hand, channels can broadcast advertisements on beauty cosmetics, teen products, clothes for females, children and younger generation etc. during the broadcasting of tele-dramas. These practices would support channels to gain more profit through advertisements by broadcasting the right thing at the right time. Programmes with romantic content or dominating female characters and actors wearing attractive and trendy clothes would also help television channels to attract more female viewers to their channels. Most importantly, telecasting programmes with content about empowering women would fulfil social responsibility requirements of the television channels while helping to capture more female contribution to the national production.

The public/private channel choice model was also presented under the binary logistic statistic model which revealed that employed people are most likely to watch public channels, and also that people who have specific political norms are like to watch private channels. As people are of the opinion that public channels are politically biased they try to go for private channels which contain current political trends. To avoid that problem, public channels should always try to present unbiased and balanced content while being impartial.

To identify the factors associated with the number of hours spent watching television, Semi-Log regression statistical model has been used. Age, marital status and the employment status of the total sample appear to be positively correlated with the number of hours spent watching television while a higher number of working hours lower the available time for watching television for the employed people.

Corneo (2002) and the labour leisure model also presented the same results on television watching hours and the relationship between television watching hours and the working hours of the respondents. The elderly population showed more preference to spend it in front of the television; thus television channels could telecast programmes which hold morally significant messages to enhance virtue while enhancing the betterment of society.

The unemployed and economically enactive individuals showed greater number of hours spent in front of the television. Under that fact, by telecasting advertisements and programmes which promote self-employment and employment opportunities channels would encourage the unemployed population to engage in any kind of employment activity to earn income and would eventually help to increase the

national GDP, per capita income and employment rate in the country at the macro level.

The overall contribution of this study flow towards identifying the patterns and trends of television viewing among people and providing a scientific approach for identification. Demographic factors, employment characteristics and political preferences details were absorbed to the models to measure the factors that affect the recreational demand for watching television under programme preferences, public/private channel choices and hours spent watching television.

Even though several authorities in Sri Lanka conduct some annual surveys related to the television industry, those do not provide significant approaches to understand the variations as they do not provide scientific analysis for the long term determinants of viewing patterns and does not provide better approaches to policy making. Thus the current study targets the television industry's policy aspects.

According to the findings of the study, it is clearly reveal that personal, employment and in-built characteristics of people directly influence the preferences in watching television for them and indicate different television watching preferences of people. Both these aspects would highly support the television industry to make the right decisions at the right time as clear identification of the viewing patterns of people would support television channels to broadcast efficient and productive content. That would eventually help television channels to attract more viewers to the channels and keep them for a longer time while capturing more advertisements in order to gain more profit.

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EDUCATION SERVICE DELIVERY ECONOMICS OF THE SRI LANKAN STATE UNIVERSITY SYSTEM: COST COMPETITIVENESS, CONCERNS AND STRATEGIC OPPORTUNITIES

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ABSTRACT

Given the national objective of developing Sri Lanka into a knowledge hub in the South-Asian region, the Sri Lankan State University system would be expected to play a pivotal role in developing the country's human resource. Even though the national universities, through free education, have realized many achievements towards this direction, bureaucratic governance and budgetary constraints have limited the further development of the State-run national university system to cater to growing demands. This has forced candidate students to opt for alternatives offered by local and foreign private universities. There is also the perception that the present State university structure is cost-ineffective and thus is a burden on national coffers. This question of cost-competitiveness of the Sri Lankan higher education sector was subjected to examination in the present study. The results indicated that the State university system is significantly cost effective in producing graduates of internationally acceptable quality. An in-depth analysis on the discipline of Medical Sciences confirmed that the Sri Lankan State university system is capable of, cost-wise, competing with international universities in producing medical graduates. Letting the State university system suffocate within bureaucratic governance and budgetary constraints is thereby proven unwarranted as the system appears capable; not only of cost-effectively meeting the local demand for higher education but also of being internationally marketable, potentially becoming a true knowledge-hub, paving the way to earn foreign exchange to the national economy.

Keywords: State Universities, Cost Effectiveness, Foreign Exchange Effect, International Competitiveness, Free Education Endowment Mechanism

1. Introduction

Sri Lanka has set itself an ambitious goal of becoming a regional knowledge and economic hub; the realization of which would call for strategic focus on development of knowledge and skills of her future citizens. The State university system, which has played a pivotal role in human resource development while benefitting from the free-

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education policy over the past 70 years, holds prime importance in launching such an endeavor, and much would be expected from it towards this end in the future as well.

However, the bureaucratic governance and budgetary constraints have set obstacles to the further development of the State-run national university system to cater for the expanding demand. This has, since of late, compelled candidate students to look for alternatives offered by local private universities and also by foreign universities leading to an outward drainage of hard-earned foreign exchange (Abayratne and Lekamge 2012). There also is the perception that the present State university structure is cost-ineffective (Samaranayake, 2010; Arunatilake 2010)². This would imply that it is a burden on national coffers. The relative stagnation of the State sector in higher education and the expansion of the private sector's presence could not be considered un-welcome developments under such a political-economic perception and also the increase in out-bound migration for education purposes could also be an unavoidable consequence (Chandrasiri 2003). However, under the hypothesis of a different reality, the relatively shrinking trend of the State university system would neither be justifiable, nor healthy.

This question of cost-competitiveness of the Sri Lankan higher education sector was subjected to examination in the present study in order to understand the comparative strengths; such as the possibility of internationalization of the State university system (Samarasinghe and Marshall 2012) and weaknesses of the current State university system, in order to evolve possible policy interventions to develop the accessibility to higher education in Sri Lanka.

2. Materials and Methods

In recent literature, many have dealt with the subject of higher education in Sri Lanka; but mainly on the “political” and “structural” aspects of it. The views by Wijesinghe (2016) on the way the society perceives free education, the placement of Sri Lanka's higher education structure within the Asian setting by Gamage (2016), the examination into the decline of the university system by Wanigasekera (2016), the discussion on internationalisation of State university system by Samarasinge et al (2012), and the critical appraisal brought in by Wijewardena (2013) on inclusivity of university education and its “freakishness” in response to Lakshman (2003) on the same subject, are among such contributions. Analysis on financing of higher education in Sri Lanka or its cost characteristics are rare to find in literature, even though Abeyratne et al (2012) and Chandrasiri (2003), and to some extent Wijewardena (2013), have addressed the economic aspects of it. The present study aimed at addressing this research gap, and focused the analysis on the costing aspects

² “.....State Universities will have to focus on increasing efficiency, effectiveness and accountability Sri Lanka's strategy is to piggy-back on internationally renowned universities so that the process is cost effective and mutually beneficial....” Convocation Address at Eastern University of Sri Lanka on April 20, 2013 (Samaranayake 2010)

“..... private management can improve efficiency and effectiveness as they are autonomous entities that are more accountable to parents and students. They produce education services in a more cost-efficient manner and are effective than their public sector counterparts...” (Arunatilake 2010).

of higher education delivery in view of comparatively appraising the cost competitiveness of Sri Lanka's State university system and its different academic streams, in order to gauge the system's ability to compete with local and international institutions.

Focusing on undergraduate education delivery, the research attempted a cross-study stream analysis of capital and recurrent expenditures, to assess their relative cost intensities and to compare against charges levied by local and international competitors. The average stream-based recurrent costs were added to the estimated university-specific capital costs to work out the total costs per student per year pertaining to each academic stream in 2011, which becomes necessary in appraising the "competitiveness" of the Sri Lankan State university system against the local and foreign private universities. This method was adopted in the absence of any better alternative under the given circumstances, namely (a) no previous comparative cost analysis could be found in literature pertaining to the Sri Lankan higher education sector, (b) study stream-wise cost bench-marks being unavailable to compare against, (c) cost details of private higher education establishments, at least in their institution-wise aggregates, are not made public, and (d) zero-based costing of higher education service delivery requiring itemized cost data, gathering of which from primary sources being beyond the scope and resources of this research.

Data pertaining to stream-wise recurrent costs were obtained from the statistical reports of the University Grants Commission of Sri Lanka. As no estimates were available on stream-wise capital costs, university-wise capital costs were estimated by working out the corresponding capital stocks as at 2011, using the investment figures made available by the UGC for the years from 2004 to 2011 and also for the year 2000, assuming the near-most year values as applicable for the periods anterior, and assuming a straight line capital depreciation rate of 5% per annum.³ Cost outliers were statistically identified and those lying outside the acceptable limits (at 95% confidence level) were removed using graphic techniques before such estimation of stream-wise national averages.⁴ With regard to local and foreign private universities, tuition fees for similar degree programmes were obtained by consulting their prospectus and also through direct inquiry, as their cost data were not published. Graphical representations, outlier investigation and statistical comparison of means were adopted as means of analysis.

³This method was adopted in the absence of secondary data for a sufficiently long period of time to build up a depreciable capital stock as at 2011. The series of assumed and estimated investments was brought into 2011 prices using investment deflator computed using macroeconomic data published by the Central Bank of Sri Lanka. Assumed 5% level of depreciation on straight-line basis make any capital injected prior to 1991 not reflecting in the capital stock as such would be fully depreciated by 2011.

⁴ Box-plot diagrams in Stata statistical software were used to identify outliers and remove those.

3. Analysis and Results

Table 01 summarises university-wise capital and recurrent cost estimates for the six main academic streams, namely Medicine, Engineering, Science, Agriculture, Management, and Arts/Law, for the year 2011.

TABLE 01
Expenditures per Head per Year by Academic Streams and Universities

(All Costs are in Rs. 000s)

University	Capital Expenditure	Recurrent Expenditure					
		Medicine	Engineering	Science	Agriculture	Management	Arts/Law
Colombo	12.46	250.01	-	131.59	-	46.66	85.63
Peradeniya	7.96	193.97	115.91	136.51	266.33	-	99.61
Sri J'pura	8.11	316.08	-	125.69	-	49.88	77.25
Kelaniya	9.92	297.48	-	178.74	-	42.66	79.02
Moratuwa	17.57	-	110.38	-	-	-	-
Jaffna	13.22	236.87	-	283.04	209.91	-	82.12
Ruhuna	15.14	295.64	122.86	154.40	202.99	37.34	103.83
Eastern	13.74	148.49	-	146.01	297.09	46.01	50.74
South Eastern	17.51	-	-	136.48	-	58.47	52.08
Rajarata	30.16	90.36	-	108.46	175.19	46.48	49.26
Sabaragam uwa	23.22	-	-	68.83	184.93	46.69	82.41
Wayamba	21.11	-	-	86.71	160.98	45.50	-
Uva	41.37	-	-	137.07	86.69	76.86	-

Source: Authors' estimations based on data published by the University Grants Commission.

A few particular features, however, could be observed. First, the discipline of Medicine emerges as the most costly degree programme in general in the State University system, even if the cost per student per year (and not the full cost per longer duration, namely five years) is considered as the yardstick for comparison. It costs nearly double that of Engineering or triple that of Social Sciences or Law. This may well be owing to discipline specific intricacies, such as clinical; but, the fact that the Rajarata and Eastern Universities have managed with recurrent costs of less than 50% of the more established Universities prompt the necessity of examining the

causes. If these low relative costs were a result of those Faculties managing with less than necessary inputs, urgent intervention by the authorities is needed, because any such resource constraints could compromise quality of education service delivery. Secondly, it is curious that Agriculture figures quite a close contender to Medicine in terms of recurrent costs. In effect, it is even costlier than Medicine at the Eastern and Rajarata Universities and also at the Universities of Peradeniya. It is only at the Ruhunu and Jaffna Universities where the Agriculture Faculty reports lower annual recurrent cost per student than their respective Medical Faculty. The reasons for this need to be investigated, particularly in the light of the fact that Uva, Wayamba, Sabaragamuwa and Rajarata universities have been able to manage with much lesser student specific recurrent costs. Third, Wayamba and Sabaragamuwa universities in Science, and Eastern, South-Eastern and Rajarata Universities in Arts, appear managing at much lesser recurrent costs than their respective counterparts in other Universities. This might be owing to inherent efficiencies or under-consumption; both causes call for corrective interventions. Fourth, the recurrent cost per student per year in the Science discipline at the Jaffna University is particularly high, to the extent that it is almost double that of the science streams in other universities, more than what is incurred on their own Medical students, and nearly two and a half times that of an average Engineering undergraduate; an unexpected observation needing deeper examination to find out causes. Fifth, and possibly the most note-worthy, is the clear recurrent cost effectiveness shown by the discipline of Management in comparison to Arts and Law, and to a certain extent by the faculties of Engineering in comparison to Science. It is difficult to perceive as to how an Engineering student, for instance, would impose lesser cost per year than a Physical Science undergraduate and the question might be raised as to why Arts faculties could not be as cost effective as Management faculties. These questions become more pertinent in the prevailing higher education policy perspective which apparently is being increasingly shifted towards market orientation. Lastly, the capital cost structure indicates higher capital intensities in all four relatively new universities. The Uva-Wellassa University, for example, has nearly five times the capital cost per student per year compared to Sri Jayewardenepura University, while the Rajarata University is having nearly four-fold that of Peradeniya University. This could well be a combined effect of (a) heavy capital injections that are necessary to build the required infrastructure and facilities in the formative years of these young universities, and (b) relatively lesser number of students registered, even though the reasons for such significant differences need to be examined in detail.

