The desire to adopt: Enhancing the psychological plausibility of adoption models

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Abstract. Predicting adoption is central to assessing the benefits to be had from research into agricultural innovations and to evaluating the success of extension programs. After reviewing the literatures on consumer and organisational purchasing, Wright (2011) concluded that the dual-process model of consumer decision making proposed by Bagozzi (2006a,b) would be most suitable for modelling adoption decisions by primary producers. This model incorporates several psychological variables that intervene between innovation awareness and the behavioural response to it. In the context of farms Wright (2011) argued further that the intervening variables would be sensitive to the type of innovation under consideration. We report on a preliminary investigation into the associations between type of innovation and critical intervening variables. The results indicated that there were significant associations between the complexity of an innovation and measures of the strength of the intervening variables. This suggests that the dual-process model includes variables that provide a richer description of the factors influencing the rate of adoption of innovations compared to models that treat the decision-making process as a black box.

Keywords: innovation types, farm systems, consumer behaviour, consumer action, decision making.

Introduction

Wright (2011) argued that predicting the rate of adoption of agricultural innovations, and how this might be influenced, requires an in-depth, detailed understanding of the adoption process; more so than is the case with regard to predicting the extent of adoption. This is because the extent of adoption merely requires understanding the circumstances in which an innovation will create a net relative advantage. In contrast, the rate of adoption depends on the strength of the motivation of producers to adopt, which may partly be a function of the magnitude of relative advantage but of other, personal characteristics as well. As a consequence, and because producers, like all small-business owners, cannot reliably be regarded as professional purchasers, the case was made by Wright (2011) that the adoption of agricultural innovations should be treated as an individual purchase decision rather than an organisational purchase decision. Consequently, models of consumer purchasing, with their wider array of possible inputs to decision making, are most appropriate as a foundation for analysing decisions about adoption of agricultural innovations. These may reduce, in application, to the more objectively rational model of organisational purchase decision making that is implicit in the majority of studies of agricultural adoption, but the reverse process is impossible.

Among the various models of consumer purchasing, Wright (2011) advocated the dual-process model proposed by Bagozzi (2006a) on the grounds that this model was the most comprehensive in considering the factors that might influence purchase (i.e. adoption) decisions. As well, he argued that this model was the most realistic in distinguishing two distinct processes: the motivation of an individual to consider whether to adopt an innovation (*goal setting*); and the implementation of the decision to adopt (*goal striving*), once such a decision is reached. An important implication of this model is that the adoption of innovations will be considerably delayed where there is insufficient motivation to even consider adoption.

In dual-process models, *goal desire* plays the key role in determining the urgency that is attached to considering the possibility of adoption, in terms both of promptness and persistence of attention. Goal desire can be influenced by *anticipated emotions*, *anticipatory emotions* and *preferences ('affect') about the means of achieving goals*. These are intervening psychological variables, in fact emotional factors, which capture aspects of decision maker responses to an innovation.

In this paper we report on preliminary testing of the extent to which the dual-process model proposed by Bagozzi (2006a) might enhance modelling of decision making with respect to the adoption of agricultural innovations. In particular, we sought to test whether the adoption of innovations is associated with differences in the strength of some of the key emotional factors that might influence goal desire and, therefore, the motivation to adopt innovations. A characteristic of innovations that should be expected to impact emotions in predictable ways was assumed to be their complexity. If these emotions vary across innovations, types of innovation should reveal predictable effects on them, where other innovation characteristics may have less predictable impacts on emotions and thus be uninformative for our current purpose.

