REVIEW

Farmers' strategic responses to competitive intensity and the impact on perceived performance

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Abstract

A large percentage of small- and medium-sized farms have ceased operations in the last 2 decades in part due to their inability to respond to increased competitive intensity. Consequently, the strategic responses farmers adopt to competitive intensity are important to understand as they may influence performance and ultimately their survival. Based on a sample of 388 randomly selected farmers in Sweden and using structural equation modelling, we find that as perceptions of competitive intensity increase, so does their market orientation (MO) and lean production orientation (LPO), but not entrepreneurial orientation (EO). Moreover, we find that farmers who indicate greater (in order of importance) MO and LPO report better overall performance, while increased EO surprisingly contributes negatively to performance. Our findings contribute to the limited body of research on strategic responses to competitive intensity in the agricultural sector and subsequent payoff on farm performance.

Keywords Entrepreneurial orientation · Market orientation · Lean production orientation · Competitive intensity · Subjective performance · Agriculture · Farming

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Introduction

Similar to what has been occurring in other developed economies, there has been a significant decline in the number of farms in Sweden since the 1960s (SBA 2009). While the total number of farms has declined by 83%, the number of large farms, defined as farms over 50 hectares has increased by 137% as of 2007. At the same time, the price of land has increased by 87% from 2008 to 2018, while output price indices have been variable (SBA 2019a). For example, the output price index increased 21% from 2015 to 2018 but declined by 11% from 2018 to 2019 (SBA 2019b). In such highly competitive environments, producers may search for increased returns in a variety of areas. Two broad strategies are to become more efficient or to move closer to the customer. The question before managers and policy-makers is what strategies are adopted and what are their payoffs to performance?

Porter (2008, 1991, 1985) described two main methods of improving performance. When faced with increased competition, Porter suggested that firms could either become more efficient or they could endeavor to differentiate their production to potentially earn higher prices for their production. These two broad strategic choices have been extensively studied in areas outside of agriculture (Takata 2016; Stonehouse and Pemberton 2002; Yamin et al. 1999). It has only been relatively recently, however, that researchers have examined the factors that might influence these choices within agriculture. For example, Mirzaei et al. (2016) found that market-oriented firms had better marketing outcomes among Ontario farms that differentiated by marketing channel. Other work has also shown that differentiation strategies can pay off for farms investing in this strategy (Levi et al. 2019; Meraner and Finger 2019; Bauman et al. 2018). Similarly, previous research has found farms having an entrepreneurial orientation tend to benefit financially in the long run with their entrepreneurial efforts (Grande et al. 2011). However, the pay-off of a strategic orientation depends on contextual factors such as competitive intensity and managerial ability (see, e.g. Jaworski and Kohli 1993).

It is clear that efficiency or differentiation strategies play an important role in financial performance. However, the strategy (farm) organizations adopt is not relegated to one or the other; rather, they can be expected to pursue multiple strategies in parallel (see, e.g. Mavondo et al. 2005) related to improving efficiency or diversification and for different contextual reasons such as perceptions of competitive intensity. Consequently, responses to competitive pressures and financial performance outcomes can be better understood when different strategic orientations (e.g. efficiency and differentiation) are modelled together (see, e.g. Al-Henzab et al. 2018; Baker and Sinkula 2009).

Surprisingly, the literature on differentiation strategies such as market orientation and entrepreneurial orientation, are rarely studied together with efficiency strategies such as just in time, lean, and total quality management (see, e.g. Liu and Fu 2011; Grinstein 2008; Zelbst et al. 2010). Moreover, studies focused on the relationship between strategic orientation(s) and performance tend to omit

antecedents (such as competitive intensity) driving the strategic orientation(s) (Köhr et al. 2019; Kirca et al. 2005). This limits the understanding of producers' actual responses to competitive pressure as they would likely have a portfolio approach to competitiveness: some resources are directed toward becoming more efficient, while others are directed to better understanding the needs of the market and acting upon opportunities.

Consequently, the purpose of this paper is to examine how perceptions of competitive intensity influence different strategic orientations and how they in turn affect firm performance. We use survey data gathered from a random sample of 388 Swedish farm producers and measure the competitive intensity they experience and their strategic orientation (i.e. market orientation—a propensity for understanding and catering towards customer needs; entrepreneurial orientation—the firm's proactiveness and risk tolerance towards (innovative) opportunities and lean production orientation—behaviors in the firm that foster efficiency). We then build a structural equation model to test the relationships between perceived competitive intensity and strategic orientation to understand differences in perceived performance.

A confirmatory factor analysis revealed that market, entrepreneurial and lean production orientations represented unique dimensions—however, there was considerable overlap between market orientation and entrepreneurial orientation. To resolve this, entrepreneurial orientation items relating to conservative posture were retained in the final structural equation path model. Our results show that as perceptions of competitive intensity increase, farm producers tend to display greater market and lean production orientations, but not entrepreneurial orientation. The returns to all three strategic choices were significant, however, not in the way predicted. Returns to better understanding the needs of the customer (market orientation) and efficiency (lean production orientation) were positive while being more entrepreneurially oriented had a negative effect on performance.

