SCIENTIFIC INFORMATION

Does intention lead to behaviour? A case study of the Czech Republic farmers

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Abstract: Agricultural development in both developed and developing countries is mainly dependent on the technology adoption by the farmers. Technology adoption depends on the farmers' beliefs and motives. Many researchers have found that there is a significant difference between intention and the actual behaviour. What an individual intends to do may not be what an individual actually does. Therefore, this paper tries to address the above issue with the farmers of the Southern Moravian region of the Czech Republic. Further, the study tries to identify other possible variables that explain behaviour in the agricultural technology adoption decisions. The theory of planned behaviour has provided a useful framework for explaining the farmers' behaviour. The results showed that intention has explained the behaviour. However, the attitude, the perceived behavioural control, the farmers' age and the farmers' education also show a significant relationship with behaviour. In order to increase the adoptability of new technologies, all these variables have to be taken into consideration by the policy makers and agricultural professionals when designing the agricultural development programmes as well as the technology dissemination programmes.

Key words: attitude, behaviour, beliefs, intention, perceived behavioural control

Over the past years, researchers have attempted to answer the changing questions about the agricultural technology adoption. As a result, a number of research and development institutions have initiated successful sustainable agricultural technologies in the developing world (IIRR 2000). The adoption of new agricultural technologies is an important way to the poverty reduction which is the main problem faced by many of the developing countries. Yet agricultural innovations are often adopted slowly and many of the innovations are underutilized (Pretty 1995). There are many factors that influence the diffusion of these initiatives such as proper policies, levels of investments, promotion and human factor.

In technology adoption, Roger (1993) has categorized the adopters into five categories based on the individuals' adoption behaviour. They are innovators, early adopters, early majority, late majority and laggards. Innovators are the individuals who have a habit of trying new things every time while laggards are the individuals who usually hold strong traditional values and prefer to do what they have been used to do for a long time. Therefore, it emphasises that technology adoption is a psychological process. As a result, agricultural scientists have turned to social scientists, asking for innovative models to understand the farmers' technology adoption process.

However, the structure of farmers' decision making in technology adoption is difficult to understand because of its complexity. This may get worse in developing countries as many are subsistence farmers. Therefore, the research on technology adoption done in developing countries is very scarce (Sambodo 2007).

Many factors are involved in the farmers' decision making. Physical assets available to farmers, their human skills, the access to technology (Feder et al. 1985), the type of farming and the influences from their family members and peer farmers may have an impact on their technology adoption decisions (Zhang et al. 2002; Munshi 2004). This makes farmers behaviour in technology adoption more complex. Individual farmers show a unique behaviour with respect to their own conditions. It leads to behaviour that some farmers quickly take decisions while other farmers are not prompt.

STATEMENT OF THE PROBLEM

When assessing the farmers technology adoption behaviour, the methodology has to consider a number of inter-related factors. Among them, the critical features are the policy framework for farmers, the availability of technical information and the farmers' perceptions, beliefs and motives (Beedell and Rehman 2000).

The theory of Planned Behaviour (TPB) Ajzen (1985) has provided a useful framework for understanding the farmers' behaviour. The TPB explores how different stimuli activate a particular behaviour. The TPB provide a framework to understand farmers' decision making according to their perceptions and beliefs as well as the socio-cultural influences.

However, there were different arguments about the TPB. Hagger et al. (2002) argued that the relationships proposed by the TPB will not be sufficient to predict human behaviour as it is a complex phenomenon. They further mentioned that the relationships suggested by the TPB will not always exist. Further Weber and Gillespie (1998) demonstrated that there is a significant difference between the intention and the actual behaviour. Further, they examined the link between intentions and behaviour and found that, "what an individual intends to do may not be what an individual actually does". As a result, there might be other factors that influence behaviour than intention. Therefore, the relationship between intention and behaviour is important to examine to guide the future research. Thus, the objective of this paper was to examine the link between intention and behaviour of the farmers' technology adoption decisions.

DEVELOPMENT OF CONCEPTUAL FRAMEWORK

The theory of Planned Behaviour

The TPB developed by Ajzen (1985) explains that behaviour is a function of intention. The individual's behaviour is determined by his or her intention towards the behaviour. Intention is build upon three components: attitude, subjective norm (SN) and perceived behavioural control (PBC) and these are predicted from their respective beliefs about the behaviour.

The intention to perform behaviour can be defined as the probability that an individual will engage in a particular behaviour. Intention is determined by the relevant salient beliefs about the behaviour. Consequently, the theory predicts that the stronger is an individual's intention, the more likely the individual will perform the behaviour (Pawlak et al. 2008).

Attitudes toward behaviour refer to the individual's evaluation of behaviour. The evaluation can be positive or negative. Attitudes are influenced by the relevant behavioural beliefs of the behaviour and by the outcome evaluation of the particular behavioural belief. Therefore, attitudes can be quantitatively measured by the expectancy-value framework (Stubenitsky and Mela 2000).