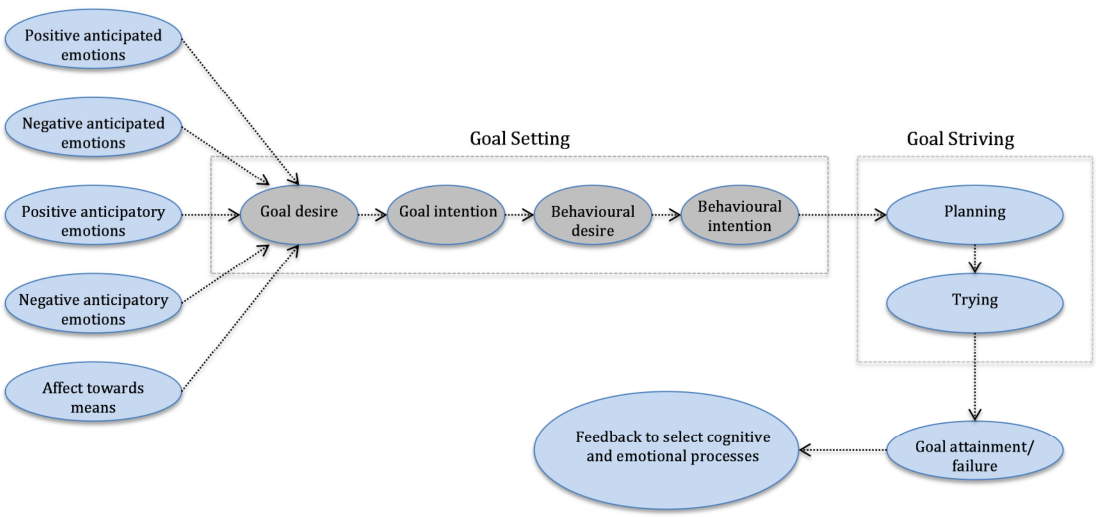
In the next section we summarise the Bagozzi (2006a) dual-process model of consumer adoption and the Henderson and Clark (1990) classification of innovation types. Detailed descriptions of these may be found in Wright (2011) and Kaine et al. (2008, 2012) respectively. The material here draws extensively from Wright (2011) and Kaine et al. (2012).

Theory

A dual-process model of adoption

The dual-process model proposed by Bagozzi (2006) builds on the extensive literature linking resistance to change as a personal disposition, which is the opposite of innovativeness, with the likelihood and speed of adoption (Ram and Sheth 1989; Bagozzi and Warshaw 1990; Bagozzi 1992; Bagozzi and Lee 1999; Oreg 2003). However, adoption involves both a decision to adopt, which is intention, and the translation of that intention into behaviour, which may not occur (Bagozzi and Lee 1999). The concept of 'goal striving' was developed to link intention with behaviour (Bagozzi and Dholakia 1999; Bagozzi and Lee 1999; Bagozzi 2007). Consequently, the dual-process model of consumer response to innovations has two components: goal setting and goal striving. The processes in the dual-process model, and the role of the intervening variables of interest here, are shown in idealised form in Figure 1.

Figure 1. Processes in the Dual-Process Model



Source: Bagozzi 2006a, p. 15

Goal setting The first process in the dual-process model is a sequence of reflective, deliberative processes: consider-imagine-appraise-decide (Bagozzi 2006a). This process is triggered by awareness of an opportunity to achieve a goal and determines the degree of interest the decision-maker has in achieving a goal: that is, goal desire. Insufficient interest halts any further cognitive processing. By implication, the greater the time and effort envisaged in adopting an innovation, the greater goal desire must be to provoke movement beyond goal desire to goal intention and thence behavioural desire and intention.

Bagozzi (2006a) proposed three elements in the consider-imagine-appraise-decide process. The first of these was positive and negative *anticipated emotions*. These emotions result from imagining success and failure, respectively, in goal attainment and their personal emotional consequences. These emotions could include happiness, excitement and pride or disappointment, anger and sadness. The likelihood of success or failure is not considered with anticipated emotions.

Another element was *anticipatory emotions*. These emotions can be positive or negative and are emotional responses to the prospect of a future event. The emotions involved are hope and fear and depend in part on the perceived probability of success or failure occurring (Wright 2011).

The final element was *affect towards the means of striving* for the goal. This is the personal emotional appeal of the methods, processes, actions and so on believed to be required to pursue the goal (Bagozzi 2006a).