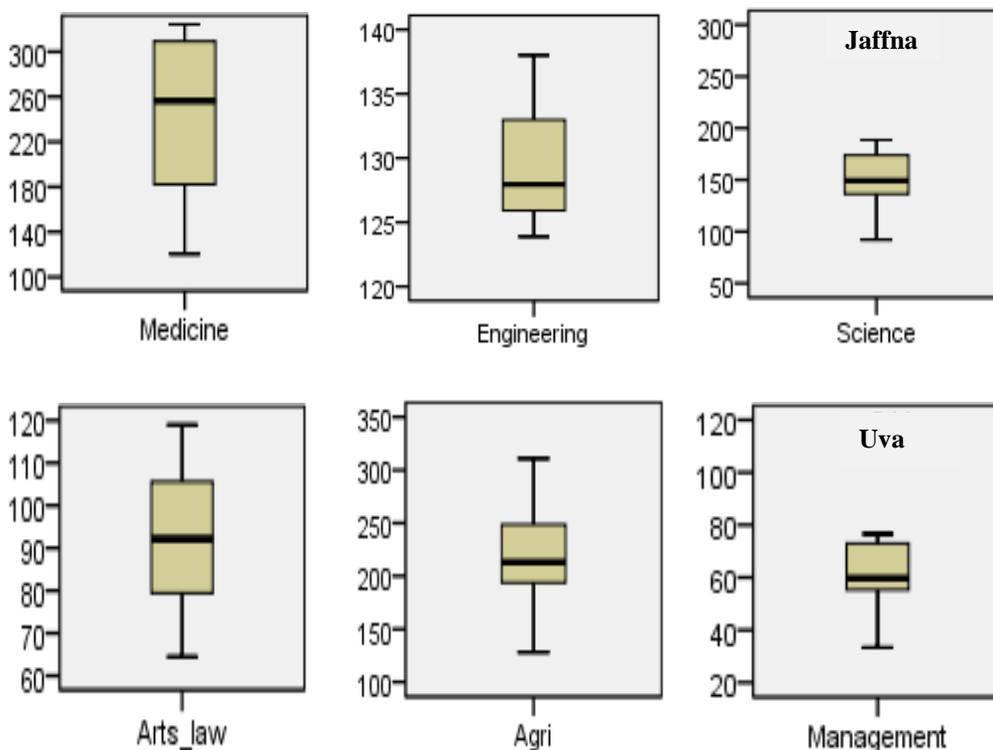
3.1. Comparative Cost Competitiveness

Average stream-wise recurrent costs were added to the estimated university-specific capital costs to work out the total costs per student per year pertaining to each academic stream in 2011, which becomes necessary in appraising the “competitiveness” of the Sri Lankan State university system against local and foreign private universities.

The cost outliers were statistically identified (at 5% significance level) and removed prior to estimating stream-wise national averages. The Uva-Wellassa University for the Management stream, and the Jaffna University for the Science

stream were thus removed; the former appears to be a direct result of high capital intensity and low student enrolment levels, possibly owing to it being a recently established member of the State university family, while the latter seems to have been caused by the extremely high recurrent cost intensity in 2011. National cost averages for each main study stream were thus estimated, the results are depicted in the Box-Plots in Figure 01.

FIGURE 01
Mean Cost per Student per Year for Main Academic Streams



Note: The estimated per head total cost for the year 2011 is represented by the Y axis.

The estimated average costs pertaining to the Sri Lankan State universities were then compared against the charges levied by a selected group of competing local and international universities offering similar academic streams, as summarised in Table 02.

Results indicate that the costs (including capital costs) incurred by the Sri Lanka's State university system to produce a graduate of an internationally acceptable quality are significantly less than the fees charged by competing alternative systems, except in the Arts stream. The difference appears to be significant even after a substantial profit margin is allowed, indicating either (a) the comparative cost efficiency of the State universities in providing higher education, or (b) the excessive profit margins earned by the competing alternative operators of higher education

institutes, or (c) both. High costs paid in foreign exchange to study abroad in particular, can therefore amount to an unnecessary erosion of economic resources caused due to inadequate expansion of the State-run higher education system.

TABLE 02
Average Cost per Student per Year by Academic Stream, 2011

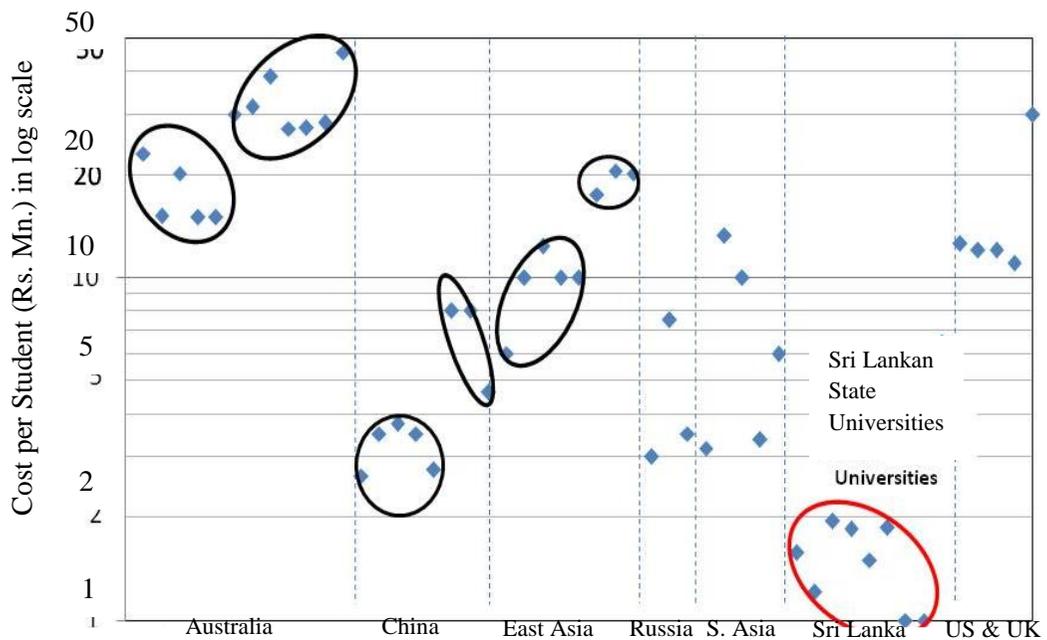
University	Medicine	Engineering	IT	Science	Management	Arts/Law	Agriculture
Colombo	262,471	N/A	75,735	144,054	59,119	98,089	N/A
Peradeniya	201,936	123,876	N/A	144,473	N/A	107,576	274,290
Sri J'pura	324,197	N/A	N/A	133,800	57,991	85,360	N/A
Kelaniya	307,401	N/A	N/A	188,656	5,281	88,938	N/A
Moratuwa	N/A	127,954	N/A	N/A	33,409	N/A	N/A
Jaffna	250,089	N/A	N/A	296,263	N/A	95,339	223,130
Ruhuna	310,775	137,999	N/A	169,535	52,476	118,966	218,123
Eastern	162,230	N/A	N/A	159,749	59,744	64,479	310,822
South Eastern	N/A	N/A	N/A	153,992	75,976	69,592	N/A
Rajarata	120,526	N/A	N/A	138,627	76,641	79,419	205,357
Sabaragamuwa	N/A	N/A	N/A	92,049	69,914	105,629	208,153
Wayamba	N/A	N/A	N/A	107,827	66,618	N/A	182,092
Uva Wellassa	N/A	N/A	N/A	178,439	118,226	N/A	128,063
Average (Sri Lankan State Universities)	256,000	128,000	75,735	149,000	59,500	92,100	212,000
Local Private Inst.	#	#	240,667	207,500	207,944	#	#
Foreign Affiliated (L)	#	#	348,750	246,806	282,000	83,333	#
Foreign Affiliated (H)	1,333,000	#	424,167	422,917	475,833	456,807	#
Foreign (L)	545,350	682,500	325,000	#	#	154,000	#
Foreign (H)	15,376,725	1,980,000	1,500,000	#	#	#	#

Note: N/A – Non availability of the particular stream; # - No information.

3.2. International Competitiveness: The Case of the Medicine Stream

The case of Medical education was further examined to fathom the magnitude of apparent cost advantage among alternatives. Severe competition in Sri Lanka to enter into a Faculty of Medicine, the absence of a recognised local alternative, and the high tendency for students to migrate for medicinal education resulting in heavy foreign exchange cost burden on the national economy were the factors behind this choice of the academic discipline for detailed analysis. Regional cost clusters⁵ against that of the Sri Lankan State university system are graphically represented in the Figure 02.

FIGURE 02
Per-Student Cost Clusters of Degree Programmes in Medicine



Source: Authors' estimations.

It is mirrored in the individual cost observations that the Sri Lankan State university system outperforms, in terms of its cost advantage, all regional and international institutions offering MBBS degree programmes that are competitively offered to local candidates. The closest cost competitors to Sri Lankan State university system appear to be those institutions in China and Russia, which also are positioned significantly above the cost levels of the Sri Lankan State university

⁵ These individual observations represents the foreign institutes frequently selected by local students as their higher education destination for medicine, and are prescribed by the local education consultants.

system.⁶ The magnitude of this cost advantage is reflected in the statistical analysis of programme costs and the significance of their differences, as summarised in the Table 03.

TABLE 03
Comparison of Average Regional Costs per Degree Programmes in Medicine

Region/ Country	Average Cost for the Degree Programme	Std. Deviation	Δ Average Cost	Calculated t Value	Minimum Cost (Rs. Mn.)	Excess Compared to SL Average as a Percentage
Sri Lanka	1.53	0.3	-	-	-	-
Australia - Low	17.7	3.7	16.1	9.618***	15	80%
Australia - High	30.5	4.2	28.8	16.63***	27.3	1684%
China -Low	3.2	0.5	1.6	6.46***	2.64	73%
China -High	6.9	2	5.3	4.76**	4.62	202%
Russia	4.6	2.4	3	2.24**	3	96%
South Asia	8.7	5.1	7.1	2.14**	3.17	107%
East Asia - Low	10.6	1.2	9	15.29***	6	292%
East Asia - High	19.4	1.6	17.8	18.65***	17.5	1044%
UK - USA	19.4	9.4	17.8	5.01***	11.03	621%

Notes: Δ Ave. Cost = Average Cost Difference as against the Cost of Sri Lankan State University System.

The t-values indicate the significance of the differences of costs (*** at 1%, and ** at 5%).

These results indicate that the cost of producing an MBBS graduate in the Sri Lankan State university system is significantly less than what is charged by the competing systems. The differences between the Sri Lankan cost and the average cost in each region/country, as indicated in the column (4) of the Table 3 would hold significant even if a substantial profit margin is charged on the total costs, possibly owing to the excessive profit margins earned by the competitors. Going by these

⁶ The quality of medical degrees awarded by Sri Lankan State universities is internationally recognised. However, given the fast evolving nature of medical education, keeping pace with the international evolution of knowledge is vital. In this respect, the adoption of the new international scoring system by the Colombo and Peradeniya universities is a step forward, which other universities should follow.

analytical evidence, it could be fathomed that the country is globally competitive in offering higher studies in Medicine, and that it could exploit this comparative advantage, not only to arrest the current exodus of foreign exchange spent abroad to study medicine, but also to earn foreign exchange by attracting foreign students to study Medicine in the Sri Lankan State university system.

In that light, the high costs in foreign exchange incurred by the national economy to educate its citizens abroad amounts to an unnecessary erosion of saveable resources. For instance, Rs. 1.6Bn per year of foreign exchange would be saved during the next 6 years if the country could provide facilities to produce 1500 more doctors per year which would enable her to achieve, by 2020, the current doctor per population ratio of Singapore, which is 18:10000, compared to the cost the nation would incur to educate the same number of Sri Lankan students to study for the MBBS degree in China. The scale of potential saving would reflect much more if the comparison is made against the cost of medical study programmes in the West or in Australia. The results for foreign exchange earning potential, on the other hand, when providing higher education in Medicine to foreign students would be approximately Rs. 2000Mn. per year for a batch of 1000 students, if the MBBS degree programme could be marketed at Rs. 2Mn with a mark-up percentage of 32.6% (surplus of Rs. 0.5Mn) per student, where the Sri Lankan State university system would still be nearly 37% more cost attractive than the minimum cost competitor in South Asia or 24% less costly than that of the lowest cost Chinese university.

Medicine, in contrast to many other academic disciplines, is taught through practical exposure, and the conventional lecture room-based teaching content is relatively less. Therefore, the limiting factor for a quality medical degree programme would be “patients” who become study material for medical students. In this respect, Colombo University has a comparative advantage compared to other State universities offering MBBS degree programmes. If the hospital facilities in and around Colombo are taken into consideration, the scope for expansion of medical education by the University of Colombo and other universities in and around Colombo would be substantial. If appropriate policy reforms and strategic interventions are made, it would be possible to harness this potential, coupled with highly competitive cost structures of the State medical degree provision revealed through this study, to make Colombo a regional education hub in the discipline of medicine.

It must be noted however that the State university system in Sri Lanka today is not geared for such an “outward-looking” orientation; for no fault of the individual universities. The funds are currently voted to universities to educate local undergraduates qualifying for admission from national schools, and no “horizon expansion” instinct for undergraduate education is enabled in such a setting. For an outward-looking orientation, while upholding and fostering free-education privileges, which is of supreme importance, an innovative reform in higher education policy and strategies becomes imperative. It might be opportune to explore such possibilities in the current context where the Government, on the one hand, looks forward to developing the country in to a regional economic hub (which would significantly increase demand for graduates in many disciplines), and, on the other hand, intends to substitute for off-shore employment of Sri Lankan unskilled labour (such as

housemaids in the Middle-East) by securing foreign employment opportunities for Sri Lankan “professionals”.

4. Conclusions

The higher education delivery structure in Sri Lanka needs expansion to cater to the growing needs of human resources for the country to realise her knowledge hub dream. This study shows that the State university system in Sri Lanka, quite contrary to the widely held perception of its inefficacies, is “cost efficient”, and could be a good candidate for such service delivery capacity expansion to cater for both local and international demand. In fact, in many a discipline, the Sri Lankan system appears cost-wise highly competitive. This illegitimatises many of the apparent “down-plays” of the system, including those of Wijewardena (2003) and Wanigasekera (2016), and puts in question the rationale of the currently observed trend of inadequate expansion of, and the resultant constraints to increase, the intake to Sri Lankan State universities in such competitive disciplines as Medicine, Engineering or Management which push the local students to migrate for education at a much higher foreign exchange cost and also at the risk of ‘brain drain’.

There appears no reason to “protect” the State higher education system as it appears internationally cost competitive, and the system could be allowed to grow in the emerging global education market. However, this calls for granting it the necessary autonomy and independence, and thus, appropriate policy reforms. If the “free-education” right of the Sri Lankan students, who get selected to the national universities based on their z-scores at GCE Advanced Level examination, could be ensured by administering a mechanism which would make the State endowments, on account of free education, available to the student rather than to the higher education institution (say, a “higher education voucher scheme”), it may be possible to open the system to operate in the market, in which it is likely to grow with no additional burden on the public coffers. The national universities so liberated would then be able to compete effectively and attract students with the quality of education they offer, while earning incomes through paid seats offered to those who do not qualify for the free education benefit. This could possibly be one of the keys towards sustainably developing Sri Lanka as a knowledge hub through gaining international popularity while preserving the spirit of “free-education” by providing equal opportunity and affordability in higher education in the long run.

