Aligning Consumers' and Farmers' Behaviors Towards Socially Responsible
Agriculture: A Canadian Empirical Study

by

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ABSTRACT

In contrast with the growing public pressure for sustainable agriculture, most Canadian farmers have not prioritized adopting socially responsible production practices. In this context, empirical analysis of farmers' responses to public demand has been crucial to assisting the agricultural sector to better cope with a more sensitive market. This thesis contributes to the literature by analyzing farmers' behaviors towards social license (SL) to operate and policy mechanisms that comply with their major perceptions and goals. Using data from a survey comprising 400 farmers across Canada, we estimate the motivations behind farmers' preferences for industry level investments. We find that SL is the least preferred option compared to alternate industry-level investments, which confirms that public and private net benefits are not aligned. On the other side of this balance, the growing disconnection between agri-food production and society reinforces the importance of research examining the motivations behind consumers' purchase behaviors. In fact, evidence about the psychometric factors underlining the heterogeneity among citizen concerns versus consumers' purchase intentions remains scarce. By employing a Structural Equation Model (SEM), this thesis also aimed to understand the direct and indirect effects between variables driving consumers' attitudes towards specially labeled meat. Our findings suggest that information and engagement in social media positively impact individuals' perceptions and concerns for farm animal welfare. Furthermore, individuals having an altruistic and anti-anthropocentric profile are also more oriented towards sustainable and ethical conduct as shoppers.

PREFACE

This thesis is an original work by Marina Mendonca de Almeida Malzoni. The research project: *Advancing Animal Welfare Management and Communication in Canada* and the project: *Investment Preferences of Agricultural Producers in Western Canada*, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics Board, NoPro0006284 on June of 2016 and NoPro00083965 on August of 2018, respectively.

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Chapter 1. Introduction

Corporate social responsibility (CSR) is a set of business actions that positively impact the environment, communities, stakeholders, and the broad public sphere. According to CSR, firms need to go beyond their core obligations: profit generation and production, embracing social interests (Bénabou et al., 2009). Due to public scrutiny and calls for a humane and sustainable production system, an increasing number of companies have started to pay attention to CSR. As a result, it has already been widely explored within the business literature (Luhmann et al., 2017).

Across consumer debates, however, the agribusiness sector is highly criticized. Due to population growth and an increasing disconnection between society and modern agriculture, there is a gap between consumers' wants and agri-food industrial practices (Böhm et al., 2010). Despite this, there is still a lack of actions to incentivize the agri-food supply chain to embrace CSR, and research on this concept remains limited for this industry (Luhmann et al., 2017). Consequently, CSR remains a vague concept for stakeholders in agriculture and is underexplored within the agricultural economics literature.

However, mindful consumers – individuals interested in how their food is produced – represent a market niche and are gaining the power to modify market dynamics (Harper et al., 2002; Yiridoe et al., 2005). According to Grunert et al. (2018), such individuals feel responsible for the environment and animal welfare, so they are willing to pay a premium price to prevent unethical products from being stocked on market shelves. This shift in consumers' demand represents an opportunity for agribusiness investments, and novel research is important to address the future of this emergent market. Farmers are not willing to support investments in ethical products because they do not have market pressure to do so currently; however, if mindful consumption becomes mainstream, farmers can be challenged to adopt socially responsible practices.

As consumers are swaying how their food is produced, understanding the motivations behind their purchases has become vital. Usually, mindful consumers look over specific details that ensure that their products are sustainable and ethical. Indeed, consumers' purchase decisions are made by deliberating on observed and non-observed characteristics of a good (Yiridoe et al., 2005). Food safety, quality, and details about the

production process can be listed as important traits that consumers cannot perceive even after the consumption, classified as credence attributes (Caswell, 2000).

The definition of credence characteristics was primarily developed by Nelson (1970) and Darby et al. (1973) and referred to the unobserved traits of a product commonly surrounded by a lack of verifiable information. This information asymmetry is often impairing consumers' shopping decisions towards sustainable and animal welfare attributes. At this matter, food labels provide a better atmosphere for conscious shopping behaviors (Harper et al., 2002). In other words, food labels can promote a trustful relationship between customers and the supply chain.

However, this shift in purchase behavior is even stronger for the livestock sector, so meat credence attributes have become a key research interest (Yang et al., 2019; Aboah et al., 2020). Throughout history, meat has often been associated with nutritional and safety concerns, and livestock producers have been highly criticized. Taking these issues into account, understanding what lies behind consumer choices regarding certified meat is critical to success. In addition, this knowledge can help the entire supply chain, from farms to industry, improve their investment strategies and develop effective labels that include claims that most appeal to consumers.

Despite the well-known importance of studies on consumer's perceptions, dedicated research on the supply side of this contemporaneous problem remains underdeveloped. Indeed, there is an urge for novel research analyzing farmers' investment preferences and how public pressure is shifting this cognitive decision-making process (Scherer et al., 2017). To summarize, food consumption and shopping behaviors have been changing over the years in response to concerns about the environment and animal and human welfare. Nonetheless, the supply and demand sides show a lack of convergence towards the prevalence of sustainable and ethical certified products on market shelves. Thus, while the agri-food supply chain needs incentives to adopt socially responsible agriculture, consumers need support to translate their interests as citizens into proper market signals.

1.1. Research Motivation

The motivation of this research is driven by the disconnection between consumers and modern agriculture. Although citizens are consistently calling for socially responsible agriculture, there is still a lack of attitudes into properly translating their environmental concerns into purchase actions. This point has already been evidenced across the literature

by the duality between citizens' stated preferences and their actual behaviors as shoppers (Grunert, 2006; Liljenstolpe, 2008).

Since consumers are concerned but currently not purchasing based on that concern, there is still untapped market potential for specially labeled products. However, producers are still not motivated to invest in a social license (SL) to operate or farm animal welfare (FAW). This speaks to the fact that farmers are constantly facing pressure, but this pressure is not great enough to overcome the associated costs and risks of a certified organic or humane production. On the other side of this balance, these costs are accounted for through higher prices for end consumers (García-Germán et al. 2016), which further inhibits low and medium-income groups from purchasing the pro-environmental ethical goods according to their values.

Although price and financial boundaries will still be an outstanding driver of individuals' intentions, other psychometric factors are shown to hold a higher impact on sustainable and moral attitudes (Gil et al., 2000; Lockie et al., 2004). By bearing in mind this issue, novel research is needed to understand the future of this emergent market. In fact, understanding the motivations behind consumers purchase decisions and how farmers perceive utility from FAW, and SL-related investments have gained importance. Our research interest is to take a deeper overview of this background by examining the factors shifting farmers' preferences for industry level investments and consumers' purchase behaviors towards a pro-environmental and ethical agriculture.

To summarize, the key research questions we aim to address are: (1) What are the key psychometric factors driving consumers' purchase behaviors towards specially labeled meat? (2) Which constructs underline farmers' intentions to behave under consumers' wants? (3) Lastly, what can motivate farmers to shift their investment preferences from a financial focus to a broader view: considering the benefits of public trust, reliance, and support?

1.2. Research Objectives

This thesis aims to provide information about how to align consumers' interests and producers' preferences for investments regarding socially responsible agriculture. This speaks to the fact that farmers are yet not being incentivized to support investments in SL, albeit the increasing consumers' calls for an ethical and pro-environmental production.

This research will be divided into two empirical studies applied to the Canadian context. The first study examines the perception of SL and FAW as challenges for Canadian farmers and whether it represents a worthwhile investment for the agri-food supply chain. For that purpose, we will examine the motivations driving producers' willingness to invest in SL, as well as their preferred policy mechanism to reduce the barriers surrounding socially responsible agriculture.

The second study investigates the demand side of this research motivation. Although the wide range of scholars focusing on consumers' behaviors towards FAW, dedicated studies on the Canadian context remain scarce to our knowledge. Yet, our research goes beyond understanding Canadian consumers behaviors towards specially labeled meat. Indeed, our goal is to understand the direct and indirect effects of specific psychometric factors, such as altruism and anti-anthropocentrism, on consumers' purchase intentions towards certain meat labels: certified-humane (CH), organic, and non-hormone added. In addition, we aim to analyze how human values and social media shape consumers' opinions regarding FAW, as well as their actual behaviors as shoppers.

In the end, these analyses can converge towards better understanding the major barriers underlining farmers' investment decisions and consumers' purchase preferences for sustainability and ethical performances. Therefore, the final objective is to take a deeper look at both results and, in turn, provide a contribution to the literature by understanding whether and how this emergent market can become mainstream.

1.3.   Thesis Structure

Three chapters will follow this thesis. Chapter 2 and 3 should be read as stand-alone papers that will address, respectively, the supply and demand angles of the research background. Finally, chapter 4 will summarize the results, combine the major findings, and discuss research limitations.

Chapter 2 will investigate Canadian farmers' investment preferences and perceptions of different policies focused on socially responsible agriculture. The conceptual framework is underlined by the Theory of Planned Behavior (TPB) to understand how attitudes, norms, and perceived behavioral control can influence farmers' preferences for industry level investments. The empirical analysis is addressed by a logit model to estimate the role of different values, information sources, and other constructs on farmers' willingness to invest in SL. In addition, a best-worst scaling approach is also employed to understand

farmers' most and least preferred investment options and their policy mechanisms preferences to incentivize sustainable and moral behaviors.

Chapter 3 focuses on how psychometric factors may influence consumers' purchase intentions regarding certain meat labels. First, ordered logit models are used to understand how Schwartz's (1992) human values drive concerns about FAW while controlling for social media engagement and other constructs. As a second stage model the empirical approach is underlined by a structural equation model (SEM) to estimate the indirect and direct effects of observed and latent variables (e.g., altruism and anti-anthropocentrism) on consumers' purchase frequency of CH, organic and non-hormone added meat, while controlling for other important values and self-identity variables.

Finally, chapter 4 summarizes the key results from chapters 2 and 3. This chapter will also provide some knowledge that can be used by policymakers and the agri-food industry. Beyond that, it will also offer specific research limitations and the possible gaps that future scholars could explore.

Chapter 2. Producers' Perspective of the Research Motivation

Farmer Investment Preferences and Behaviors Towards a Social License to Operate

Abstract

In contrast with the growing public pressure for sustainable agriculture, most Canadian farmers have not prioritized adopting socially responsible production practices. In this context, empirical analysis of farmers' responses to public demand has been crucial to assisting the agricultural sector to better cope with a more sensitive market. This study contributes to the literature by analyzing farmers' behaviors towards social license (SL) to operate and policy mechanisms that comply with their major perceptions and goals. Using data from a survey comprising 400 farmers across Canada, we estimate the motivations behind farmers' preferences for industry level investments. Aside from assessing the multiple drivers of producers' perceptions regarding investments in SL, best-worst models are conducted to understand how farmers maximize utility and investigate their policy preferences and major trade-offs among financial and non-financial goals. We find that SL is the least preferred option compared to alternate industry-level investments, which confirms that public and private net benefits are not aligned.

2.1. Introduction

Among the main challenges for the agricultural sector, the most preoccupying ones are the competition for resources, climate change, socio-cultural modifiers, and the overall public mistrust in agriculture (Thornton, 2010). Due to the disconnection between consumers and farm environments, the dynamics of agri-food markets are shifting (Saitone et al., 2017). The public urgently demands safer and higher-quality goods, so re-establishing customer trust has become one of the principal issues that agribusiness must address (Croney et al., 2009; Gössling, 2011).

While consumers shift towards ethical and sustainable products, this creates an opportunity for new agribusiness investments. Consumers increasingly have a more critical mindset, where they read labels and compare products based on farm-process attributes. This new critical mindset has become an opportunity for producers who want to strengthen their relationship with the public (Steinfeld et al., 2006; Troy et al., 2016). In this context, understanding the motivations behind farmers' investment preferences and behaviors is important to evaluate how and whether farm decisions will shift from a solely economic orientation towards a more social and environmental coverage.

Among the main concerns around agriculture, the role of a social license to operate (SL) and farm animal welfare (FAW) are the most important issues that have become the focus of debate in many developed countries. The concept of SL is defined as the unwritten consent of society to any standard corporate behavior, while FAW has emerged as one of its branches. According to Widmar et al. (2018), SL has been linked to the principles of responsible corporations and refers to the implied community approval for an existing project. Williams et al. (2011) have defined SL as the privilege of operating with minimal restrictions, whereas its loss can be rapidly converted into the cessation of important regulatory licenses (Hall et al., 2015). In the farming context, a transparent and socially responsible agriculture plays an important role in the reconnection of supply and demand (Mazur-Wierzbicka, 2015).

As discussed above, consumers' preferences and attitudes are gaining the power to challenge the agri-food sector. Nonetheless, while studies focused on the demand behavior, purchase intentions, and customers' willingness to pay are well portrayed in the literature (Heerwagen et al., 2015; Miranda-de la Lama et al., 2017; Hansen et al., 2018), solid analysis of farmers' perceptions, investment behaviors, and policy preferences have received little attention over the years, especially when it comes to SL and FAW. By considering the current agricultural background, a deeper understanding of farmers' response to public demand is relevant for agri-food policies that aim to assist the entire sector to remain resilient within the national and international spheres.

Nonetheless, this literature gap is slowly being filled by research on farmers' behaviors towards sustainable agriculture. Among them, previous scholars have investigated farmers' adoption of novel technologies and pro-environmental practices (Glenk et al., 2014; Werner et al., 2017; Liu et al., 2018), as well as their attitudes, preferences, and intentions towards FAW (Austin et al., 2005; Kauppinen et al., 2010 and 2012; Lagerkvist

et al., 2011; Hansson et al., 2014; Gocsik et al., 2014). Although prior studies investigated farmer's choices and investment perceptions (Edwards-Jones, 2006; Olsen et al., 2009; Gars et al., 2019; Kotchikpa et al., 2019), empirical analysis addressing the main constructs underlying their cognitive decision-making process can still be further explored (Darnhofer et al., 2005). In addition, to our knowledge, studies interested in farmers' behaviors towards SL remain lacking.