The consider-imagine-appraise-decide process leads to acceptance or rejection of the goal as a basis for acting or not. Acceptance requires that goal desire be converted into some goal intention: a commitment to act to achieve the goal. This commitment must then be translated into a set of specific behaviours to be implemented, which is action or behavioural desire. The factors potentially in play in this process are not pertinent to this study.

Finally, the process of goal setting has the potential to be complex and iterative, which means the process can take some time. Action will not proceed until the process of deciding has run its course (Wright 2011).

Goal striving The factors that influence the correlation between intended and actual behaviour are considered in the goal striving component of the dual-process model. Explicit consideration of these factors enables anticipation of rates of adoption and identification of opportunities, if any, that may exist to influence this correlation. The first stage is action planning. Action planning 'involves decisions as to when, where, how and how long to act. In this stage situational cues for the timing of specific actions are contemplated' (Wright 2011, p. 18). The second stage in goal striving is 'trying': the implementation of the plan, which is the commencement of action in pursuit of the goal.

The final stage is the outcome: adoption, trial or failure to adopt, which will generate emotions. As they are experienced, outcomes will feedback to influence goal setting for subsequent innovations.

Given that the effort involved in adopting complex agricultural innovations is likely to be greater than for simple innovations, the intensity of the motivation required to adopt complex innovations should, on average, be greater than for simple innovations. Hence, a first step towards assessing the usefulness of the dual-process model as a model for predicting the rate of adoption of agricultural innovations would be to test for differences in the strength of anticipated emotions, anticipatory emotions and affect towards means across complex and simple agricultural innovations. Such a test requires a rigorous method for distinguishing between simple and complex innovations. Wright (2011) suggested that Henderson and Clark's (1990) framework for classifying product changes into types of innovations, which was adapted for innovations to agricultural systems by Kaine et al. (2008), was most suitable for this purpose.

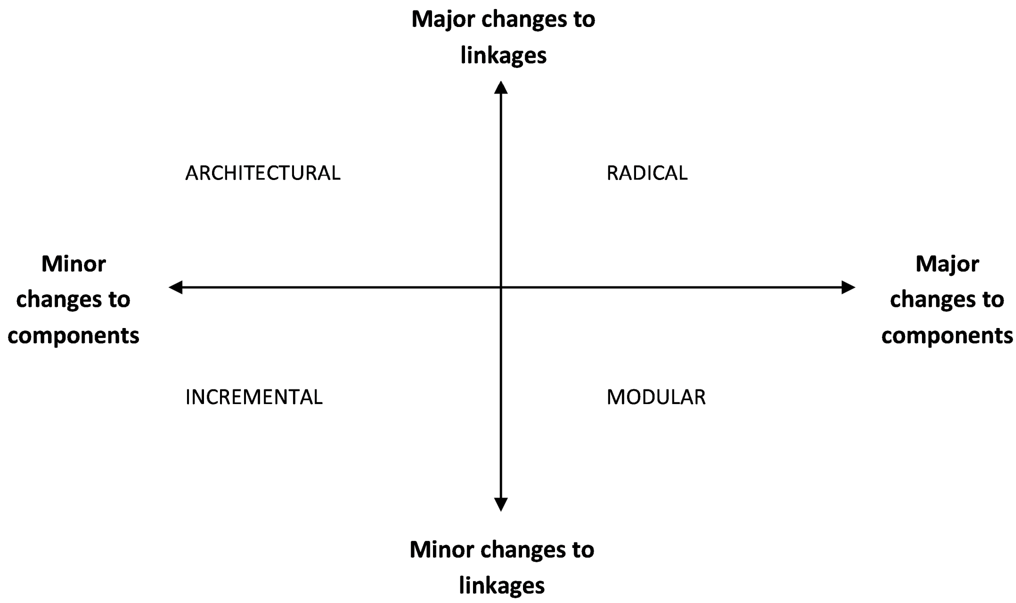
Types of agricultural innovations

There is confusion and ambiguity surrounding constructs in the literature related to innovations and their impacts on organisations (Gatignon et al. 2002). Innovation may affect product (i.e. output) characteristics, production processes or both. The usefulness of the classification developed by Henderson and Clark (1990) arises from what it reveals about the magnitude of the impact of adoption of an innovation in terms of disruption to system activity, the destruction of competencies and the need for new skills and knowledge (see Kaine et al. (2008) and Gatignon et al. (2002) for more detail).