An auxiliary benefit of such a strategy would be letting the students choose their intended education programme, subject to having entry qualifications for such programmes, by appropriately tendering their State endowment voucher to that choice. By this way, the students would be granted greater opportunity to decide not only their own study combination, faculty and university, but also their future, rather than being forced to follow a degree programme at a university and a faculty largely determined on their behalf by the authorities, and to join a job(less) queue.

The results of the study, in the meantime, highlight the importance of further examining the causes for the apparently excessively costly national university degree programmes such as Arts and Science. It is not generally expected that unit recurrent costs of such streams could be higher than that of Management and Engineering streams, respectively. Similarly, the costs of Arts degree programmes being higher

than the fees charged by foreign affiliated universities could not be considered rational, particularly when almost all other academic streams appear internationally highly cost competitive. Appropriate policy interventions, developed based on an in-depth examination of inter-relationships, are thereby warranted to rectify this apparent anomaly.

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FACTORS CONTRIBUTING TO STUDENTS' ACADEMIC PERFORMANCE: A CASE OF UNIVERSITY OF SRI JAYEWARDENEPURA, SRI LANKA

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ABSTRACT

This study examined the factors affecting academic performance based on a study conducted at the Faculty of Management Studies and Commerce, University of Sri Jayewardenepura. The sample consisted of 200 undergraduate students selected from the 2500 students of the faculty. The 200 respondents were selected using random sampling method from 3rd year and 4th year students of the faculty. The data were collected through structured questionnaires. As the main technique of data analysis a multiple regression model has been employed to quantify the impact of different factors affecting the academic performance of students measured by their Grade Point Average of semester examinations. The findings of the study showed that mothers' education levels made a significant contribution to the students' academic performance. However, English knowledge of the students becomes the second important factor which influences students' academic performance. Students with higher levels of attendance for lectures have positive effect towards their academic performance. Further, higher socio-economic status exhibits a positive significant impact on students' performance. Further, the study employed an independent sample T-test and correlation analysis to identify differences among various group of students and the relationship between dependent and independent variables. Fourteen hypotheses were tested by employing an independent sample T- test in the study to explore whether the mean values of GPA among different student groups were equal or not. The null hypothesis is that the mean value of GPA of the two groups is equal. Nine null hypotheses were rejected at 1% level of significance.

Keywords: Academic Performance, Undergraduate Students, Knowledge of English, Socio-economic Status, Parents' Education Level

1. Introduction

The three main mechanisms for acquiring human capital are experience, training and education. Among them education being the key for most individuals. Education empowers the acquisition of new skills and knowledge that ultimately increase productivity. Increase in productivity frees up resources to create new technologies, new businesses, and new wealth, finally it leads to economic growth. Education is a

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“public good” and it provides benefits to the society as well as the individuals (Saxton, 2000). There is a large impact on labour market experience from the amount of education acquired by a person. When individuals acquire more education, they are able to absorb new information, new skills, and familiarize themselves with new technologies than the others (Ann and Nachum, 1995). In this era of technological developments, education plays an important role in the advancement of human capital and it is considered the first step for every human aspect. Further education is closely linked with an individual’s well-being and opportunities for better living standards (Battle & Lewis, 2002). The quality of a student’s success has a great influence on a student’s self-esteem, motivation, and perseverance in higher education. Therefore, education remains as the students’ top priority. Lower level of students’ performance or higher level of failure rates may result in unacceptable levels of attrition, reduced number of graduates and increased cost of education. This also declines admission opportunities for students who are seeking higher degrees (Crosnoe et al., 2004, Farooq et al, 2011).

Students are an important resource of universities. Their performance (academic achievement) plays an essential role in producing the highest quality graduates and they will become dominant leaders and manpower for the country, not only that but also they become key responsible persons of the country’s economic and social development. Hence, the administrators, educators, policy makers and corporations in the labour market pay more attention to the performance of students in universities. The employers consider academic performance as one of the key factors in recruiting employees; especially fresh graduates. Thus, students have to pay attention to obtaining a good result in order to fulfil the employer’s requirements (Ali et.al, 2009). Students’ academic performance is measured by the Grade Point Average (GPA). It is a familiar measure of student performance that is commonly used in college, high school and universities (Peter et al. 2007).

Hence, determinants of students’ academic performance have become an interesting research theme for researchers. Many research studies have received considerable attention in identifying and understanding the variables that contribute to academic performance of the students. Educators and many researchers have found demographic, socio-economic, family and school factors as variables contributing to students’ academic performance. This is challenging aspects of academic literature, and performances of the student are affected by social, psychological, economic, class environmental, teaching styles, and personal factors. These factors strongly influence the student performance, but findings of the studies vary from area to area (like rural to urban), student to student, region to region and country to country. Therefore, some students academically perform much better than others (Cheesman et al, 2006; Raychaudhury et al, 2010).

This research focuses on one of the public universities in Sri Lanka. Students of the Faculty of Management Studies and Commerce (FMSC) at the University of Sri Jayewardenepura (USJP) are taken as the population of the study. The FMSC is the largest faculty in the university system in Sri Lanka and was founded in the 1960s and has a proud history and heritage as the pioneering Faculty for Management

Education in Sri Lanka. As the largest faculty in Management Studies and Commerce, it currently enrolls about 5,000 internal undergraduate students. Students that enter the University come from a wide range of social backgrounds and all over the country. These give them different life experiences, life styles, different educational opportunities, expectations, needs and diverse academic potential.

According to the records of the University Grants Commission (UGC), student admissions, there were 1,150 registered students for the 2010/2011 academic year at the FMSC (Table 01). Based on this information, we decided to select respondents from the FMSC for the study.

TABLE 01
Undergraduate Student Admission by Academic Stream - USJP

Academic Stream	No. of Students
Arts	706
Management and Commerce	1150*
Medicine	151
Paramedical Studies	78
Science	520

*The total number of students of the Management and Commerce stream for all public universities is 4330.

Source: University Grant Commission, Sri Lanka (Academic Year 2010/2011).

After 2002, the FMSC had introduced significant changes in the traditional teaching and learning system within the faculty. It has had a tradition of enrolling fulltime students on an annual basis before introducing a new system. However, since 2002 there has been a shift to accommodate students under the semester system. The differences between the conventional status and the semester basis are the time when lectures are conducted, medium of instruction, evaluation system, size of the class, method of teaching, number of subjects, course content, attendance policy, structure of degree programmes and subject combinations etc. Subjects like Information Technology (IT) and English have recorded higher dropout rates than the others. Not only that the students in public universities are coming from different areas and with various backgrounds; and knowledge in particular subjects like English and IT is at the lower level. At present-day this variety is much more complex than before in Sri Lankan culture. By considering all these complexities, the study is initiated to examine the influence of selected factors on students' performance at the FMSC in the USJP in Sri Lanka and performance differences among student groups.

2. Literature Review

Previous studies have been paid attention to in identifying and analysing the number of factors that affect academic performance. These studies focused on factors such as class schedules, class size, English text books, environment of the class, technology used in the class, extracurricular activities, part-time employment, family and work activities, parental education, family income, and etc. (Cheesman et al, 2006; Win and Miller, 2005). Diaz (2003) established that the relationship between personal, family and academic factors that account for school failure, as well as studying influence each other.

Qureshi and Ahmad (2014) found that the death of parents is one of the most severe shocks that a child can suffer. The loss of parents causes so many problems that a deprived child faces. Among those, the important problem is the effects on children's academic performance. The death of the father and divorcee's children show similar levels of academic performance. Further, it was revealed that the father's presence plays a very significant role in the academic performance of children.

Hanushek (1987) identified that the student's achievements typically depend on socio-demographic characteristics of families; including parental education, income and family size. Children who belong to more educated and wealthier parents perform better on average. In particular, the educated mother, measured by the years of formal schooling, is identified as a valuable resource in determining children's performance. The study also reported that assets that belongs to families, such as food and other learning materials (which include nutritious food, comfortable housing and reading materials) in the home do not show steady effects on children's learning (Murnane et al, 1981). Evans and Farley (1998) showed that there is a positive and significant relationship with student performance in Mathematics as well as Accounting subjects.

Most of the time, knowledge is transferred to the students by delivering lectures and other class meetings. This is the primary means of instruction in almost all undergraduate courses at universities. So far more or less everyone who has conducted lectures for an undergraduate course have probably noticed that attendance at these lectures/meetings is far below the expected level. Romer (1993) showed that there is a very strong statistical relationship between absenteeism and students' performance.

Newman et al (2009) have pointed out that a number of factors have contributed to declining class attendances around the world. Among them they identified that assessment pressures, poor delivery of lectures, timing of lectures, and work commitments as the major reasons for students' non-attendance. Gender and age showed minor impacts on academic performance while place of residence and former educational attainment appeared as significant predictors of performance. Further results of the study showed that three factors to be interrelated. Class attendance was correlated strongly with both entry points and place of residence. In turn, there was a strong relationship between prior educational attainment and place of residence.

Academics and administrators in higher education institutes have different thoughts relating to attendance policies for students. Informal studies indicate that there are some academics as well as administrators who try to maintain strict compulsory attendance policies; in the meantime others are not concerned about a compulsory attendance policy (St Clair, 1999). The major reasons for lower levels of attendance are assessment pressures, poor lecturing, inconvenient timing of the lecture, poor quality of lecture content (Fleming, 1992; 1995). Longhurst (1999) identified fifteen different types of factors for student absenteeism.

Rodgers and Rodgers (2003) have examined the effect of absenteeism on performance in an intermediate microeconomics class of business and economics students at a medium- size Australian university. They found absenteeism from lectures and tutorials to be common: on average, students attended 62 percent of lectures, 73 percent of tutorials and 65 percent of all classes (lectures and tutorials) during the semester. They observed that there was a decreasing trend of the attendance for lectures throughout the semester from 68 percent in the first half to 55 percent in the second half of the semester.

Raychaudhury et al (2010) found that socio-economic factors like family income, and mother's and father's education, teacher-student ratio, presence of trained teacher in school, sex of student and distance of school also affect the performance of the students. The study found that there was a positive impact on students' academic performance from Mother's education and presence of trained teacher in the school.

Karemera et al (2003) studied relationships among students' family characteristics, educational background, college climate and services; and student performance and satisfaction. An important finding is that there was a significant correlation in between students' performance and satisfaction with the academic environment. The adequacy of library services is found to be significantly associated with college performance.

Win and Miller (2005) examined the factors that affect university students' performance at the University of Western Australia. The study has concentrated on individual factors and school factors. Main conclusion drawn from the study is that high schools (type of secondary education institute) have a large impact on the performance of students rather than individual factors. Further, the study found that the education level of the parents also had a significant influence on students' academic performance.

Farooq et al (2011) studied determinants of academic performance of secondary school students in Pakistan. The findings of the study shown that parent's education and socio economic positions indicate an important impact on overall students' achievements. Furthermore, the results revealed that a high level of education and an average socio economic status have a significant effect than a lower level of education. Performances in the subjects of English and Mathematics also have a significant relationship with socio economics status and education levels of the parents. Meanwhile, the results showed that girls' performance is higher than the male students' performance in this school.

Ganyaupfu (2013) investigated factors determining academic performance of business students of private owned higher education establishments in South Africa. Sample size was 119 students who followed quantitative subjects. Results of the study revealed that there is a significant positive relationship among lecturer competence, teaching methods and quality of learning materials with undergraduate students' academic performance.

Akessa and Dhufera (2015) examined factors influencing academic achievement of students at Universities in Ethiopia. Sample for the study was selected through random sampling and data was collected by using survey questionnaires. Findings of the study revealed that there is a significant relationship between the academic achievement and their parent's education level as well as economic status of families.

Harb and El-Shaarawi (2006) investigated the determinants of students' performance of the College of Business and Economics in United Arab Emirates. Findings of the study indicate that there is a positive significant impact from competency in English and lecture participation on student's performance. Karemera et al (2003) showed that there is a significant relationship between students' performance and satisfaction with academic environment as well as service received. Further the results revealed that the higher academic performance is recorded with the existence of professional development programs and internship opportunities.

Gottfried (2010) analysed the relationship between attendance of the students and student performance of elementary and middle school students in the Philadelphia School District. The results indicated that significant relationships between students' attendance and student-level achievement. Osaikhiuwu (2014) recognized the importance of the institutional factors on students' performance in a Nigerian University. 131 final year students were selected using the purposive sampling approach. Findings of the study indicated that institutional variables like an unfavourable learning environment, inadequate water supply, and insufficient library facilities did not show significant relationship with students' performance. Further, the results showed that overcrowded lecture rooms, break-downs of electricity supply, continuous strikes and closure of school have a significant impact on students' performance.

Sattayanuwat (2015) examined the determinants of student performance in an international trade course at a Thailand university. The study found that the performance of male students were better than female students. Meanwhile higher level of family income has a positive impact on students' performance. Further, results showed that students who earned an average GP perform better in class. When students felt comfortable in communicating at the university they perform in a better manner. In addition to the above findings, the study showed that a higher level of attendance for the lectures and tutorial classes directed to increase the performance level.

The key determinants of undergraduate degree performance were examined by Barrow et al. (2009). The research has considered gender, entry qualifications, age level at the beginning of the course, health conditions, age at the completion of the

course, father's socio-economic conditions, and ethnic group. The study revealed that the mature students recorded higher levels of achievements than immature students. At the same time the study showed that pre-entry qualifications had a significant impact on performance while ethnicity and socio-economic status have a marginal impact.

Raychaudhuri et al (2010) examined the association between students' performance and students' attendance in the class, family income, mother's and father's education level, teacher-student ratio, distance from home to learning place and sex of the student in Bangladesh. Hijazi and Raza Naqvi (2006) explained the effects of mothers age, mothers education, family income, study hours, attendance level for the class on students' performance in Pakistan.

As a summary it was identified that all of the previous research findings support the hypothesis that students' performance depends on various socio-economic, environmental and psychological factors. Keeping in all views of the research findings reported by different researchers the following variables and research objectives that are recognizable in Sri Lankan setting were chosen.