This research aims to contribute to the literature by analyzing the multiple factors driving farmers' investment behaviors towards SL and the segmentation among livestock and crop producers' preferences for policies addressing FAW and SL. This paper aims to provide knowledge that could help answer the following questions: (1) Is SL a perceived challenge for the agricultural sector? (2) Are farmers willing to support industry level investments in SL? (3) How can farmers be motivated to make sustainably and ethically produced food more prevalent in the marketplace? This research focuses on the future of modern agribusiness in light of the current public pressure and examines how the sector can adapt to remain resilient and robust. Hence, our principal goal is to analyze which factors drive farmers' industry level investment decisions, and to provide knowledge regarding policy mechanisms that align with producers' interests. At the end, we aim to favor better relationships and communication between the agri-food supply chain and its customers.

2.2.   Literature Review

Corporate social responsibility (CSR) has gained prominence as a mechanism for aligning entrepreneurial strategies with the public demand and its major expectations (Dubielzig et al., 2005; Mueller, 2014). As a CSR strategy, the concept of SL has started to cover important agricultural dimensions, such as ecology, human health, nutrition, food safety, animal welfare, economic responsibility, and local wellness. The role of SL in agriculture is shifting farmers' concerns, being an opportunity for future investments (Forsman-Hugg et al., 2013).

The pattern described above has been more significant and faster in developed nations, where consumers are consistently demanding a transparent production system that complies with society's core values (Luhmann et al., 2017). According to Lin (2001), legitimacy and reputation are valuable assets that ensure that a project holds an SL. The major importance of SL for agribusiness has been studied by previous scholars, whose

findings evidence its benefits in improving farmers' public image and attracting green investors, seizing ethical consumers, and motivating local communities (Valle, 2012; Troy et al., 2016).

Due to consumer calls around SL and its importance for agriculture, studies providing knowledge regarding policy strategies have become vital. Indeed, the importance of novel research around this topic is even stronger in Canada. Canadian agricultural progress was profoundly reasoned on enhanced yields throughout history but has failed to incentivize sustainable growth. In this regard, policy-making strategies were focused on overcoming the competition and favoring commodities instead of supporting local food systems. Nonetheless, its side effects and associated costs, which were neglected over the decades, are visible social problems (MacRae, 1999).

According to Eagle et al. (2015), the national effort to assist the agri-food sector in maintaining its SL and attest a pro-environmental and ethical production is insufficient. Current policies and legislation have failed to support national agriculture to follow the role of public benefits and accomplish a sustainable and humane performance. In this context, Van Vugt (2009) elaborated on the principal measures to counter social dilemmas, such as farmers' and consumers' imbalance. As a result, minimal uncertainty, powerful social identity, credibility, and financial inducements have been discussed as efficient approaches to solve major market issues (Jonge et al., 2013). According to Holmes et al. (2002), self-enhancing incentives can be classified as one of the most important drivers of investment behaviors.

Among positive incentives, cost-sharing incentive programs (Dupont, 2010) and financial inducements (Lamba et al., 2009) have shown up as effective measures to increase farmers' adoption of best management practices (BMP). Other research has also found that government subsidies (Reimer et al., 2014) and credits (Tiwari et al., 2008) are powerful in promoting BMP adoption. Nevertheless, information and awareness (Varble et al., 2016), and social approval/conformity (Nowak, 2009) were also revealed to matter as drivers of farmers' intentions towards BMP. Beyond government initiatives, an industry collaborative approach is also important in order to create a certification framework to demonstrate a sustainable production. In Canada, the Global Roundtable for Sustainable Beef (GRSB) provides guidance to improve the marketability of socially responsible products, through a multiple stakeholder collaboration – including producers, processors, agri-food businesses, retail, foodservices, government, and research (Souza

et al., 2017). Also, the Verified Beef Production Plus (VBP+) is another Canadian business-to-business program enabling the certification of beef cattle operations, which helps producers meet industry standards and attests to society FAW, sustainability, and food safety attributes.

These public and private initiatives are aligned with Deimel et al. (2012), who has stated that farmers are feeling undermined by the current public pressure, which they are consistently pushed to attend without any compensation or acknowledgment. Intending to decide which mechanism is the most appropriate to incentivize farmers' socially responsible behaviors, it is important to understand the motivations behind farmers' managerial decisions. According to Nuthall (2010), producers' behaviors are driven by their knowledge, entrepreneurial skills, and intrinsic factors composing personalities and beliefs. Despite the role of psychometric variables, socio-demographic characteristics, such as age, income, gender, and education, along with the size of the farm operational system, were also proved to matter in decision-making strategies (Edwards-Jones, 2006; Kim et al., 2013). In this sense, stewardship performances are improved according to the decision-makers' education level and technical skills (Wilson et al., 2014). Similarly, farmers develop their managerial knowledge by looking over information on different sources (Solano et al., 2003; Liu et al., 2018). Therefore, an analysis of where producers access information has gained relevance for communication strategies and understanding the cognitive process behind investment decisions (Appiah, 2018).

More importantly, farmers' investments decisions are driven by a trade-off among different opportunities. According to Bock et al. (2007), farmers' preferences for different assets are heterogeneous due to their economic or moral orientation. In a more detailed view, farmer's investment performances are driven by the extent to which the economic value of the behavior is acknowledged and desired (McInerney, 2004). Therefore, initiatives towards a pro-environmental and moral attitude can be explained by their perceived utility and capability to outweigh associated costs.

As Lagerkvist et al. (2011) proposed, farmers have been facing a trade-off between use and non-use values to adjust the utility and principal costs regarding adopting FAW practices. Non-use values, or public benefits, are mainly linked to non-financial attributes of the farming process. In other words, public benefits are deeply related to an individual's morality and ethics, whereas use-values, or private benefits, are strongly associated with productivity rates and financial outcomes (Gocsik et al., 2014).

Accordingly, survey choice analysis should consider the impact of major trade-offs and relative preferences for other investment options (Davidson et al., 2019), especially when comparing financials and non-financial outcomes – such as farm economics and SL/FAW.

The relationship between use and non-use values developed by Lagerkvist et al. (2011) can be analyzed together with Pannel et al. (2006), whose study primarily applied the concepts of private and public net benefits on policy proposals. The private net benefits are linked to its financial returns, modification on risks, and indirect impacts on managers' lifestyles. On the other hand, public benefits are composed of major advantages conferred entirely to society (Pannell et al., 2006 and 2008[a]). As a result, private benefits contain the main factors influencing attitudes and investment behaviors (Pannell et al., 2008[a]). However, one of the major advantages carried out by investments in public benefits, such as FAW, arises from the self-approval felt by producers while conducting an ethical activity under no animal suffering or injury. Furthermore, sustainable and animal-friendly outputs also favor establishing a trustful relationship with customers, which may lead to positive and prosperous financial outcomes (McInerney, 2004; Lagerkvist et al., 2011).

As producers face a more sensitive demand, research on farmers' investment intentions and decision-making process towards socially responsible agriculture gained relevance. Despite its contemporaneous importance, research tying up farmers' motivations and policy perspectives towards SL and FAW are still lacking. However, while several scholars investigated consumer's perceptions, intentions, and willingness to pay for sustainable food attributes (Lagerkvist & Hess, 2011; Heerwagen et al., 2015; Yiridoe et al., 2005; Suki et al., 2016), little attention has been given to farmers' interests. However, this literature gap is being filled by novel research. Indeed, some scholars examined investment behaviors and policy preferences targeted at improving farm animal welfare (Gocsik et al., 2014; Hansson et al., 2016) and promoting an organic and sustainable production (Mzoughi, 2011; Bravo-Monroy et al., 2016). Additionally, recent studies are increasingly focusing on policy implications of farmers' preferences among a climate-mitigative production (Glenk et al., 2014; Davidson et al., 2019) and best management practices (BMP) (Greiner et al., 2009; Werner et al., 2017; Liu et al., 2018; Ndagijimana et al., 2018).

Similarly, a wide range of research has highlighted the demand side across Canada (Uzea et al., 2011; Hamzaoui-Essoussi et al., 2012; Spooner et al., 2014), whereas few scholars

were interested in the supply chain context, by taking into consideration farmers' interests on supporting sustainable practices (Khaledi et al., 2010; Spooner et al., 2012; Davidson et al., 2019). Moreover, the analysis of farmers' perceptions and investment behaviors towards SL remains underexplored across the literature to our knowledge.

This paper aims to collaborate with previous scholars by analyzing how public expectations can shape farmers' perceived challenges and concerns. In fact, our objective is to empirically examine Canadian farmers' perceptions, policy preferences, and investment behaviors. At the end, we intend to help policymakers to reduce SL and FAW investment barriers. Given the lack of literature addressing farmers' concerns and cognitive behaviors towards FAW and SL investments, this study is relevant for presenting a different approach to policy designs.

2.3. Conceptual Model Framework

Social-psychological theories gained importance to thoroughly analyze and correlate the broad variables influencing heterogeneous individuals' conduct. According to Fishbein et al. (2001), social-psychological methods' main goal is to explain why individuals behave differently. The Theory of Planned Behavior (TPB) is one of the most important and broadly applied methods to explain and predict individual intentions and performances. In this context, the TPB was developed by Ajzen (1985) to assess motivational influences, understand the reasons why individuals engage differently, and design strategies capable of modifying behaviors.

The TPB is primary composed of three categories determining intentions: attitude towards the behavior, social norms, and perceived behavioral control (PBC) (Ajzen, 1985 and 1991; Ajzen et al., 1986). Nonetheless, Ajzen (1991) stated the aim to include other components into the model to improve its predictive power and capture further fluctuations in behaviors. Other scholars have also addressed the benefits of including additional variables on the basic TPB structure, such as the role of self-identity and personal norms (Ajzen et al., 1980; Ajzen, 1985; Sheppard et al., 1988; Conner et al., 1998; Shaw et al., 2000).

In this research context, the concept of attitude was related to farmers' appraisal regarding the behavior under analysis (Ajzen, 1991). Indeed, investment intentions are reasoned on a perceived positive or negative outcome and its associated economic, social, and psychological rewards (Harland et al., 1999; Ajzen et al., 2000). On the other hand,

subjective norms reflect the major influence of the surrounding community opinions on individuals' choices. In other words, it represents the pressure from external sources, which will depend on the extent to which producers feel to belong to this social environment (Ajzen, 1991). The PBC is mostly related to farmers' capability to operate and structural resources allowing the desired investment performance (Ajzen, 2002; Trafimow et al., 2002). In addition, self-identity refers to the concept of self-image, which shapes the way that a producer perceives himself within society (Goyder, 2003). Finally, personal norms have been related to farmers' self-expectations, narrowly driven by subjective values (Schwartz, 1977).

The assumptions underpinning TPB are reasoned on humans' rationality, goal-oriented conduct, and the systematic use of information through the analysis of heterogeneous outcomes (Conner et al., 1998; Ajzen, 2005). In this research, farmers' investment decisions are expected to result from rational economic deliberations, which intend to maximize utilities by evaluating disposable information and possible trade-offs. Consequently, farmers select the best alternatives by analyzing the factors composing different choices and considering its multiple objectives and conflicting goals. With this background, external and internal forces have been identified by Gocsik et al. (2014) as an outstanding portion driving farmer's behavioral intentions. External forces refer to the main attributes that farmers cannot control, including the economic, political, social, and technological context. On the other hand, internal forces are linked to a specific set of characteristics regarding a farmer's personality, technical skills, and property structure (Gocsik et al., 2014).

Several scholars applied the TPB conceptual model to analyze consumers' purchase intentions towards FAW and organic attributes (Tarkiainen et al., 2005; Chen, 2015; Nocella et al., 2012). By the same approach, the TPB has also been applied to evaluate farmers' decision-making process (Edwards-Jones, 2006), and more specifically, their preferences towards pro-environmental and ethical operations (Lagerkvist et al., 2011; Purwins et al., 2018; Gocski et al., 2014; Hansson et al., 2014). Hence, the TPB is aligned with our objective to better understand and estimate the cognitive process behind farmers' investment decisions towards SL.

However, a key issue surrounding farmers' behaviors is the lack of knowledge regarding the trade-off between investments favoring farm revenues and the ones focused on non-use values — associated with social benefits (Lagerkvist et al., 2011; McInerney, 2004).

Lagerkvist et al. (2011) elaborated on this issue by developing a conceptual framework that integrates farmers' decisions among non-use values (e.g., FAW) and use-values (e.g., productivity), or as defined on policy literature, public and private benefits (Pannell et al., 2008a). Therefore, analyzing how farmers select SL over other challenges for the agri-food sector is important to build up effective policy proposals: considering the influence of private and public benefits on heterogeneous investment preferences (Pannel et al., 2008a; Lagerkvist et al., 2011).

