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Factors affecting the Internet behaviour of horticultural growers in Flanders, Belgium

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ABSTRACT

Horticultural growers in Flanders make low use of the Internet. The Internet applications used most frequently are online banking, information on market prices and yields of outputs, and weather forecasts. However, a large variation of the Internet behaviour is observed among the growers. The influence of personal characteristics (biographical and social characteristics, communication behaviour) and business size is examined on the use of five groups of Internet applications: general applications, basic management information, specialised management information, information on output prices and yields, and e-commerce. Data were collected at 163 horticultural businesses with Internet use for business purposes. Categorical principal component analysis of the explaining variables resulted in five dimensions. "Openness and active search for information" shows a significantly positive influence for all examined Internet applications, except for e-commerce. "Long-term perspectives of the business" is found to have a significantly positive influence on the use of general applications and e-commerce. E-commerce is also significantly influenced by the "attitude towards risks and environmentally friendly production techniques" and "agricultural or horticultural education, supplemented by additional courses". "Larger businesses with the search for specific advice" is a dimension with a significantly positive effect on the use of specialised management information and e-commerce. For many Internet applications the personal attitudes of the business manager seem to be important, suggesting that developing human capital is crucial to increase the speed and coverage of Internet adoption.

1. Introduction

Information use is becoming a critical factor in the changing competitive environment of horticultural growers. The importance of the Internet is growing, both as a source of information and as a vehicle for transactions. It is likely that businesses working outside this system will lose competitiveness (Gloy and Akridge, 2000; Rolfe et al., 2003; Smith et al., 2004; Taragola et al., 2001; Taragola and Gelb, 2005; Taragola and Van Lierde, 2007a,b). The Internet is increasing the perceived value of computer use, and can be associated with improved management (Michailidis, 2006). Recent research on ICT adoption reveals that in developed countries the main question is not anymore if a computer with Internet access is available, but rather which applications are used (Rosskopf and Wagner, 2005; Taragola and Gelb, 2005; Taragola and Van Lierde, 2007a). According to the census of 15 May 2005, 2845 (92.4%) of the 3110 horticultural holdings with a computer have an Internet connection (Taragola and Van Lierde, 2007b; Van Lierde and Taragola, 2008). Researchers have found that farmers' and horticulturists' personal and business characteristics strongly influence their adoption of computers and the Internet (e.g. Amponsah, 1995; Austin et al., 1998; Batte et al., 1990; Batte, 2005; Bonny, 1992; Gelb et al., 2004; Gibbon and Warren, 1992; Gloy and Akridge, 2000; Iddings and Apps, 1990; Jarvis, 1990; Michailidis, 2006; Ortman and Stockil, 1998; Putler and Zilberman, 1988; Smith et al., 2004; Taragola and Gelb, 2005; Taragola and Van Lierde, 2007a,b; Taragola et al., 2001; Van Lierde and Taragola, 2008; Warren, 2002a,b, 2003, 2004; Warren et al., 1996, 1999, 2000). However, there is little research on how these characteristics influence the use of various Internet applications. The benefits of Internet access will be determined by the use of the Internet, and not by the fact of Internet access alone. The benefit of this technology may best be measured according to usage. Usage generally determines how much value individuals derive from ICT in general (Verstegen and Huirne, 2001; Nuthall, 2004) and from the Internet in particular (Goldfarb and Prince, 2007). Although the adoption of a personal computer is virtually necessary to start using the Internet, as a technology the Internet has many characteristics that differentiate it from the PC (Gloy and Akridge, 2000). For instance, a personal computer is frequently used to process the internal data of the company, while the Internet helps the business manager to acquire and analyse external data and information. The Internet is also a convenient way for busi-

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ness managers to communicate and transact business with buyers, suppliers, specialists and other business managers.

The objective of the research is to better understand the factors influencing the use of Internet applications for business purposes in horticulture located in Flanders (northern Belgium). In order to stimulate Internet use, it is important to know which factors influence the use of various Internet applications. More in particular the influence of personal and business characteristics on the use of different Internet applications is examined.

2. Theoretical framework

Cyert and March (1963) were the first to describe the importance of search behaviour as a step in the decision-making process. They argued that information is not given but has to be obtained; that alternatives are searched for and discovered sequentially. In the search process, the environment is scanned for information that can be formulated into relevant alternatives.

A variety of factors influence the use of information. Several researchers have attempted to uncover relationships between managerial and farm characteristics and the use of information (Driver and Onwona, 1986; Ford and Babb, 1989; Schnitkey et al., 1992; Ortmann et al., 1993; Gloy et al., 2000; Alvarez and Nuthall, 2006). The managers' characteristics can be subdivided into biographical characteristics such as age, education level and so on, and social characteristics such as personal values, attitudes, objectives and communication behaviour.