The main objective of the study was to analyse the effect of level of English and IT knowledge, the level of internet usage, lecture and tutorial participation, employment, the level of library and reference books usage, and the level of socio-economic status, parents' education level on students' academic performance. This study aims to contribute to the existing knowledge by documenting the factors associated with students' academic performance in the USJP, in Sri Lanka. The research question of this study is formed based on this background information and it is given below.

What are the important factors that affect students' academic performance?

University academics highlight different factors to answer this question in general. They include ability, motivation, the school the student attended, the area they lived in, family background and the financial condition of the family. Of these factors, university administrators in Sri Lanka place high weight on ability, attendance policy, financial problems and language skills on the basis of academic achievement of student at the FMSC. However, despite the importance to higher education decision making of knowledge of the determinants of university students' performance, there have been relatively few academic studies on this theme in Sri Lanka.

The study may provide valuable information to the University administration, academics, policy makers in the country and parents and the students. It especially, helps the university administration to design and implement the policies to improve the students' performance and the quality of education by changing the attitude of students towards learning, facilitating students and modifying the curricula as well as teaching methods. Parents can use the findings of the study to solve the students' problems relating to family. Meanwhile results may enhance awareness levels among students about their level of knowledge of particular subjects like English and IT.

3. Objectives of the Study

The main objective of this study is to examine the factors that affect the academic performance of undergraduate students at the FMSC.

Secondary objectives of the study are to determine the relationship between selected variables and students' performance. Further the study aims to identify the relationship between the average GPA of the students and the proportions for male and female, working and non-working, students staying at home and other places and so on.

4. Methodology and Analysis

This study was carried out in the University of Sri Jayewardenepura, one of the largest universities, in terms of the number of students, in Sri Lanka, which is located in the Western Province of the country. According to the records of registered students in the faculty, there were about 2,500 registered students for the 2011/2012 and 2012/2013 academic years. The sample consisted of 200 3rd year and 4th year undergraduate students selected from this population of the FMSC. The 200 respondents were selected using random sampling based on the data of the students' attendance records for management undergraduates from the faculty. The data were collected through structured questionnaires.

Ordinary least squares multiple regression analysis was used to identify the impact of independent variables on the dependent variable. The study used academic performance as a dependent variable and we measured academic performance based on GPA. Independent variables were identified based on previous research as follows. They are the level of English and IT knowledge, socio-economic status, lectures and tutorial participation, library usage, use of references and extra reading materials, usage of internet, residence of the students, their working status, education level of parents, involvement of extra-curricular activities and skill development programmes. To identify the mean differences among different student groups, the null hypothesis was tested by employing an independent sample T- test. Further the study employed correlation analysis to identify association between selected variables.

5. Results and Discussion

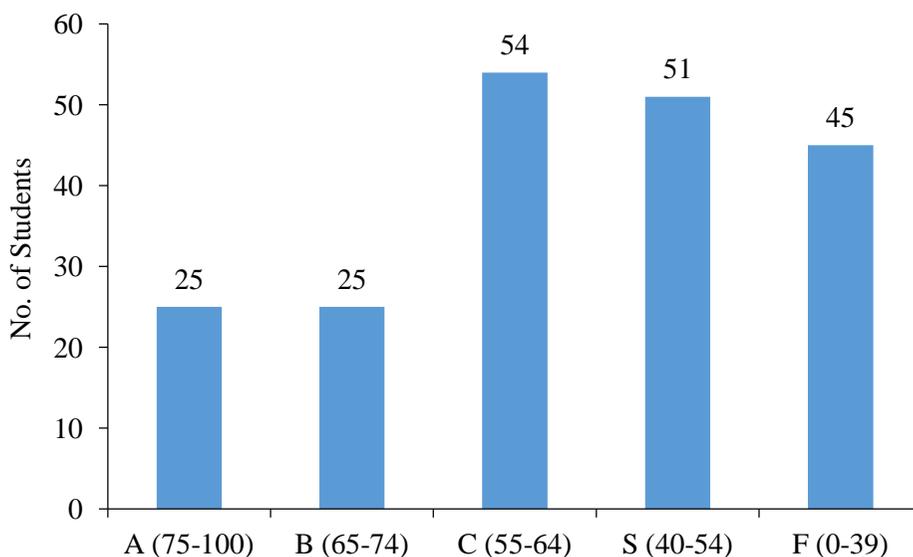
A random sample of 200 students from the FMSC was asked to complete a questionnaire for this study. Table 02 summarizes the demographic characteristics of the participants. It shows that 59% of the students were males, while the remaining 41% were females. Majority of them (74%) resided on other than their own residence place while the 24% lived with their family in their own residence. In respect of performance, the results showed that the Grade Point Average (GPA) of 3.12, indicating that more than half of the students would graduate with a second class lower degree which is not a very impressive performance.

TABLE 02
Demographic Characteristics of the Sample

	Variable	Frequency	Percent
Gender	Male	118	59.0
	Female	82	41.0
Working	Yes	155	77.5
	No	45	22.5
Students Stay	at Home	52	26.0
	Other Places	148	74.0
Urban students		119	59.5
Rural students		81	40.5
Average GPA		3.1152	

Source: Author compiled based on survey data.

FIGURE 01
Results of English as a Subject of Advanced Level Examination



Source: Survey data.

As indicated in Figure 01 about 22.5% (25 students) have earned below 40 marks for English while 25.5% students belonged to average (40-54) marks.

5.1. Reliability of the Data

To get an idea of reliability of the data, researcher has randomly selected 10 questionnaires and cross checked with the available data at the Faculty of Management Studies and Commerce. After confirmation of the reliability of the data, we have used the following analytical tools to achieve said objectives of the study.

Further, the study employed Cronbach's Alpha (reliability coefficient) which is a measure of internal consistency and content validity of the questionnaire. In social sciences, Cronbach's alpha 0.60 coefficients are acceptable (Nunnally (1978) and Hair et al. 2007). The reliability coefficient on average showed 0.623, and indicating that the items in this study have a relatively high internal consistency.

5.2. Statistical Analysis of Hypotheses

H₀₁: There is No Significant Difference in Students' Performance and Gender

Null hypothesis was analysed by using independent sample T- test which tested the differences in performances by gender. Null hypothesis was rejected at 1 % level of significant and it shows that the mean GPA for female student (3.2071) was higher than the male students (see Table 03). Results show that there is a significant difference between performance of male and female students. Woodfield and Earl-Novell (2006) showed that female students outperformed the male students. Therefore, female students are being more conscientious and less likely to miss lectures.

H₀₂: There is No Significant Difference in Students' Performance and Place of Residence

Table 03 shows that the mean score for students who stay at their home during the university life (3.3792) was higher than the mean score for students who stay outside places in their university life (3.0224), the difference was significant, $t(198)=5.994$, $p=.000$. This result was in accordance with the research carried out by Tho (1994) indicated that there is a significant positive correlation between residential status and student performance.

H₀₃: There is No Significant Difference in Students' Performance and Level of English Knowledge

Table 03 (3rd row) showed the result of the independent T-test which analysed the differences between performance and level of English knowledge among students. From the table, $t(198) = 7.209$, $p \leq 0.000^*$. There was a significant difference between performance and level of English knowledge. Higher level of English knowledge indicates a higher level of performance and the mean value was 3.3933. Thus, the above null hypothesis (H_{03}) was rejected since the p-value is less than 0.01.

TABLE 03
Results of the Independent T-test

Variable	Category	Mean	t	Sig. (2-tailed)	Decision
Gender	Male	3.0513	-2.751	0.006**	H ₀₁ - Rejected
	Female	3.2071			
Residence of Student	Home	3.3792	5.994	0.000**	H ₀₂ - Rejected
	Other	3.0224			
Level of English Knowledge	High	3.3933	7.209	0.000**	H ₀₃ - Rejected
	Low	2.9959			
Level of IT Knowledge	High	3.2554	3.450	0.001**	H ₀₄ - Rejected
	Low	3.0507			
Level of Socio-economic Status (Family Income)	High	3.3916	5.561	0.000**	H ₀₅ - Rejected
	Low	3.0372			
Home Town of the Students	Urban	3.2439	5.975	0.000**	H ₀₆ - Rejected
	Rural	2.9259			
Extra-curricular Activities	Yes	3.1693	2.320	0.021*	H ₀₇ - Rejected
	No	3.0372			
Professional Courses	Yes	3.1282	1.382	0.168	H ₀₈ - Accepted
	No	2.9980			
Skill Development Programs	Always attend	3.1496	0.682	0.496	H ₀₉ - Accepted
	Not always	3.1496			
Participation Level of the Lectures	Low	3.0738	-3.367	0.001**	H ₀₁₀ - Rejected
	High	3.3242			
Working Status	Yes	3.1041	-.722	0.471	H ₀₁₁ - Accepted
	No	3.1531			
Reference and Recommended Readings	Low	3.0840	-2.260	0.025*	H ₀₁₂ - Rejected
	High	3.2438			
Level of Internet Usage	Low	3.0892	-1.102	0.272	H ₀₁₃ - Accepted
	High	3.1526			
Level of Library Usage	High	3.1407	1.469	0.143	H ₀₁₄ - Accepted
	Low	3.0478			

** Mean difference is significant at the 0.01 level (2-tailed)

* Mean difference is significant at the 0.05 level (2-tailed)

Source: Author constructed based on survey data.

H₀₄: There is No Significant Difference in Students' Performance and Level of IT Knowledge

Similar to H₀₃, 4th line indicates that there was a significant difference between performance and level of IT knowledge. It shows the mean score for students with higher level of IT knowledge (3.2554) was higher than the those who have lower level of IT knowledge group (3.0507) and the difference was significant { t (198)= 3.450, p =0.001 }

H₀₅: There is No Significant Difference in Students' Performance and Level of Socio-economic Status of the Family

The results reported in Table 03 (5th line) indicates that the students who belongs to higher income family (higher level of socio-economic status), earned higher performance than low income family students. Thus, the performance of the students differs from family income levels. The high income family students' mean of 3.3916 is higher than the mean of the low income family students at 3.0372.

H₀₆: There is No Significant Difference in Students' Performance and Home Town

Table 03 shows, the mean score for students who come from urban areas (3.2439) was higher than the students who enter into the university from rural areas (2.9259). The p-value for this test was reported as t (198) = 5.975, p>.01, indicating that we have strong evidence to reject the null hypothesis, H₀₆, in favour of the alternative hypothesis.

H₀₇: There is No Significant Difference in Students' Performance and Extra-curricular Activities

Table 03 line 7 shows the mean score for students who are involved in extra-curricular activities was higher than the other group and the difference was nearly significant t (198)= 2.320, p = .021.

According to the analysis, it shows that hypotheses H₀₈, H₀₉, H₀₁₁, H₀₁₃, and H₀₁₄ have accepted at 1% significant level.

H₁₀: There is No Significant Difference in Students' Performance and Participation Level for Lectures

Table 03 shows the mean score for students with good attendance for lecturers (3.3242) was higher than the poor attendance group (3.0738) and the difference was significant at 1% level { t (198)= -3.367, p = 0.001 }.

H₁₂: There is No Significant Difference in Students' Performance and Recommended Readings / References

An Independent T-test was performed on the independent variable of referring level recommended readings and the dependent variable of the GPA achievement. Table 03 shows the mean score for students with higher usage level of the recommended readings (3.2438) was higher than the mean score for students with lower reading habits (3.0840), the difference was significant, $t(198) = -2.260$, $p = 0.025$.

6. Results of Regression Analysis

In order to identify the important factors which influence students' performance, the study employed ordinary least square (OLS) method to estimate the following model.

$$Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \beta_{11}X_{11} + \beta_{12}X_{12} + U_i \quad \text{Equation (1)}$$

Here, ' α ' is a constant, $\beta_1, \beta_2, \beta_3, \beta_4$ etc. are regression coefficients, Y is the academic performance (dependent variable) measured by the GPA of the students in semester examination and X_1, X_2, X_3 , etc. are independent variables. U is a random term that accounts for unobserved factors.

TABLE 04
Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate	F	Sig.	Durbin-Watson
0.617	0.381	0.338	0.32591	8.799	0.000	1.922

Source: Author constructed based on survey data.

The adjusted R^2 value, presented in Table 04 illustrate the extent to which variance in each independent variable explains variance in the dependent variable. For this sample, the group of independent variables shared nearly 38% of variance with the dependent variable included in the regression analysis. The F value gives the overall significance of the regression model. The F-test value (8.799) shows that the model was statistically significant at 1% level.

All variables specified in the above equation (1) have positive impacts on students' performance except fathers' education level. Based on standardized coefficients of the regression results, English knowledge, mothers' education level, socio-economic status and lecture participation were accounted for approximately 24.2%, 28.6%, 19.2%, and 23.2% variation in students' academic performance; respectively at 1% significant level (see Table 05). The coefficient of mothers'

education level shows that one unit increase in the education level of mothers' results in an increase in academic performance of the student by 0.286, holding other factors constant. It has nearly 29% positive influence on students' performance, and the t-value is significant at 1% significant level. Therefore, it is clear that mothers' education level has an effect on students' performance; those whose mothers are at above secondary education level have more success as compared to those whose mothers are illiterate or and primary education level.

TABLE 05
Determinants of Academic Performance of Students

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.28	0.361		3.542	0.001
English Knowledge	0.159	0.052	0.242	3.06	0.003
Mother Education Level	0.121	0.036	0.286	3.347	0.001
Socio-economic Status	0.066	0.026	0.192	2.584	0.011
Lecture Participation	0.11	0.031	0.239	3.565	0.0
Library Usage	0.04	0.021	0.117	1.916	0.049
Father Education Level	-0.029	0.036	-0.075	-0.814	0.417
Reference Usage	0.106	0.166	0.245	0.639	0.524
Internet Usage	0.031	0.028	0.067	1.11	0.268
Working Status	0.0	0.057	0.001	0.009	0.993
Extra- curricular Activities	0.038	0.052	0.047	0.739	0.461
Skill Development Program	0.019	0.029	0.044	0.665	0.507
IT Knowledge	0.011	0.047	0.017	0.235	0.815

Dependent Variable: Overall GPA

Source: Author constructed based on survey data.