This paper follows this rationale by assuming that financially oriented farmers will be less inclined to support SL industry investments because they value economic returns over social benefits. Therefore, it is hypothesized that farmers who associate agriculture mainly with financial and business interests will be less likely to invest in SL. The structure of the conceptual framework assembling the major constructs driving farmers' investment behaviors is outlined in Figure 1. This conceptual model measures the attitude towards SL investments by capturing farmer's goals, concerns, and challenges perceived by the agricultural sector. Therefore, a positive relationship between investments in SL and farmers perceiving it as a major concern, goal, and challenge is expected. Moreover, social norms are represented by farmers' social environment in terms of engagement with different information sources. In contrast, personal norms are derived from intrinsic values and perspectives on farming.
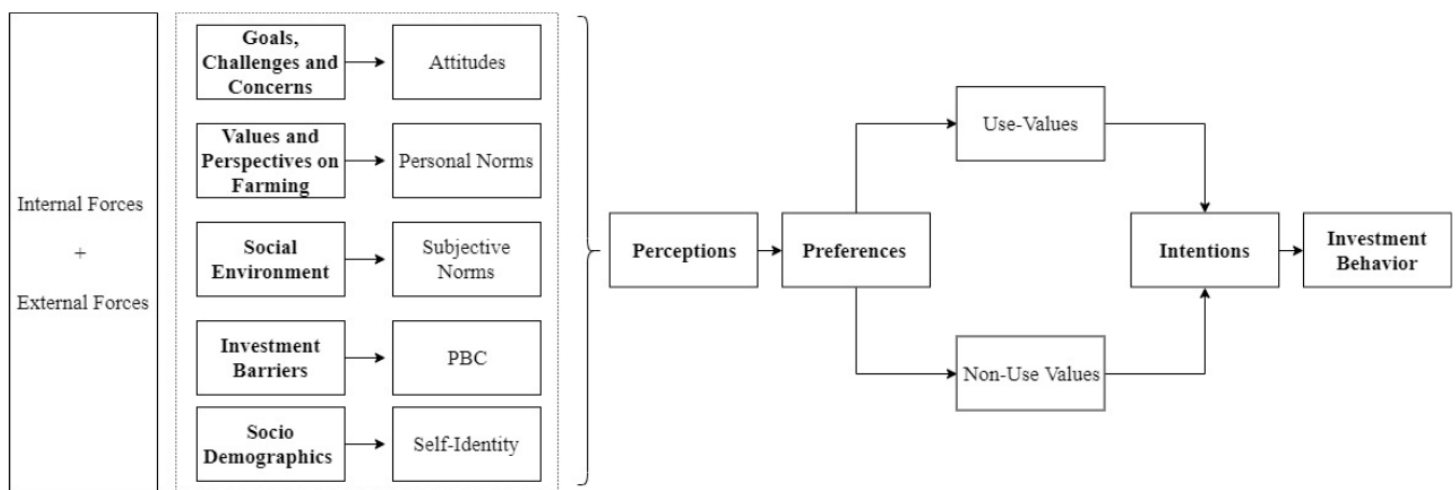
Figure 1. TPB framework underlying farmer behaviors regarding industry level investments

In addition, the PBC acts as a barrier to investment, represented by the role of farmers as decision-makers. In this sense, it is expected that farmers responsible for the decision-making process are less constrained to follow their SL interests. Finally, self-identity is correlated to key socio-demographic variables. Underscored by the role of internal and external forces, these constructs are expected to drive farmers' perceptions, intentions, and main investment preferences in favor of public or private benefits.

As mentioned above, the TPB allows us to understand the main variables influencing farmers' investment preferences. This conceptualization is important for revealing appropriated policy mechanisms to incentivize or modify a behavior towards public benefits. Depending on farmers' preferences for investments in non-use values, such as SL and FAW, as Lagerkvist et al. (2011) proposed, different policy mechanisms can be considered and implemented (Pannell, 2008a).

According to Pannell (2008a), agri-environmental projects have been related to their public and private net benefits. Therefore, policy proposals need to be selected and discriminated according to their balance of gains and losses, aiming to assist behaviors evoking higher social benefits. This framework approaches public and private net benefits on a scale, where public benefits are estimated by the significance or value of an asset for society. In contrast, the private advantage is measured by its level of adoption (Pannell, 2008b). This describes the linkage between the TPB conceptual model underlined by Lagerkvist et al. (2011) and the policy framework constructed by Pannel (2008a): depending on how farmers perceive the benefits of SL investments, different policies can be considered.

Among different policy mechanisms, positive incentives (e.g., subsidies) can encourage managers to modify their investment decisions (Figure 2). This policy is efficient when private benefits (e.g., use-values) are still low, despite the great advantage of this asset for society. The theory behind such support is feasible since public benefits are high enough to counterbalance these additional costs. Conversely, negative incentives, such as regulations and taxes, may result in managers avoiding specific conduct. The main justification for negative incentives is the disparity between low public benefits and high private net advantages, which means that managers are likely to behave against society values unless forbidden by law (Pannell, 2008$_a$).

The extension is identified as a less expensive strategy to assist managers in learning and adopting certain strategies achieved by technology transfer, education, and communication initiatives. The construction of a solid scientific basis can also favor the development of novel technologies that enhance private financial returns on projects primarily supporting net public benefits (Pannell, 2008$_a$). Accordingly, novel policy proposals – which comply with producers' preferences and public demand – can be considered by analyzing the conceptual frameworks structured by Ajzen (1985), Pannell (2008$_a$), and Lagerkvist et al. (2011).

To summarize, this research approaches farmers' behaviors towards investments increasing public benefits, such as SL projects. Farmers' perceptions on use and non-use values described by Lagerkvist et al. (2011) will be underlined by TPB (Ajzen, 1985), aiming to examine their behaviors towards SL investments (Figure 1). At the same time, we aim to extrapolate these results (how farmers perceive SL investments) towards effective policy proposals for a better balance between private and public net gains (Figure 2). As socially responsible agriculture becomes more demanded by the public, effective policies will depend on whether farmers perceive investments in SL as worthwhile. If farmers are willing to support investments in SL, an extension can be considered as an effective measure. However, if farmers are unwilling to have industry level investments in SL – which we hypothesize to be true – positive incentives or technology modification can be considered.
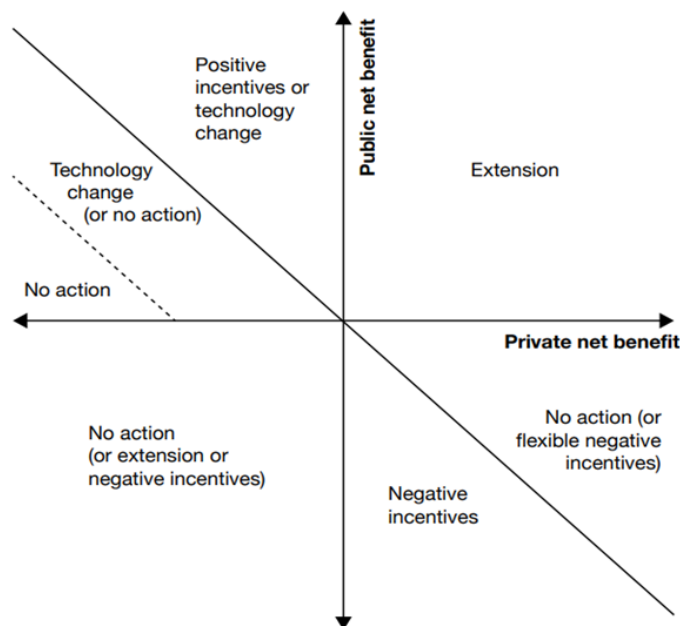
Figure 2. Conceptual guidance for policy proposals (Pannell, 2008$_a$)

2.4. Methodology

2.4.1. Survey Design and Data

The survey aimed to investigate farmers' preferences and trade-offs for industry-level investments targeted to address major market challenges. In this regard, the survey was elaborated to capture the heterogeneity among farmers' perceptions and the major constructs influencing their investment behaviors.

A total of 400 farmers from Alberta, Saskatchewan, Ontario, and Manitoba have responded to the survey, covering the major farming regions across Canada. Kynetec conducted the survey in 2019, and its major contents are also described in Table 5 (Appendix). The questionnaire adapted the general format of the questions developed by Witte (2018) and Davidson et al. (2019). Their studies have respectively focused on farmers' use of market intelligence and their interest in climate-mitigative practices.

The questionnaire encompasses a broad range of stated preferences, socio-psychological and farm management-related queries to assess how farmers make decisions across different investment options. Aside from containing questions regarding information sources, social media engagement, and perspectives on farming and decision-making, the survey covered farmers' financial and non-financial goals, major concerns, and perceived challenges for the agribusiness. Along with the survey, respondents were asked a broad range of five and ten-point Likert scale questions to understand the key variables driving investment behaviors.

The structure of the survey was developed to analyze how the constructs from the TPB conceptual model will impact farmers' behavioral intentions for SL investments, as illustrated by Figure 1. Hence, the survey covered a broad range of components related to farmers' attitudes (e.g., goals, concerns, and challenges), personal norms (e.g., values and perceptions), self-identity (e.g., socio-demographics), subjective norms (e.g., information sources) and the PBC (e.g., role as a decision-maker). Table 6 (Appendix) provides more detailed information about how the survey questions were constructed and aligned with the TPB model. Major descriptive statistics are presented in Table 1.

As a primary conclusion, the survey revealed the heterogeneity among farmer's perceptions, preferences, and behaviors. On average, innovative farmers have perceived SL as a challenge and have shown a deeper concern for public trust. In contrast,

economically oriented farmers are more likely to focus on financial goals and hold a lower willingness to invest in SL. Additionally, most farmers selected local magazines, agronomists, and their close social circle (e.g., family) as the most important sources for agricultural information, which composed about 50% of the responses.

Table 1. Descriptive statistics of the sample (n = 400)

Variable	Description	Mean	S.D.
Age	Farmer age	57.08	10.97
Gender	1: Female 0: Male	0.07	0.26
Education (%)	High School	36.3%	0.48
	Trade or Technical School	16.8%	0.75
	Professional Degree	1.5%	0.12
	College Degree	16.5%	0.37
	University or Bachelor's Degree	19.5%	0.40
	Graduate Degree	5.3%	0.22
	Other	4.1%	0.20
Farm Operation (%)	Primary crops/hay	40.0%	0.49
	Primary livestock	18.0%	0.38
	Mixed	36.0%	0.48
	Farmed area (acres)	3253.46	4906.00
Location (%)	Alberta	32.0%	0.47
	Saskatchewan	30.0%	0.46
	Manitoba	12.8%	0.33
	Ontario	25.2%	0.43

Moreover, after responding to a broad range of queries targeted at building a behavior profile, farmers were asked to analyze their specific investment preferences. In order to understand behaviors and associated utilities, the respondents were exposed to best and worst scenarios and asked to choose their most and least preferred industry level investment option. The best-worst scaling (BWS) method was also applied to identify major policy preferences targeted at improving SL and FAW, as illustrated in Figure 3.

In order to achieve detailed information regarding farmers' policy preferences, this research has structured a specific section to capture major perceptions and discrepancies of crop and livestock farmers regarding SL and FAW, respectively. Hence, crop producers responded to questions related to SL, whereas livestock farmers or in a mixed operation answered FAW-related queries. This section aims to evaluate possible

divergences between crop and livestock farmers regarding their barriers to investing in SL/FAW and capture the most and the least preferred policy mechanism to promote an adoption of pro-environmental and ethical practices.

13. Given your previous ranking, if you had to make decision on a single challenge, where should your industry association invest? Please select your most preferred and your least preferred option.

Most preferred	Issue	Least preferred
O	Farm economics and farm management	O
O	Markets	O
O	Climate	O
O	Market demand	O
O	Environment	O
O	Regulations	O
O	Social license	O
O	Technology and innovation	O

19. Suppose program funding was available to specifically address the issue of (**FAW = if livestock producer; SL = if crop producer**) and its effect on Canadian farms. In this context, which of the following organizations would you most prefer to work with, and which organization would you least prefer to work with? Please indicate tour most preferred and your least preferred partner organization.

Most preferred	Organizations	Least preferred
	Agriculture & Agri-Food Canada (AAFC)	
	Provincial ministries of agriculture	
	National agricultural industry groups	
	Provincial agricultural industry groups	
	Agricultural advocate groups	
	Downstream agribusiness	
	Grocery retail chains	
	Local county or municipal district governments	
	Environmental groups	
	Farm management groups	

Figure 3. BWS questions regarding farmers' investments and policy preferences

Our BWS approach (Figure 3) follows previous research on farmers' FAW perceptions (Hansson et al., 2016), as well as their preferred agri-food policies to assist the adoption of specific practices (Wolf et al., 2013; Ochieng' et al., 2016; Westover, 2019). Nonetheless, our study provides a different angle for policy implications by bringing the BWS responses into the conceptual model developed by Pannell (2008$_a$). Previous scholars have applied Pannell's (2008$_a$) concepts to analyze farmers' motivations and policy instruments to incentivize conservation practices (Rode et al., 2015; Greiner et al., 2009). Following this idea, farmers' responses regarding their most preferred industry level investments signalize whether an SL adoption is a source of private benefits for the supply chain. In this regard, a low or high level of associated private benefit will determine the appropriate policy mechanism to boost farmers' willingness to behave towards public support and trust.

2.4.2. Statistical Approach

a) Behavioral Analysis

A logistic regression using investment preferences as a binary dependent variable was structured to model the probability of preferring investments in SL. In this study, the binary dependent variable was set equal to 1 to represent farmers aiming to support industry level investments in SL. Hence, four logit models were estimated while controlling for different variables comprising the TPB conceptual framework. Equation 1 represents the utility function associated with the combined regression models employed on this analysis, framed by the role of attitudes, personal norms, subjective norms, self-identity, and PBC:

$$U_f = \beta_1\, Goals + \beta_2\, SLConcern + \beta_3\, SLChallenge + \beta_4\, Values + \beta_5\, Information +$$
$$\beta_6\, Sociodemographics + \varepsilon_f + u_f \qquad (1)$$

where U_f refers to a farmer f's utility associated with an investment in SL, and $U_f > 0$ if SL is selected as a preferred investment. The role of farmer goals, SL concerns, perceived challenges, values, engagement with information sources, and socio-demographics were tested as predictors of investment behaviors towards an SL. β is a vector of coefficients relating the exogenous variables with the utility function, whereas ε_f and u_f are, respectively, the observed and unobserved error terms.