Classification of innovations Henderson and Clark (1990) argued that any final product of an organisation could be conceived of as being composed of a hierarchy of subsystems. These might also be defined as modules (Gatignon et al. 2002). Each subsystem or module contributes to the creation of the final product and is a collection of components that are linked together. The *components* of a subsystem are its physically distinct parts (Henderson and Clark 1990). How the components are linked together to enable the subsystem to function is the *architecture* of the subsystem.

The contribution of Henderson and Clark (1990) to this literature was that they suggested that an innovation can be conceptualised as changes to components, the linkages between them, or both. They then suggested that innovations could be categorised into four types: incremental, modular, architectural or radical, depending on the degree of change introduced into the components and the linkages between them (see Figure 2). In essence, their framework identifies different generic types of innovations with more elaborate, organisation-specific detail than previously.

Figure 2. A Classification of Innovations



Source: Adapted from Henderson and Clark 1990

Henderson and Clark (1990) described how the creation, maintenance and management of a subsystem requires specialised knowledge in regard to: (1) the components of the subsystem and the design concepts they embody; (2) the way components are linked together and the design concepts embodied in the architecture of those linkages; and (3) how the components and linkages combine to influence the way in which the subsystem functions and behaves in different environments.

According to Henderson and Clark (1990), incremental innovations introduce relatively modest changes to the components of a subsystem, leaving the links between components, the architecture, largely unchanged. Incremental innovations exploit the potential of an established design and are described as competence-enhancing because they tend to build on and extend, existing skills and reinforce the applicability of existing knowledge.

Modular innovations introduce relatively substantial changes to the components of a subsystem in that at least some existing components become obsolete because the new components are based on novel design concepts rather than simply being improvements to an established design (Henderson and Clark 1990). Generally speaking, the architecture linking the components together remains largely unchanged with a modular innovation. Entirely new skills, competencies and processes may be required to manufacture and install the new components. Consequently, modular innovations may be competence-enhancing or competence-destroying depending on the history of the specific organisation (Gatignon et al. 2002).

Henderson and Clark (1990) define an architectural innovation as changing an established subsystem to link the existing components together in a different way. Generally speaking, architectural innovations entail relatively minor changes in the components. Architectural innovations have been shown to create serious disruptions to organisations because architectural knowledge becomes embedded in the organisational procedures, processes and structures over time (Henderson and Clark 1990). Hence, architectural innovations not only require the acquisition of new skills and competencies, they may also require changes in the operating procedures, processes and structures of the organisations that adopt them.

Finally, radical innovations involve a new set of design concepts that are embodied in new components that are linked together using a new architecture (Henderson and Clark 1990). Radical innovations are based on completely different scientific and engineering principles to the principles that were used in the processes they supersede. The magnitude of change entailed in radical innovations means that many areas of organisational knowledge and competence are rendered irrelevant (Henderson and Clark 1990). Consequently, an organisation may have to consider new ways of thinking to adopt a radical innovation (Smith 2000).

<u>Classification of agricultural innovations</u> Following Henderson and Clark (1990): a farm subsystem is a set of components that link together in a specific way to perform a function; the

components are the physically distinct elements of the subsystem; and the architecture of the subsystem describes how the components are arranged or linked together to enable the subsystem to function. The components of a farm subsystem may include technology, techniques and practices.