Level of English knowledge has about 24% positive influence on students' performance; hence if students are able to enhance their English knowledge, it leads to improve their performance by 24%. The coefficients of socio-economic status shows that a unit increases in income cause of increase in academic performance by 0.192, holding other factors as constant. This coefficient is significant at 1% level of significance. The results show that the higher a family income level, the higher the academic performance of the students. These findings are consistent with the study done by Kyei and Nemaorani (2014). They found that socio-economic status of parents is a very important factor that affects the academic performance of students. Level of reference usage has nearly 25% positive influence on students' performance, but the t-value is insignificant. Therefore, the null hypothesis, that level of reference usage has a significant effect on students' achievements, can be rejected. Further, extra- curricular activities, IT knowledge and Internet usage also have positive influences on students' performance, but the t- values are insignificant.

6.1. Correlation Analysis

For further analysis, the Pearson correlation was conducted to examine the relationship between selected variables and performances, based on each student's GPA scores. The results are summarized in Table 06. Results show that the strength of association between dependent (Students' GPA) and independent variables (English knowledge, mothers' education level, socio-economic status, lecture participation and library usage). Table 6 shows that the GPA and all independent variables have a positive correlation. Mothers' education is one of the most important factors affecting the student performance. The correlation strength among mothers' education (0.462) and students' performance is positive and greater than the other factors. The correlation between level of English knowledge and students' achievement showed strong positive significant relationship, $p = 0.000$ (see Table 06). The correlation between library usage and students' achievement showed a significant relationship, $p = 0.030$. However, as shown by the correlation, the relationship was relatively weak.

TABLE 06
Results of Correlation Analysis

Description		Overall GPA	English Knowledge	Mother's Education Level	Socio-economic Status	Lecture Participation	Library Usage
Overall GPA	Pearson Correlation	1	0.441**	0.462**	0.385**	0.230**	0.153*
	Sig. (2-tailed)		0.000	0.000	0.000	0.001	0.030

(Table 06 continued)

(Table 06 continued)

English Knowledge	Pearson Correlation	0.441**	1	0.354**	0.362**	0.227**	0.030
	Sig. (2-tailed)	0.000		0.000	0.000	0.001	0.678
Mother Education Level	Pearson Correlation	0.462**	0.354**	1	0.515**	0.042	0.117
	Sig. (2-tailed)	0.000	0.000		0.000	0.550	0.098
Socio-economic Status	Pearson Correlation	0.385**	0.362**	0.515**	1	-0.143*	0.143*
	Sig. (2-tailed)	0.000	0.000	0.000		0.043	0.043
Lecture Participation	Pearson Correlation	0.230**	0.227**	0.042	-0.143*	1	-0.205*
	Sig. (2-tailed)	0.001	0.001	0.550	0.043		0.004
Library Usage	Pearson Correlation	0.153*	0.030	0.117	0.143*	-0.205**	1
	Sig. (2-tailed)	0.030	0.678	0.098	0.043	0.004	

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Source: Author constructed based on survey data.

7. Conclusion

This study was conducted to identify the main factors that influence students' academic performance at the FMSC. Fourteen hypotheses were tested by employing an independent sample T- test in the study to explore whether the mean values of GPA among student groups are equal or not. The null hypothesis is that the mean value of GPA of the two groups is equal. Nine null hypotheses were rejected at 1% level of significance. The study found that female students performed better than male students. The study conducted by Manan and Mohamad (2003) and Chambers and Schreiber (2004) revealed that the female students perform better than the male students. This finding is in accordance with their findings.

Further, the results show that there is a relationship between place of residence and their performance. The students who stay at their home have higher performance than the other students. Similar findings were recorded by Tho (1994), that there is a significant positive correlation between residential status and student performance but it is not a significant explanatory variable in the regression model.

The study found that socio-economic status (family income) had a significant effect on students' performance. The students who belong to higher income families achieve higher results than those whose parents are at low level socio-economic status. This is because families with low income levels suffer setbacks; and on the other hand, the higher economic status of parents give them the ability to provide

materials like stationary, text books, etc. and an ability to provide guidance and financial support for improving their study environment. This finding is consistent with the findings of Kingdon (1996), Aslam (2003), Wenglinsky (2007) and Kirkup (2008).

Students who regularly attend lectures perform better than those who miss lectures. It was perceived that lecture attendance influences students' performance in the FMSC, since the students who did not miss lectures had a higher mean score as compared to those who sometimes missed lectures. This result is consistent with the findings of Ogwenno et al. (2014). Further, Ogwenno et al. (2014) mentioned that as stated by Mwinzi and Kimengi (2006) the impact of missing classes have various outcomes on the students; including increasing chances of dropping out, discouraging hard work, and increasing the stress levels of the students while they are trying to cover missed lectures; hence, increase probability of failing.

In this study, students' English and IT knowledge seems to be influencing their academic performance. The students who have higher knowledge in English and IT achieve higher performance than those who have lower knowledge and skills in these subjects. Another main factor that influence students' performance is that their home town. The students who come from rural areas earned lower a GPA than those who come from urban areas.

As revealed from the regression results, we conclude that the most significant impact indicted by mothers' education level on students' performance. Furthermore, father's education has a negative and insignificant effect on the academic performance of students. The educated mothers' contribution to their children's overall performance by motivating them to study is at a higher level. Significant impact of mother's education is observed by Suryadarma et al. (2004), Duncan and Sandy (2007) and Byamugisha (2010).

Further, it shows that another important factor that determines students' performance is competence in English. Harb and El- Shaarawi (2006) showed that the most significant factor is student's competence level in English. This finding, therefore, is consistent with other studies.

Karemera et al (2003) found that students' performance is significantly correlated with satisfaction with academic environment and facilities such as library, computer lab and etc. in the institution. The results of this study also revealed that there was a significant relationship between library usage and students' performance.

Students who regularly attend lectures perform better than those who miss lectures sometimes. This finding is in line with the findings of Ogwenno et al. (2014). Further Ong Yu (2016) proposes that although there is a correlation between attendance rate and Students' performance, the correlation is relatively weak. They suggest that university lecturers and counsellors need to work together closely to improve students' attendance. The study revealed that there is a strong correlation between absenteeism rate and failure rate. If students have more than 20% absentee rate in lectures it causes them to fail their final exam.

As we see from our findings, the socio-economic status of family is a very important factor that affects the academic performance. Garzon (2006), Kahlenberg (2006), and Kirkup (2008) revealed that students who belong to high level socio-economic status families perform better than those whose parents are of low level socio-economic status.

Implications of the study indicate that social and economic policies should be put in place to enable student to get equal opportunities to advance knowledge as well as skills.

The government should provide better facilities that meet all students' requirements in different areas; especially in rural areas. Because it is not easy for parents with low socio-economic status to afford buying extra materials for learning, finding boarding places, etc. Further, parents, teachers, lecturers should encourage students to read English literature books and English magazines etc. at all times. They must also engage in English discussions and debates. They are equally advised to listen to English programmes on the television to help them improve their skills and knowledge in English.

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INCENTIVES FOR ADOPTION OF ENVIRONMENTAL MANAGEMENT PRACTICES AMONG TEXTILE AND APPAREL MANUFACTURES IN SRI LANKA

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ABSTRACT

Fifty eight percent of export earnings and fifty two percent of industrial employments are generated by the textile and apparel industry in Sri Lanka. Despite their economic importance the sector too contributes to environmental pollution. Surprisingly, some textile and apparel manufactures in Sri Lanka have introduced some voluntary mechanisms to reduce the level of environmental pollution caused by their operation. Existing literature has explained different reasons for their adaption decision without specifying the most powerful motive which caused their decision. In addressing this unfulfilled literature gap, the study intends to explore the most significant factors for the adoption decision among Sri Lankan textile and apparel manufactures. In addition, the study further provides an understanding of the existing legislative background as well as determining whether this legislative background provides any incentives for their adoption decision. The findings of this novel study expect to motivate non-adopters within and among industries.

Case study strategy was used in the study to achieve its objectives. The study examined factories registered in the Board of Investment of Sri Lanka. Data were collected through in-depth interviews and an industry based survey from BOI registered textile and apparel manufactures in Sri Lanka. Survey data were analysed quantitatively to identify the significant factories that drives their adoption decision. Environmental management practices are identified with four variables; ISO 14001 certification, environmental audits, water recycling procedures and material reuse as well as factory characteristics, regulatory pressures and market based pressures are identified as the explanatory variables for their adoption decision.

Accordingly, the study found that more than 96% of the factories have adopted at least one voluntary practices and are influenced by factory characteristics and market based pressures. The study revealed that the regulatory pressures are not significant and there are many issues in the existing legal background; especially in implementing and monitoring. Hence, this novel study contributes to both manufactures and policy makers by identifying the drivers and gaps in the legal system.

Keywords: Textile and Apparel Manufacturing Factories, Voluntary Environmental Management Practices, ISO 14001, Recycle, Central Environmental Authority, Environmental Protection License

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1. Introduction

The textile and apparel industry contributes to more than 58% of the total industrial export earnings (Central Bank of Sri Lanka, 2013) and 52% of the industrial sector employments (Department of Census and Statistics, 2014) in Sri Lanka. Approximately, 3,500 textile and apparel manufacturing factories operate at present in this sector (Department of Census and Statistics, 2014). Despite their economic importance, this industry significantly contributes to environmental pollution mainly by generating solid wastes, polluting inland water sources, and polluting air. Specifically, factories that are engaged with washing and dyeing processes generate significant level of harmful toxics with high concentration of chemicals to water resources (World Bank, 2014).

In order to control environmental pollution, command and control policies (Delmas and Toffel, 2003; Hart, 1995; Priyadarshani and Gupta, 2003; Dasgupta, Hettige and Wheeler, 2000), market based policies were introduced, both in developed and developing countries. However, regulations have not been as efficient and effective; specifically in developing countries (Anton *et al.*, 2002; Blackman and Sisto, 2005; Maxwell and Lyon, 2000). Alternatively, firms² have adopted environmental management practices (EMPs) (Esty and Chertow, 1997; Carraro and Leveque, 1999) to control potential negative impacts of their business operations. However, limited empirical evidence are available to reveal the drivers of such adoption practices among the industry players. Similarly, limited studies demonstrate satisfactory results on pollution control by using EMPs (Anton, 2005; Jayasinghe–Mudalige, Udugama and Ikram, 2011; Uchida and Ferraro, 2007; Florida and Davison, 2001; Pulvor, 2002).

Despite their importance and effectiveness, many firms are reluctant to adopt EMPs, claiming that high transaction costs and problems of collective efforts among industries (Ervin, Khanna, Jones & Wirkkala, 2013) are associated with it. Therefore, this novel study fulfils the literature gap as well as provides insights to the policy making process by identifying the drivers of adopting EMPs among the manufactures in the textile and apparel industry in Sri Lanka. Further, the study explores and documents existing legislative procedures that governs environmental pollution in the industrial sector. The findings of the study will motivate other operators in the textile and apparel industry by identifying the motivations for their adoption decision. Further, the identified factors will influence policy making towards pollution reduction (Jayasinghe, and Udugama 2011). The rest of the paper, organized as Section 2, provides a literature review with a brief overview of the Sri Lankan textile & apparel industry and the existing legal background, in order to establish the background for the study. Section 3 presents the research methodology and Section 4 deals with data presentation. Section 5 presents findings of the study followed by Section 6 with a discussion.

² One firm has more than one factory.

The study intends to achieve two specific objectives:

- i. To explore the existing legal system applicable to the textile and apparel sector in Sri Lanka; and
- ii. To explore the factors affecting the adoption decision among textile and apparel manufactures in Sri Lanka.

2. Literature Review

2.1. Empirical Literature

The concept of EMPs is interchangeably used with Corporate Environmental Management (CEM), Corporate Social Responsibility (CSR), Corporate Environmental Engagement (CEE) and Corporate Environmental Responsibility (CER). The concept gained corporate world attention with the events of the Burtland Report in 1987, Earth Summit in Rio in 1992, World Summit on Sustainable Development in 2002 and Earth Summit in 2012 (Nyirenda and Ngwakwe, 2014). EMPs are defined as the techniques, guidelines and ways targeted at monitoring and controlling the effect of a firms actions on the natural environment (Montabon, Sroufe and Narasimhan (2007). Similarly, Nyirenda and Ngwakwe (2014) define EMPs as actions taken by organizations and firms to remedy environmental pollution through waste management, carbon emission reduction, efficient energy use and efficient water usage. After considering these definitions, this study defines EMPs as any actions, decisions, efforts or practices taken by factories/manufactures to reduce environmental pollution caused by their operations.

There are several studies which examined the factors affecting adoption decision of EMPs among the industry players. There are different types of environmental management systems, for example: unilateral commitments by firms, public voluntary programs and joint initiatives between government and polluters (Carraro and Leveque,1999). Some studies highlight that adopting environmental management systems bring benefits to organizations (Mori and Welch, 2008; To, Lee and Yu, 2011). However, these evidences are not adequate to convince the industry players due to some misconceptions highlighted by them (Nyirenda and Ngwakwe, 2014). One of the reasons is that it requires organizational changes (Cassells, Lewis and Findlater, 2012) which create resistance among employees (Zutshi, Sohal & Adams, 2008).

According to available literature there are two main motives for factories' EMPs adoption decisions: external factors and internal factors. Government regulations are found to be the key motive behind adoption of EMPs among industry players (Henrigness and Sadorsky, 1996; Zhang et al, 2008; Potoski and Prakash, 2004; Jayasinghe and Weersink, 2004). Furthermore, environmental sanctions are found to be a way of implementing government regulations (Meegeren, 2001; Delmas 2002). In terms of relative effectiveness, government regulations through compliance and enforcement are found to be positively related with adoption decision (Helland,1998). Reijnders (2003) found that regulations through issuance of permits are more effective than other measures. A counter argument is presented by Triebswetter and Hitchens (2005) with the study conducted among German industrial

manufactures by revealing that pollution abatement initiatives did not negatively affect economic benefits. This finding emphasizes the economic benefits of adopting EMPs among industry layers. Esty and Chertow's (1997) study also revealed that the government command and control measures are effective only for a short term period, due to cost inefficiency and inflexibility to reduce environment pollution. Toffel (2005) reveals a mix of both external and internal factors on firms adoption decision. Regulatory environment and community pressures as the external factors whereas organizational characteristics are the internal factors identified by Toffel's study.

