Successful implementation of new strategies in the farm business – Facilitators and inhibitions found at Swedish sugar beet farms

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Abstract

This paper aimed at relating the implementation success of new action programs in farm businesses to the nature of the program and to personal characteristics and situation of the farmer. Hypotheses about how the nature of the action program and personal characteristics and situation of the farmer influence implementation success, defined as the extent to which the program solved the problem it was intended to solve, were developed and tested in a generalized logits model. The study was based on the observed implementation success among Swedish sugar beet farmers, who implemented action programs in response to the recent sugar beet reform. Data were collected through a postal questionnaire sent to a random sample of Swedish sugar beet farmers. Results showed that successful implementation of action programs was related to action programs that do not allow for incremental implementation, i.e. a situation where a more thorough change is done directly. Furthermore, successful implementation was found to be related to internal locus of control, absence of other major problems, and to analytical approaches to interpreting information. The results provided a ground for discussing how farm advisory services can be improved to help farmers to successfully implement new action plans.

Keywords: Farms, Implementation of action programs, Strategy, Sugar beet, Sweden

1. Introduction

Many farmers face an increasingly unstable external environment. In several European countries, farms are involved in major structural changes, where small farms tend to exit farming or merge with other farms (see e.g. Hansson, 2008a). At the same time, farms are meeting new challenges and opportunities through increasingly unstable prices, new emerging markets, such as bio-energy and agricultural tourism, and increasing competition.

To survive and stay competitive in this environment, successful implementation of action programs in response to the problems that arise are essential and successful strategic decision-making, or in other words, strategic problem solving, must be viewed as a key success factor. Indeed, in a study by Harling in 1992 it was found that farmers who tend to think more in terms of strategic management were the more successful ones. Thus, careful strategic management can help farmers to handle the increasingly unstable environment. Despite this, strategic management among farmers is somewhat under-developed. For instance Hansson (2008b) found, while surveying dairy farmers in Sweden, that only 15% of 313 farmers reviewed their financial situation and made a new budget at the beginning of the year. Furthermore, Hansson (2008b) found that 35% of 327 farmers did not check the outcome of their major decisions after implementing them. Thereby, they missed the opportunity to use this information when making major decisions in the future.

Farmers' actual strategic decision making processes have been studied in some detail in the literature. However, most of the studies do not focus on the implementation of action programs. Successful implementation of action programs would be crucial for the farmers to adapt to new situations. Rather, previous literature has focused on the detection and definition of unique problems (eg. Öhlmér et al. 1997; Öhlmér 1998), on the choice of action alternatives (e.g. Lunneryd & Öhlmér 2009) or on the strategic decision-making process as such (e.g. Farmar-Bowers & Lane 2009; Sutherland 2010). However, Öhlmér et al. (1998) studied in detail the entire problem solving process (including implementation) of farmers and found that they prefer an incremental approach to implementation, where strategic matters are solved step-wise and ideas can be tested at a smaller scale before the main implementation. Furthermore, Lund & Christensen (2003) and Noell & Lund (2003) advocated the utility of the Balanced Scorecard to implement new strategies on farms. None of these studies evaluated the success of the problem solving process.

Outside agriculture, facilitators and inhibitors of successful implementation of strategic decisions are studied in empirical applications. For instance, Nutt (1999) found that the implementation tactic must be adapted to situational conditions, such as corporate culture and power. Hickson et al. (2003) concluded that a combination of an experience-based, i.e. planned approach, and a readiness-based approach provides the best implementation success. In a study by Miller (1997) successful implementation was found to depend on clear aims, planning and cultural receptivity, whereas experience, prioritizing implementation, and having abundant resources were found to matter less.