The extent of change to the components and architecture of a farm subsystem provide a basis for classifying innovations in farm subsystems into the four types of innovation: incremental, modular, architectural and radical. Each type is hypothesised to require different sets of skills and knowledge to adopt and implement. Put another way, differences can be expected in the time and effort involved in implementing each of the four different types of innovations in an agricultural context. This suggests that, depending on the type of innovation, the motivation to adopt an innovation must change correspondingly to achieve a given level of interest in pursuing adoption.

Returning to the dual-process model, anticipated emotions were identified as potentially important determinants of goal desire. It may be the case that imagined goal achievement and goal failure are perceived to have trivial emotional content with incremental and modular innovations. If this is the case, anticipated emotions will play a limited role in goal setting. Consequently, goal desire in relation to incremental and modular innovations would depend less on the strength of producers' anticipated emotions and more on their perceptions of the time paths and reliability of the costs and benefits of adoption (Wright 2011).

In contrast, it may be the case that imagined goal achievement and goal failure are perceived to have significant emotional content with architectural and radical innovations. If this is the case, the relative strength of positive and negative anticipated emotions will strongly influence goal desire.

Anticipatory emotions, too, will impact on goal desire according to the perceived chances of goal achievement and goal failure. As these are measures of hope and fear, they likely will be influenced by factors such as perceived behavioural control, resistance to change and anticipated difficulties in striving. The influence of these on goal setting may be particularly strong for architectural and radical innovations given the demands that the adoption of these types of innovations can create for new skills and knowledge.

In short, both anticipated and anticipatory emotions may play a substantial role in the adoption of architectural and radical innovations because of the complexity of these kinds of innovations and the challenges they may pose to farmer competence. The same may be said for affect towards the means. This suggests that a classification of innovations into types such as incremental, modular, architectural and radical, representing increasing complexity, could be most informative about the likelihood of adoption to the extent that the type of innovation conditions the status of anticipated emotions, anticipatory emotion and affect towards means and, therefore, the intensity of motivation to adopt.

Methods

The research was conducted with large dryland cropping enterprises in the Wimmera (Victoria) and Southern Riverina (NSW). Farmers were interviewed in person by two researchers to enable accurate manual recording of interviews. Interviewees were selected using a mixture of convenience sampling and 'snowball' sampling (Goodman 1960); representativeness was not of major concern for this exploratory study. The convenience sample (of farmers known to us) was drawn from producers previously involved in farmer groups run by the Victorian Department of Primary Industries in the North East of Victoria. We also used the telephone directory to identify contact details of people who identified themselves as farmers in the Yellow Pages.

Interviews were conducted between February 2012 and April 2012 to avoid peak activity times on the farm (i.e. sowing, spraying or grain harvest). Nine farmers were interviewed between February and April 2012. Five farmers were from the Wimmera district while four were from the Southern Riverina. In all cases, interviewees were invited to discuss an innovation that was less complicated and an innovation that was more complicated. In both cases the interviewee chose an innovation that had been adopted on their farm. The duration of interviews was between 40 and 60 minutes.

A mix of semi-structured and structured questioning was used in the interviews. Semi-structured questioning (Walter 2006) is particularly useful for the exploration of perceptions and opinions because they allow the interviewee to respond to broad questions or statements with limited direction and provide opportunities for the interviewer to probe for further information (Bryman 2004). This questioning involved:

- Understanding the farm system: included property size, enterprise description and proportion sown to crops.
- Understanding a less complicated innovation adopted on farm, its function in the relevant farm subsystem, the relative advantage it offered and the process of thinking prior to adopting the innovation.
- Understanding a more complicated innovation adopted on-farm, its function in the relevant farm subsystem, the relative advantage it offered and the process of thinking prior to adopting the innovation.

There was extensive probing around each question.