The TPB framework and logistic regressions have underpinned recent studies to predict the probability of adopting different farming systems (Sheikh et al., 2003; Werner et al., 2017; Ndagijimana et al., 2018; Gars et al., 2019). Scholars have applied logistic regressions to evaluate the adoption of FAW practices, farmer's responses to the fluctuating demand, and major drivers of investment behaviors (Widmar, 2009; Olsen et al., 2009; Purwins et al., 2018). In this regard, logistic regressions of consumers' and producers' choices can be an important tool for understanding the motivations for their purchase and investment intentions (Besanko et al., 1998). Following previous literature, the chosen methodology fits well into the core objective of this analysis, aiming to evaluate the key drivers of farmers' investment behaviors towards an SL and assist policy designs.

b) Best-Worst Scaling (BWS)

Over the years, the BWS has provided a novel methodological concept for survey elaboration and a theoretical construct that explains how respondents select most and least preferred choices (Flynn et al., 2007). Despite its broad application in past studies within different fields, such as health sciences (Ratcliffe et al., 2016; Flynn et al., 2007), the BWS has shown to be a good method for agribusiness research, holding a growing interest within producers' and consumers' behavioral analysis (Hansson et al., 2016; Sackett et al., 2013), as well as on agri-food policy literature (Kruger et al., 2012; Wolf et al., 2013; Ochieng' et al., 2016; Westover, 2019).

In this study, best-worst methods, as an extension of random utility models (RUM), were applied to estimate major trade-offs on investment preferences and farmers' predisposition to work with different organizations towards FAW and SL. The RUM rests on the assumption that agents will choose the option providing the highest level of utility (McFadden, 1986). Therefore, its format can be structured in the following manner:

$$U_i = \sum_{k=1}^{n} \beta_k X_k + e_i \tag{2}$$

where U_i is the utility associated to the choice i, X_k refers to the kth of n attributes of a particular choice, and β_k weighs the importance of each attribute under analysis. The probability of choosing option i is modeled following its major components and important characteristics. In this sense, conditional logit models have been widely employed to estimate the likelihoods of individual choices, which have been underpinned by the premise that a rational agent will choose the option providing the highest level of utility, as demonstrated by the following: $U_i > U_j, i \neq j$. Moreover, under the assumption that the error term is Gumbel distributed, the probability of option i being chosen is:

$$P_C(i) = \frac{e^{\mu V_i}}{\sum_{j \in C} e^{\mu V_j}} \tag{3}$$

where $P_C(i)$ refers to the probability of an individual selecting i over j in a set of choice alternatives C. In addition, μ is a scale parameter related to the error variance, and V_i and V_j represents, respectively, the utility of the choices i and j. In addition, the BWS assumes that respondents will analyze all possible alternatives and choose the pair of items holding a maximum difference (*maxdiff*) in terms of benefits for the respondent (Louviere, 1993). The advantage of using BWS instead of category rating scales (RS) is the possibility of

examining trade-offs, the difficulty of interpreting RS results, and the lack of knowledge regarding RS reliability (Flynn et al., 2007). Indeed, the main positive aspect of BWS is a more straightforward questionnaire due to a simpler format, which results in more accurate answers that are less plagued by bias (Lusk et al., 2009).

In short, the best and worst choices can be ruled by a utility function and combined into a single model, entailing in a unique score, or utility, for each item. The best-worst models performed in this analysis are developed to assess farmers' most and least preferred investment alternatives and their segmentations for preferable organizations to work with towards improvements on SL and FAW. Nonetheless, respondents were asked only one set of best and worst options instead of answering multiple sets with randomized attributes specified by the standard BWS approach. This methodology was considered appropriate since farmers were previously exposed to these key options while answering RS queries related to major concerns, challenges, and mechanisms to address FAW/SL, which would already give them insights for unbiased BWS answers.

Three models were estimated by addressing best, worst, and pooled best and worst choices. Afterward, performing likelihood ratio tests to ensure the possibility of pooling the data, heteroskedastic conditional logit models were estimated and evaluated.

2.5.   Results and Discussion

2.5.1. Descriptive Results

Respondents have highly rated SL as a principal concern and a minor challenge for agribusiness (Figure 4). Indeed, Canadian farmers are strongly concerned with the principles of markets, farm administration, and SL. However, while farm economics and management are a perceived challenge for the entire sector, SL has portrayed little risk for farming operations. Information from respondents' preferred investments was gathered to assess their respective levels of SL concern and analyze how SL was scaled as a threat to the sector. In this regard, Figure 5 reveals how farmers perceive SL as a concern or a challenge according to their investment preferences. We can conclude, for example, that respondents willing to support investments in SL perceive it more as a challenge than a concern for their industry.

Aiming to analyze why SL is not a perceived challenge and a preferred investment for the agri-food supply chain, the stage of public demand and social pressure needs to be

evaluated. According to Spooner et al. (2014) and Uzea et al. (2011), Canadian citizens are increasingly concerned about ethical and moral ways of producing food, but this concern does not yet drive their behavior as buyers. In addition, the heterogeneity among consumers in terms of knowledge, conduct, lifestyle, and values contributes to an uneven awareness and disparate feedback regarding label examinations (Vanhonacker et al., 2008). According to Widmar (2009), consumer purchases are mostly driven by information regarding the production process and its perceived quality and reliability. Nonetheless, there is a divergence between citizens' stated interests and their actual purchase behaviors. Several studies addressed the duality among citizens' and consumers' performances according to their role on political/social engagements (Korthals, 2001; Bennett et al., 2002; Liljenstolpe, 2008; Grunert, 2006). In this sense, SL has been attested as a main concern for producers and consumers, but the proper intention in transforming it into a purchase or investment action is yet deprived.
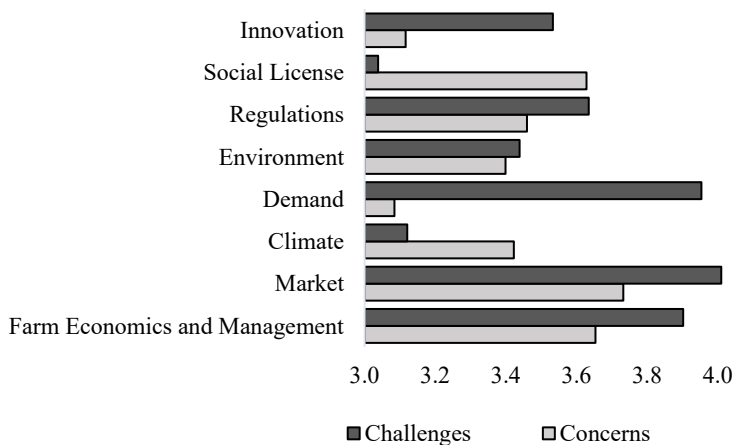
Figure 4. Average of respondents concerns and perceived challenges for the agri-food sector (Scale from 1 to 5)
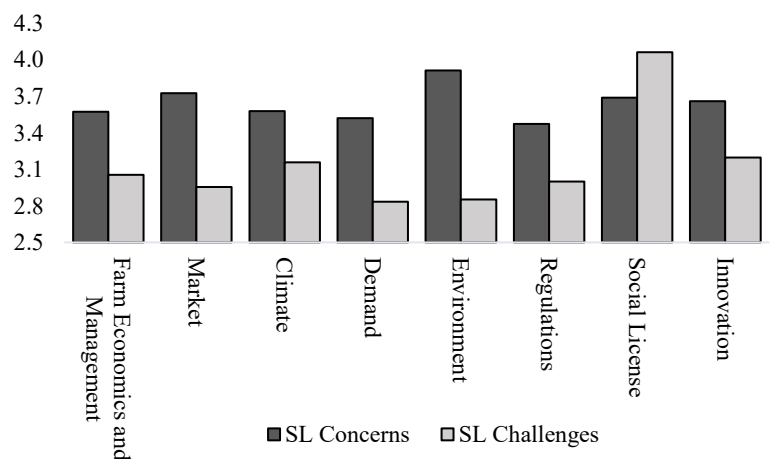
Figure 5. SL concern and perceived challenge according to farmers' investment preferences (Scale from 1 to 5)

Therefore, consumer market signals are not strong enough to pressure and challenge farmers to behave towards an SL. On the other hand, according to Bock et al. (2007) and Hubbard et al. (2007), farmers mistrust of consumer's willingness to pay for ethical and sustainable goods, together with the higher cost to comply and certificate these production systems, are the major constraints for the adoption of sustainable agriculture. Holding and attesting the prevalence of a pro-environmental and ethical operation is costly for farmers, which justifies farmers' lack of interest and the higher prices of certified goods for the final consumer. Expensive products, such as certified humane or organic meat, are mainly

affordable by an upper social stratum, which explains why, despite public scrutiny, investments in SL remain inexpressive (Laryea et al., 2017). Together, these scenarios comprise the main explanation of why ethical and pro-environmental products are not being widely purchased and, in turn, predominant in the marketplace (Verbeke, 2009).

In this context, farmers need to be challenged by the demand side to behave towards public desire (Figure 5). Accordingly, this suggests that consumers need to prioritize specially labeled products for farmers to invest in it. Figure 6 reveals that respondents selected public pressure as the most important force to promote the success of SL.

Public pressure	16.2%
Environmental pressure	11.1%
Demographic pressure	9.6%
National regulations	7.2%
Industry standards	6.8%
Farmers' values	6.3%
International treaties	5.2%
Secure customer base	5.0%
Farmers' personality	4.9%
Farmers' age	3.6%
Farmers' risk attitudes	3.5%
Farmers' innovation ability	3.2%
Farm life-cycle	2.8%
Technological forces	2.8%
Having farm successor	2.6%
Farm location	2.4%
Scale of production	2.1%
Farmers' ablity	1.7%
Price premiums	1.7%
Farm financial position	1.2%

Figure 6. Selected forces for strengthening the SL of Canadian agriculture (% of responses)

However, motivating farmers to invest in SL requires a deeper understanding of their perceptions and interests. Although the survey provides a broad overview of farmers' investment preferences, it also focused on their preferred policy mechanisms for targeting crop and livestock producers to SL and FAW, respectively. Figure 7 shows the heterogeneity among farmer's major perceived barriers for investing in FAW and SL. While crop farmers perceive SL as a nonpriority, livestock producers associate FAW as an expensive and risky investment. Moreover, 63% and 23% of the crop producers ranked industry initiatives and government engagement, respectively, as highly preferred mechanisms to address an SL. Livestock and producers on a mixed operation followed

the same trend, as 67% of them preferer industrial initiatives. The least ranked option was governmental regulations in both contexts, as illustrated by Figure 8.
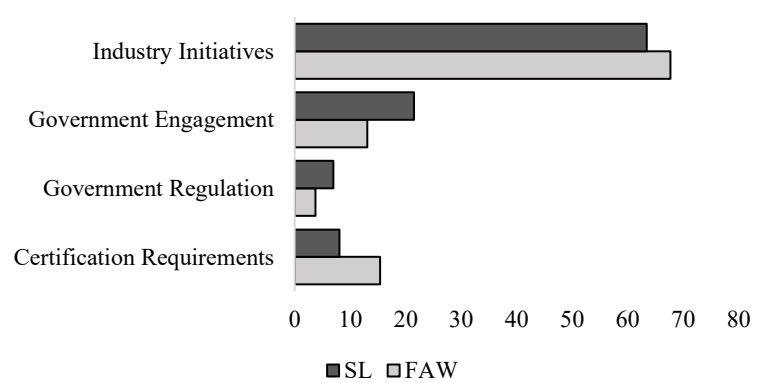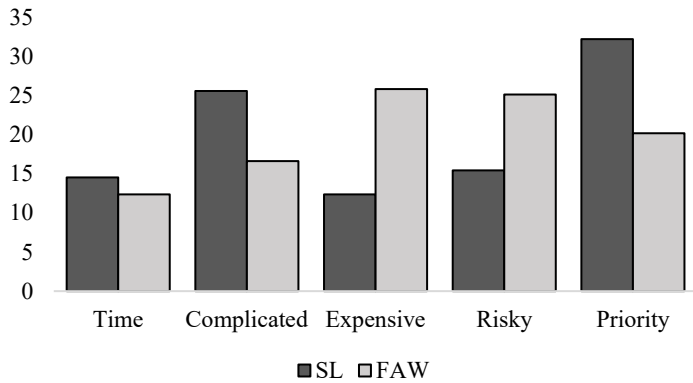
Figure 7. Perceived barriers to invest in SL and FAW (% of responses)

Figure 8. Preferred mechanisms to address SL and FAW (% of responses)

2.5.2. Econometric Results

We estimated four logit models to understand what factors drive farmers to prefer industry level investments in SL. All four models tested different constructs of the TPB theoretical framework. Each model includes *Attitudes* towards the behavior (investing in SL). Other variables were also included, such as *Self-Identity* (Model 1), *Personal Norms* (Model 2), and *Subjective Norms* (Model 3). Model 4 contains the variables for all elements of the TPB. Overall, our models support that a small portion of farmers is open and willing to support investments in SL.

Our models suggest that SL investments are not entirely driven by farmer's goals regarding public and private benefits, e.g., environmental/moral benefits and profit generation (Table 2). Instead, farmers appear to be motivated by increasing farm operational efficiency. Indeed, SL investments are positively associated with younger, high-educated, and female farmers, as well as to their willingness to be efficient and innovative. These results align with Davidson et al. (2019), whose study found farmers' learning orientation as the strongest driver of a climate mitigative practice.

Against expectations, our results show that a greater concern about SL (coef. -0.00495) does not positively influence producer willingness to invest in SL, providing evidence of heterogeneity between farmers' intentions as citizens and decision-makers (Table 2). Most farmers are concerned about SL, but this concern has yet little effect on their

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investment preferences. In fact, farmers need to be challenged (0.0105) in order to be opened to prefer industry level investments in straightening public trust and support. Hence, SL investments are not reasoned on being concerned about SL, but on perceiving it as an opportunity for being innovative and efficient. Moreover, farmers supporting investments in SL gather information mainly from their close social network (e.g., family) and from the government. Table 7 in Appendix provide information about the parameter estimation and the goodness of fit for the logit models provided in Table 2.