Although these studies contribute to the understanding of successful implementation of action programs, they are not readily applicable to farms. As farms are often small, one-man-businesses, the decision-maker and the person implementing the decision is often the same person and this is different to the above-cited studies, where decisions are implemented by someone else. On farms, successful implementation is more likely to depend on the nature of the action program and on personal characteristics and situation of the farmer. In particular, successful implementation is likely to depend on whether or not the action program can be implemented through an incremental strategy (Öhlmér et al. 1998), implying that the farmer can test the idea on a smaller scale, or have a realistic possibility to change the program once implementation has started. This can be contrasted to the case where the program cannot be tested on a smaller scale or be adjusted to any larger extent once implementation has started. Furthermore, the small size of farms, and that they are often run and managed by only one or a few people, means the personal characteristics and situation of the farmer will heavily influence the strategic decision making on the farm.

Successful implementation of new strategies can be defined either as having adopted a decision, a definition which does not consider the effectiveness of the decision and what was achieved with the decision, or as choosing and implementing an action plan that solves the problem it was intended to solve i.e. the appropriateness of the implemented strategy. The first definition of successful implementation is a pre-requisite to the second one; however, the second definition is not a pre-requisite to the first one. In the literature, both definitions are used, sometimes simultaneously, and sometimes only one of the definitions is used (Miller 1997; Nutt 1999).

The aim of this paper was to contribute to the farm management literature, by relating the implementation success of action programs in farm businesses to the nature of the program and to the personal characteristics and situation of the farmer. In so doing, the paper provides a foundation for improved farm advisory services for farmers implementing working action programs in response to the changing surrounding environment. Further, the paper contributes to the literature on implementation of strategic plans by considering the effect of incremental implementation. Successful implementation was defined as the extent to which the new strategy solved the problem it was intended to solve. This measure of successful implementation takes into consideration whether or not the implemented action program achieved what it was intended to achieve.

2. Literature and hypotheses

2.1 The nature of the action program

One way of analyzing the nature of the action program is whether it can be regarded as allowing for incremental implementation. In a situation where incremental implementation is possible, the farmer can try the action program on a small scale before full implementation (Öhlmér et al 1998). Incremental implementation enables learning through trial-and-error, to undertake necessary corrective actions during implementation and to reverse the process if the results are not according to plan. In this respect, the incremental implementation process can be contrasted to more rational implementation processes, where implementation is thoroughly planned before the process starts, and once the implementation process has started there are no, or only minor, possibilities to reverse the decision. Incremental implementation involves several interwoven decisions and streams of actions, which all constitute the new action program, and in this respect is similar to the concept of emergent strategy (Mintzberg & Quinn 1992).

It was hypothesized that whether or not the new action program allows for incremental implementation affects implementation success. As farmers prefer incremental implementation (Öhlmér et al 1998), it was assumed that a strategy allowing incremental implementation should lead to more successful implementation. This produced the following hypothesis:

H1: *Farmers who choose an action program that does not allow incremental implementation experience less successful implementation.*

2.2 Personal characteristics and situation of the farmer

Personal characteristics and situation of the farmer have been found repeatedly in the empirical literature to affect the economic outcome of farms (e.g. Wilson et al. 2001; Trip et al. 2002; Hansson, 2008b). The success of a strategic decision making process is likely to depend considerably on the human resources in the firm (e.g. Lee et al. 1999). The literature on the influence of the farmer's personal characteristics and situation on farm outcome covers a wide range of aspects, including the demographics such as the farmers' experience (Wilson et al. 1998; Sharma et al. 1999; Wilson et al. 2001), their goals and values (Gasson 1973; Wilson et al. 2001; Trip et al. 2002; Hansson 2008b), and psychological aspects such as locus of control. Locus of control, originally due to Rotter (1954), refers to the extent that individuals believe that they can affect their own situations themselves. Locus of control has been found by Öhlmér et al. (1997) and Öhlmér (1998) to affect the ability of farmers and therefore their problem detection and definition. Hansson (2008b) found that a higher degree of internal locus of control positively affected farmers' economic efficiency.

A situation where the farmer experiences other major problems should also affect implementation success. Öhlmér (1997) found that presence of other significant problems, something that was called avoidance, negatively influenced the problem detection of farmers, a finding that shows that presence of other problems diverts attention from other possible problems and that problems are addressed sequentially.