Age and education are related to a decision-maker's ability to create value from the information gathered. Schnitkey et al. (1992) argue that age is related to farming experience, and that farmers with more experience should have less demand for external information. However, according to Ford and Babb (1989) more experienced farmers relied more on extension services for information about cropping decisions than younger farmers. Kool et al. (1997) show that input suppliers were more likely to have established relationships with older producers. Because the Internet is a relatively new information source, one can expect that older producers will be less familiar with it and probably will trust it less, resulting in lower use of Internet applications. Following Gasson and Errington (1993), the presence or absence of a successor may have more influence upon decision-making than the farmer's age. One can expect that at companies with a successor more use will be made of Internet applications than at those of the same age without a successor. Higher levels of education are expected to be positively related to the use of Internet applications, and should be consistent with an increased ability to process information. Education should also influence the usefulness of the most sophisticated information available. Internet use can also be seen as an innovation, and according to the innovation diffusion theory, adoption of innovations is positively influenced by education (Rogers, 1995). Education and knowledge have a dynamic character. Development of new knowledge happens only through a continuous learning process (Lei et al., 1996). Formal training should therefore be supplemented with additional training. According to Smith and Miner (1983) "opportunistic entrepreneurs" have complemented their technical education with education on business management, entrepreneurship, languages, and the like. One can assume that formal education and additional training will have a positive influence on Internet use.

The influence of attitudes on behaviour is described in the Theory of Planned Behaviour, developed by Fishbein and Ajzen (1975) and expanded by Ajzen and Madden (1986). This theory is based on the assumption that human beings are usually quite rational. An attitude is a disposition to respond favourably or unfavourably to an object, person, institution or event (Kim and Hunter, 1993). According to Rogers (1995), earlier adopters of innovations have a more favourable attitude towards change than later adopters. They are also better able to cope with uncertainty and risk than later adopters. Research on Scottish farmers' decision-making (Willock et al., 1998) revealed that environmentally oriented behaviour was significantly correlated with environmental objectives and the psychological variables of extraversion, intelligence, information gathering, an open and innovative personality, and a negative attitude towards the use of chemicals. In the research cited, the environmentally friendly farmer is the most innovative while retaining the traits of openness, information seeking and conscientiousness typical of business farmers. One can thus expect that managers with a positive attitude towards environmentally sound production techniques will make more use of Internet applications in general, and particularly for seeking information about environmentally friendly production methods.

Communication behaviour, according to Rogers (1995), is also related to the adoption rate of innovations. Earlier adopters seek information about innovations more actively than later adopters. They have more contact with change agents than later adopters, have more social participation, and are more connected through interpersonal networks. Given the above, one can expect that socially open managers that actively search for information through seminars, extension services, study clubs, agricultural magazines and the like, will also make more use of Internet applications.

On the basis of the literature cited above, the following hypotheses can be formulated.

Hypothesis 1. Internet use will be influenced by the business manager's personal characteristics. Age will negatively influence Internet use, while the following will have a positive influence: education, positive attitudes towards openness, risk, and environmentally friendly production, and open communication behaviour (including attendance at seminars and membership in study clubs and working groups).

Hypothesis 2. Internet use will be influenced by the size of the business. We expect that business size will be positively related to the use of Internet applications. Rogers (1995) stated that earlier adopters have larger units than later adopters. One reason for this is that large firms are normally able to derive greater benefit from the costs of information acquisition. Most of the researchers found that farm size was positively related to attitudes towards and use of information sources (Ford and Babb, 1989; Schnitkey et al., 1992; Ortmann et al., 1993).

3. Methodology

In 2005, we surveyed 208 horticultural businesses that are all members of the Flemish farm accountancy data network (FADN). Sixty-four of them specialised in glasshouse vegetables, 31 in open-air vegetables, 71 in ornamental plants, and 42 in fruit production. The sample consists of professional businesses with a dimension of at least 4 Standard Gross Units (S.G.U.). One S.G.U. corresponds to a Standard Gross Margin (S.G.M.) of 5380 Euro (Taragola and Van Lierde, 2005). The FADN accountant receives business data on paper, so the business manager does not need to own a personal computer for that purpose. In 2005, we performed face-to-face interviews with 208 firm managers, resulting in a response rate of 100%. An advantage of using the FADN is that it tracks data on business characteristics (structural data, economic data, etc.) and personal characteristics of the firm manager (age, education level, etc.). This information was also used in our survey.

Of the 208 business managers, 189 (91%) owned a personal computer. In the sample the adoption of a personal computer was positively related to business size and the business manager's level