Subjective norms are defined as the individual's perception of the social pressures to perform or not to perform the behaviour. It is a belief of an individual, how significantly the others would like him or her to act on a particular behaviour. Subjective norms are thought to be driven by normative beliefs and the motivation to comply. Therefore, according to the expectancy-value framework, it also could be quantified (Pawlak et al. 2008).

The perceived behavioural control is defined as the individual opinion of the ease or difficulty of performing the behaviour. The situational and internal factors restrict or facilitate performing the behaviour. The perceived behavioural control is influenced by the control belief and the power of the relevant control belief. The expectancy-value framework could be used to measure it quantitatively (Pawlak et al. 2008).

RESEARCH METHODOLOGY

Measuring variables in the TPB

Most of the attitude research follows the Expectancy-Value method. This method is based on the assumption that the attitude towards a behaviour is dependent on the belief about the behaviour and its evaluation

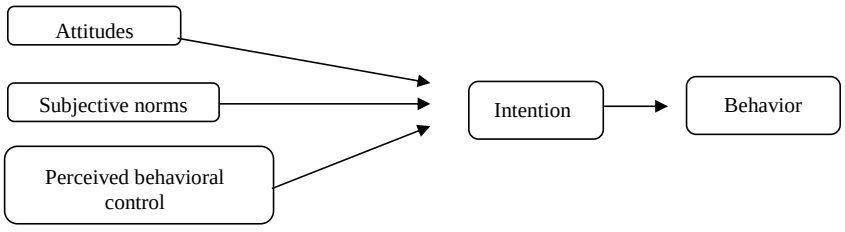

Figure 1. Theory of Planned Behaviour

Source: Ajzen (1985)

(evaluation can be good or bad) (Viklund 2002). The expectancy-value method has three basic components. Belief (b) towards a behaviour, value (v) for the behaviour placed by the individual and expectation or attitude (a) which is the results of the above two

$$a = \sum_{i=1}^{n} b_i v_i$$

According to the concept of the TPB:

$$B \approx I \infty AT + SN + PBC$$

where:
B = behaviour, I = intension, AT = attitude, SN = subjective norm, PBC = perceived behavioural control, bb = behavioural belief, oe = outcome evaluation, nb = normative belief, mc = motivation to comply, cb = control beliefs, p = power

Computable Model of the TPB:

$$B \approx I = \gamma_1 \sum_{i=1}^{s} bb_i\, oe_i + \gamma_2 \sum_{j=1}^{t} nb_j\, mc_j + \gamma_3 \sum_{k=1}^{u} cb_k\, p_k$$

Developing the survey instrument

A structured questionnaire was used to collect the data from the farmers. Questions related to the TPB were assessed based on a five point Likert scale and open ended questions were designed to get the data for background variables. Questions related to the TPB were developed using a manual for constructing questionnaires based on the theory of planned behaviour (Francis et al. 2004).

Sampling method and data collection

The empirical research was carried out in the Southern Moravian region of the Czech Republic from October to December, 2009. The simple random sampling technique was adopted to collect the data. The sample frame was obtained from the Agriculture and Rural Development Agency in the city of Uherské Hradiště. There were large scale commercial farms as well as small scale farms among the sample frame. A mail survey method was utilized to collect the data. Generally, it is accepted that the mail survey method of data collection gives a low response rate. However, this method was utilized for the present study because there were not enough courses available to visit each farmer individually and to conduct face to face interviews. The questionnaire was sent to 120 farm addresses given by the Agriculture and Rural Development Agency. Finally, after several reminders, 36 questionnaires were received for the data analysis. The data analysis was done using the SPSS.

RESULTS

Reliability analysis

Reliability analysis was conducted to ensure that the measured concepts were adequate or reliable (Hair et al. 1998). The most widely used internal consistency measure is the Cronbach's alpha. The Cronbach's alpha for the TPB variables calculated by reliability analysis. The Cronbach's alpha of the variables ranged from 0.848 (very reliable) to 0.630 (reliable). Most of the variables in the model have shown a high internal consistency. Intention and behaviour do not require an internal consistency test because each is represented by a single question (Table 1).

Demographic characteristics

The majority (73%) of the respondents were the farm managers. Eight percent of the respondents were the owners of their farm while the rest belongs to the large scale commercial farms managed by a group of people. Most of the respondents belonged to the age category between 41 to 55 years. The average age of the sample was 53 years. However, the farm sizes varied widely. The smallest farm was of

Table 1. Cronbach's alphas of the variables in the TPB

Variable	Description	Cronbach's alpha
bb	Behavioural beliefs of new technology adoption	0.708
oe	Outcome evaluation of the expected behavioural beliefs	0.726
nb	Normative beliefs of significant others for new technology adoption	0.846
mc	Motivation to comply with their significant others	0.842
cb	Control beliefs of new technology adoption	0.630
p	Power of control beliefs	0.848

Source: Survey data 2009

Table 2. The intention vs. the behaviour

Independent variable	Regression weight	Dependent variable	Beta value	Sig.
Intention	→	behaviour	0.64	0.000
R^2 value			41%	
F-statistics			23.63 ($P < 0.000$)	

Source: Survey data 2009

1 ha while the largest farm was of 2670 ha. The average farmland size was 561 ha. The male domination was visible in the farming community in the Czech Republic as 75% were male farmers. The majority of Czech farmers were well educated and 61% of the sample has received university education. 25% have attended secondary school and 14% have studied in a professional school.