The psychological literature on problem solving often emphasizes the way information is interpreted as an explanation for different approaches and results in problem solving. In this respect, Hogarth (2001) provides insights relevant for this study in that two basic systems operate when interpreting information: the tacit and the deliberate systems. The tacit, or intuitive system, interprets information relying on previous experience or feelings; whereas, the deliberate, or analytical, system interprets information based on conscious listings of advantages and disadvantages and careful calculations. The intuitive system is fast, effortless and requires no attention. The analytical system is slower and requires effort and attention, but is more likely to be correct, if previous experience is limited.

Thus, the following set of hypotheses with respect to how personal characteristic and situation of the farmer affect implementation success were formulated:

H2: *Farmers who have more experience in management of an agricultural firm experience more successful implementations*.

H3: *Farmers who have a higher degree of internal locus of control, experience more successful implementations.*

H4: *Farmers who have other major problems, experience less successful implementations.*

H5: *Farmers who use analytical approaches to interpreting information, experience more successful implementations.*

3. Material and methods

This study was based on the observed implementation process of Swedish sugar beet producers' adaptation to a major decrease in revenue caused by the sugar beet reform suggested by the EU commission in 2004 and decided in early 2006. The sugar beet reform implied that the guaranteed output price of sugar would be reduced by almost 40 percent; thus, if sugar beet producers did nothing about their situation, their previous revenue from beet cultivation would be reduced by 40 percent. Even though the reform also implied that sugar beet producers would be compensated for 60 percent of their loss through the decoupled Single Farm Payment and policy interventions were issued to stimulate them to stop producing sugar beets, the reform did imply a substantial reduction of farm revenue. To most farmers growing sugar beet, this meant that a crop previously amongst their most profitable was no longer viable to produce. Therefore, an action program was required and needed implementing.

The hypotheses (H1 – H5) outlined were tested in regression analysis. The size of the farm (measured by its turnover), the perceived size of the problem, dependency on sugar beet production (measured as the percentage of total revenue originating from sugar beet production), and the perceived situation before the sugar beet reform were control variables in the regression analysis, as they were likely to also influence implementation success.

3.1 Data

Data were collected through postal questionnaires sent to a random sample of 354 Swedish sugar beet producers in March 2007 inquiring about action programs, implementation success, and about the farmer and the farms in general. When the questionnaire was sent out, the sugar beet reform had been in place about eight months. To ensure that sugar beet production was a major part of the farm revenue, inclusion in the sample was restricted to farmers with a production quota of at least 100 000 kg, which implied at least 12 hectares reserved for sugar beet production. The response rate was 58 percent (206 replies). Of these, 121 (59 percent) farmers had decided on an action program to meet the new situation, of whom 95 farmers had already implemented an action program in response to the sugar beet reform. The remaining 26 had not yet reached implementation step in their strategic decision process. Seventy-three of the 95 farmers who had implemented a new strategic plan completed all questions of interest for this study, and were thus included in this paper. T-tests were conducted to investigate whether or not there were significant differences between the farms included in the study and those excluded but revealed no significant differences in terms of estimated loss, in SEK, caused by the sugar beet reform. However, the farms included in the study had a slightly larger part of their revenue originating from sugar beet production (p-value: 0.064).

As emphasized previously, successful implementation was measured by taking into consideration whether the implemented action program achieved what it was intended to achieve. This was done by considering whether the action program was enough to compensate for both the decrease in farm profit and the private income of the farmer. The respondents were asked to chose among three alternatives in the questionnaire 1) the chosen action program is not enough to compensate for the decrease in farm profit or in the farmer's private income, 2) the chosen action program is enough to compensate for the decrease in the farmer's private income, but not for the decrease in the farm profit and 3) the chosen action program is enough to compensate for the decrease in both farm profit and in the farmer's private income.

A critique against collecting data via a questionnaire is that respondents may understand questions in different ways, and thus respond to them in different ways. To reduce the risk of this, the questionnaire was discussed with potential respondents and experts. Furthermore,

experience gained from the authors' previous work with questionnaires sent to farmers were used to construct clear questions with minimal risks of miss-interpretations.