The structured questioning involved scales based on Rogers (2003), Gatignon et al. (2002) and Bagozzi (2006a). Following Rogers (2003), statements describing producers' perceptions of the trialability of an innovation, its observability and relative advantage were formulated. Gatignon et al. (2002) were the first to develop and validate scales to assess an innovation's type and consequences using the Henderson and Clark conceptual framework. We used three of their items to capture producers' perceptions of the innovation regarding the magnitude of the technological improvement the innovation represented over the technology it was superseding. Scales from Gatignon et al. (2002) were also adapted to capture producers' perceptions of the impact of adopting an innovation on the relevance of existing skills and the need for new skills. Scales from Gatignon et al. (2002) were also used to capture information on the impact of innovations on the farm subsystem in terms of its architecture and components. This scale provided a means of ordering innovations from relatively simple (incremental, modular) to relatively complex (architectural, radical) based on their impact on the components and architecture of farm sub-systems. Finally, scales contained in Bagozzi (2006a) were used to capture producers' perceptions of anticipated and anticipatory emotions, affect towards the means and effort devoted to decision making associated with each innovation. The scales are described in more detail in Kaine et al. (2012).

Results

The median property size of the Wimmera interviewees was 1,400 hectares while the median for the Southern Riverina was smaller at 920 hectares. Cropping activities on all properties were predominantly dryland. Most of the cropping area was sown to a wheat and canola rotation in the Southern Riverina, whereas barley and wheat were the main crops in the Wimmera along with various grain legumes.

The innovations that interviewees nominated as simple were changing wheat variety or minor modifications to machinery (see Kaine et al. 2012 for more details). Generally speaking, interviewees adopted these innovations without trialling. They stated that they believed that the technical improvements these innovations offered were relatively minor. Often, the need for trialling of the innovation was not considered necessary as it could be evaluated by observing it in operation on other farms, viewing it at field trials, or researching it.

The innovations that interviewees nominated as complex were components of multiple-stage innovations such as no-till and stubble retention soil preparation regimes, GPS auto-steering on equipment and controlled (i.e. fixed) traffic routing (see Kaine et al. 2012 for more details). From the perspective of the interviewees these more complex innovations appeared to involve greater changes to farm subsystems. These innovations were implemented in a sequence of stages.

Kaine et al. (2012) provide a detailed description of an investigation of the differences in the ratings given by interviewees to the complex innovation and simple innovations they identified. This analysis provided a method for detecting whether the interviewees consistently rated simple and complex innovations differently. The results confirmed that interviewees had, from their perspective, identified and distinguished between innovations that were more and less complex.

We used correlation analysis to investigate associations among the characteristics of innovations including associations among types of innovations, anticipated emotions, anticipatory emotions and affect towards means. Prior to conducting the analysis, the reliability of the scales used in the interviews was investigated by estimating Cronbach's alpha (Carmines and Zeller 1979) for each scale. The estimated reliabilities were 0.67 or greater. Since Cronbach's alpha is a conservative estimate of reliability and this is an exploratory study, the reliability of the scales was judged to be satisfactory (Carmines and Zeller 1979).

In Table 1 the correlations between the scales for the various characteristics are reported. Inspection of the table reveals, first, that innovation type is correlated with the anticipated emotions and affect towards means. This result supports the proposition that these factors influence goal setting and therefore the motivation to adopt an innovation. This result also suggests that these factors may be more influential in regard to complex innovations than simple innovations. The results also reveal that, as expected, innovation type is correlated with the need for new skills and knowledge and decision effort.

Table 1. Correlations between scales

Scale	Correlations								
	1	2	3	4	5	6	7	8	9
1. Innovation type	-								
2. Impact on farm architecture	0.46	-							
3. Need for new skills	0.58*	0.49*	-						
4. Impact on existing skills	0.15	0.57*	0.11	-					
5. Impact on performance	0.34	0.19	0.08	0.08	-				
6. Decision effort	0.63*	0.78*	0.43	0.51*	0.28	-			
7. Anticipated emotions	0.51*	0.25	0.27	0.04	0.43	0.39	-		
8.Anticipatory emotions	0.39	-0.24	0.10	0.10	0.29	0.14	0.60*	-	
9. Affect towards means	0.52*	0.33	0.50*	0.31	0.37	0.44	0.77*	0.55*	-

Note: * denotes statistical significant association (p=0.05)

Inspection of the table shows that, as expected, anticipated emotions, anticipatory emotions and affect towards means are correlated with each other. This suggests that, the stronger the emotional involvement of interviewees in anticipating the success or failure of adopting an innovation, the stronger their emotional involvement in the adoption process and the emotional involvement provoked by the chance of failure.

