The impact of ICT in large scale agricultural producers' productivity; evidences in Kandy district

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1. Introduction

In this rapidly developing modern world, Information and Communication Technology (ICT) plays a significant role in every single aspect of human life. ICT tools can play a vital role in uplifting the standards, accuracy and efficiency in every industry. ICT includes a broad range of converging technologies, including smart devices, Geographic Information Systems, remote sensors, satellites etc. (Corpin, 2021). There is already an increasing trend towards adapting to ICT in almost every sector. Agriculture sector is no exception. The agriculture sector significantly contributes to the country's economy. Being the backbone of the economy of Sri Lanka, agriculture sector contributes 8.36% to the country's GDP (O'Neill, 2021). The agriculture sector is facing major challenges in increasing productivity at a time when natural resources required for production are declining. However, increasing demand for agricultural products also provides opportunities for producers. The agriculture sector faces a number of significant challenges especially in developing countries due to price shocks, climate change and the continuing lack of infrastructure (Das, 2013). Today digital devices are being extensively utilized by agricultural producers in providing solutions

In Sri Lankan context, majority of the producers are small scale farmers, but the sector is dominated by the less number of Large Scale agricultural producers (LSAP). They play a vital role in Sri Lankan agriculture sector while contributing to the country's economy significantly.

In general, the adaptation to ICT tools is less prominent in the Sri Lankan agriculture sector, still LSAP utilize ICT in their business context compared to small scale farmers/ producers. Use of ICT helps LSAP to deal with suppliers and consumers, to determine the potential markets, to monitor and regulate their stocks, prices, quantities depending on demand fluctuations and to do various predictions on the entire process. The purpose of this study was to examine the impact of ICT on productivity of LSAP.

2. Materials and Methods

The methodological approach for this study was the descriptive quantitative method which collects data from the LSAP to make interpretations in a numerical way. In this quantitative research, the researcher has used a survey as the research strategy. Data were collected via a questionnaire distributed among the LSAP in Kandy district.

The researcher has identified 3 variables to measure the impact of ICT on LSAPs productivity. Therefore, convenience, accuracy, and efficiency were defined as the independent variables whereas productivity was the dependent variable.

When considering the dependent variable, productivity, it is about achieving the best output using the available inputs (Jona-Lasinio, Haskel & Corrado, 2021). The convenience of a particular agri-business is a judgment made by users/business owners themselves according to their sense of control over the access and the use of the service. Increased convenience of the firm operations enhances the productivity of the entire firm (Farquhar & Rowley, 2009). Accuracy is described as the level of measurement that yields true and consistent information (Wilkerson & Lang, 2003). According to Wilkerson & Lang, 2003, accuracy of data is a crucial

component in measuring productivity. Agriculture sector, being a hard-to-predict sector compared to other sectors in the world of business, requires more accurate and precise data in order to make appropriate decisions and to make predictions. The concept of efficiency is closely related with the productivity. Input-output relationships are greatly bounded with both these concepts. For instance, if a company is obtaining a maximum output from a least input within a least time period, it is identified as an efficient process.

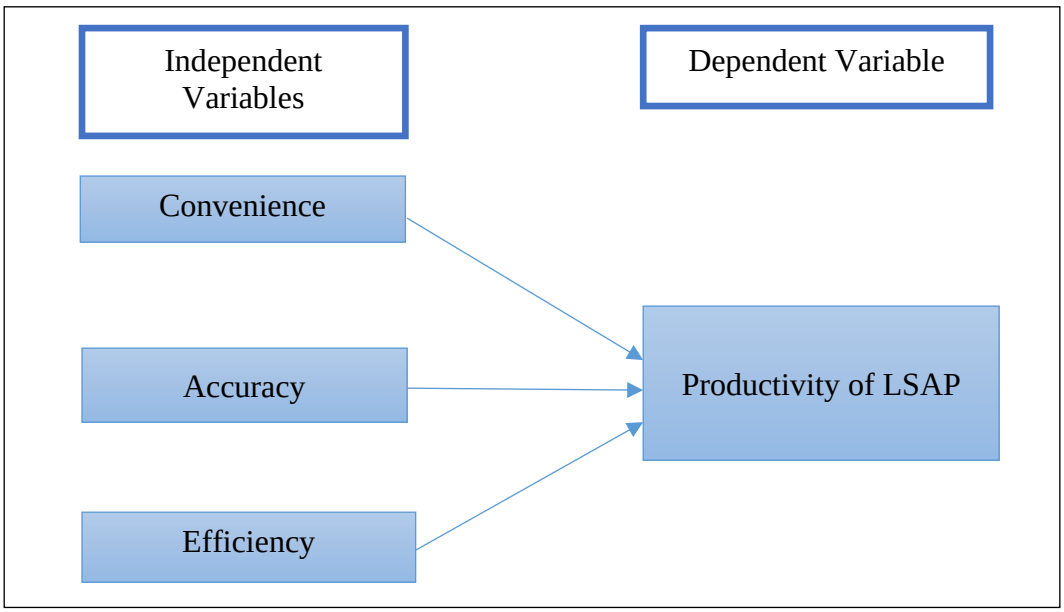

Figure 3. Conceptual framework (developed by the authors - 2021)