Frame of reference and hypotheses

Swedish farmers' (much like farmers in the rest of the Western world) operate in highly competitive markets. Since joining the European Union and the opening of markets in the 1990s, Sweden has faced increasing competition from imports and individual companies are surrounded by larger and more efficient competitors. Given the strong competition from European and global competitors, farms must either adapt to the new competitive environment or risk failure. Recent statistics show that the rate of exit continues to be around 6% and is attributed to competitive intensity (Statistics Sweden 2019). Even with significant support through the Common Agricultural Policy, increased competitiveness would suggest that to survive and thrive, farmers in Sweden need to find sustainable ways to improve performance.

Recent work has suggested that increased competitive pressure can trigger changes in the strategic direction of firms, as well as moderate the effectiveness of the actions undertaken by firms. For example, O'Cass and Weerawardena (2010) find that increased competitive intensity increases market-focused learning among a sample of manufacturing and service firms. Given new trade agreements combined

with changes within the EU agricultural sector, Swedish farms are facing an increasingly dynamic market (Konkurrensverket 2011). At the same time, consumer demands continue to evolve, necessitating the need to be continually aware of how a farm's production fits within the broader agricultural value chain. These changes can therefore stimulate strategic changes within agricultural firms to explore new opportunities or to exploit current capabilities in meeting the needs of the market (Abebe and Angriawan 2014).

Competitive intensity (CI) as an antecedent of strategic orientations

Actors in markets embodying high levels of competitive intensity tend to experience fierce competition from a large number of competitors as products are usually interchangeable, offerings easily matched by other actors, and competition is driven by price and cost (see, e.g. Auh and Menguc 2005; Zahra and Covin 1995). Competitive intensity has been modeled by Porter (1985) and others (see, e.g. O'Cass and Weerawardena 2010) as relating to buyer power, supplier power, threat of entry, threat of substitution, and rivalry. More competitive industries would have greater pressures from one or more of these forces. Others have focused mainly on the issue of rivalry when studying competitive intensity (Feng et al. 2019). In our context, we view competitive intensity as a combination of price intensity, competitor strength and ease with which products can be replaced.

The entrepreneurship and marketing literature has tended to focus on competitive intensity as a moderator between a market orientation (MO) and profitability. In highly competitive industries, for example, the benefits of having a high MO outweighs its costs. However, in other situations, such as where a company has a monopoly or where competition is not intense, having a high MO may not be strongly related to profitability (Kohli and Jaworski 1990). When the focus of research is on comparing industries or sectors that have large variation between competitive intensity, treating competitive intensity (CI) as a moderator can reveal under which conditions firms benefit from different strategies such as MO, entrepreneurial orientation (EO), or lean production orientation (LPO). However, and arguably, treating CI as a moderator within industries where competitive intensity is more uniform, such as farming, is less interesting.

Nevertheless, within a specific industry variation in how a firm chooses to respond can be expected to be based on perceived competitive intensity. When based on perceptions, competitive intensity can also be viewed as an antecedent variable. That is, CI may influence the development of different strategies to counter hostile operating environments. In fact, Lusch and Laczniak (1987) demonstrated that increased perceptions of competitive intensity (by Fortune 500 executives) led to more market-oriented behaviors. Similarly, increased perceptions of CI have been shown to increase export entrepreneurship (Navarro-García et al. 2015) and have been tested (but not confirmed) for its positive effect on EO in the pharmaceutical industry (Jambulingam and Doucette 1999). The common denominator between MO and EO studies that have CI as an antecedent is the suggestion that competition forces companies to be more aware of their customer needs and competitors (MO)

and to take risks by exploiting opportunities (EO). Agricultural producers, however, tend to view the path to improved performance through improved efficiency (Hansson 2007; Van Passel et al. 2006). In this manner, farms may seek to become more efficient through standardization processes which seek to identify best practices and to ensure they are practiced by all family members and employees on the farm.

Though we are unaware of previous research that has explored the relationship between perceived CI and increases in MO or EO in the agricultural sector, we hypothesize that the logic should be similar. That is, increased perceptions of CI by farmers should spur increasing levels of EO and MO as a result. Moreover, countering CI through increased entrepreneurship and marketing orientation is a topic heavily promoted by the government and NGOs in Sweden (see, e.g. Regeringen 2017). Finally, rationalization and structural changes witnessed across the world in agriculture are direct results of efforts to increase production efficiency in the face of increased competition (Hendrickson et al. 2014; Weis and Weis 2007). It follows, therefore, that as farmers perceive higher levels of CI, they will be more likely to be engaged in activities that improve their efficiency (later described and operationalized as LPO). Taken together, we hypothesize that increased perceptions of CI will lead to increases in market, entrepreneurial and lean orientations as follows:

H_1: An increase in perceived competitive intensity is associated with an increase in the level of lean production orientation.

H_2: An increase in perceived competitive intensity is associated with an increase in the level of entrepreneurial orientation.

H_3: An increase in perceived competitive intensity is associated with an increase in the level of market orientation.

Lean production orientation (LPO) and subjective performance

In commodity markets where prices are set in global markets, increases in net income are largely driven by efficiency gains that lower per unit costs of production. Agricultural firms have often focused on the adoption of new technologies that have been developed outside the farm gate to achieve this goal, but these gains are often short-lived, and the developer of the technology often takes a considerable share of any projected gains in efficiency. Internal innovation practices are another means to increase efficiency. This follows the work by Karlsson and Åhlström (1996) who define lean production systems along a variety of practices aimed at improving production efficiency. Moreover, research has shown that involving employees and others in decision-making processes and worker autonomy can lead to improved production outcomes (Kalleberg et al. 2009).