Two other external factors are the market forces and the community (Chen and Soyez, 2003). Policy makers paid attention on market based instruments as a replacement of command and control policies (Khanna and Anton, 2002). As a result, some industry players have adopted voluntary mechanisms to control pollution (Toffel, 2005). However, limited literature is available on corporate self-regulations or self-policing behaviour (Toffel, 2005). Furthermore, customers and suppliers also influence manufactures towards effective solutions towards sustainability (Prakash and Potoski, 2006). A study based on Chinese manufactures revealed that market pressure became strong for their adoption decision (Zhu et al, 2007). When customers' awareness for environmentally friendly product increase, the motivation for adoption among manufactures increase. Community pressure (Gunningham et al, 2003) and their characteristics are affecting their adoption decision.

In terms of a theoretical point of view, Hart (1995) discusses the institutional theory, which highlights regulatory pressure as the most powerful instrument to influence firm's adoption decisions. According to the deterrence theory, firms follow legal obligations only to the extent at which the cost of expected penalties exceed the benefits of non-compliance (Thornton, Gunningham, Kagan, 2005). Khanna and Brouhle (2007) explain firms' behaviour with the economic theory of profit maximization, which suggests that a firm's adoption decision depends on the expected profits from such actions. Arora and Cason (1995) similarly explain firm's responses in relation to its profits maximization.³ EMPs lead to a better compliance status in industrial pollution control (Dasgupta et al, 2000). Some firms opted to adopt voluntary mechanisms due to extra cost engaged in mandatory mechanism or political interferences (Maxwell and Lyon, 2000; Kanchana, 2000). This is specifically due to the cost saving generated from voluntary mechanisms. However, low level of punitive measures and weak legal systems hinders the voluntary adoption of EMPs (Priyadarshani and Gupta, 2003).

Interestingly, some studies find that neither market based nor regulatory pressures directly impact a firm's pollution intensity (Khanna et al., 2007; Anton, Deltas and Khanna, 2002) because some considers these effects as indirect (Anton, Deltas and Khanna, 2002). Information disclosure strategies can have a noteworthy effect on pollution and compliance levels (Foulan, Lanoie and Laplante, 2002).

³ A variation on this is provided by Testa et al. (2011), who point to three different approaches for explaining the adoption decision: traditional neoclassical approach, revisionists approach based on the Porter hypothesis and, third, a resource based approach.

The second category of factors are the internal factors. Firm specific characteristics, which are considered internal factors, influence the adoption of EMPs; specifically among industry operators (Jayasinghe-Mudalige, Udugama, and Ikram, 2011; Delmas and Toffel, 2003; Blackman, 2009). Firm size (Arora and Cason, 1995; Jayasinghe-Mudalige, Udugama, and Ikram, 2011; Pargal and Wheeler (1996), export orientation (Christmann & Taylor, 2001), plant's characteristics (Pargal and Wheeler, 1996) and managers' leadership within the firm (Delmas and Toffel, 2003) are, for example, important variables that influence firms' behaviour. For example: Arora and Cason (1995) examining factors affecting the adoption decision to 33/50 programme in the USA in 1993, found that large firms and more polluting firms voluntarily adopt this system when compared to other firms (Arora and Cason, 1995).

However, researchers have not studied the main factors which affect the adoption decisions among the factories (Liu et al, 2010). Therefore, the contribution of this study would be to identify the most important factors towards factories' adoption decision, specifically within the Sri Lankan context, where there are no such studies undertaken in the textile and apparel industry. This study's findings will be beneficial to both industry players and policy makers towards introducing sustainable business practices to control environmental pollution.

The next section in the literature review provides a brief introduction to the Sri Lankan textile and apparel industry.

2.2. Textile and Apparel Industry in Sri Lanka

The textile and apparel industry in Sri Lanka commercially started in the 1960s, limited to the local markets. After economic liberalization in the early 1970s, foreign direct investments and exports started. Low labour costs, the establishment of the Board of Investment (BOI) and the Export Processing Zones (EPZs), were able to attract foreign investors.

The textile and apparel industry recorded an USD 4.5 billion export income in 2013⁴. This represents 43% of total export earnings and 58% of total industrial export earnings in Sri Lanka (Central Bank of Sri Lanka, 2013). The United States of America (43%) and Europe (46%) are the major export markets for the Sri Lankan textile and apparel industry (Central Bank of Sri Lanka, 2013). They manufacture: sportswear, lingerie, loungewear, bridal wear, safety worker's wear, swimwear, and children's wear. These are further classified as knitted or crocheted, un-knitted and warm clothing.

However, the textile and apparel industry encountered a number of challenges; for example: suspension of the GSP+ (Generalized System of

⁴ Value of GNP is SLR 8,438,960 million (64.9 USD billion). USD 1 = SLR 130.

Manufacturing sector- industrial manufacturing: SLR 1,402,353 million (10.8 USD billion); Textile and Apparel: SLR 259,412 million (USD 2 billion). Textile and apparel export earnings are SLR 583,046 million at current market prices (USD 4.5 billion which is out of USD 10.4 billion of total export income).

Preferences) facility which provides the EU tax free access for Sri Lankan garments within the European Union. Thus, the industry has begun to specialize in high quality products and the use of some specific labels. For example: “Ethically Manufactured Garments”, “Garments without Guilt Certification” and “Sustainable Environmental Friendly Manufacturing”. With these changes the industry aims to build a reputation in high quality finished products and to make in-roads into niche markets.

The forthcoming empirical analysis focuses on the Board of Investment (BOI) registered establishments, which are largely large-scale export-oriented factories operating in the apparel and textile sector. The BOI is the governmental agency responsible for increasing foreign and domestic investment in the textile and apparel sector in Sri Lanka. Its main mandate is to provide advice and assistance to potential investors. The BOI is in charge of administering Export Processing Zones (EPZs) which offer special benefits to investors. For example: tax holidays or preferential rates, exemption from customs duty and foreign exchange controls. The EPZs are equipped with modern public infrastructure; access roads, water and sewerage facilities, security, as well as a range of business services. There are nine EPZs in Sri Lanka.

Three hundred and twenty six (326) textile and apparel manufacturing factories are registered with the BOI, including 168 factories with more than 250 employees. Further, 16 textiles and fabric manufacturing factories and 09 finishing factories (representing less than 5% of all establishments) are registered with the BOI (BOI and Central Bank of Sri Lanka, 2013). The BOI-registered factories represent 96% of the total apparel export earnings in Sri Lanka. Even though, the number of BOI registered factories are smaller (10%) when compared to the total establishments⁵ in the sector, their level of contribution to the national economy is highly significant. Having understood the current situation in the textile and apparel industry in Sri Lanka, the next section introduces existing environmental regulations that are applicable to this industry.

2.3. Environmental Regulations Applicable to the Textile and Apparel Industry in Sri Lanka

The Ministry of Environment and Renewable Energy⁶ is responsible for the overall management of the environment and natural resources, while the Central Environment Authority (CEA) is responsible for policy implementation and monitoring. The legislative structure delegates its legal powers to the CEA to regulate firms' /factories' behaviour. Two main instruments are used by the CEA: the Environmental Protection License (EPL) and effluent standards. The CEA similarly disseminates environmental-related information and offers laboratory testing facilities (for measuring water quality, soil and solid waste contamination, noise level, and air

⁵ A total of 1,977 establishments were recorded in category 17 (Manufacturing of textiles) and 1,553 establishments in category 18 (Manufacturing of wearing apparel) in the 2011 Survey of Industries (Department of Census and Statistics, 2014). Among these, 61 in the textile sector and 335 in the apparel sector had more than 100 employees.

⁶ Earlier it was the Ministry of Environment and Natural Resources.

pollution) to factories.⁷ CEA offices are located in each of the nine provinces and 13 district offices. In addition, the Environment Department of the BOI is given the responsibility of monitoring environmental pollution of industries registered at the BOI. Regulations related to pollution control are mainly described in the National Environment Act No 47 of 1980 (Central Environment Authority, 1980 #504).

The Environment Protection License (EPL)

Under Section 23A and 23B of the 1988 amendment to the National Environmental Act, any new business is required to obtain project approval and EPL certificate from the CEA, before starting their operations. This license allows the right to emit or discharge pollutants in accordance with the standards and criteria set by the Act⁸. Approved projects are required to submit an Environmental Impact Assessment (EIA) report, before starting their operations describing their impact on the environment and the subsequent measures undertaken to control any excess pollution levels. General public is then informed about the approved projects through media as a third party monitoring mechanism ((Ministry of Environment and Natural Resources, 2008 #502).

According to the Act, industries are classified into three categories: A, B, and C depending on their potential level of pollution. Category A consists of 80 highly polluting industrial activities, while Category B includes 33 activities generating medium levels of pollution. Category C consists with 25 low polluting industrial activities.⁹ All textile and apparel manufacturing factories are classified under either Category A or Category B. A factory is listed in Category A, if its operations involve bleaching, dyeing, printing, washing and sand blasting activities. Factories with more than 25 power looms or machines used for sizing activities; or factories which use shared or individual wastewater treatment plants with a capacity of 10,000 cubic meters per day or more; or factories that employ 200 workers or more per shift; or factories which discharge 10 cubic meters of wastewater (or more) per day or use toxic chemicals in its production process are too categorised under Category A.

A factory is listed in Category B, if it is a batik industry; or less than 10 workers are employed; or a factory with less than 25 power looms; or a factory with hand looms or knitting or embroider with more than 10 looms; or a garment with employees 25-200 per shift; or any factory which discharge 3-10 cubic meters of industrial processing waste water per day.

As mentioned earlier, an EPL is issued or renewed either by the CEA or the BOI since they are the two monitoring bodies. BOI-registered companies within the EPZs are directly monitored by the BOI's Environmental Management Department (EMD). EPZs are also indirectly monitored by the CEA since it issues an EPL for each EPZ, considering each zone as a single enterprise. Thereafter, EPL is issued to

⁷ There are currently 29 registered laboratories and 41 registered consultants in the CEA.

⁸ Hereafter, the Act refers to the Act No 47 of 1980 National Environment Act.

⁹ Amendments to the 1980 National Environmental Act published in 2000 and 2008 provide further details regarding the issuance of the EPL for different types of activities.

individual enterprise by the BOI's Environment Management Department. Similarly, the EPL for a BOI-registered factory which is not located within an EPZ, is issued by the EMD after obtaining concurrence from the CEA based on joint inspection by CEA and BOI officers.

Every application for an EPL needs to be accompanied with a certificate which shows a sufficient amount to cover damages that may be caused to the public as a result of any activities carried out by the factory. Once granted, the license is valid for a period of one to three years, after which it is required to be renewed. Section 23D of the Act No 56 of 1988 describes the cases where the license can be suspended or cancelled. Accordingly, the CEA takes actions against a company which violates the rules by issuing a written warning, non-renewal or cancellation of EPL, penalty, and at last decision to close down the factory.

Effluent Standards

The type of waste and pollutants emitted by textile and apparel factories depend on their main activities undertaken, specifically water pollution remains the primary concern. Table 01 presents the standards set by the CEA that apply to wastewater discharge into inland surface waters. In addition to the national standards, interim standards (some less stringent standards) apply within EPZs. Factories within the BOI zones are required to maintain these interim standards set by the BOI Ordinance whereas overall EPZ (zone as an individual enterprise) is required to maintain national standards set by the National Environmental Act.

According to Section 29 of the Act, the environmental regulator has the power to monitor and inspect activities undertaken by a licensee, or to examine records, or to take samples of wastes or recycled wastes, or/ and to provide advice on waste handling. Factories are required to maintain records of their waste generation and waste handling. Violation of the set standards can result in licenses being suspended or cancelled and the factory being fined. Section 31 of the Act states that any factory manager who commits an offence is liable to imprisonment not exceeding two years, or to a fine of not less than SLR 10,000 to 100,000, or to both imprisonment and a fine.

Monitoring and Enforcement

The process for monitoring and enforcement involves licensing and inspection of Category A and B factories. According to the Act, every factory is required to obtain an EPL before starting their commercial operations and every factory has to renew its EPL annually (Category A factories) or tri-annually (Category B factories). In practice, every factory is inspected by CEA officers.

TABLE 01
Tolerance Limits for Wastewater from the Textile Industry being Discharged into Inland Surface Waters (National and Interim Standards Set by the CEA)

No.	Parameter	Unit Type of Limit	National Standards	Interim Standards
01	pH at ambient temperature		6.5 to 8.5	6.5 to 8.5
02	Temperature	⁰ C, max	40 measured at site of sampling	40 measured at site of sampling
03	Total suspended solids	mg/1, max	50	500
04	Biochemical Oxygen Demand (BOD ₅) in five days at 20 ⁰ c or BOD ₃ in a three days at 27 ⁰ c	mg/1, max	60	200
05	Colour	Wavelength range: Yellow range Red range Blue range	Maximum spectral absorption coefficient: 436 nm (7m ⁻¹) 525 nm (5m ⁻¹) 620 nm (3m ⁻¹)	Maximum spectral absorption coefficient: 400- 499 nm (7m ⁻¹) 500- 599 nm (5m ⁻¹) 600- 750 nm (3m ⁻¹)
06	Oil and grease	mg/1, max	10	30
07	Phenolic compounds (Phenolic OH)	mg/1, max	1.0	5.0
08	Chemical Oxygen Demand (COD)	mg/1, max	250	600
09	Sulphides (S)	mg/1, max	2.0	2.0
10	Copper, total (Cu)	mg/1, max	3.0	3.0
11	Zinc, total (Zn)	mg/1, max	5.0	10
12	Ammoniacal nitrogen (N)	mg/1, max	60	50
13	Chloride (Cl)	mg/1, max	70	900

Source: Environmental Norms, Board of Investment of Sri Lanka (2011) and National Environmental Act, No 47 of 1980 as per the gazette of the Democratic Socialist Republic of Sri Lanka, Extraordinary, No: 1534/18, Friday, February 1, 2008.

After the brief explanation of the present legislative background affecting Sri Lankan apparel manufactures, the next section presents the study methodology.