Table 2. Marginal effects of the TPB constructs driving the willingness for industry-level investments in Social License

	Model 1	Model 2	Model 3	Model 4
Attitudes				
Non-financial goals	-0.000455	-0.00188	-0.00176	-0.00184**
	(0.00116)	(0.00137)	(0.00108)	(0.000776)
Financial goals	-0.00977***	-0.0104***	-0.00517***	-0.00476***
	(0.00205)	(0.00237)	(0.00185)	(0.00142)
Willingness to reduce risk	0.00188	0.00338**	0.000876	0.00164*
	(0.00143)	(0.00172)	(0.00139)	(0.000933)
Willingness to increase efficiency	0.00582***	0.00510***	0.00475***	0.00298***
	(0.00144)	(0.00143)	(0.00127)	(0.000902)
SL concern	-0.00495**	-0.00673***	-0.00505***	-0.00458***
	(0.00194)	(0.00227)	(0.00172)	(0.00136)
SL challenge	0.0105***	0.0107***	0.0104***	0.00703***
	(0.00121)	(0.00126)	(0.00129)	(0.00118)
Self-Identity				
Age	-0.000285**			-0.000142*
	(0.000130)			(8.40e-05)
Gender	0.0333***			0.0259**
	(0.0128)			(0.0111)
Education	0.00262***			0.00120**
	(0.000844)			(0.000592)
Farmed area	4.01e-07			-1.66e-08
	(2.47e-07)			(1.54e-07)
Personal Norms				
Belief that farming is about money		-0.00338**		-0.000942
		(0.00172)		(0.000965)
Belief that farming is about innovation		0.00855***		0.00746***
		(0.00300)		(0.00195)
Belief that the sector is improving towards SL		0.00563***		0.00437***
		(0.00186)		(0.00124)
Subjective Norms				
Social media information			-0.0105***	-0.0112***
			(0.00304)	(0.00263)
University information			-0.00957***	-0.00757***

	(0.00271)	(0.00212)
Government information	0.0125***	0.00749***
	(0.00330)	(0.00244)
Magazine's information	0.00179	0.000937
	(0.00159)	(0.00108)
Family information	0.00984***	0.00662***
	(0.00294)	(0.00219)
Veterinarian information	-0.000240	-0.000755
	(0.00267)	(0.00191)
Agronomist information	-0.00482	-0.00283
	(0.00310)	(0.00216)
Agricultural groups information	-0.00738***	-0.00634***
	(0.00251)	(0.00187)
PBC		
Sole Decision-Maker		0.00156
		(0.00179)

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Our statistically significant estimates on attitudes are consistent with previous literature emphasizing their importance for farmers' behavior toward FAW (Austin et al., 2005; Kauppinen et al., 2010 and 2012). The role of farmers' goals as a driver of behavior was also consistent with the findings of Greiner et al. (2009), and our results show that producers who focus on efficiency are more likely to prefer industry level investments in SL. Although non-financial goals negatively influence SL investments, financially oriented farmers are even less likely to pursue a socially responsible agriculture. In addition, personal norms and heterogeneous psychological profiles influence producers' decision-making behavior (Edwards-Jones, 2006). Individuals' attitudes towards risk are also important in explaining different behaviors since efforts towards pro-environmental systems – beyond a concrete economic return – are mostly perceived as an uncertainty (Bock et al., 2007). Hence, we found the willingness to reduce risks to be positively related with investment performances towards an SL. Regarding the role of socio-demographics on SL investments, confirming previous results by Austin et al. (2005), we found that younger and high-educated individuals are more likely to act towards SL. Furthermore, the effects of gender on farmers' intentions are also consistent with literature, by showing that women are more likely to support an environmentally friendly and humane production.

Despite the logical effect that farm operations might hold on behavioral intentions, the amount of area held under production and the role of farmers as decision-makers were unresponsive to investment decisions. This result was in line with Hansson et al. (2014), who have found that farmers' attitudes towards FAW were unaffected by the farm and

household sizes. Regarding the role of information on farmers' investment decisions, we found a significant effect following previous results by Solano et al. (2003) and Liu et al. (2018), as information sources seem to matter in the decision-making process towards a socially responsible agriculture.

These results above are essential for better understanding farmers' intentions towards SL. By bearing in mind the current disparity between what society demands and what farmers are willing and open to do, policy instruments focused on promoting SL and FAW have become vital. Consequently, this research aimed to collaborate with this topic by capturing farmers' key opinions and policy preferences. In this sense, farmers were asked about their most and least preferred industry-level investment options. The results were estimated through a BWS analysis, which is presented in Table 3. The output was estimated holding SL as a reference, supporting the hypothesis that SL remains exhibiting a slight benefit and utility for the supply chain.

Table 3. Farmer BWS industry investment preferences

Investment Options	
Farm Economics/Management	2.867***
	(0.222)
Market	3.228***
	(0.268)
Climate	0.155
	(0.121)
Demand	2.167***
	(0.200)
Environment	1.340***
	(0.165)
Regulations	1.533***
	(0.170)
Innovation	1.177***
	(0.157)

Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Overall, investments in markets and farm economics and management are the most preferred by Canadian farmers, whereas investments in SL are the least selected ones. Respondents' intentions towards SL are even inferior to their willingness to adopt practices focusing on mitigating climate change, which has been found by Davidson et al. (2019) as a highly disapproved nomenclature by Canadian producers. Investing in SL remains not being a standard behavior among farmers across Canada. Thus, we analyzed the heterogeneity among crop producers and animal raisers regarding their most preferred

organizations to work towards FAW and SL-related practices (Table 4). As a reference, the results have held farm management groups selected as the most preferred category in both case scenarios.

Table 4. Farmer BWS organizations preferences

	Crop farmers SL	Livestock farmers FAW
AAFC	-0.316	-0.807**
	(0.224)	(0.346)
Provincial Ministries of Agriculture	-0.849***	-0.577**
	(0.293)	(0.243)
National Agricultural Industry Groups	-0.713***	-1.524***
	(0.254)	(0.355)
Provincial Agricultural Industry Groups	-0.402*	-0.253
	(0.207)	(0.193)
Agricultural Advocate Groups	-0.444**	-0.947***
	(0.206)	(0.286)
Downstream Agribusiness	-0.994***	-1.278***
	(0.260)	(0.306)
Grocery Retail Chains	-1.692***	-2.276***
	(0.339)	(0.339)
Municipal District Governments	-1.314***	-1.033***
	(0.310)	(0.330)
Environmental Groups	-2.945***	-3.519***
	(0.278)	(0.317)
Observations	186	214

Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

According to the above findings, crop farmers prefer to work with farm management groups, provincial agricultural industries, and agricultural advocate groups to strengthen SL. On the other hand, livestock producers aim to collaborate with FAW alongside farm management groups, provincial ministries of agriculture, and the Agriculture and Agri-Food Canada (AAFC). In conclusion, respondents are willing to improve their farming operations towards FAW and SL, but with the support and convergence of industry and government initiatives. The results show that investments in SL are constrained by its complexity and lower priority, whereas FAW is perceived as an expensive, risky, and not a prioritized option. Considering the high public benefits of FAW and SL, initiatives by the private and public sectors are essential to promote an enhanced utility for producers.

2.6.   Policy Implications

In contrast with the current public calls for sustainable and ethical products, this analysis has shown that industry investments in SL portray a slight level of utility for farmers. The disconnection between the public and private net benefits has been leading to market imbalances. This context explains the urge for novel empirical research and initiatives addressing policy proposals.

On average, producers and consumers are highly concerned about environmental and moral issues surrounding the agri-food industry. Nonetheless, most demand and supply agents find difficulties transforming their major concerns into proper market signals, such as purchase intentions and investment decisions. In line with Pannell (2008a) conceptual framework, the high level of public concern and the low private benefit associated with SL investments evidence that positive incentives and technology modifications are recommended to align farmers' behaviors with social wants. Positive incentives (e.g., subsidies) can lead to an ethical, cost-efficient, and pro-environmental production, which tends to approximate economic and moral interests, instead of evoking a conflict of goals (Jonge et al., 2013; Holmes et al., 2002).

Beyond government approaches, our findings reveal that farmers value an engagement between public and private initiatives to dispose of effective measures – which are not reasoned on regulations but a collaboration between producers, government, and the whole supply-chain. Initiatives towards a multiple stakeholder's engagement are receiving more attention recently since it provides a positive environment for sustainability and promotes the marketability of certified products. The Global Roundtable for Sustainable Beef and the Canadian Verified Beef Production Plus (VBP+) are key examples of collaborative approaches assisting a socially responsible production, and helping producers to meet food safety, sustainability and FAW standards. In this context, industrial engagements are highly valued for the disclosure of private net benefits associated with SL projects. In particular, efforts to reduce the costs and to provide a more straightforward orientation for labelling and attesting a pro-environmental production can be an outstanding tool, reducing the price of certified products and enabling its marketability for lower- and middle-income classes of society (Verbeke, 2009).

Our study is aligned with previous scholars and concludes that a combination of positive incentives and collaborative programs to enhance farmers' SL/FAW-related knowledge

are the first steps towards socially responsible agriculture (Davidson et al., 2019). Following previous environmental policy literature (Varble et al., 2016), spreading SL benefits for agribusiness could positively modify farmers' perceptions of sustainable and ethical production. Finally, reconnecting consumers with farming activities could also evoke higher agricultural knowledge for the public, which would help to restore a trust relationship between the supply and demand sides. Even so, as Liu et al. (2018) stated, further research should analyze the impact of time on farmers' behaviors since what motivates farmers in the short term might be different from what motivates them in the long term.

2.7.   Conclusions

This study found that SL is not a preferred investment for the Canadian agricultural sector. Despite of the high level of stakeholders' concerns regarding SL and FAW, environmentally friendly and ethical products remain a small portion of the market share (Verbeke, 2009). In this respect, novel policy instruments and an engagement of the entire supply chain can be considered to assist the growth of socially responsible agriculture.

This paper contributed to the literature by analyzing, in advance, farmers' investment behaviors and policy preferences towards FAW and SL. In conclusion, we found that farmers' interests are heterogenous and mainly guided by the role of attitudes, self-identity, and norms. The segmentation among farmers' preferences and behaviors provides evidence that innovative producers, caring about efficiency and willing to improve their knowledge, are already acting towards public trust and social values. However, further efforts and engagements between the private and public sectors are important to incentivize financially oriented farmers and the whole sector to do the same and evolve SL and FAW-related practices as a market mainstream.

Chapter 3. Consumers' Perspective of the Research Motivation

How human values shape public behavior regarding pro-environmental and ethical meat credence attributes?

Abstract

Meat consumption patterns are changing over the years as consumers become more aware of sustainable and ethical practices along the supply chain. The growing disconnection between agri-food production and society reinforces the importance of research examining the motivations behind consumers' purchase behaviors. In fact, evidence about the psychometric factors underlining the heterogeneity among citizen concerns versus consumers' purchase intentions remains scarce. By employing a Structural Equation Model (SEM), this study aimed to understand the direct and indirect effects between variables driving consumers' attitudes towards specially labeled meat. Our findings suggest that information and engagement in social media positively impact individuals' perceptions and concerns for farm animal welfare. Furthermore, individuals having an altruistic and anti-anthropocentric profile are also more oriented towards sustainable and ethical conduct as shoppers.

3.1.   Introduction

Food purchase behavior is changing over the years as consumers become more concerned about sustainability and the role of ethics over the supply chain (Harper et al., 2002; Yiridoe et al., 2005). Following the global population growth and industrialization, dietary patterns are shifting, so citizens are increasingly calling for resource-intensive agriculture (Garnett, 2014; Weber et al., 2020). In this regard, the future success of food marketing is linked to its capability to align more closely with consumer preferences (Vanhonacker et al., 2007; Wang et al., 2021; Guiné et al., 2021).

As a result, several scholars have turned their research focus to understand the multiple factors underlining this shift in consumers' behaviors (Teng et al., 2014; Chen, 2015; Moser, 2015; Tandon et al., 2021). This vast literature provides evidence that individuals'

trust in agriculture and food labels are important attributes guiding heterogeneous choices (Teng et al., 2014). More importantly, previous research found intrinsic motivations (Tandon et al., 2021) and community beliefs and approval (Chen, 2015) as key components influencing ethical and sustainable purchase decisions.

Following the literature suggests, psychometric variables — used to quantify the mental process that influences behavior — are an important component driving purchase intentions toward specially labeled food. Accordingly, some studies investigated the direct and indirect effects of individuals' perceptions, norms, and values on shopping attitudes. For example, the concept of personal norms, first introduced by Schwartz (1977), guided one of the first insights into self-interest, altruism, and biospheric values as drivers of consumers' environmental concerns — which have only recently received greater attention in the literature (Birch et al., 2018; Boobalan et al., 2021). In addition, ongoing research identified the positive impact of universalism and benevolence as key drivers of green label purchase behaviors (Verbeke, 2009; Doran, 2009).

While novel research is increasingly paying attention to the big picture of consumers' behaviors, an empirical analysis focusing on specific food labels (e.g., certified humane meat, organic meat, non-hormone added meat) can still be further explored. In fact, this shift in food shopping patterns is even stronger across the retail market sector, with meat consumption being widely criticized. In result, information about where and how food is being produced has gained relevance, especially for sensitive products closely related to moral dilemmas, such as meat (Rothgerber, 2020). While some individuals may decide to stop eating meat, other consumers can compensate for the emotional distress by attesting that the farm animal was humanely raised before and during slaughtering (Lin-Schilstra et al., 2020). Therefore, there is a growing urge for novel research integrating psychometric profiles and consumers' behaviors towards meat attributes, especially regarding consumers' heterogeneous views of farm animal welfare (FAW) and the role of human values (altruism versus anthropocentrism).