Given the nature of agricultural markets, farmers are continually searching for the means to increase efficiency. Work by Hansson (2007) showed that there is significant room for efficiency gains among farms in Sweden. While Hansson (2007) suggested that the CAP may reduce the necessity to seek improved efficiency in firms who do not meet their performance goals, they can choose to invest valuable resources in becoming more efficient thereby lowering their break-even price and allowing them to cover costs of production as greater levels of competition and

innovation pushes equilibrium prices lower. Recent studies have shown that investing in lean production systems, even incrementally, may lead to improved financial performance in markets where competitive dynamics have changed (Barth and Melin 2018; Shah and Ganji 2017).

Lean production systems balance worker autonomy with process standardization. The ability to stop the assembly line is based on worker autonomy, but the idea of assembly line itself is based on task standardization (MÍkva et al. 2016). For firms with employees, standardizing practices ensure that tasks are repeatable and that outcomes fall within acceptable tolerance levels. A core tenet of lean philosophy is to reduce waste and embrace a "just-in-time" production system, including continuous improvements that will add value in every step (Ohno 1988). The promise of lean production is improved productivity (Lewis 2000), enhanced quality, shortened lead times, reduced costs (Karlsson and Åhlström 1996), reduced waste and improved operational effectiveness (Roriz et al. 2017) which contributes to desired improvements in the quality process. In this paper, we define a lean production orientation as one that standardizes production processes to reduce waste and improve efficiency.

Increases in efficiency gained through the standardization of practices should theoretically lead to better financial performance. However, the positive association between lean practices and increased performance has not always received empirical support. This may be due to differences in measurement or intervening variables such as non-financial measures (Fullerton and Wempe 2009). Nevertheless, even if lean business practices increase the risk of, e.g. ill-health (Landsbergis et al. 1999), especially in dangerous occupations such as farming (see, e.g. Alwall et al. 2019; Hall 2007), the literature and widespread adoption seem to support the aggregate cost–benefit to performance. Consequently, we propose that farms that adopt a LPO will have better performance measures than those that do not. Moreover, we expect to find this effect to be independent of and in addition to the differentiation strategies we discuss in the next section.

H_4: An increase in lean production orientation is associated with an increase in firm performance.

Entrepreneurial orientation (EO) and subjective performance

Entrepreneurial orientation refers to an organizational mindset that promotes ongoing autonomy (Anderson and Eshima 2013), innovativeness, risk-taking, proactiveness (Wiklund 1999), and competitive aggressiveness (Anderson and Eshima 2013; Lumpkin and Dess 2001, 1996). It is this mindset that forms the basis for entrepreneurship in organizations—that is the new entry of goods and services into new and existing markets (Lumpkin and Dess 1996). Despite conflicting evidence in individual studies, the body of research suggests that an EO has positive implications for performance. For example, Naldi et al. (2007) could not find support for a significant relationship between entrepreneurial orientation and performance in small family businesses. However, Grande et al. (2011) found EO paid off financially in farm-based ventures over time. Building on the knowledge available, Rauch et al. (2009)

concluded from a meta-analytical study of 53 samples that EO has positive—and moderately large—performance implications for businesses across cultures, operationalization of the construct, and time.

Within agricultural markets, entrepreneurial actions may be evident in both input and output markets. For example, in commodity markets, much of the competition among producers is for inputs (e.g. highly productive land; quality employees). On the other hand, firms that seek to differentiate their production may develop new products or seek to operate in new markets or channels (Mirzaei et al. 2016). Regardless, being proactive in the search and acquisition of valuable inputs or the development of innovative methods to market agricultural production should ultimately lead to improved performance through greater efficiency or increased revenues. Given this, we propose that:

H_5: An increase in entrepreneurial orientation is associated with an increase in firm performance.

Market orientation (MO) and subjective performance

A market orientation has been defined by Slater and Narver (1994) as an organizational culture focused on the discovery of customer needs. Through a greater understanding of the customer and the strengths and weaknesses of other firms in the market, market-oriented firms may develop strategies that can lead to improved performance. Even in agricultural markets where production from one farm is indistinguishable from another, research has shown that firms who better understand the needs of their buyer have improved performance (Micheels and Gow 2015; Verhees and Meulenberg 2004).