The descriptive statistics of the 73 farmers analyzed in this study are presented in Table 1. The chosen action program was generally insufficient to compensate for the private income loss caused by the sugar beet reform (Table 1). Most farmers implemented an action program that was to some extent incremental, i.e. it can be tested on a smaller scale, or to a large extent adjusted at a later stage. Thirty percent of the farmers implemented action programs that could not be adjusted. Generally, farmers perceived the sugar beet reform as a middle-sized problem, that is, neither a small problem nor a large problem, and appeared content with the situation before the sugar beet reform. On a five-point scale, this gave an average score of 4.70 (Table 1).

Table 1. Descriptive statistics of the variables use in the study, n = 73.

Variable (abbreviation)	Scale	Mean	Standard deviation
Implementation success *(SUCCESS)*	1: The chosen action program is not enough to compensate for the decrease in farm profit or in the farmer's private income (n = 25) 2: The chosen action program is enough to compensate for the decrease in the farmer's private income but not for the decrease in the farm profit (n = 22) 3: The chosen action program is enough to compensate for the decrease in both farm profit and in the farmer's private income (n = 26)	2. 01	0.84
Non-incremental strategy *(NO-INCR)*	1: yes 0: no	0.30	0.46
Turnover *(TURN)*	1: less than SEK 1000 000… 6: more than SEK 5000 000	3.85	1.52
Revenue from sugar beets in relation to total revenue *(SUGAR)*	Percent	23.16	10.56
Perceived size of problem *(SIZE)*	1: no problem …5: a very big problem	3.04	1.05
Perceived situation before the sugar beet reform *(SIT)*	1: unacceptable….5: very good	4.70	1.06
Experience from business management *(EXPER)*	Years	21.89	10.28
Other problems *(OTHER)*	1: yes 0: no	0.15	0.36
Locus of control *(LOC)*	1: Own decisions have very little effect on the economic results of the farm…4: Own decisions have the largest effect on the economic results of the farm.	3.47	0.87
Analytical thinking *(ANALY)*	1: yes 0: no	0.84	0.37

The Spearman correlation coefficients between the variables in the study are presented in Table 2: the degree of implementation success is significantly negatively correlated with *SUGAR* (p-value: 0.008), *SIZE* (p-value: 0.006) and *EXPER* (p-value: 0.008) and positively correlated with *LOC* (p-value: 0.001), but not correlated with *NO-INCR.* For mutual correlations between the covariates, *OTHER* is correlated with *TURN* (p-value: 0.010), *SUGAR* (p-value: 0.021), *SIZE* (p-value: 0.040) and *EXPER* (p-value: 0.046), which may cause *OTHER* to be insignificant in the regression analyses. Furthermore, there was a strong correlation between *SUGAR* and *TURN* (p-value: <0.001).

Table 2. Spearman correlation coefficients: p-values in parentheses.

	SUCCESS	*NO-INCR*	*TURN*	*SUGAR*	*SIZE*	*SIT*	*EXPER*	*LOC*	*OTHER*	*ANALY*
SUCCESS	1.000									
NO-INCR	0.131	1.000								
	(0.270)									
TURN	-0.011	0.046	1.000							
	(0.929)	(0.702)								
SUGAR	-0.308	0.037	-0.550	1.000						
	(0.008)	(0.755)	(<0.001)							
SIZE	-0.321	0.066	-0.185	0.270	1.000					
	(0.006)	(0.577)	(0.116)	(0.021)						
SIT	0.143	0.088	0.160	-0.110	-0.245	1.000				
	(0.231)	(0.457)	(0.175)	(0.356)	(0.037)					
EXPER	-0.307	0.053	-0.019	0.118	0.201	-0.016	1.000			
	(0.008)	(0.659)	(0.872)	(0.322)	(0.088)	(0.891)				
LOC	0.367	-0.190	0.040	-0.059	-0.126	0.077	-0.259	1.000		
	(0.001)	(0.107)	(0.734)	(0.619)	(0.287)	(0.515)	(0.027)			
OTHER	-0.054	-0.026	-0.301	-0.270	-0.241	0.074	-0.234	0.093	1.000	
	(0.650)	(0.825)	(0.010)	(0.021)	(0.040)	(0.532)	(0.046)	(0.434)		
ANALY	-0.082	0.050	-0.150	0.148	0.364	-0.175	-0.039	-0.123	-0.182	1.000
	(0.491)	(0.677)	(0.204)	(0.212)	(0.002)	(0.138)	(0.745)	(0.299)	(0.124)	