Part of this literature gap has already been filled by studies revealing the positive effect of altruism and openness to changes in consumers' behaviors towards organic meat and FAW attributes (Caracciolo et al., 2016). At the same time, anti-anthropocentric values were also found as drivers of organic meat purchases (Doorn et al., 2015), whereas individuals holding a self-enhancement profile, related to egoism, have shown to be less likely to care about sustainability and FAW (Lombardi et al. 2015; Caracciolo et al.,

2016). Nonetheless, novel research relating consumers' behaviors with human values are still important as they provide detailed knowledge about the decision-making cognitive process.

This paper aims to analyze the roles that altruism and anti-anthropocentrism play in shaping consumers' intentions towards specially labeled meat. Although previous literature provides some knowledge about this matter (Toma et al., 2011; Spain et al., 2018; Nguyen et al., 2019), empirical studies controlling for other norms and self-identity constructs can be further explored. More importantly, research describing the direct and indirect effects of the drivers of consumers' behaviors towards certified meat remains scarce. Finally, to our knowledge, research on this topic applied to the Canadian context remains lacking.

3.2. Literature Review

Food consumption and shopping behaviors are changing over the years in response to concerns about environmental resources, sustainability, and animal and human welfare (Croney et al., 2009; Gössling, 2011). Mindful consumers – individuals looking over information on food labels – are gaining market relevance and becoming capable of modifying conventional agricultural practices (Harper et al., 2002; Yiridoe et al., 2005). Accordingly, certification systems and food labels are growing as an effective tool providing detailed information about a specific good and driving purchase decisions, especially when it comes to pro-environmental and ethical attributes (Pedersen et al., 2006; Moser, 2015).

As a result, several scholars focused on how consumers respond to different food labels (Konuk, 2018). There are some well-known drivers of consumer behavior towards green labels in the literature; people assigned female, vegetarians, or pet-owners are more likely to choose labels that highlight ethical and sustainable practices (Winterich et al., 2012; McKendree et al., 2014; Backer et al., 2015). In addition, people with more children and higher income (Septiani et al., 2019) are also leaning towards green labels. Consumers' trust and a transparent production can also positively impact individuals' perceptions and attitudes (Nocella et al., 2012). Moreover, knowledge, education, eating habits, religion, and environmental concerns were also proven to influence sustainable and ethical food purchases (Tarakeshwar et al., 2003; Shamsolla et al., 2013; Aanesen et al., 2014; Hynes et al., 2016; Hwang, 2018; Vigors, 2019).

Despite this extensive knowledge, there is a growing interest in shopping intentions over sensitive food, especially organic (Loo et al., 2010) and humanely raised meat (Mceachern et al., 2002; Spain et al., 2018). Meat consumption differs from the demand for other types of food as it comes from a living creature raised and killed for human consumption. In turn, meat consumption refers to a moral decision for consumers (Lagerkvist et al., 2011; Lin-Schilstra et al., 2020). Thus, consumers' ethics (Gracia, 2013), personal norms (Ursin, 2016; Carfora et al., 2020), moral concerns, and attitudes (Rollin, 2015; Heleski et al., 2015) are the major constructs influencing shopping behaviors towards pro-environmental and FAW meat credence attributes.

Moreover, individuals following public common perceptions and pressures can also be more aligned with FAW-related purchases (Andorfer, 2013). However, while deciding among different labels, customers can evaluate values that are important for themselves and society (Doran, 2009). In turn, those appear as conflicting motivational interests as individuals must select among self-interests and moral needs. For example, buying specially labeled meat, such as organic and CH, can be explained by the desire to consume a healthier and safer product and/or incentivize local producers, preserve natural resources, and act towards FAW (Andersch et al., 2019). Hence, there is a growing urge for novel analyses examining how personal norms and human values underline this cognitive decision-making process.

The relationship between psychometric variables and heterogeneous food choices is not a new concept in the literature (Maio et al. 1994; Inglehart, 1997). Schwartz (1992) developed one of the most well-known scales for measuring individuals' life-guiding principles, which is widely applied to food behavioral analysis. Schwartz (1992) elaborated on four meta-values explaining different humans' profiles: conservation (security, conformity, and tradition) versus openness to change (stimulation, self-direction, and hedonism); self-enhancement (hedonism, achievement, and power) versus self-transcendence (benevolence and universalism). As a result, several scholars have linked the heterogeneity among meat-eating habits with these human values across Schwartz methodology (Caracciolo et al., 2016; Cembalo et al., 2016; Hirsch et al., 2017).

Indeed, some studies found a positive relationship between Schwartz's meta-values – self-transcendence and openness to change – as drivers of consumers' behaviors towards organic and FAW attributes (Krystallis et al., 2008; Aschemann-Witzel, 2015; Caracciolo et al., 2016; Cembalo et al., 2016). On the other hand, conservatism (Cembalo et al., 2016)

and self-enhancement, related to egoism, were a minor concern for individuals caring about farm animal welfare and natural resources preservation (Lombardi et al. 2015; Caracciolo et al., 2016). In addition, an anti-anthropocentric profile was also revealed by previous scholars as a driver of organic meat purchases (Doorn et al., 2015).

Due to the development of novel behavioral economic approaches, the role of psychometric factors on food purchases is receiving more attention across the literature. Nevertheless, empirical evidence about how these multiple subjective factors are related to FAW choices remains lacking, specially while controlling for self-identity and other constructs accounting for personal norms. This study employs a structural equation model (SEM) to fill this literature gap and quantify individual's attitudes in the presence of key latent explanatory variables (Temme et al., 2008), such as altruism and anti-anthropocentrism.

SEM has been profoundly addressed in consumer analysis as it accounts for both direct and indirect effects between latent and observed variables (Temme et al., 2008). Many scholars used this method to understand consumers' behaviors towards pro-environmental and ethical goods (Toma et al., 2011; Moser, 2015), local food (Birch et al., 2018), and the role of altruism behind the purchase of green packaging (Prakash et al., 2019). However, research employing SEM to estimate how human values drive certified meat purchases can be further explored, especially while controlling for spiritualism, politics, social media engagement, and major norms and self-identity variables. This research becomes even more relevant as previous scholars noted the remaining importance of research focusing on a more consistent framework to explain consumer behavior toward certain food labels (Cembalo et al., 2016).

Moreover, to the best of our knowledge, no study to date has looked more closely at the Canadian context. Although previous scholars have noted a growing public interest in FAW products in Canada (Uzea et al., 2011; Spooner, 2014), there is still a lack of empirical studies focusing on consumers' motivations in choosing FAW. In summary, we are aware of the existence of a literature gap, and our goal is to assess, in a theory-consistent manner, how psychometric factors directly and indirectly influence individuals' purchase intentions toward specially labeled meat. We develop a two-tier analysis to understand how human values shape public opinion regarding FAW and estimate the pathways that altruism and anti-anthropocentrism explain consumers' choices towards organic, CH, and non-hormone added labeled meat.

3.3.   Conceptual Model Framework

Altruistic behavior is motivated by acting in accordance with one's moral values and concern for the welfare of others (Schwartz et al., 1984). In the context of this study, altruism refers to individuals who care about social justice, a world at peace and equality. On the other hand, anthropocentrism, in a narrower sense, refers to the appreciation of the environment because of its benefits to humans (Thompson et al., 1994). Both altruism and anthropocentrism are psychometric factors receiving focus across the literature, especially by measuring attitudes towards the environment (Thompson et al., 1994), consumers' pro-environmental and ethical purchase intentions (Rahman et al., 2017; Barker et al., 2019), and FAW perceptions (Merlino et al., 2019).

In this research, we measure human values by the Theory of Basic Human Values (TBHV) developed by Schwartz (1992). We decided to use Schwartz (1992) methodology over food values scale developed by Lusk et al. (2009) because it fits better with our research goal of analyzing respondents major guiding life principles. Several scholars analyzed consumers' preferences for sustainable and ethical attributes by employing the TBHV (Cembalo et al., 2016; Sonoda et al., 2018; Prakash et al., 2019). According to Schwartz (1992 and 2006), human values are solid beliefs represented in a circular structure based on four core meta-values: self-enhancement, self-transcendence, openness to change, and conservation, as illustrated in Figure 9. The position of these indicators within the circle provides information about the similarities and differences among them. For example, proximity along the circular structure indicates similar meanings, while distance signifies conflict or contrast (Sonoda et al., 2018).

The first stage of this research will test the meta-values from the Schwartz scale as drivers of citizens' perceptions and FAW concern, while controlling for socio-demographics, knowledge, experience, and other personal norms. We hypothesize that altruism, as measured by self-transcendence, and anti-anthropocentrism, which refers to the belief that humans do not rule over nature, are the main values driving Canadians' concerns about FAW. Afterward, the goal of our second stage model is to analyze how latent variables (e.g., human values) shape consumers' behaviors towards specific meat labels. First, we aim to investigate how the observed variables, such as knowledge, norms, self-identity, and information, are related to altruism and anti-anthropocentrism. Lastly, we intend to

examine how these pathways between observed and latent variables can explain the frequency with which a consumer purchases specially labeled meat.
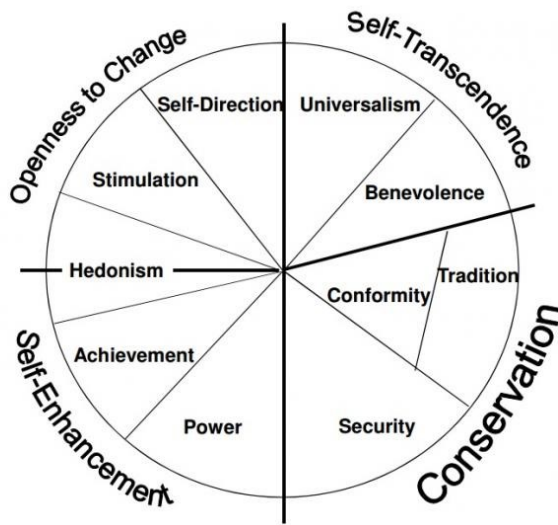
Figure 9. Theory of Basic Human Values (Schwartz, 1992)

As an empirical approach, a Structural Equation Model (SEM)[1] is employed. This framework speaks to our research objective because we can decouple both direct and indirect effects between latent and observed variables on individuals' decisions. By employing SEM, we can analyze the relationship between multiple constructs and how they, together, drive the pathways for heterogeneous shopping behaviors. For example, liberalism may directly increase the likelihood that an individual will purchase certified meat. However, political views can also be related to certain latent variables, such as altruism, which would act as an indirect pathway influencing green label purchases. Hence, SEM allow us to understand and control for these connections between explanatory constructs, which is particularly important for analyzing what motivates consumers to buy specially labeled meat.

Nonetheless, few studies have adopted the role of psychometric factors, such as altruism and anti-anthropocentrism, within such a wider framework to analyze intentions towards meat credence attributes (Toma et al., 2011). Moreover, in this study, an altruistic profile was considered to drive the motivations around the New Ecological Paradigm (NEP), which is linked to the idea that humans and animals have the same right to exist (anti-anthropocentrism), giving more power to the theoretical framework. The NEP scale

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[1]A latent class model approach was considered but not used.

proposed by Dunlap et al. (1978) was developed to measure the different levels of environmental concern that significantly shape attitudes and are widely applied to consumers' behavior science (Wong et al., 2018).

Overall, an individual holding a positive attitude towards a behavior is more likely to intend to perform it (Teng et al., 2015). Moreover, attitude is proven to hold a high level of predictive power within the agri-food context (Tanner et al., 2003). Following Diekmann (2003), Ha et al. (2012), and Septiani et al. (2019), the attitude was measured in this analysis by shopping intentions, knowledge, experience, and FAW concern. Nevertheless, we also controlled other lifestyles, such as spiritualism, ethics, political views, and social media engagement. Figure 10 represents the structural model to be estimated and the path diagram of the effects of observed and latent variables on respondents' purchase intentions. Arrows represent causal relationships between variables, rectangles indicate observed variables, and ovals correspond to latent constructs.
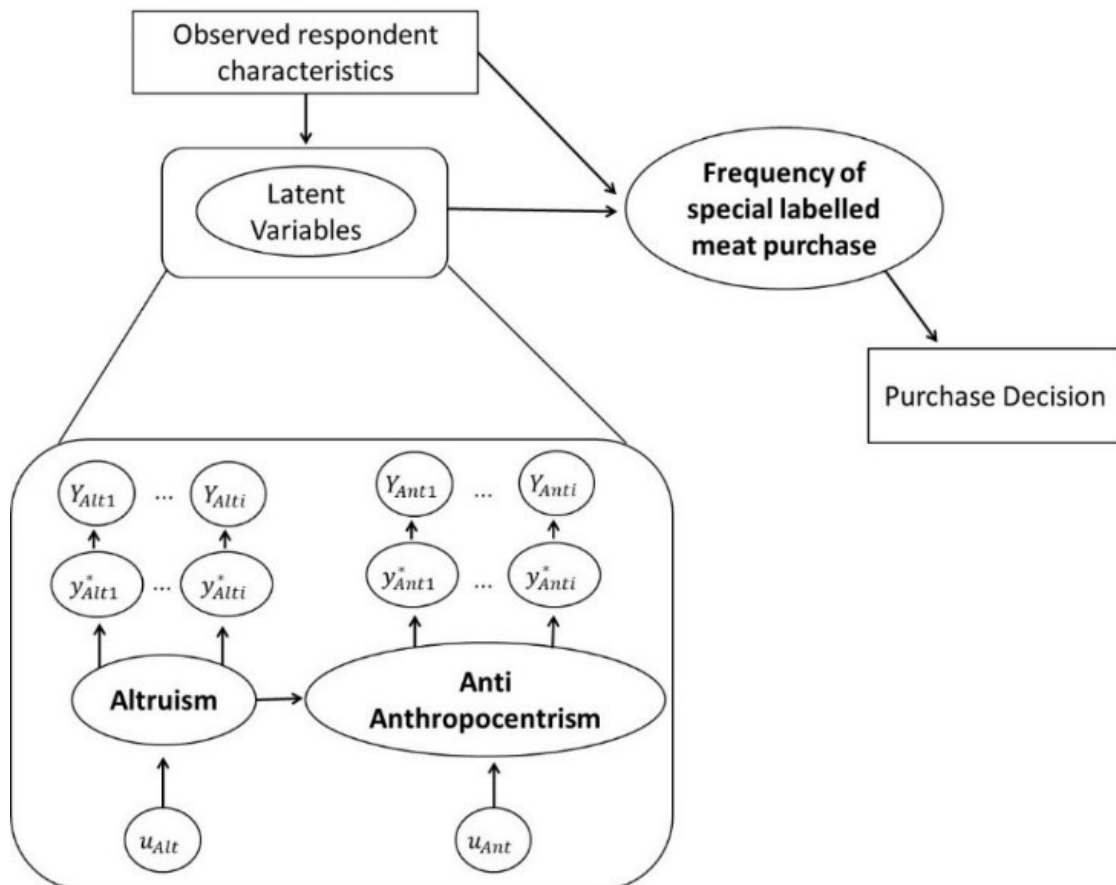
Figure 10. Path diagram estimating observed and latent variables effects on the intention to purchase specially labeled meat