Production agriculture has long been a near textbook case of a perfectly competitive market. In typical agricultural commodity markets, farm businesses compete with firms with similar resource endowments and similar constraints to sell agricultural commodities (which are undifferentiated by definition) to processors and retailers. Through a combination of exit and mergers and organic growth, many agricultural landscapes are now populated by fewer and larger firms. At the same time, the needs of value chain participants have evolved to reflect the changing needs of consumers. Increasingly, agricultural value chains are attempting to compete with competitors based on measures of environmental sustainability, increased animal welfare, degree of localness, as well as price. For agricultural producers operating within these value chain systems, greater competition at the production level may lead to greater pressures on firm performance. As suggested by Levinthal and March (1993), search is a function of aspirations, and the ability of the firm to meet performance goals. Alternatively, agricultural firms facing increased competition could focus on developing a differentiated value offering based on their unique ability to help the value chain meet customer needs. As downstream firms face greater competition due to mergers and acquisitions, greater competition from international firms, and changing consumer demands, firms who can better understand their buyer (and their buyer's customer) may find that performance can also be improved in this manner. Recent studies have shown that market-oriented firms in agricultural markets

can improve performance through greater learning about customer needs (Micheels and Gow 2015; Gellynck et al. 2012) even though other studies have shown that issues surrounding legitimacy may inhibit the development of a market orientation (Press et al. 2014). Based on this, we hypothesize that:

The hypotheses introduced in this section are modelled in Fig. 1. The structural model suggests that increased competitive intensity leads to increases in three different strategic orientations—LPO, EO, and MO—that in turn, and in parallel are expected to increase perceptions of firm performance.

Methods

Sample and procedure

A list of all active farmers in Sweden was retrieved from the Statistics Bureau in Sweden (SCB). This list contained a total of 62,095 farmers and included contact information and basic demographic information about e.g. sector focus, size of the farm in terms of area, and age. Farm units with less than 10 hectares and farms categorized as "Smallholders" by SCB were removed from sample consideration. This was done to avoid collecting data on "hobby farmers" who are over-represented among small-landholders who do not consider farming as their main occupation and often produce for their own needs rather than for profit. Of the remaining 29,295 farmers, 1,952 were randomly selected and sent a pen-and-paper questionnaire via the postal service with a return envelope and pre-paid postage. After four weeks, a single reminder, also by post, was sent to those who did not respond to the initial survey.

Participants were told that the questionnaire was used to gather benchmark data of managerial activities in agriculture and answers they provided would be treated
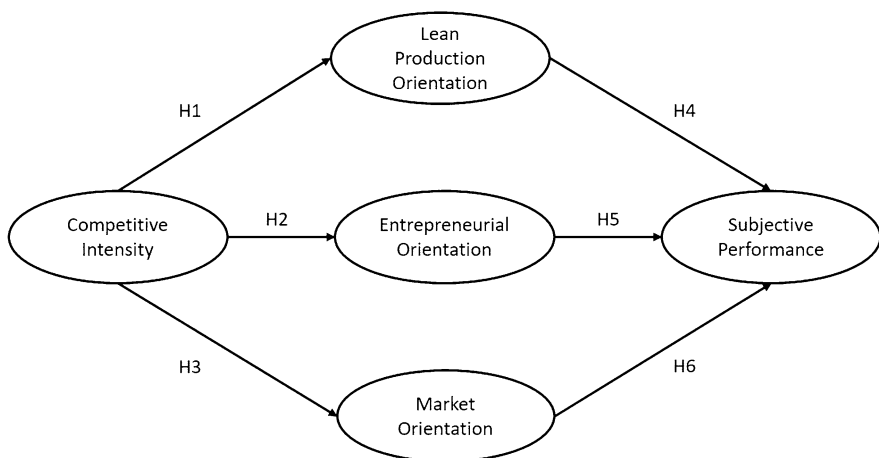

Fig. 1 Structural model

anonymously and reported in aggregate to make identification impossible. Instructions in the survey asked that it be filled in by the person most responsible for making strategic decisions on e.g. investments and production. Finally, all participants were informed in writing that responding to the survey was completely voluntary. A pre-test of the questionnaire was conducted by a small group of students with farming experience ($N=10$) to improve reliability (e.g. by flagging confusing language or unclear instructions; ensuring concepts were understood; structure was easy to follow, etc.). In total, 388 completed surveys were returned for a response rate of around 20%. Due to an extensive area, Sweden is divided into regions where livestock is the most dominant in the central districts of the country, and crop production dominated the south (plain district), and the forest district is represented by a majority of smaller farm holdings (Statistics Sweden 2019). On average farmers in Sweden are 57 years old with males representing 88% of farmers (Statistics Sweden 2019). In comparing the known population of Farmers in Sweden with our sample data, we find that in terms of gender and age, size (ha), production district, and education, there are no significant differences (see Table 1).

Measurements

For a complete list of the questions used to measure competitive intensity, LPO, EO, MO, and subjective performance the reader is directed to ESM Appendix. All items were translated from English to Swedish and measured on 7-point Likert scales with end points strongly disagree $=1$ and strongly agree $=7$. Below, the choice of operationalization is motivated.

Subjective performance (SP)

While performance is often captured using objective financial measures such as ROA (Dess and Robinson Jr. 1984), growth in sales (Pearce et al. 1987; Dess and Robinson Jr. 1984), profit (Wall et al. 2004) they are more difficult to attain, evaluate and potentially less accurate than subjective measures (Rowe and Morrow Jr. 1999). Previous research has shown remarkable correlation between objective and subjective measures of performance (Pearce et al. 1987; Dess and Robinson Jr. 1984)

Table 1 Socio-demographic characteristics of respondents

Gender (%)	Male	88.4	Education (%)	Primary school	20.6
	Female	10.8		Secondary school	43.0
Age	Average	56.7		Higher education	36.4
Size (ha)	Average	132.8	Production (%)	Conventional	77.6
Production district (%)	Plain district	22.7		Organic	20.6
	Central districts	40.5			
	Forest districts	35.6			

and therefore some researchers advocate the use of subjective measures (Slater and Narver 1994).