3. Methodology

As per the two objectives of the study and its epistemological assumptions, which is about the acceptable, valid and legitimate knowledge (Saunders, Lewis and Thornhill, 2016), the study stands upon the interpretivism philosophical position, since it addresses the problems in the business and management disciplines. Since the business situations are complex and unique, understanding their complexities by a researcher is important for its solutions (Saunders et al 2016). According to Saunders et al (2016) interpretivism, helps to create a richer understanding of the social world. The knowledge is created through the deductive approach. The study employed a case study strategy in achieving the study objectives. Case studies are suitable where research questions ask 'why' and 'how' questions, studying a problem in its real life settings and where the study investigates a contemporary issue (Yin, 2014). Within the case study strategy, the study was conducted through two primary data collection methods; in-depth interviews and an industry survey, in addition to secondary data sources. The study used a mixed method in achieving its objectives. One of the advantages of the mixed method is the ability to elaborate, enhance, clarify or confirmed the study findings (Saunders et al, 2016). It further improves the generalizability of findings.

The study examined the existing acts, policy briefs, minutes, and government websites relating to environmental protection and pollution control to understand and document the existing legal background of the environmental pollution in Sri Lanka. This fulfilled the first research objective. Similarly, in-depth interviews were conducted with the Directors of the Environmental Pollution Control Unit and Environmental Impact Assessment Unit of the Central Environmental Authority (CEA), the Environment Unit of the BOI Zonal office (in Katunayake Export Processing Zone), and the Statistical Unit of the BOI. Three directors of certification bodies, the Director of the System Certification Unit at the Sri Lanka Standard Institute, and the Director of the Textile Industry at the Ministry of Industry and Commerce were also interviewed. The industry survey was conducted in order to identify the factors affecting adoption decisions among manufactures in order to achieve study's second objective. The manufactures were selected from the list of firms registered at the BOI in Sri Lanka.

The survey was carried out with a closed-ended questionnaire. Survey method helps to reduce the time and cost of data collection. (Saunders et al, 2016). The data were collected during August 2013 to November 2013 as cross sectional data. The survey data were analysed quantitatively using descriptive statistics and inferential statistics. The study used a simple random sampling technique for sample selection. Simple random sample ensure the free from biasness in sample selection, since the sample must be adequate enough to derive study objectives (Saunders et al, 2016). This study frames its sampling frame as the factories registered at the BOI in Sri Lanka. There were 326 factories registered at the BOI, however only 237 factories were in operation at the time of data collection. Therefore 160 questionnaires were distributed and only 55 questionnaires were completed.

The study examined factory level data to figure-out the factors that influence firms' decisions to adopt EMPs. Following Jayasinghe and Udugama (2011), our

conceptual understanding is that the decision maker gets utility (U) from undertaking environmental management practices in the firm. Accordingly, $U_i = u[V(\text{EMP}_i | I_{ji}, F_{ki})]$, where V represents gains from adopting environmental practices by the factory and EMP_i represents different EMPs adopted by the factory (Jayasinghe and Udugama, 2011). These EMPs are influenced by regulatory and market based factors and factory's characteristics.

$$\text{EMP}_i = \alpha + \beta_j I_{ji} + \tau_k F_{ki} + e_i \quad (1)$$

where I_{ji} refers to j different incentives (both regulatory and market based) faced by the factory i for the adoption of EMPs and F_{ki} refers to the k factory characteristics of the i th factory.

We estimate the following Poisson model where the dependent variable is the number of EMPs undertaken at the factory:

$$\text{Pr}(\text{EMP} = y) = \frac{e^{-\mu} \mu^y}{y!}, y = 0, 1, 2, 3, \text{ or } 4. \quad (2)$$

The parameter μ is called the intensity or rate parameter. The Poisson model is estimated using Maximum Likelihood.

3.1. Description of Data

The dependent variable in model (2) represents the number of EMPs adopted by a factory. Data for the analysis is collected from a survey of 55 BOI-registered factories in the Western Province in Sri Lanka, where a majority of textile and apparel factories are located.¹⁰ The researchers randomly selected 160 factories out of the 221 BOI-registered factories operate in the Western province.¹¹ Questionnaires were emailed to factory managers and copies were also hand-delivered #to the highest officer in charge of safety and compliance. Following up with frequent telephone reminders, data from 55 questionnaires were. BOI-registered factories were focused on because the value addition from this sector to GDP and export earnings is significant. The survey inquired about the EMPs adoption decisions of factories with four environmental management practices; 1) ISO 14001-certification,¹² 2) water recycling, 3) material re-use, and 4) environmental audits. Availability of ISO 14001 certifice with the factory means that the factory has taken voluntary actions to set targets, implement strategies, and make necessary adjustments to minimize the environmental impacts due to their production process. Water recycling means that

¹⁰ Some two-thirds (221) of all the BOI-registered factories are located in the Western province (Colombo, Gampaha and Kalutara districts)

¹¹ Colombo district records the highest number of factories (163 BOI- registered factories) and the highest per capita income compared to other districts in Sri Lanka. There are 44 BOI-registered textile and apparel manufacturers and five EPZ in Gampaha district and 14 factories and one EPZ registered in Kalutara district.

¹² There are certification bodies with international accreditation to issue ISO 14001 and 9001 standards in Sri Lanka.

factories have taken necessary steps to recycle the used water/ waste water before discharging it to the sewerage system or before using it for some other purposes such as toilet flushing or gardening. Some factories have established their own waste water treatment plants whereas others have given it as a contract to a third party. Material re-use is another EMP adopted by factories in the sample. Different types of waste materials are generated such as fabric waste, cones, bulbs, water, dye, paper, cardboard, tires, food, etc. Some of these waste materials are used for the second time by factories or others. For example; fabric wastes are used at the canteen, factory floor, for boilers etc. Used cones are reused for the same purposes. Paper waste is used for making bags, and in the canteen as welfare services. Tires and plastic cans are used for gardening purposes. The fourth environmental practice is the issuance of environmental audits by factories. Environmental audits are conducted by two parties. Internal audits are carried out by compliance department, maintenance department or engineering department. They compare the energy targets, and environmental related targets with the actuals. The external audits are conducted by either certification bodies or buyers, or agents from buying office. These EMPs are presented in Table 02.

TABLE 02
Description of Environmental Management Practices

Variable	Mean Value	Description of the Variable (1= Yes; 0 = No)
ISO 14001	0.27	Factory has obtained the ISO 14001 certificate
Water Recycling	0.42	Factory recycle used water by the factory itself or contract out before releasing to sewerage system
Material Reuse	0.87	Factory re-use fabric waste, paper waste, recycled water, cans, tyres, cones, any other items
Environmental Audits	0.67	Factory produces or issues environmental audits

Source: Author constructed based on survey data.

As per the Table 02, 87% of factories have practiced material re-use whereas 67% of factories prepare environmental audits. Only 47% of factories engaged in water recycling within this sample. Among the sampled factories, only 27% of factories have obtained ISO 14001 certification. It is evident that most of the practices are positively correlated with each other practice. For example; if the factory adopted a water recycling procedures, the factory has re-used water as material reuse. Hence we summated the total number of practices adopted by each factory as presented in Table 3. The EMP in model (2) can take five possible values: 0, 1, 2, 3 and 4, where 0 refers to no EMP as presented in Table 2. For example: 1 indicates that only one of these four EMPs is undertaken.

TABLE 03
Number of EMPs Undertaken by Factories

No. of EMPs	Freq.	Cumulative Freq.	Percent	Cumulative Percent
0	2	2	4	4
1	15	17	27	31
2	16	33	29	60
3	12	45	22	82
4	10	55	18	100

Source: Factory survey.

Based on our literature review, we hypothesize that internal factors, for example: firm size, type of activities undertaken, location within an export zone and external factors, for example: pressures from different parties including market-orientation, affect factory's adoption behaviour. Firm size is measured through the number of factories owned by the company (*nofactories*). Market orientation of the factory was controlled using a dummy variable that takes the value 1 if more than 90% of its sales are exported, and 0 otherwise (*i_foreignexp*). Type of activities undertaken by a factory is captured by six dummy variables that represent factories engaged with dyeing, washing, weaving, apparel manufacturing, embroidery, and accessories (*i_dye*, *i_wash*, *i_weaving*, *i_apparel*, *i_embroid*, and *i_access*, respectively). The role of monitoring and enforcement or regulatory pressure could not be directly measured since none of the 55 factories had been fined (even though 54 out of 55 have been inspected). However, a variable was created (*av_pressure*) that indicates the firm's perception on overall pressure it feels from different sources (regulatory and market) to comply with environmental standards. Finally, it was determined if the factory is located within an EPZ or not (*i_boiepz*). The model that is presented here provides the best fit to the data. Other explanatory variables were available in the database depicted in Table 04 and some of them were not used in the model to avoid multicollinearity problems.

The survey recorded information on a number of factors as proxies for the explanatory variables identified as legislative pressures, market based pressures and factory characteristics. These include location, years in operation, type of company, share of foreign exports, monthly sales, number of employees and type of activities undertaken by a factory. Managers were also interviewed about certifications received by the factory, EMPs and presence of environmental audits at the factory level.¹³ In addition to factory's characteristics, we were interested in the impact of regulatory pressures and market pressures. Managers were, thus, questioned about

¹³This information was reported by the interviewees. We visited all of the 10 case study factory sites.

inspections by environmental officers and fines they may have been received. Finally, they were asked to evaluate the level of pressure (on a scale from 1 to 5) for compliance with environmental regulations and/or adoption of EMPs, they may have received from i) the Apparel Exporters Association (AEA); ii) the Central Environmental Authority (CEA); iii) the local community; iv) from the buyers, and v) from the owners.¹⁴

In addition to the industry survey, in-depth interviews were conducted with the identified stakeholders. At present, there are 86 Senior Environmental Officers (SEO), 150 Environmental Officers (EO) and 250 Deputy Environmental Officers (DEO) at CEA's provincial and district offices, who are responsible for monitoring and licensing industries in all sectors.¹⁵ Most of them are graduates from the science stream. Further, they are regularly given local as well as overseas training. There are 6 SEOs and 4 DEO and EOs at the CEA head office and they carry out inspections in factories within the Western province. In practice, a SEO goes with a DEO or EO for inspections.

Based on their inspections and complains made by public, CEA issues legal notices to the factories which violate regulations. The most common violation is non-renewal of license. In 2013, across all industrial sectors, there were 53 cases filed (39 were finalized) and 65 EPLs were cancelled (none related to textiles and apparels). The time taken to finalize a case varies. Some factories are required to establish an effluent treatment plant or to change their waste handling methods, which may require considerable time. According to the legal department of the CEA, only one textile manufacturing factory was fined for excessive water pollution during the year 2013 (this factory was not a BOI registered factory). All the variables used in the study are presented in Table 04.

¹⁴ Owners represent owner- entrepreneurs of the factories if it is a sole proprietorship, partnership or a public limited company. If it is a public limited company the owner represents the Chairman or Managing Director. If it is a branch of the foreign company the owner represents the foreign entrepreneur.

¹⁵ During 2013, for category A industries, after inspecting 1,192 factories across all industrial sectors, a total of 1,006 new EPL were issued; and after inspecting 2,236 factories, 2,188 EPLs were renewed. For Category B industries, 938 new EPLs were issued after completing 1,137 inspections and 793 were renewed out of 870 inspections.

TABLE 04
List of Variable and their Definitions

Variable	Mean	Description of Variable
i_Colombo	0.45	Equal to 1 if the factory is located in Colombo district, 0 otherwise
i_Gampaha	0.42	Equal to 1 if the factory is located in Gampaha district, 0 otherwise
i_Kaluthara	0.13	Equal to 1 if the factory is located in Kaluthara district, 0 otherwise
i_boiepz*	0.6	Equal to 1 if the factory is located in a BOI or EPZ zone, 0 otherwise
yearsestab	16.85	Number of years since establishment of the factory
i_solep	0.15	Equal to 1 if the company is in sole proprietorship, 0 otherwise
i_partner	0.11	Equal to 1 if the company is in partnership, 0 otherwise
i ltdliab	0.33	Equal to 1 if the company is a limited liability company, 0 otherwise
i_group	0.29	Equal to 1 if the company belongs to a group of companies, 0 otherwise
i_brforeign	0.13	Equal to 1 if the company is a branch of a foreign company, 0 otherwise
nofactories*	8.49	Number of factories owned by the company
i_foreignexp*	0.91	Equal to 1 if more than 90% of sales are exported, 0 otherwise
i_salesgr15	0.78	Equal to 1 if average monthly sales are greater than 15 M SLR, 0 otherwise
totalemployees	843.2	Total number of employees in the factory
sh_managers	0.04	Proportion of managers
i_dye*	0.25	Equal to 1 if dyeing activities are done at the factory, 0 otherwise
i_wash*	0.27	Equal to 1 if washing activities are done at the factory, 0 otherwise
i_weaving*	0.11	Equal to 1 if weaving activities are done at the factory, 0 otherwise

(Table 04 continued)

(Table 04 continued)

i_apparel*	0.71	Equal to 1 if apparel is produced at the factory, 0 otherwise
i_accesso*	0.07	Equal to 1 if accessories are produced at the factory, 0 otherwise
i_embroid*	0.16	Equal to 1 if embroidery activities are done at the factory, 0 otherwise
nostaffems	12.29	Number of staff involved in EMS
i_degree	0.53	Equal to 1 if the highest qualified person in charge of EMS has a degree, 0 otherwise
i_iso14001	0.27	Equal to 1 if the factory is ISO 14001-certified, 0 otherwise
i_iso9001*	0.38	Equal to 1 if the factory is ISO 9001-certified, 0 otherwise
i_recycle	0.42	Equal to 1 if the factory is doing some water recycling, 0 otherwise
i_reuse	0.87	Equal to 1 if the factory is reusing any material (e.g. fabric, paper, or water), 0 otherwise
i_envaudit	0.67	Equal to 1 if the factory has undertaken some environmental audit, 0 otherwise
i_fines	0	Equal to 1 if the factory had to pay fines due to noncompliance with environmental regulations, 0 otherwise
i_inspect	0.98	Equal to 1 if the factory has been inspected, 0 otherwise
AEA pressure	2.22	Level of pressure from the Apparel Exporters Association (AEA), scale from 1 (no pressure) to 5 (highest level of pressure)
CEA pressure	3.44	Level of pressure from the Central Environmental Authority (CEA), from 1 to 5
Community pressure	2.29	Level of pressure from the community, from 1 to 5
buyer pressure	3.96	Level of pressure from the buyers, from 1 to 5
ownerpressure	3.76	Level of pressure from the owners, from 1 to 5
av_pressure*	3.13	Average level of pressure, from AEA, CEA, community, buyers, and owners

Source: Author constructed based on survey data.