3.4.   Methods

3.4.1.   Survey Design and Data

The survey data was collected in 2016 by the global research marketing and consulting company *Ipos-Reid*. The questionnaire was designed to measure Canadians personal profiles and capture the multiple factors driving food purchase behaviors regarding different meat labels. The survey was administered through a random sample of 1,602 Canadian consumers taken from a panel of 200,000 households across the ten Canadian provinces[2]. The average responses for socio-demographic queries, such as gender, age, income, and education, suggest the sample is aligned with the Canadian census (Statistics Canada, 2021).

The key questionnaire contents are described in Table 15 in the Appendix. Sections of the survey developed by Uzea et al. (2011) and Spooner (2014) guided the construction of FAW engagement-related queries, whereas Parkins' (2016) methodology was followed to measure attitudes and respondents' knowledge. At the beginning of the survey, respondents were asked how frequently they have previously purchased different types of meat on a 3-point Likert scale, including organic, hormone-free, and CH, aiming to understand an individual's intention to buy specially labeled meat: *never, rarely, and regularly.* To better analyze consumers' behaviors, the questionnaire consisted of different sections containing questions related to food shopping, concerns for FAW, reasons for purchasing specially labeled meat, farm knowledge, personal values, and the role of social media. Major descriptive statistics are provided in Table 8.

Table 5. Descriptive statistics of the sample

	Average	S.D.	Min	Max	Description
Male	0.49	0.50	0.00	1.00	1 if male
Age	47.20	15.26	18.00	86.00	Respondent's age
Vegetarian	0.11	0.31	0.00	1.00	1 if vegetarian
Pet Owner	0.58	0.49	0.00	1.00	1 if pet owner
Income	7.68	5.11	0.50	25.00	Income divided by 10,000
FAW Concern	3.80	0.96	1.00	5.00	5-point Likert scale
Liberal	0.37	0.48	0.00	1.00	1 if liberal
Conservative	0.24	0.43	0.00	1.00	1 if conservative
Subjective Ethics	3.50	0.88	1.00	5.00	5-point Likert scale
Social Media Use	0.42	0.49	0.00	1.00	1 if use social media
University	0.24	0.43	0.00	1.00	1 if attended a University

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[2]The survey has considered only English-speakers and excluded territories.

Subjective Agricultural Knowledge	0.23	0.42	0.00	1.00	1 if believe to know more about agriculture
Altruism	4.27	0.84	1.00	5.00	5-point Likert scale
Anti-anthropocentrism	3.50	1.06	1.00	5.00	5-point Likert scale
Religious	0.35	0.48	0.00	1.00	1 if religious
Purchase frequency (CH)	1.77	0.80	1.00	3.00	3-point Likert scale
Purchase frequency (Organic)	1.80	0.74	1.00	3.00	3-point Likert scale
Purchase frequency (Hormone-free)	2.02	0.83	1.00	3.00	3-point Likert scale
Lived on a farm	0.16	0.37	0.00	1.00	1 if lived on a farm
British Columbia	0.17	0.38	0.00	1.00	1 if lives in British Columbia
Prairies	0.22	0.41	0.00	1.00	1 if lives in Prairies
Ontario	0.49	0.50	0.00	1.00	1 if lives in Ontario
Atlantic	0.08	0.27	0.00	1.00	1 if lives in Atlantic

An agricultural knowledge was measured in two ways: (1) subjectively by asking how the respondent would compare his knowledge against his social circle, and (2) objectively by testing each respondent with randomized questions related to modern agriculture. We also added another question asking how certain the respondent was about his answer. The certainty of the response was evaluated to exclude probable correct answers due to random luck that do not come from a higher agricultural knowledge.

We developed 5-point Likert scale questions to access respondents' perceptions across Schwartz's guiding life principles (1992) and measure key latent variables. In this regard, self-enhancement was measured by the respondent's beliefs that humans have the right to modify the environment and their care for being influential and wealthy. Conservation was grasped by individuals who regarded themselves as respectful of older individuals, while self-transcendence was associated with justice. Openness to change was also included in the analysis by respondents desiring to have a varied and eventful life. Items measuring altruism were composed by Schwartz's meta-value representing self-transcendence, especially the aim for justice, peace, and equality. By employing items from the NEP scale, we measured anti-anthropocentrism by asking individuals' perceptions of whether humans were meant to rule over nature (Dunlap et al., 2000). The items forming each latent scale and their response formats are listed in Table 9.

Moreover, this current study wanted to understand further how an altruistic individual, represented by the category of self-transcendence, behaves as a buyer. As mentioned earlier, consumers may purchase environmentally friendly goods based on both their sustainability/ethical awareness (altruism purpose) and in response to their health and safety concerns (selfish reasons). Therefore, Likert scale questions were also constructed

to capture whether respondents' purchases were driven primarily by concern for FAW or by a desire for a higher quality of life (Table 16 in the Appendix).

3.4.2. Statistical Methods

a) Ordered Logit Model

Ordered logistic regressions have been widely employed within food economics and marketing research (Ibrahim et al., 2016). In our first stage approach, respondents have scaled their concern for FAW. Therefore, the model specification can be defined by:

$$y_i = Socio - demographics * \beta_1 + Vegetarian * \beta_2 + Trust\ in\ famers * \beta_3 +$$
$$Social\ media\ engagement * \beta_4\ +\ Ethics * \beta_5\ + Religion * \beta_6\ + Liberalism * \beta_7 +$$
$$Norms\ and\ Human\ values * \beta_8\ + \varepsilon_i \tag{1}$$

where, y_i is the FAW concern to be represented by the bundle of observed variables (socio-demographics, vegetarianism, trust in farmers, social media engagement, ethics, religion, liberalism, and human values), and ε_i is the error term. Additionally, β's are parameters to be estimated. The dependent variable y_i can be segregated into thresholds, as each respondent has defined their scale of FAW concern. The following process underlines the mapping of the latent attitude:

$y_i = 1\ (not\ at\ all\ concerned)$, if $y_i \leq 1$
$y_i = 2\ (not\ very\ concerned)$, if $1 < y_i \leq \mu_1$
$y_i = 3\ (neutral)$, if $\mu_1 < y_i \leq \mu_2$
$y_i = 4\ (somewhat\ concerned)$, if $\mu_2 < y_i \leq \mu_3$
$y_i = 5\ (very\ concerned)$, if $\mu_3\ \leq y_i \tag{2}$

Underlined by the assumption that the errors are independently and identically distributed, the probabilities models can be represented as the following:

$Prob\ (y_i = 1) = \alpha(-\beta x_i)$
$Prob\ (y_i = 2) = \alpha(\mu_1 - \beta x_i) - \alpha(-\beta x_i)$
$Prob\ (y_i = 3) = \alpha(\mu_2 - \beta x_i) - \alpha(\mu_1 - \beta x_i)$
$Prob\ (y_i = 4) = \alpha(\mu_3 - \beta x_i) - \alpha(\mu_2 - \beta x_i)$
$Prob\ (y_i = 5) = 1 - \alpha(\mu_4 - \beta x_i) \tag{3}$

$$L\ (\beta, \mu) = \sum_j \sum_i I\ [y = j] \log\ (\alpha(\mu_j - \beta x_i) - \alpha(\mu_j - 1 - \beta x_i) \tag{4}$$

where β_i and μ_i are chosen to maximize the log-likelihood equation presented above (Equation 4), with i referring to each respondent and j representing one of the five possible responses for the FAW concern model. Several scholars have applied a similar analysis to understand consumers' interests (Verbeke et al., 2006) and different determinants of consumption behaviors towards organic (Shamsolla et al., 2013) and FAW (Prickett, 2007) labeled products. By following previous scholars, we used this approach to understand how human values shape citizens' perceptions regarding FAW while controlling other observed variables.

b) Structural Equation Model (SEM)

The SEM of respondents' purchase intentions towards specially labeled meat was structured to be related with observed variables (e.g., socio-demographics) and three latent variables represented by altruism, anti-anthropocentrism, and the actual purchase frequency. Major descriptions and details of the latent groups are provided in Table 9.

Table 6. Description of scales used to measure latent variables

Scale, *indicator*	Question	Likert-Scale
Altruism	Please think about how important each statement is as a guiding principle in your life	Not at all important
ALT1	A world at peace, free of war and conflict	Not very important
LT2	Equality, equal opportunity for all human beings	Neutral
ALT3	Social justice, correcting injustice and caring for the weak	Somewhat important
		Very important
Anti-anthropocentrism	Please indicate whether you agree or disagree with the following statements	Strongly disagree
NEP1	Humans have the right to modify the natural environment to suit their needs	Disagree
NEP2	Humans were meant to rule over the rest of nature	Neutral
NEP3	Plants and animals have as much right as humans to exist	Agree
Purchase frequency	How often have you purchased meat products with any of the claims listed below?	Strongly agree
PF1	Certified Humane	Never
PF2	Organic	Rarely
PF3	Hormone free	Regularly

The intention to purchase organic, hormone-free, and CH labeled meat was assumed to be driven by an unobserved function, Z*, which was structured as the following ordered logit model:

$$Z^* = \beta X + \gamma \mu + \varepsilon$$

$$Z^* = \begin{cases} 1 & if & Z^* \leq k_1 \\ 2 & if\ k_1 < Z^* \leq k_2 \\ 3 & if & k_2 < Z^* \end{cases} \tag{5}$$

where X is a vector of observed variables, μ is the latent characteristics of a respondent, β and γ are parameters to be estimated, while ε represents the error term. More specifically, X includes factors such as socio-demographics, knowledge, social media engagement, concerns, and political orientation. On the other hand, μ is composed of the latent variables, which are altruism, purchase frequency, and anti-anthropocentrism. Two thresholds, k_i are estimated to forecast the observed categorical response.

Equations 6 and 7 represent the measurement component of a multiple indicators multiple causes (MIMIC) model, estimating the relationship between the i indicator to the latent variable j, as shown in Table 8. The assumption implies an underlined response y_{ij}^* explaining individuals' response to the c-category indicator question, Y_{ij}, while estimating $c-1$ thresholds, π. This relationship is demonstrated below:

$$y_{ij}^* = \theta_i\, \mu_i + v_{ij}, \qquad \theta_i = 1 \tag{6}$$

$$Y_{ij} = \begin{cases} 1 & if & Y_{ij}^* \leq \pi_{ij,1} \\ 2 & if & \pi_{ij1} < Y_{ij}^* \leq \pi_{ij,2} \\ & \cdot \\ & \cdot \\ & \cdot \\ c & if & \pi_{ij,c-1} < Y_{ij}^* \end{cases} \tag{7}$$

The equations above were structured as probit models, where π_i is a matrix of coefficients and v_{ij} represents the matrix of error terms. The second component of the MIMIC model is the structural model based on the relationship of each latent variable (μ_{ij}) to the observed constructs (X), as shown below:

$$\mu_j = \partial_j X + u_j \tag{8}$$

where ∂_j and u_j are parameters and residuals vectors, respectively. These systems of equations were computed in *Mplus* 7.0.