For the aforementioned reasons, performance was measured subjectively and operationalized using seven items developed by Micheels (2010) and one item from Pearce et al. (1987). These items captured responses to questions related to whether return on assets, investments, and marketing met expectations; more global questions related to performance in the previous year based on expectations or when compared to major competitors; questions about cash flow and sales growth were also measured. Together, these questions on subjective performance were intended to capture multiple aspects of financial and market performance. See ESM Appendix for a full list of items used to measure subjective performance.

Competitive intensity, EO, MO, and LPO

Measures for LPO, MO, EO and CI were taken from previously published scales and adjusted slightly to fit an agricultural context. LPO was captured using 11 measurement items and took inspiration from Karlsson and Åhlström (1996). The key elements of LPO are activities related to reducing costs and improving profit margins (Zhou 2016). However, much of the literature and operationalization of lean were developed in the field of operations management and in the context of large manufacturing organizations. As a result, efforts were made to keep the items for LPO as similar as possible to the ones borrowed from Karlsson and Åhlström (1996). In total, 16 items were used to capture MO. These were inspired by the seminal Narver and Slater (1990) article but based on Micheels (2010) adaptations made for the agricultural sector. The items correspond to three dimensions of MO, i.e., customer orientation, competitor orientation and inter-functional coordination. Eight items intended to measure EO were taken from Covin and Slevin (1989) and deal with strategic posturing or activities the firm typically engages in such as innovation, proactiveness, and risk-taking. Even though competing models of EO have been presented in the literature, Covin and Slevin (1989) were used because it was developed for studying small (rather than large) firms and has been validated repeatedly over the last few decades. The items retained in the model measuring EO include five items and capture at least one item related to innovativeness, proactiveness, and risk-taking (and subsequently recoded so that agreement on the items reflected increasing EO). CI was developed using one item from (Gatignon and Xuereb 1997) relating to a rapidly declining market and seven items from Jaworski and Kohli (1993) corresponding to demand uncertainty and the perceived intensity of external competitors and market prices.

Reliability and validity

The reliability and validity of the measurement scales were tested using SPSS 24 and AMOS 24. Table 2 shows factors loadings for the retained items used in the model. Factor loadings at 0.5 are accepted, but values over 0.7 are preferred (Hair et al. 2014). To measure for internal consistency, Cronbach alpha was used

Table 2 Factor loadings of the items including Cronbach's α and Corrected item-to-total correlations (for all items in the questionnaire, see ESM Appendix)

Constructs	Items	Factor loading		Cr. alpha	Corrected item total correlations	AVE	Square root of AVE
		1	2				
Competitive intensity (CI)	CI1	0.841		0.767	0.623	0.684	0.827
	CI2	0.820			0.592		
	CI3	0.820			0.593		
Lean production orientation (LPO)	LPO1	0.873		0.844	0.645	0.627	0.792
	LPO2	0.839			0.698		
	LPO3	0.774			0.657		
	LPO4	0.680			0.611		
	LPO5		0.837		0.587		
	LPO6		0.835		0.637		
	LPO7		0.683		0.391		
Entrepreneurial orientation (EO)	EO1	0.782		0.738	0.588	0.495	0.704
	EO2	0.730			0.535		
	EO3	0.683			0.486		
	EO4	0.671			0.462		
	EO5	0.644			0.449		
Market orientation (MO)	MO1	0.803		0.876	0.671	0.604	0.777
	MO2	0.771			0.612		
	MO3	0.733			0.582		
	MO4	0.726			0.699		
	MO5	0.654			0.622		
	MO6		0.874		0.677		
	MO7		0.874		0.686		
	MO8		0.755		0.563		
Subjective performance (SP)	SP1	0.879		0.850	0.705	0.942	0.835
	SP2	0.842			0.606		
	SP3	0.824			0.737		
	SP4	0.739			0.534		
	SP5		0.914		0.539		
	SP6		0.855		0.622		
	SP7		0.784		0.538		

as measurement. Acceptable values for internal consistency range from 0.70 (Hair et al. 2014) to 0.95 (Tavakol and Dennick 2011). Low values could indicate poor correlation or poor inter-relatedness between items and should be discarded, while if Cronbach alpha is too high this could be an indication of items testing the same thing and therefore a maximum Cronbach alpha of 0.90 has been recommended (Tavakol and Dennick 2011). The results meet the threshold for internal consistency with Cronbach alpha values that range from 0.738 to 0.876. Item-total correlations

less than 0.3 were removed in accordance with Rodriguez-Blazquez et al. (2011); Cristobal et al. (2007) since they are likely to measure different construct from other items in the scale.