The total population of the study was all the LSAPs in Kandy district. The researcher was unable to find the exact population in the study since there were few obstacles that occurred while finding the exact population. Because of that the researcher used the convenience sampling method which is a non-probability sampling method. Therefore, the researcher selected 50 companies representing different natures of agribusinesses which are LSAP in Kandy district which report a high annual average output and which gives a significant contribution to the export sector, as the sample. This study was mainly based on primarily collected data from the selected sample; therefore, questionnaires were the main instrument of data collection. First part of the questionnaire consisted of demographic questions. Five point Likert scale was used in the second part of the questionnaire. The researcher additionally used secondary data from company profiles in gathering information on utilization of ICT, financial information, and production.

3. Results and Discussion

The researcher analyzed the collected data by using the SPSS analytical tool. Reliability and validity are the concepts used to evaluate the quality of the research. Hence, the researcher has used internal consistency method to test the reliability of the questionnaire. According to the reliability test coefficient alpha (α) values were 0.783, 0.758, 0.736, 0.707 for convenience, accuracy, efficiency and productivity respectively. Therefore, all the independent and dependent variables were considered as reliable since all the values were above 0.7. Validity is defined as the extent to which a concept is accurately measured in a quantitative study. The researcher mainly focused on construct validity to measure the validity of the questionnaire.

Data was analyzed using two statistical techniques; descriptive statistics and inferential statistics. Descriptive statistics are used to analyze demographic factors to describe the basic

features of the sample of the study. (Mean, mode, median, standard deviation, variance and skewness). The study revealed that the most respondents are from the LSAP of tea sector, while being the highest output provider too. LSAP in cocoa (chocolate) sector marked the highest number of employees owned within the sample. Also, average utilization of ICT-related devices was highest in the cocoa sector as well. Inferential statistics allows making predictions from collected data and making generalizations about the population.

According to Pearson correlation coefficient analysis the relationship between convenience and LSAP productivity has a positive relationship with a value of 0.433. The p value is 0.000 which shows a significant relationship between convenience and productivity. It implies that the convenience level gained by utilizing ICT devices in firm operations, positively affects the productivity of LSAP. As a sector dealing with a tremendous amount of statistical data, it's difficult to engage in manual calculations of data. Therefore, the study reveals that utilizing ICT in such operations makes it more convenient to enhance its productivity. The relationship between accuracy and LSAP productivity has a positive relationship with a value of 0.524. The p value is 0.001 which shows a significant relationship between accuracy and productivity. It demonstrates that the accuracy of the digitalized data of a company leads to obtain a higher productivity. Because, accurate data ensures accurate decision making and predictions on agriculture sector. The relationship between efficiency and LSAP productivity has a positive relationship with a value of 0.478. The p value is 0.000 which shows a significant relationship between efficiency and productivity. This illustrates that efficiently acquired data, through utilization of ICT tools and knowledge on ICT enhances the productivity. All three independent variables showed a significant positive relationship with productivity. Also, above values illustrate that accuracy has the strongest relationship with the productivity of LSAP. This can be further explained as follows; large scale agricultural production sector deals with an immense amount of data based on many farming operations that are tough to handle manually. Hence, the accuracy of such data and processed information is questionable. Adaptation of ICT helps reaching accurate decisions through accuracy of data. Therefore, accuracy shows the strongest relationship.

Regression analysis was used to determine the relationship between the dependent variable and one or more independent variables. The researcher used a multiple regression analysis to measure the hypothesis of this study. According to the results, Beta (ß) values were 0.123, 0.547, 0.149 for convenience, accuracy and efficiency respectively. Only accuracy and efficiency were significantly related and p values were 0.000 for both variables. Convenience took 0.749 for the p value which showed insignificant relationship with the dependent variable.

The coefficient of multiple regression analysis indicates the percentage of variation in a dependent variable explained by the combination of all independent variables. It indicates the goodness of fit of the model. The r2 value for the current study was 0.581 which represent that the 58.1% of the variance in the dependent variable is explained by the independent variables.

4. Conclusions

The main objective of this research was to investigate the impact of ICT on LSAP. Therefore, the researcher collected information randomly from 50 LSAP. This study concluded that convenience, accuracy and efficiency gained by utilizing ICT have a positive relationship with LSAPs productivity while accuracy having the highest relationship with productivity. In conclusion, although adaptation to ICT tools is less prominent in Sri Lankan agriculture context, this study revealed that ICT imposes a positive impact on the productivity of LSAP. The study lays a basis for other agricultural producers to improve productivity with the use of ICT.

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