3.2 Statistical methods

As the dependent variable, i.e. how successful the implemented strategy was, was measured at ordinal scale, the initial intention was to fit the data to an ordinal logistic model for assessing the impact of the hypothesized influencing variables and the control variables. The proportional odds assumption was rejected (p-value: < 0.0001) and it implied the ordinal logistic model could not be used; instead, the generalized logits model was fitted to the data.

The generalized logits model implied treating the response variable *SUCCESS* as having no internal order in the responses; thus, the three levels of success were treated as nominal variables. In the generalized logits model, one level in the response variable was treated as the reference category, and logits for the other levels were modelled to compare the response levels to the reference category. This model is expressed as:

$$\log\left(\frac{\pi_{\mathbf{ij}}}{\pi_{\mathbf{ir}}}\right) = \alpha_j + \mathbf{x'_i}\,\beta_j \qquad (1)$$

where π_{ij} is the probability that a farmer with covariates in vector **i** reaches an implementation success level *j*, $j \neq r$ where success level *r* is the reference category. The model produces separate intercept parameters α_j and regression parameters β_j for each logit. In this case, there were three response levels in the response variable. One of these was the reference category, this was response level 1: *The chosen action program is not enough to compensate for the decrease in farm profit or in the farmer's private income.*

Two logits were modelled for the covariates considered: one logit compared the reference category to the second response level (*The chosen action program is enough to compensate for the decrease in the farmer's private income, but not for the decrease in the farm profit*), and one compared the reference category to the third response level (*The chosen action program is enough to compensate for the decrease in both farm profit and in the farmer's private income*).

The proc logistic procedure, with the option link=glogit in the statistical program SAS version 9.1 (SAS institute inc., 2002-2003) was used to fit the model in Equation 1 to the data.

4. Results

The impact of the hypothesized influencing variables was assessed according to the procedure outlined above. The parameter estimates and the point estimates and 95% Wald confidence intervals of the odds ratios are presented in Table 3. Two logits were estimated, one compared implementation success of level 2 to the reference category, i.e. implementation success level 1, and the other compared implementation success of level 3 to the reference category (Table 3, where 2 and 3 in the *SUCCESS* column refer to the level of implementation success as compared to level 1).

The global fit statistics supported a significant model fit, with significant likelihood ratio, score and Wald tests. R-square was 0.611 and the max-rescaled r-square was 0.688, indicating a good model fit. The odds ratio point estimates were defined as e^{β_i} and indicated how the probability of having an implementation success level of 2 compared to the reference category, i.e. failure, or 3 in comparison to 1.

The results in Table 3 show that the two logits had different significant explanatory variables. The control variable *SUGAR* was significant in the logit referring to success level 3, whereas, *SIZE* and *SIT* were significant in the logit referring to success level 2: the control variable *TURN* was not significant. The results implied the probability of being at success level 3 compared to the reference category decreased if income from sugar beet production increased relative to total income. Furthermore, the results imply that the probability of being at success level 2 compared to the reference category decreased if the problem was perceived as larger, and increased if the situation, before the sugar beet reform, was perceived as better. All these findings were plausible.

In terms of the relationships hypothesized, *NO-INCR* was significant for both logits. The estimates were positive, indicating that farmers who chose to implement an action plan that was not possible to implement incrementally, were more likely to be at implementation success levels 2 or 3 than at the reference category.

The degree of internal locus of control, *LOC*, was significant in the logit comparing implementation success level 3 and the reference category. The sign of the parameter estimate was positive, which suggested that having a higher level of internal locus of control increased

the probability of being at the highest implementation success level compared to the reference category.