To assess convergent validity, i.e. the amount of variance captured by each construct, average variance extracted (AVE) values were calculated. The AVE value should exceed 0.50 (Fornell and Larcker 1981), and an AVE < 0.50 indicates on average more errors remain than variance explained (Hair et al. 2014, 2011). To test for common method bias (CMB), Harman's single factor test was conducted in SPSS. One factor stood for 22% of explained variance. This indicates that CMB exists; however, it does not exceed the commonly accepted threshold value of 50% (Eichhorn 2014) and, therefore, no further actions are necessary (Podsakoff 2003). Table 3 shows descriptive statistics of constructs being significantly correlated to each with the Pearson Correlation Coefficients ranging between -0.050 to 0.590. Previous researchers have pointed out considerable conceptual (Jones and Rowley 2011) and empirical (Kwak et al. 2013; Sciascia et al. 2006) overlap between EO and MO. In retaining EO items mostly related to conservativeness or risk-taking, such as "my firm typically embrace(s) low risk projects…and typically avoids high-risk projects" (see ESM Appendix), we avoid conceptual overlap with MO items that were mostly related to customer orientation and interfunctional coordination. Importantly, we found no indication of multicollinearity in the retained items used to capture the constructs as the correlations were less than 0.90 (Hair et al. 2014).

Results

The structural model was analyzed using SPSS 24 and AMOS version 24. Structural equation modelling (SEM) was used to test the structural model (Fig. 1) and the relationship between latent constructs (Ullman and Bentler 2003). SEM is a multivariate technique that provides a simultaneous estimate that a single multiple regression or a single factor analysis does not (Weston and Gore Jr. 2006). Thus, SEM will involve both the structural and measurement model combined and therefore provides a better way of empirically examining the theoretical model (Hair et al. 2014; Weston and Gore Jr. 2006). Further, the strength in using SEM is that the technique allows for measurement errors to be eliminated (Cohen et al. 1990). In

Table 3 Descriptive statistics (mean and standard deviation) and correlation matrix of the constructs

| Construct	Mean	SD	1	2	3	4	5
1. Competitive intensity	4.22	1.35	1				
2. Lean production orientation	3.52	1.34	0.216**	1			
3. Entrepreneurial orientation	4.03	1.20	− 0.016	− 0.184**	1		
4. Market orientation	3.46	1.21	0.219**	0.517**	− 0.190**	1	
5. Subjective performance	4.06	1.09	− 0.049	0.271**	− 0.199**	0.423**	1

**Correlation is significant at the 0.01 level * Correlation is significant at the 0.05 level

addition, SEM allows for flexibility in the interplay between theory and data and the outcome represents a more complex theoretical model (Chin 1998).

Model fit

Figure 2 shows the structural model of the effects from competitive intensity on Swedish farmers' strategic response and the return on their estimated performance. To determine model fit we used common indices. Chi-square (X^2) is a method to assess model fit and in a good fitting model, the chi-square value should be non-significant (Hooper et al. 2008). Because chi-square value can be sensitive to sample size (Hooper et al. 2008) additional indices assessing model fit have been used. Some common indices used include the Tucker–Lewis Index (TLI), Comparative Fit Index (CFI) and root mean square error of approximation (RMSEA) and Standardized Root Mean Square (SRMR) (Hair et al. 2014). General threshold values for a good model fit for interpreted indices are TLI > 0.95, CFI > 0.95, RMSEA > 0.08, and SRMR ≤ 0.08. SRMR values range from 0 to 1.0, where 0.05 is considered a well-fitted model, whereas 0.08 is acceptable (Schreiber et al. 2006).

Our results show an acceptable model fit. The X^2 measure is 1171.41 and is non-significant with 374 degrees of freedom. From the test for discrepancy between the hypothesized model and the data, CFI turned out to be 0.852, indicating an acceptable fit. The relative fit indices, TLI, is 0.827 which is an acceptable fit. The parsimony-adjusted index, RMSEA, that corrects for model complexity is 0.06 which represents a moderate fit. The calculated SRMR value of 0.1232 turns out to exceed the threshold value for even a mediocre fit. This could indicate that the hypothesized model may be too parsimonious. Table 4 shows the results from the path diagram and indicates that the data in general supports the hypothesized structural model.
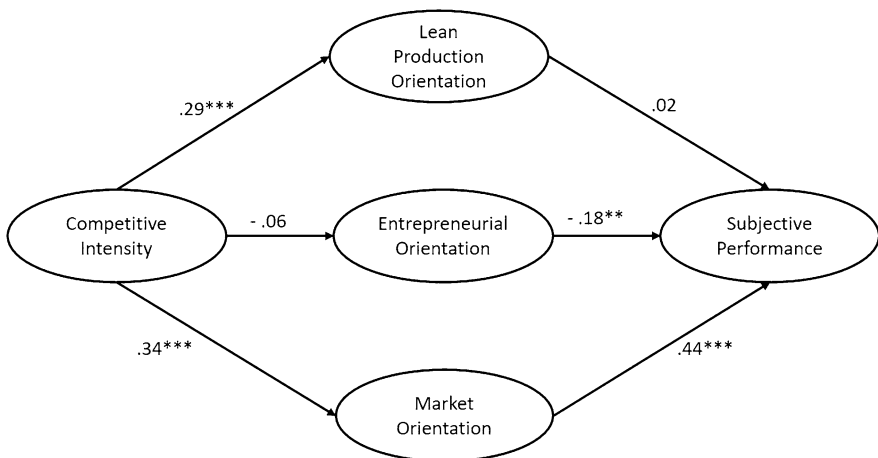
Fig. 2 Structural model of the effects from competitive intensity on Swedish farmer's strategic response and return on subjective performance. Overall model fit: Chi-square = 1171.41 *df* = 374 CFI = 0.852 TLI 0.888 RMSEA = 0.0740 SRMR = 0.1232

