Evaluation of the Adoption Behavior of Barn Automation Technology in Flue Cured Tobacco Industry in Sri Lanka

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Introduction

Tobacco is a well known profitable cash crop cultivated in different areas of Sri Lanka. Curing considered as the one of the major process in primary processing of tobacco. Curing of tobacco is done in barns. It was stated that stabilization of the barn in given temperature till end of each stage is extremely important to obtain desired characteristic. There are lots of drawbacks observed in manual barn controlling. To overcome these constraints after several years of successful experimentation one farmer introduced an automated furnace in year 2001. Introducing of an automated furnace was recognised as a revolutionary change by the experts of the tobacco industry. Therefore company expected to grater adoption rate with in a shorter period. Population of barn owners in flue cured tobacco industry is about nearly 2000 (BAT leaf system). However, the automated furnace has only adopted in 54 barns up to now. Therefore even after four years of implementation the expected progress in adoption to the technology has not met. Therefore this study was conducted to evaluate the different dimension of adoption behavior and identifying the determinants of non adopter's intention to use the automation technology.

Methodology

Two field surveys have been conducted to achieve the objectives of the study. First survey was conducted to evaluate the adoption behavior through different dimensions which were illustrated in the theory of planned behavior (Mathesion, 1991). All the technology adopters have been used for the survey one since there are only 54 technology adopters. Structured questionnaire was used to collect the data. Data were collected from the technology adopters who have registered Galewela and Polonnaruwa Depot. Data were analyzed by using variant analysis and Bi variant analyses Second survey was conducted to evaluate the impact of the different determinants of non adopter's intention to use the automation technology.150 non adopters sample was selected for the survey two. Stratified random sampling technique was used to select the sample. Each depot is considered as the strata. Structured questionnaire was used to collect data. Logistic regression was used as the analytical tool to analyse the data. Fourteen variables have been considered as predictor variables in the regression model.

Results and discussion

According to survey one, External influence (EI) toward the adoption, self efficacy (SE) of the technology, facilitating condition (FC), perceived user friendliness (PUF) were recorded 3.5836, 4.5256, 4.2179 and 4.5705 mean values respectively. It depicts that respondents almost agreed with these dimensions. Considering the interpersonal influence (II) toward the adoption, self control of decision (SE) and perceived use fullness (PU) 3.2628, 3.3333 and 3.3713 mean values have recorded denoting that respondents are moderately satisfied

with these dimensions. Descriptive Statistics and correlation between dimensions of adoption

Behavior is given in Table 1.

Table 01: Descriptive Statistics and Correlation between Dimensions of Adoption Behavior

	Mean	SD	Covariance	EI	II	SC	SE	FC	PU
EI	3.5836	0.3811	0.1452						
II	3.2628	0.7023	0.4933	0.0195					
SC	3.3333	0.3409	0.1162	**-0.044	0.387				
SE	4.5256	0.5281	0.2789	0.2087	-0.0142	0.134			
FC	4.2179	0.5262	0.2769	-0.002	**0.375	0.2628	**0.3108		
PU	3.3713	0.4066	0.1653	0.0022	**0.4875	***0.5113	0.1009	0.1844	
PUF	4.5705	0.4831	0.2334	0.203	0.0264	0.213	**0.4226	**0.3585	0.2089

* P< 0.1 * *P< 0.05 ***P< 0.01

Self control of decision has shown negative correlation with the external influence. Both interpersonal influence and self efficacy of the technology were indicated positive relationship with the facilitating condition of the technology. Other than these perceived user friendliness of the product have shown positive relationship with the self efficacy of the product.

Table 02: Reduced Logistic Regression Model for the use in Barn Automation Technology

Variable	**Marginal Effect**	**Coefficient**	**Std.Err**	**Z**
Constant		6.2808	1.9188	4.34
Awareness ***	0.7370	8.3306	1.5963	1.86
Attendance*	0.0778	2.9717	0.0441	-0.41
Experience *	-0.0004	-0.0181	0.2547	1.75
Education *	0.0117	0.4468	0.7312	-2.52
Industrial uncertainty**	-0.0342	-1.3073	0.6425	-2.03
product cost**	-0.0482	-1.8425	3.6429	1.72

* P< 0.1 * *P< 0.05 ***P< 0.01 n=150 Pseudo R^2 = .8305

According to the logistic regression, six variables have indicated significant relationship with non adopter's intention to use the automation technology (Table 2). Technology awareness, attendance to the farmer training programmes and barn owner's education level have shown positive relationship with the non adopter's intention to use the technology. Barn owners technology awareness was significant in the 99% confidence level while other two significant in the 90% confidence level. Barn owners experience in the industry,

attitude towards the industrial uncertainty and production cost have indicated negative relationship with the non adopters intention to use the technology. Attitude towards the industrial uncertainty and attitude towards the production cost were significant in the 95% confidence level. Barn owners experience have significant in the 90% confidence level. Considering the overall suitability of the model, probability value is recorded as 0.0000. It was highly significant in the 99% confidence level. Considering the overall readability of the model, pseudo R squared is recorded as 0.8305. It denotes that 83.05% variation of the non adopter's intention to use the automation technology can be described by the variable combination of the model. Finally this model is identified as the best fit model to explain the non adopter's intention to use the automation technology.

Conclusions

Facilitating conditions for the barn automation technology have improved the interpersonal influence to adoption and self efficacy of the technology. External influence has reduced the barn owners self control of decisions and perceived user friendliness improves the self efficacy of the technology. Lack of awareness regarding the barn automation technology has highly affected in reducing the non adopters intention to use the automation technology. Lack of training regarding the barn automation technology have affected negatively to the non adopters intention to use. Non adopters believe that automation technology is an additional cost for their production since they already reach to high production cost. This negative attitude has discouraged the non adopters intention to use the technology. Industrial uncertainty also affect negatively to the intention to use the automation technology since majority does not have confidence about the future stability of the industry. Barn owners who have long term experience in the industry are reluctant to adopt for automation technology since they used to the manual barns. Non adopters intention to use the technology is enhanced with the education level of barn owners

References

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