Other major problems, *OTHER*, was significant in the logit comparing implementation success level 3 with the reference category. The estimate was negative, suggesting that other major problems decreased the probability of being at success level 3. Thus, farmers who experienced other problems, in addition to the problems caused by the sugar beet reform, were less likely to be able to implement a strategy that allowed them to experience the highest success level.

An analytical approach to interpreting information, *ANALY*, was significant in the logit comparing the implementation success level 2 with the reference category. The parameter estimate was positive, implying that the probability of being at implementation success level 2, compared to the reference category, increased if an analytical approach to interpreting information was applied.

The hypothesized relationship between the farmers' degree of experience of business management and successful implementation was non-significant in both cases, suggesting that the degree of experience did not affect implementation success.

Table 3. Parameter estimates, odds ratio point estimates, and confidence intervals of the two estimated logits: p-values in parenthesis.

	SUCCESS	Parameter estimate	Odds ratio point estimate	Lower conf. limit	Upper conf. limit
INTERCEPT	2	-3.885 (0.363)			
INTERCEPT	3	-4.805 (0.368)			
NO-INCR	2	2.493 (0.021)	12.093	1.453	100.644
NO-INCR	3	3.043 (0.010)	20.977	2.088	210.703
TURN	2	0.238 (0.472)	1.268	0.664	2.422
TURN	3	-0.593 (0.114)	0.553	0.265	1.153
SUGAR	2	-0.085 (0.125)	0.919	0.825	1.024
SUGAR	3	-0.194 (0.002)	0.823	0.728	0.932
SIZE	2	-1.116 (0.0381)	0.327	0.114	0.941
SIZE	3	-0.757 (0.139)	0.469	0.172	1.280
SIT	2	0.791 (0.087)	2.206	0.892	5.453
SIT	3	0.711 (0.163)	2.035	0.750	5.522
EXPER	2	0.003 (0.944)	1.003	0.918	1.096
EXPER	3	-0.077 (0.105)	0.926	0.844	1.016
LOC	2	0.492 (0.319)	1.636	0.621	4.307
LOC	3	3.056 (0.006)	21.236	2.418	186.488
OTHER	2	0.026 (0.983)	1.026	0.101	10.432
OTHER	3	-3.318 (0.041)	0.036	0.002	0.866
ANALY	2	2.740 (0.047)	15.480	1.043	229.745
ANALY	3	1.002 (0.387)	2.725	0.281	26.398

Global fit statistics of $\beta = 0$: Likelihood Ratio test, p-value < 0.0001; Score test, p-value <0.0001; Wald test, p-value = 0.0698

R-square: 0.611; Max-rescaled R-square: 0.688

5. Discussion and conclusion

This paper aimed at relating the implementation success of action programs that farmers have undertaken in response to strategic problems in their businesses, to the nature of the action program, and to the farmers' characteristics. In particular, implementation success was related to the non-incremental nature of the action program and to personal characteristics and situation of the farmer, i.e., locus of control, analytical thinking, experience and presence of other major problems, while controlling for farm size, perceived problem size, dependency on sugar beet production, and the perceived situation before the problem arose.

The study was based on data collected by surveying a sample of Swedish sugar beet producers about their responses to the strategic problems caused by the sugar beet reform. The data collection process implies that the farmers' perceptions of their implementation success were considered. If the perceptions deviate from the real outcome, this will influence the results. In future studies it would be interesting to follow up the implementation on the studied farms by evaluating the implementation success based on their accounting systems. This would however require that respondents are willing to share their accounting system with researchers.

About one-third of the farmers who answered the questionnaire had implemented a new strategic plan as a response to the sugar beet reform, and were therefore included in this study. The reason the other two-thirds had not yet implemented a new strategic plan might be that for some reason their implementation failed, or they had not had time to do the implementation, at the time of survey. This question needs to be followed up in future research. Among farms included in the study, the distribution of implementation success was about 1/3 at each implementation success level, and the analysis of these farms provided important insights into the research question.