The results show that there is a statistically significant association between affect towards means and the type of innovation and the need for new skills as well as anticipated and anticipatory emotions. These results suggest that interviewees' emotional involvement in the process of adoption may be influenced by the need to acquire new skills and knowledge.

In the literature simple innovations tend to build on current skills, knowledge and experience while complex innovations tend to render current skills, knowledge and experience obsolete. This suggests that there should be a negative correlation between ratings for type of innovation and ratings for the continued usefulness of current skills. We found this to be the case. However, the results show that there is a statistically significant association between the continued usefulness of current skills, the impact of the innovation on farm architecture, and decision effort. This raises the possibility that the implementation of more complex innovations depends on current skills, knowledge and experience because these are critical to successfully integrating complex innovations into the existing farm system. This would explain the absence of a negative correlation between ratings for type of innovation and ratings for the continued usefulness of current skills.

Earlier the possibility was raised that the innovations the interviewees had chosen may be a mix of incremental, modular, architectural and radical innovations and that, if this was the case, such a mix could mask differences between apparently simple and complex innovations. This possibility was investigated by comparing the placement of innovations in component-relationship space. This was achieved by using multi-dimensional scaling (Kruskal and Wish 1991) to map the similarity in innovations using ratings on the scales representing innovation type and impact on farm architecture. The results of the multi-dimensional scaling analysis (not shown here) revealed that simple innovations included both incremental and architectural innovations while the complex innovations included both radical and modular innovations. This overlap in types may have obscured differences in the characteristics of complex, radical innovations and simple, incremental innovations.

Discussion

In the dual-process model goal desire plays the key role in determining the urgency that is attached to an adoption possibility. In this model, goal desire is influenced by anticipated emotions, anticipatory emotions, and affect towards the means of achieving goals. Wright (2011) argued that the influence of these factors would depend on the type of innovation under consideration: incremental, modular, architectural or radical (Henderson and Clark 1990). These emotional factors may be relatively trivial in the case of incremental and modular innovations, but critically important in the case of architectural and radical innovations.

Four main findings emerge from the results. First, we found that anticipated emotions, anticipatory emotions and affect towards means were present in the adoption process for both simple and complex innovations. Also, as hypothesised, we found a significant positive correlation between the strength of anticipated emotions, affect towards means and the type of innovation indicating that the relative strength of these emotional factors increases with the complexity of innovations. This is consistent with the proposition that the adoption of more complex innovations requires correspondingly greater levels of motivation than less complex innovations. As a consequence, the adoption of more complex innovations such as architectural and radical innovations may be more susceptible to delay because of insufficient motivation. In such instances, the role of extension agents is to increase, if possible, the motivation of producers to consider adopting the innovation. This would require knowledge of the root cause of the lack of motivation.

Second, we found significant positive correlation between the strength of anticipated emotions, anticipatory emotions and affect towards means. This result raises the possibility that one or more of the factors that influence these emotions, such as perceptions of relative advantage, may be common to all. Alternatively, these emotions may interact directly. Strong, positive anticipated emotions may, for example, result in more favourable evaluations of affects towards means than might otherwise be the case. In either case this means that, in the right circumstances, goal setting might be responsive to extension efforts. Consequently, extension may influence the extent, and rate, of adoption via two routes: by contributing to goal setting and by facilitating goal striving.