Link between intention and behaviour of the farmers

Table 2 shows the relationship between intention and behaviour. The significant *F*-value explained that the model is valid (23.63, $P < 0.000$). The strength of intention and behaviour was explained by the Beta value and it was 0.64, $P < 0.000$. The model fit value was expressed by the R^2 value and it explained the variance in the behaviour by 41% from the intention.

The behaviour was explained by 41% from the model and the rest 59% was unexplained. However, according to the TPB, behaviour was link to intention. There were studies which mentioned that always behaviour was not explained by the intention. Weber and Gillespie (1998) confirmed that there are significant differences between intention and behaviour. Karami and Mansoorabadi (2008) stated that sustainable agricultural behaviour was explained by 25% and it was a low value. Therefore, intention will not always lead to behaviour. There are evidences that other variables influence behaviour than intention.

Therefore, it is important to examine this link. According to the TPB, behaviour was explained only by the intention. Therefore, it is worthwhile to assess how each of the three components of the TPB model together (attitude, SN and PBC) directly contribute to explain the behaviour.

Link between the TPB components and behaviour of the farmers

Table 3 shows the relationships of the attitude, the subjective norm and the perceived behavioural control with behaviour. The attitude explained the behaviour significantly showing a strong relationship. The Beta value was 0.54, $P < 0.000$. In contrast, the subjective norm does not show a statistically significant relationship with behaviour. The reason for it may be that the data was collected from large commercial farms, where the technologies have already been decided by the farm management. The perceived behavioural control contributed significantly to explain the behaviour with the strength of 0.40, $P < 0.01$. The *F*-statistics (15.18, $P < 0.000$) shows the model was valid. All independent variables together explained the behaviour by 58%. The significant contribution was from the attitude and perceived behavioural control while there was no significant contribution from the subjective norm to the model.

Link between background variables and behaviour of the farmers

Table 4 shows the relationships of the background variables and the behaviour. The model was signifi-

Table 3. TPB components vs. behaviour

Independent variable	Regression weight	Dependent variable	Beta value	Sig.
Attitude	→	behaviour	0.54	0.000
SN	→	behaviour	–0.13	0.319
PBC	→	behaviour	0.40	0.004
R^2 value			58%	
F-statistics			15.18 ($P < 0.000$)	

Source: Survey data 2009

Table 4. Background variables vs. behaviour

Independent variable	Regression weight	Dependent variable	Beta value	Sig.
Age	→	behaviour	–0.35	0.029
Farm size	→	behaviour	0.60	0.691
Gender	→	behaviour	0.09	0.527
Education	→	behaviour	0.62	0.000
R^2 value			41%	
F-statistics			5.37 ($P < 0.002$)	

Source: Survey data 2009

cant at the *F*-value 5.37, $P < 0.002$. The coefficient of determination was 0.41. Therefore, all background variables explained the behaviour by 41%. Age has a negative significant relationship with behaviour. It implies that when the age increases, there was a decline in the technology adoption behaviour among the farmers. It shows that the younger generation has a greater tendency to adopt new technology than the older generation. This could be further strengthened by education. The independent variable education also displayed a statistically significant relationship with behaviour. It has the highest value (0.62, $P < 0.000$) among the two significant variables. It implies that education has a significant contribution to the technology adoption among the farming community. The empirical analysis shows that there was no statistically significant relationship with either the farm size or gender with behaviour. According to Roger (1993), there was a tendency of adopting new technology when farmers are educated. Kiptot et al. (2006) and Bergevoet et al. (2004) have shown that the farm size has a significant impact on the behaviour of farmers. But in the present study, there was no such relationship. The main reason may be that the data was collected from large commercial farms. Hence, the farm size does not have an impact on the technology adoption.

CONCLUSION

The study shows that intention, attitude, perceived behavioural control, age and education have a significant relationship with the new technology adoption decisions of farmers who are in the Southern Moravian region of the Czech Republic. New technology adoption is an important phenomenon because it is essential to improve the yield qualitatively and quantitatively. Therefore, policy makers and agricultural practitioners have to pay attention to increasing the adoption rate of new technologies. This can be achieved through changing the attitudes of young educated farmers. Further, the changing process can be enhanced by minimizing the external barriers to adopt new technology such as the easy assess to credit facilities and technology, establishing new marketing channels and reasonable prices for their products.

Limitations of the study

The main limitation of the study was the low response rate which is unavoidable in the mail survey method of data collection. Therefore, the results of the present study are confined to the Southern Moravian region of the Czech Republic.

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