Based on a literature review, a set of hypotheses was formulated and tested in a subsequent regression analysis. Hypothesis H1 was rejected in both logits, the results obtained from both logits suggested that farmers who chose action programs that did not allow for incremental implementation experienced the more successful implementation. Öhlmér et al (1998) suggest that farmers prefer incremental approaches to implementation; however, these finding suggested that the preferred implementation strategy lead to a lower implementation success. One reason for the negative impact of action plans allowing incremental implementation

could be that it is more time consuming to conduct and thereby the expected pay-offs are not yet fully realized. Further, implementation of non-incremental action programs, i.e. action programs that cannot be easily adjusted, may cause managers to think in an *ex post* rational way to justify the decision, and thereby perceive a higher degree of implementation success. Another reason why action plans that do not allow for incremental implementation lead to higher success levels is that such action plans might be more innovative and associated with markets that are not yet fully exploited. In such a situation microeconomic theory suggests that the profit margins should be larger. Furthermore, action plans that do not allow for incremental implementation might also be associated with higher risk, something which is normally also associated with higher (but more volatile) return (e.g. Ross et al. 2002). Yet another reason for the higher implementation success caused by action programs that do not allow for incremental implementation is that these action plans may be more thorough and therefore imply a higher level of implementation success. From a farm advisory services perspective, this suggests that advisors should encourage more thorough changes, although this question needs to be further addressed.

Although experience is considered to strongly influence the economic and technical efficiency results in farms (e.g. Wilson et al. 1998; Sharma et al. 1999; Wilson et al. 2001), the statistical results did not support the effect of experience on implementation success; thus, hypothesis H2 was rejected. This finding implied that the more experienced farmers did not achieve higher levels of implementation success, even though they should be more experienced with implementation. Implementation of an action program in response to a strategic problem can be considered as a unique situation, in which case previous experience may not facilitate the implementation. This line of reasoning suggest that the mental models (Klein et al. 2005) of implementation of new action programs are not more developed for people who have been farm managers for a longer period of time. It should however be noted that the average level of experience in the sample was high, with a small standard deviation, suggesting that insignificance of experience might also be due to low variation in this particular sample.

Locus of control was significant and positive in the logit contrasting implementation success level 3 to the reference category, suggesting that a higher degree of internal locus of control increased the probability of achieving higher levels of implementation success. This confirmed hypothesis H3. The positive effect of higher internal locus of control concurs with other research (Öhlmér et al. 1997; Öhlmér 1998; Hansson 2008b). To support farmers in

becoming more successful in their implementation processes, their feelings about being able to influence the situation need strengthening.

Major problems other than caused by the sugar beet reform significantly affected implementation success in such a way that those farmers with other problems were less likely to be at the highest level of implementation success, compared to the reference category. Thus, hypothesis H4 was confirmed. One reason for this finding might be that farmers with other problems lacked resources and time for solving the problem caused by the sugar beet reform and suggested that problems were addressed sequentially. This behavior was suggested by Cyert & March (1963) to also occur in larger firms because of limited capacity to handle all problems simultaneously. Similar results are identified by Öhlmér et al. (1997) and Öhlmér (1998). Although the behavior is a natural consequence of managers' limited resources, the consequences are that problems accumulate. This problem needs solving, for instance by developing managerial assistance tools that help managers with other problems to also be able to detect and handle new ones: this would help to develop farm advisory tools.

The farmers' analytical approach to interpreting information increased the probability of being at implementation success level 2 compared to the reference category; thus, hypothesis H5 was confirmed in one of the logits. The result implied that farmers who apply analytical approaches to interpreting information achieve higher levels of implementation success than those who apply only intuitive approaches. To support farmers in becoming more successful in their implementation of new action programs, it would be beneficial to help them become more analytical in their interpretation of information.

In conclusion, this paper has, by relating the implementation success of action programs in farm businesses to the nature of the program and to personal characteristics and situation of the farmer provided insights into what facilitates and inhibits implementation success. Apart from contributing to the academic farm management literature, where studies of farmers' implementation success previously did not exist, and to the general literature on successful implementation, which had previously not considered the effect of incremental implementation, this paper provides a foundation for discussing how farm advisory services can be improved.

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