Third, we found that there were significant positive correlations between the type of innovation and the need for new skills and decision effort. We also found that complex innovations were evaluated for a significantly longer period than simple innovations prior to adoption. These results highlight that the rate of adoption of complex innovations will be inherently slower, on average, than the rate of adoption of simple innovations. This implies that classifying innovations into types - incremental, modular, architectural and radical - is useful in predicting the rate of adoption of an innovation. This knowledge will also be useful for anticipating the information and training needs of producers, as previously suggested by Kaine et al. (2008).

Fourth, the results indicate that current skills, knowledge and experience were useful in the adoption of complex as well as simple innovations; this result was not as hypothesised. Significant positive correlations were found between the impact of the innovation on the architecture of the farm system, the usefulness of current skills, knowledge and experience, and decision effort. This suggests that, unlike manufacturing industries, current knowledge and experience is vital in the task of realigning farm subsystems when integrating more complex innovations into a farm system. The implication of this is that there is a richer interconnectedness between subsystems on farms than in other organisations producing physical output; service production may be a different situation again. This finding highlights the potential for delay in the adoption of architectural and radical innovations because integration of these more complex innovations requires greater effort, both in goal setting and goal striving, than does the integration of incremental innovations.

Overall, the results reported here suggest that the dual-process model (Bagozzi 2006a) suggested by Wright (2011) shows promise as a means for analysing farmer decisions about the adoption of agricultural innovations and for providing novel guidance as to how those decisions may better be influenced. This relates somewhat to the extent of adoption but most clearly to likely rate of adoption;: the speed of resolution of decisions.

Further research along a number of lines could be conducted that would build confidence in the findings reported here and establish the merit of the dual-process model. For example, the scales describing anticipated emotions, anticipatory emotions, and affect towards means, and the scales describing the different types of innovations, need development and validation. The analysis reported here should be repeated with a suitably large sample. Also, the role of psychological constructs such as personality predispositions and social identity that influence goal setting could be explored as these factors may influence anticipated emotions, anticipatory emotions, affect towards means and the formation of behavioural intentions (Bagozzi 2006a). Finally, the predictions of the dual-process model could be validated against actual data on the rate of adoption of agricultural innovations where satisfactory information on the population of potential adopters is available.

Conclusion

Predicting and estimating the extent and rate of adoption is central to assessing the benefits to be had from research into agricultural innovations and evaluating the success of marketing and extension programs. After reviewing the literatures on consumer and organisational purchasing, Wright (2011) concluded that the dual-process model of consumer decision making proposed by Bagozzi (2006a) would be suitable for modelling adoption decisions by producers, and subsequently rates of adoption, as this is the most comprehensive of possible causal factors. Specifically, in the context of adoption decisions being made by non-specialist purchasing managers (i.e. farmers), subjectively rational factors, such as emotional responses to innovations, may come into play as they may for consumers. Allowing explicitly for such factors creates the possibility of better model validity.

In this paper we reported on a preliminary investigation into the associations between type of innovation and anticipated emotions, anticipatory emotions, and affect towards the means. Data in relation to these variables were collected from a small sample of grain farmers in the Wimmera and Southern Riverina. The results indicated that there were significant associations between the complexity of an innovation and measures of the strength of anticipated emotions, anticipatory emotions, and affect towards the means. The results support the proposition that the adoption of more complex innovations is associated with the stronger expression of anticipated emotions and affect towards means. The results also suggest that while the adoption of complex innovations is likely to require the acquisition of new skills and knowledge, the need to integrate innovations into the existing, richly interconnected farm system means current skills, knowledge and experience continue to remain useful. There was also evidence to suggest that greater effort and time was devoted to decision making about complex innovations, especially where the adoption of these innovations changed the architecture of the relevant farm subsystem.

The results indicate that goal desire can play an important role in determining the rate with which agricultural innovations are adopted. They also indicate that the dual-process model shows promise as a method for analysing the adoption of agricultural innovations. Furthermore, unlike other models in the literature, the dual-process model has the potential to provide a rich description of the factors influencing the rate of adoption of innovations and, as a consequence, provide guidance as to how rates may best be influenced.

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