4. Results

Most of the regulators interviewed indicated that they were moderately satisfied with the overall monitoring and enforcement process in the textile and apparel sector. They identified several factors that appear to positively influence compliance in this sector:

1. The dominance of apparel manufacturing (dry process) is itself a major factor since these firms are less polluting in general.
2. Another important factor that repeatedly came up was pressure from foreign customers: major buyers, mostly from Europe and the USA, make indirect pressure on Sri Lankan factories to comply with regulations and even international standards. To cite the Deputy Director General, Environmental Pollution Control, Central Environmental Authority *“90% of the Sri Lankan textiles and garments go to Europe and the USA, where they are concerned about environmentally friendly production methods. If a company does not obtain an EPL certificate and test reports; such as noise level report, ambient air quality report, waste water treatments’ reports etc., the foreign buyers will withdraw their orders from the factory.”* The factory managers who were interviewed also confirmed that they felt pressure from their international buyers. They further mention that the foreign buyers conduct their own audits, which cover employees' health and safety, production techniques, employee payments as well as environmental practices of the factory.
3. Regulators recognize that the public has also become cognizant about environmental issues with an active media that frequently reports on industrial pollution. For instance, one recent incident in a rubber manufacturing factory was reported by media and the factory was closed down as a result of community unrest. Chemical waste from this factory had contaminated local water bodies and raised severe health issues among villages (Ratnakara, 2013).
4. Regulators also believe that the CEA staff is relatively well qualified to monitor environmental pollution. All CEA staff members are graduates and have completed some form of relevant training (locally or internationally).

Based on the interviews the following issues in the implementing and monitoring are identified:

1. Number of staff is not sufficient to ensure proper monitoring. Because of the small number of staff, a factory is generally inspected only when an EPL is given or renewed. EMDs in the EPZs also suffer from staff shortages. Usually there are two to three inspectors allocated to each EPZ, while each zone commonly gathers more than 50 factories.
2. Furthermore, the laboratory facilities within the EPZs are not adequate and the environmental officers sometimes have to send samples to laboratories located outside the zone, which causes enormous delays and expense.
3. CEA officials further pointed out stringent penalties and legal bottlenecks. Many of the regulators opined that the level of fines charged to non-compliant factories

is generally small and does not provide much incentive to factories to comply with standards. In fact, the CEA has recently requested the Attorney General and the Legal Draftsman Division to increase the current fines. The CEA is also not directly responsible for fines, which have to be mandated by the courts. There are specific amounts of fines for different violations.¹⁶ In practice, the CEA does not consider fines for first time violations.

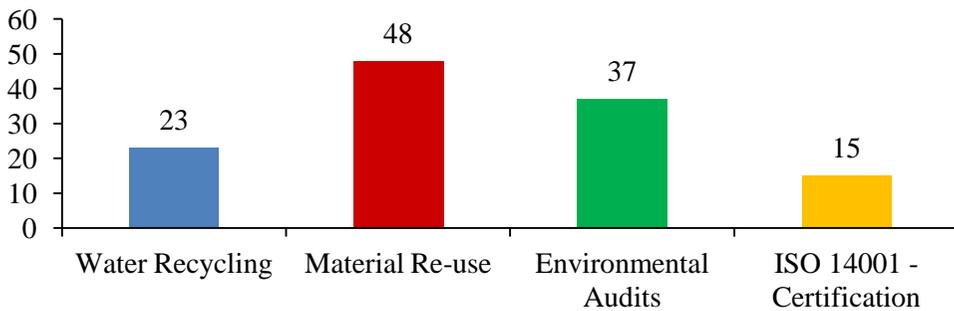
4. The whole judiciary process can take time due to practical reasons such as the number of cases to be handled by the district courts in a day, shortage of officers, etc. On average, a case can take several months to years. Thus, legal delays seem to be a major deterrent to effective implementation of regulations. They follow several prior steps such as warning in writing, filing a case, hearing a case, giving chances for appeals etc. The process is as follows:
 - i. If the CEA finds any violations through their inspections or sometimes as a result of complaints made by the community, they start their legal actions.
 - ii. The CEA conducts inspections once again to collect the evidence.
 - iii. With the collected evidence CEA files, a case against the company.
 - iv. Within the given ranges of fines under different violations, the final amount is set by the court.

According to the industry survey, 60% of the firms are located within an EPZ and 91% are export oriented (i.e., more than 90% of their sales are made outside the domestic market) (Table 04). The average length of operation of a factory is 17 years and has an average of 843 employees (ranging from 35 to 3,800). Per Sri Lanka's industry laws, a factory is large scale if it has at least 25 employees. Thus, 100% of the factories surveyed are large factories per their number of employees. Furthermore, 90% of factories are classified into category A or B due to the number of employees per shift.

Figure 01 depicts environmental management practices among the surveyed factories: 27% (15 factories) are ISO 14001-certified, 42% have water re-cycling, majority (87%) re-use material (e.g. paper and fabric), and 67% have had environmental audits. Only two factories do not undertake any EMPs, while 18% (10 out of the 55) factories are ISO 14001-certified, recycle water, reuse material, and have been audited on their environmental practices. Of those factories undertaking only one EMP, the most common practice is material reuse (11 out of 15 factories). This suggests that material re-use is one of the easiest or least-costly EMPs that firms can adopt.

¹⁶ 1) If waste water discharge exceeds the standards set by the Act - SLR 15,000 – SLR 120,000; 2) If the factory exceeds the standard level of noise pollution – SLR 15,000-120,000; 3) An industry operating without having an EPL – SLR. 10,000 to 100,000 plus 1 year imprisonment or could be both; 3) In addition to the above mentioned 3 cases, there is fine on violation of EIA assessment. Maximum to SLR. 10,000; and 4). In case of air pollution, there is no specific fine stated by the act due to inability to measure air pollution from the industry.

FIGURE 01
Number of Factories Adopting Each of the Four EMPs



Source: Author constructed based on survey data.

The proportion of factories undertaking each of the four EMPs between factories outside an EPZ (22 observations) and factories located within an EPZ (33 observations) is 2:3. On average, the factories that are located within an EPZ engage more often in voluntary water recycling, are more often audited, and are more likely to have an ISO 14001 certification. Simple statistics show that factories located within an EPZ have more employees, on average, than factories located outside an EPZ but the difference is not statistically significant. In general, a factory being located in an EPZ seems to make it more environmentally friendly.

Factories with washing and dyeing operations (10 observations) were compared with the factories with dry operations (45 observations). Dyeing and washing are activities that require large quantities of water and contribute to water pollution in the textile and apparel sector. However, contrary to this generally held view, the factories that do washing and dyeing operations are more likely to voluntarily adopt the four EMPs within the surveyed factories. Thus, these firms appear to be taking on additional practices to clean than inherently dirtier sets of activities.

Management attitude regarding pressure from different stakeholders are measured from a 1-5 scale measurement. The strongest pressure comes from the buyers (3.96 on average) followed by the owners (3.76), while Apparel Exporters Association (AEA) and the community exert the least influence on factory managers' compliance decisions (Table 04).

The regression results are shown in Table 05. The Wald test indicates an overall significance of the model even if the Pseudo-R² is only 0.09. The average marginal effects indicate the expected change in the number of EMPs following a one-unit change in the corresponding explanatory variable. Our results in Table 05 show that factories belonging to larger companies (as measured by the number of factories belonging to the same company) are significantly more likely to undertake more EMPs. This suggests that there may be some economies of scale in

implementing EMPs, i.e., the larger the scale or replicability of the EMP practice, the more likely there will be a corporate strategy for adopting EMPs.

TABLE 05
Poisson Model, Maximum Likelihood Estimation Results (55 Observations)

	Coef.	Robust Std. Err.	P>z	Average Marginal Effect	P>z
nofactories	0.011***	0.004	0.007	0.024***	0.008
i_foreignexp	0.693***	0.169	0.000	1.200***	0.003
i_access (ref.)	-	-	-	-	-
i_dye	0.853***	0.167	0.000	2.437***	0.000
i_wash	-0.450***	0.152	0.003	-0.945***	0.000
i_weaving	0.257	0.194	0.184	0.640	0.236
i_apparel	0.334**	0.147	0.023	0.717*	0.051
i_embroid	-0.159	0.139	0.252	-0.337	0.218
i_iso9001	0.287***	0.107	0.007	0.655**	0.014
av_pressure	0.021	0.071	0.762	0.048	0.761
i_boiepz	0.207*	0.108	0.055	0.453*	0.088
constant	-0.610*	0.357	0.088		
Wald chi2(10)	74.73				
Prob>chi2	0.0000				
Pseudo R2	0.0851				

*, **, *** indicate significance at the 10, 5, and 1 percent level, respectively.

Source: Author constructed based on survey data.

As expected, a higher proportion of sales directed towards the foreign markets are associated with a significant increase in EMPs. The type of activities undertaken by the factories also has a significant impact on the number of EMPs: factories that run dyeing operations, the most polluting activity, adopt 2.4 additional EMPs on average relative to factories associated with accessories (category of activity used as the reference), while washing is associated with a reduction in the number of EMPs (-0.9 on average). Factories that produce apparel are also more likely to engage voluntarily in EMPs (the marginal effect in terms of EMPs is estimated at 0.7). One possible explanation for the latter result (something discussed during the face-to-face interviews) is that apparel manufacturers directly deal with

buyers whereas weaving and embroidery factories do not (they usually supply apparel manufacturers on contract basis). It is also interesting to note that, among BOI-registered firms, the most generally polluting firms, i.e. dyeing factories, undertake more EMPs. This suggests that even the most polluting firms can be transformed under the right circumstances.

The coefficient on ISO 9001-certification is significant and associated with 0.7 additional EMPs, which suggests that factories that are certified by external bodies adopt a higher number of EMPs. The ISO-9001 certification process is not focused on environmental issues. Yet, it seems to have a broader environmental effect on factories. It is also possible that such factories are also more open and pre-disposed to issues of sustainability and environmental management.

The coefficient of the variable on pressure from different sources is positive but not statistically significant. Finally, being located in an EPZ increases the number of EMPs voluntarily adopted, which might reflect some (positive) peer or neighbouring effects (i.e., factories might be influenced by what other factories within the EPZ are doing).

5. Discussion and Conclusion

The textile and apparel industry is almost equally divided between textile manufacturing and apparel manufacturing factories in the Sri Lankan context. Because of the relatively large presence of apparel manufacturing factories, Sri Lanka's textile and apparel industry is relatively less damaging to the environment. This is probably one reason why the level of compliance to environmental regulations in the textile and apparel sector is high in Sri Lanka. In a survey of 55 firms, it was found that 96% had implemented at least one environmental management practice and that almost all had been inspected but never fined. Further, discussions with officials from the Central Environmental Authority and BOI also suggest that compliance is moderately satisfactory.

One of the main reasons that the Sri Lankan textile and apparel sector operates with high voluntary environmental standards is because of the pressure from the international buyers from Europe and the USA. A majority of the firms surveyed had gone through environmental audits conducted by representatives of the major brands. The role of international buyers was also emphasized by the factory managers who were interviewed.

Several factory level characteristics influence a factory's decision to adopt environmental management practices. A factory that belongs to a group of firms is more like to increase its adoption of EMPs relative to a single factory. The type of production activity a factory is involved in is clearly important for the adoption decision. Since apparel is a dry production process, most apparel producers voluntarily adopt EMPs. Interestingly, in the acquired dataset, factories that engage in more polluting activities (such as dyeing and washing) also adopt more EMPs. This is likely because these export-oriented factories are trying to make sure that their production is clean and *perceived* to be clean. Factories are also likely to adopt EMPs if they are ISO 9001 certified, even though this certification is not related to the environment. It is also interesting to note that factories within export processing

zones fare better than those outside in terms of their environmental practices. Buyer's pressure also has a significant influence on factory EMP adoption. This is a major finding that emerges from the econometric analyses of factory level survey data.

The message for the policy maker is that the export oriented producers adopt more voluntary environmental practices. Another important finding is that, easily, any firm can adopt at least a few environmental management practices without a significant amount of investment. For example: reuse of materials and conducting environmental audits are helpful in their participation to voluntary practices as well as to reduce costs and wastes. Therefore, in their awareness raising and networking activities for the industry, policy formulating and monitoring bodies should emphasize how firms can gain in terms of accessing a broader market, improving their reputation and obtaining some internal savings by adopting EMPs.

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Appendix: Major Provisions in the Environmental Regulations of Sri Lanka

Rule / Act No	Clause	Remarks
National Environmental Act, No 47 of 1980	Section 9	Appointment of District Environmental Agency
	Section 10 (1)	The powers, functions and duties of the Authority
	Section 23	Environmental research
	Section 24	Furnishing of information
	Section 25	Appointment of analysts and Pollution Control Officers
	Section 31	Violation of the Act and regulations and fines
National Environmental (Amendment) Act No 56 of 1988	Section 10	Increase of power, functions and duties of the Authority
	Section 23A	Prohibition of the discharge, emission of deposit of waste into the environment
	Section 23B	Issue of a license
	Section 23C	Refer the application to Government Department or Public Corporation
	Section 23D	Suspense or cancellation of license
	Section 23E	Appeal against refusal of license
	Section 23G	Restriction on regulation and control of pollution of the inland waters.
	Section 23H	Pollution of inland waters of Sri Lanka
	Section 23L	Failure to fit and maintain prescribed control devices an offence
	Section 23U	Failure to comply with notice an offence
	Section 23X	Certificate to be prima facie evidence of facts stated therein.
	Section 23AA	Approval of prescribed projects
	Section 23BB	Submission of environmental impact assessment report

(Appendix continued)

	Section 24A	Power to enter and inspect
National Environmental (Amendment) Act No 53 of 2000	Section 23A	Power to issue a license
Environmental Protection License Prescribed activities (Gazette notification No 1533/ 16 of 25 01 2008)	Section 23A	Prescribed activities for which a license is required
National Environmental (Protection and Quality) Regulations, No. 1 of 2008	Section 23A	Issuance of EPL for emission or disposal of waste

Source: National Environmental Act, No 47 of 1980, National Environmental Regulations 2008, 1998.