Table 4 Results from path diagram

Latent construct		Influence	Hypothesis	Hypothesis supported	Estimates	Std. errors	Multiple sq. correlations
LPO	←	CI	H1	Yes	0.223	0.056	0.083
EO	←	CI	H2	No	− 0.034	0.043	0.003
MO	←	CI	H3	Yes	0.298	0.066	0.118
SP	←	LPO	H4	Yes	0.088	0.053	0.1
SP	←	EO	H5	No	− 0.224	0.087	0.1
SP	←	MO	H6	Yes	0.384	0.061	0.1

The SEM results in Fig. 2 and Table 4 indicate that CI has a positive effect on MO (H3 supported) having the highest standardized coefficient value (0.35) followed by LPO (0.32) (H1 supported). However, CI does not appear to influence EO (H2 rejected) as the standardized coefficient is non-significant at − 0.03. Looking at the different strategic orientations, MO appears to have a positive, medium effect, on SP (0.27) followed by LPO at 0.12. Surprisingly, EO was significantly, but negatively related to SP (− 0.18). Based on this, we find support for H4 and H6, but not H5. Although the results for H5 are significant, the finding is inconclusive since we operationalized, in line with extant literature, EO as having a positive relationship with performance. Taken together, the results suggest that when farmers perceive increased CI, they tend to increase their LPO and MO, but not EO. At the same time, the results also suggest that each of the strategic orientations influences perceived performance with MO having the largest effect followed by LPO and a surprising negative effect for EO.

Discussion and conclusions

The purpose of this paper was to examine how perceptions of competitive intensity influence different strategic orientations and how they in turn affect firm performance. In doing this, we confirmed that two of the strategic orientations measured, MO and LPO were related to increased perceptions of performance; unexpectedly, EO was negatively related to performance. Our structural model also revealed that the strategic paths farmers chose when CI increased tended to include MO and LPO, but fittingly perhaps, not EO.

This research contributes to an understanding of how farmers strategically respond to competitive intensity and in turn how this influences their performance. Previous research in this area has tended to focus on linear relationships between, e.g. MO and firm performance, rather than on how different strategic orientations work in parallel (Hernández-Linares et al. 2018). We suggest that the structural model used in this study comes closer than previous studies in mimicking farmers' strategic, "portfolio" response to competitive intensity and the performance "payoff" that flows from their choices. In addition to confirming the independent nature of the MO, EO, and LPO factor structures, we also showed the relative importance

(i.e. effect size) of each strategy orientation on performance under conditions of competitive intensity.

Porter (1991) suggests that firms could either become more efficient or attempt to differentiate production facing increased competition. In line with this, our results show that Swedish farmers turn to both as perceived CI increases. Although an increase in LPO was shown to contribute to improved performance, the effect size was smaller than turning to increased MO. One reason for this result may be related to the law of diminishing returns—e.g. farmers have focused on improving efficiency for decades (Hendrickson et al. 2014; Welter 2011; Qualman and Tait 2004) therefore marginal gains may be easier to achieve through orientations directed at better understanding the buyer and downstream customer needs (Assuncao and Ghatak 2003). Nevertheless, the importance of LPO on performance, in particular as we have measured through standardized routines and following up those routines with employees should not be understated and may become more important over time. Currently, the average Swedish farm has the equivalent of 1.3 employees, not including family members or temporary and seasonal workers (Sweden Statistics 2019). Due to structural change and rationalization, the average farm size (in Sweden and Worldwide) has increased, as has the movement of migrant laborers which currently is estimated to be 15,000 working in Swedish agriculture. Efficiency can be expressed in different ways. However, having temporary and external employees during peak season highlight the need for developed routines to minimize mistakes since mistakes can have a great impact on margins. Therefore, well-developed routines (i.e. lean production routines) should minimize the risk of mistakes by employees and thereby improve efficiency.

MO promotes, e.g. new revenue opportunities in less competitive arenas that allow the farmer to sell at a higher price, or to produce products for alternative markets (e.g. barley for the beer or whisky industry). LPO and the cost benefits that accrue from such a strategy may instead promote expansion and larger production units. However, bigger units come with a cost such as different expectations on leadership and management (Assuncao and Ghatak 2003). To keep up cash flow in bigger units the farmer must be able to coordinate different events in the market, and market intelligence becomes important. Interestingly, our findings show that returns to EO, even when accounting for the variance captured by MO and LPO, are significant and display a larger effect size than LPO. This indicates that producers do not necessarily need to take significant risk when attempting to improve performance outcomes. On the contrary, the effect we found for EO suggests that taking large risks, being competitively aggressive, and ignoring caution is negatively related to performance. This unexpected finding seems to contradict previous EO research on farm businesses that show a positive effect on firm performance (see, e.g. Gellynck et al. 2015; Veidal and Flaten 2014; Grande et al. 2011). This difference may be explained by the Swedish farm context used to gather data or the combination of strategic orientations captured in this study; nevertheless, this has important implications for policy-makers, farm organizations, and advisors who regularly advocate entrepreneurship as a pathway towards increased competitiveness and survival (see, e.g. Regeringen 2017; Regeringen 2015; EU 2013; EU 2011).

Policy makers often assume that increased production, efficiency, market orientation, and entrepreneurship is the solution to agricultural competitiveness (Regeringen 2015). However, to our knowledge, no research has so far sought to understand how farmers act when competition increases from the perspective of multiple strategic choices. The EU continues to push for an increased MO-responsiveness from farmers. In the overview of CAP-reform 2014–2020, the Commission stated that "… to enhance market orientation of EU agriculture is continued by adapting the policy instruments to further encourage farmers to base their production decision on market signals" (EU 2013; p. 5). This statement is likely true, but it needs more context to achieve the intended results. First, farmers already respond and make decisions on market signals. We see this each spring when farmers make allocation decisions regarding which crops to seed for the upcoming season. Moreover, increasing market orientation does not mean that new product innovation means moving closer to the consumer. This is discussed by, e.g. Grunert et al. (2010) who suggested that producing a high-quality and homogeneous raw product (such as milk, grain, meat, etc.) is an example of an MO-response. In this manner, the market or channel is signaling their needs in terms of quality, quantity, and other characteristics (time of delivery, residue limits, etc.). Thus, market-orientated farmers are well positioned to identify such needs, which are in line with our findings. MO captures activities such as visiting customers to learn more about their needs, gathering intelligence on competitors, and sharing information in the company to produce products that target the right markets or are better tailored to match customer needs. While all of these activities are entrepreneurial in nature, they are less risky than the behaviors captured by an EO which includes, e.g. making major changes to product offerings or even launching completely new ones. A strategic orientation combining EO and MO brings Sarasvathy's (2001) theory of effectuation to mind. Effectuation describes an approach to making entrepreneurial decisions that includes using only those resources available (bird-in hand) and investing only as much as you are willing to lose (affordable loss). In other words, the relationship we found between a strategic orientation, showing negative EO effects, combined with pro-MO leading to greater performance may be due to farmers risking only what they could afford with the means they had available.

The results for EO do not imply that farmers avoid entrepreneurial behavior or entrepreneurial orientations; however, we can say that EO does not appear to be triggered by differences in competitive intensity perceptions. This result runs counter to strategic recommendations by, e.g. researchers Engelen et al. (2015) and Porter (2008) and, e.g. E.U. governments (EU 2011). It may be the case that (Swedish) farmers tend to avoid risky entrepreneurial behavior under all perceived levels of competitive intensity or simply when competitive intensity is high. An argument could be made that focusing solely on improving production orientation or market intelligence under intense competitive situations will not be enough to survive in the long run. Should future research establish such a connection, the challenge becomes how to educate and convince farmers on the need to take larger risks in the face of increased competitiveness when a general, low-risk effectuation type strategy, at least in Sweden, appears to have a higher pay-off.

Limitations

Our model proposes that CI is an antecedent to managerial orientations, and LPO, EO and MO as antecedents to SP. However, the results in our model are, to an unknown extent, based on the measurements we retained and omitted. The items kept capture a fragment of the dynamic environment (CI) and reflect how farm managers in Sweden react to external factors. While we argue that we captured EO, the results may be difficult to compare with other studies that made use of all Covin and Slevin (1989) items or those that used semantic differential items to capture EO instead of Likert items. Our operationalization of LPO is focused on assembly-line systems and did not capture practices related to improving biological efficiency through e.g. input usage or technology. Arguably, this may have led to our results underrepresenting the relative importance of lean production as a response to competitive intensity and impact on performance. While production agriculture is not exactly representative of an assembly line, decisions made at different points in the growing season can be sources of cumulative errors. As found by Deflorin and Scherrer-Rathje (2012) a mass producer benefits from a semi-standardized LPO protocol since this opens up for employees to solve problems as they arise in the operational process of work. For example, in agriculture, loading a sprayer with the incorrect chemical can kill the crop rather than the weeds. In this instance, having lean systems in place where managers and employees check that it is the right chemical at the right rate in the right field at the right time might ensure that small mistakes do not become large mistakes.

Main contribution

Arguably, EO, MO and LPO all have an influence on competitiveness and may be approached independently or in combination by businesses trying to increase their competitiveness. Structural changes have created a necessity for farmers to take on trade-off decisions for their business. The main choice is to grow in size and, therefore, benefit from cost-efficiency, or to differentiate and as a result gain a deeper understanding of market mechanisms, what customers want and deliver greater value than competitors. In addition, structural change contributes to an increase in competitive intensity where fewer farm holdings compete with bigger units of produce, which makes it challenging for small farms to compete. Increased competition in a farming context can be understood as a race of cost-efficiency where all farms produce the same quality, meaning there is always a risk for someone else, with different circumstances producing the same at a lower cost. To avoid this race to the bottom, farmers' may consider alternative strategies such as MO that allow them to grow with the market rather than become a victim of structural change and rationalization or avoiding risky entrepreneurial endeavors altogether that may expedite this process.

Data availability All data analysed are contained in the paper.

Declaration

Conflict of interest Jozefine Nybom declares that she has no conflict of interest. Erik Hunter declares that he has no conflict of interest. Eric Micheels declares that he has no conflict of interest. Martin Melin declares that he has no conflict of interest.

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