3.5. Results and Discussion

3.5.1. Descriptive Results

One of our main research goals is to understand how human values shape public opinion about FAW. Specifically, we aim to analyze the role of altruism and anti-anthropocentrism as drivers of citizens' perceptions of the well-being of farm animals. With the goal of obtaining some of this information, the sample of responses was analyzed to understand how human values relate to heterogeneity in FAW concerns. The descriptive results confirm our expectations that altruistic and anti-anthropocentric individuals are more orientated to care about FAW. Figure 11 provides evidence about this relationship as respondents neglecting anthropocentrism and holding altruism as a guiding life principle are, on average, showing a higher level of concern for FAW.
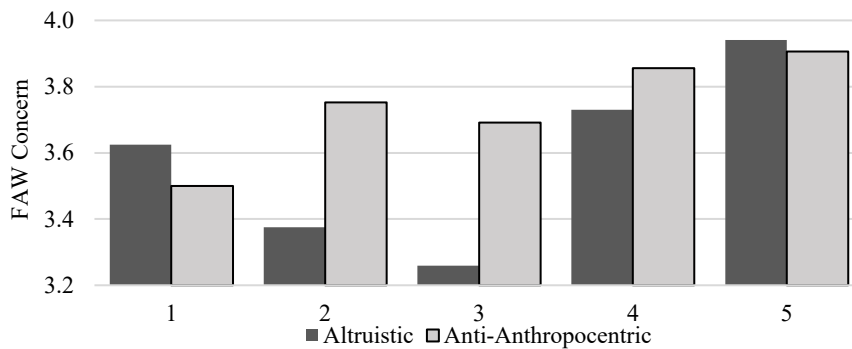
Figure 11. Human values and FAW concern

[Scale from 1: Strongly disagree to 5: Strongly agree that anti-anthropocentric/altruistic values are my guiding life principles. FAW concern ranges from 1 (not concerned) to 5 (very concerned)]
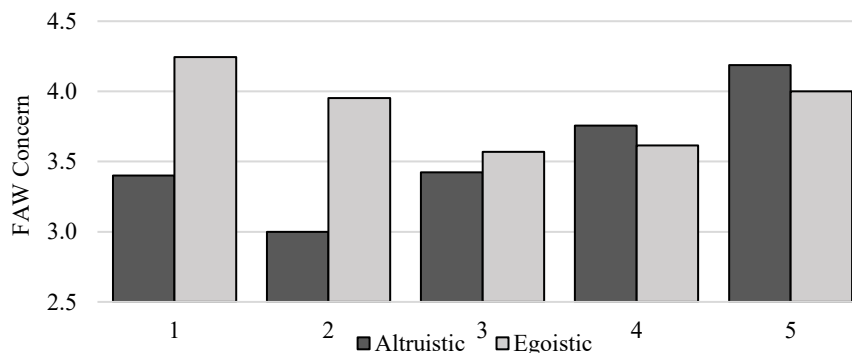
Figure 12. Reasons for purchasing specially labeled meat and FAW concern

[Scale from 1: Strongly disagree to 5: Strongly agree that egoistic/altruistic reasons drive my purchases. FAW concern ranges from 1 (not concerned) to 5 (very concerned)]

The sample of responses was also disaggregated to examine how concern about FAW underscores consumers' stated purchase preferences. As mentioned earlier, consumers may purchase green labels for an altruistic reason, such as concern for the environment and FAW, or selfish reasons related to human well-being (meat quality, taste, and safety attributes). From Figure 12, we can conclude that altruistic buyers are more likely to care about farm animal welfare than selfish buyers.

3.5.2. Econometric Results

a) Ordered Logit Model

Our first approach was to develop a detailed analysis of the multiple factors driving an individual to be concerned about FAW in Canada. The marginal effects results are provided in Table 10, whereas the coefficients estimation and goodness of fit information are provided in Table 17 (Appendix). We find that anthropocentrism is negatively related to FAW concern, whereas individuals carrying a self-transcendence profile, captured by a high level of sense of justice, are more likely to care about the well-being of farm animals. Consistent with Sonoda et al. (2018), we found that people who have a positive attitude toward change and are willing to fill their lives with experiences are more likely to advocate for an ethical food.

Additionally, we found that individuals perceiving themselves as ethical and with a liberal political view are more likely to care about FAW (Harper et al., 2002; Rollin, 2015; Heleski et al., 2015). These results were obtained controlling for the main socio-demographic variables. According to our results, women are more interested in FAW (Winterich et al., 2012), as they may be more inclined to buy green label products because they care about the needs of the public. Moreover, the positive effect of having children was strengthened in this current study (Septiani et al., 2019). The influence of the household income was also controlled. Following previous scholars, such as Gil et al. (2000) and Lockie et al. (2004), we found a minor significance of socioeconomic variables compared to personal norms and attitudes.

Table 7. Marginal effects of the FAW concern ordered logit model

	1 Not at all concerned	2 Not very concerned	3 Neutral	4 Somewhat concerned	5 Very concerned
Socio-Demographics					
Gender	-0.00954***	-0.0392***	-0.113***	0.0227**	0.139***
	(0.00215)	(0.00610)	(0.0150)	(0.00905)	(0.0184)
Age	-0.000135***	-0.000561***	-0.00165***	0.000388**	0.00196***
	(4.97e-05)	(0.000185)	(0.000533)	(0.000178)	(0.000628)
# children	-0.00247*	-0.0102*	-0.0301*	0.00707*	0.0357*
	(0.00134)	(0.00529)	(0.0154)	(0.00430)	(0.0183)
Income	9.74e-09	4.04e-08	1.19e-07	-2.79e-08	-1.41e-07
	(1.34e-08)	(5.52e-08)	(1.62e-07)	(3.91e-08)	(1.93e-07)
Vegetarian	-0.00306*	-0.0128*	-0.0400*	0.00252	0.0534*
	(0.00164)	(0.00665)	(0.0217)	(0.00429)	(0.0325)
Knowledge and Experience					
Trust in farmers	2.67e-05	0.000111	0.000326	-7.65e-05	-0.000387
	(0.000685)	(0.00284)	(0.00837)	(0.00197)	(0.00993)
Education	0.000496	0.00206	0.00606	-0.00142	-0.00719
	(0.000373)	(0.00152)	(0.00445)	(0.00115)	(0.00526)
Seek FAW information	-0.0120***	-0.0505***	-0.163***	-0.0548***	0.280***
	(0.00243)	(0.00596)	(0.0143)	(0.0194)	(0.0307)
Engage in social media	-0.00288**	-0.0120**	-0.0355**	0.00737*	0.0429**
	(0.00130)	(0.00502)	(0.0147)	(0.00384)	(0.0181)
Norms and Human Values					
Ethical	-0.00451***	-0.0187***	-0.0551***	0.0129***	0.0653***
	(0.00110)	(0.00341)	(0.00927)	(0.00477)	(0.0107)
Religious	-0.00110**	-0.00458**	-0.0135**	0.00317*	0.0160**
	(0.000512)	(0.00199)	(0.00579)	(0.00172)	(0.00683)
Liberal	-0.00170***	-0.00706***	-0.0208***	0.00489**	0.0247***
	(0.000594)	(0.00218)	(0.00626)	(0.00219)	(0.00736)
Belief that human's rule over nature	0.00366***	0.0152***	0.0447***	-0.0105***	-0.0530***
	(0.000878)	(0.00270)	(0.00730)	(0.00387)	(0.00839)
Being influential is important	-0.000783	-0.00325	-0.00956	0.00225	0.0113
	(0.000712)	(0.00291)	(0.00855)	(0.00213)	(0.0101)
Justice is important	-0.00315***	-0.0131***	-0.0385***	0.00903**	0.0456***
	(0.000984)	(0.00351)	(0.0100)	(0.00379)	(0.0117)
Respect for elders is important	-0.00102	-0.00425	-0.0125	0.00294	0.0149
	(0.000840)	(0.00342)	(0.0100)	(0.00253)	(0.0119)
Having an exciting life is important	-0.00198**	-0.00820***	-0.0242***	0.00568**	0.0287***
	(0.000819)	(0.00313)	(0.00905)	(0.00282)	(0.0107)
Being wealth is important	0.000513	0.00213	0.00626	-0.00147	-0.00743
	(0.000652)	(0.00268)	(0.00787)	(0.00191)	(0.00934)
Observations	1,329	1,329	1,329	1,329	1,329

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

The influence of the household and individual's eating habits was also included in the analysis. Thus, although vegetarians are not meat consumers, they can still be meat shoppers for the household. In line with previous studies such as Backer et al. (2015), our results show that vegetarians are more likely to be concerned about the living standards of farm animals. Furthermore, the level of trust in farmers was negatively related to FAW concern but without statistical significance. Following Hynes et al.'s (2016) major findings, social media is an outstanding driver of FAW concern, as individuals seeking FAW information and engaging on social media are more likely to care about the well-being of farm animals.

b) SEM

As a first step in the statistical process, we list the measurement model results in Equation 6 (Table 11), examining the relationship between latent variables and their predictors as described in Table 9. Then, aiming to evaluate the model fit statistics, we reported some indicators, such as the Root Mean Square Error of Approximation (RSMEA = 0.034, ≤ 0.05) and the Comparative Fit Index (CFI = 0.954, ≥ 0.9). These indicators provide information that our empirical model fits the data well (Cheung et al., 2002). Additionally, loadings have achieved highly significant coefficients on their corresponding latent group, which implies validity and reliability in the model. This last statement can also be evidenced by the internal consistency, as the α scores ranged from 0.65 to 0.80 into the latent group variables, altruism, purchase frequency, and anti-anthropocentrism (Gadermann et al., 2012).

Table 8. Measurement model results relating latent variables to their indicators

Latent Variable	Indicator	Coefficient	S. E.
Altruism *(α = 0.79)*	Alt1	1	0
	Alt2	1.130***	0.04
	Alt3	1.006***	0.035
Anti-Anthropocentrism *(α = 0.66)*	AA1	1	0
	AA2	1.098***	0.055
	AA3	0.886***	0.041
Purchase Frequency *(α = 0.78)*	PF1	1	0
	PF2	0.886***	0.031
	PF3	1.080***	0.038
Residual Variance			
Altruism		0.502***	0.028
Anti-Anthropocentrism		0.399***	0.026
Purchase Frequency		0.584***	0.029

***Significant at the 1% level.

Table 12 presents estimates of direct, indirect, and total variable effects, where indirect effects show the influence an observed variable has on the intention to purchase specially labeled meat mediated through latent variables. In this study, indirect effects capture the relationship between our observed and latent variables, telling us how much more our observed variables may explain purchase frequency because of its relationship with altruism and/or anti-anthropocentrism. On the other hand, the direct effect can be interpreted as each observed variable impact on the purchase frequency of CH, organic and non-hormone added meat, while controlling for altruism and anti-anthropocentrism. Table 13 summarizes the relationship between respondents' observed traits and latent constructs, describing these indirect pathways towards the purchase frequency of specially labeled meat.

Our SEM results show that both altruism (coef. 0.136) and anti-anthropocentrism (0.165) shape consumers' behaviors towards specially labeled meat (Table 11). Hence, personal characteristics being closely associated with altruism and anti-anthropocentrism may also indirectly explain individuals' purchase behaviors towards pro-environmental and ethical meat. According to Table 12, we observe that concerns about FAW are directly and indirectly influencing individuals to purchase CH, organic and hormone-free meat labels. The indirect component is mainly due to its linkage with altruism (0.104), as shown in Table 13.

In addition, vegetarians are also directly related to a higher purchase frequency of certified meat (0.196). However, we found vegetarians to be statistically less altruistic (-0.2) (Table 12). Although previous literature stated that vegetarianism is associated with altruism and biocentrism (Kalof et al., 2009), our findings suggest that survey respondents may have changed their eating habits following mostly their own health and safety concerns, as they were found to be less concerned about justice, peace and equality. Beyond that, as discussed before, only vegetarians that are meat buyers were included on this analysis, which may explain the differences among our results and the ones achieved by previous scholars. At the same time, pet-owners are also more likely to purchase specially labeled meat, directly and indirectly (Table 12), with an attitude that their anti-anthropocentrism can partially explain, as shown in Table 13 (McKendree et al., 2014).

Table 9. Direct, indirect, and total effects of all variables on respondents' intentions to purchase specially labeled meat, as estimated by an ordinal probit equation

Variables	Indirect Effect Coef.	Direct Effect Coef.	Total Effect Coef.	S. E.
Male	-0.096***	0.050	-0.046	0.050
Age	0.002***	-0.008***	-0.006***	0.002
Vegetarian	-0.054***	0.250***	0.196***	0.076
Pet Owner	0.048***	0.125**	0.173***	0.052
Suburban	-0.001	0.022	0.021	0.061
Income	0.000	0.011**	0.01**	0.005
Religious/Spiritual	-0.009	0.225***	0.216***	0.051
University	-0.049***	0.057	0.007	0.062
British Columbia	-0.006	0.157**	0.151**	0.067
Prairies	-0.01	-0.027	-0.037	0.063
Atlantic	-0.001	-0.041	-0.042	0.094
Liberal	0.044***	0.131**	0.175***	0.057
Conservative	-0.035**	0.111*	0.076	0.066
FAW Concern	0.018**	0.086**	0.104***	0.037
Subjective Ethics	0.085***	-0.083**	0.001	0.037
Lived on a Farm	0.002	0.109**	0.111**	0.052
Subjective Agricultural Knowledge		0.174***	0.174***	0.061
Highly Examines Food Labels		1.079***	1.079***	0.092
Moderate Examines Food Labels		0.574***	0.574***	0.100
Purchases Meat Weekly		0.150***	0.150***	0.052
Social Media Usage		0.019	0.019	0.033
Altruism		0.136***	0.136***	0.042
Anti-Anthropocentrism		0.165***	0.165***	0.046

*, **, *** significant at 10%, 5%, 1% level.

Table 10. Linear model estimates with latent traits as the dependent variables

Observed Variables	Altruism		Anti-Anthropocentrism		Purchase Frequency	
Variable	*Coefficient*	*S. E.*	*Coefficient*	*S. E.*	*Coefficient*	*S. E.*
Highly Examines Food Labels					1.079***	0.092
Moderate Examines Food Labels					0.574***	0.1
Purchases Meat Weekly					0.15***	0.052
Subjective Agricultural Knowledge					0.174***	0.061
Social Media Usage					0.019	0.033
Male	-0.329***	0.048	-0.224***	0.046	0.05	0.052
Age	0.012***	0.002	-0.002	0.002	-0.008***	0.002
Vegetarian	-0.2***	0.077	-0.109	0.068	0.25***	0.076
Pet Owner	0.036	0.049	0.249***	0.045	0.125**	0.053
Income	-0.002	0.005	0	0.004	0.011**	0.005
Religious/Spiritual	0.171***	0.05	-0.24***	0.044	0.225***	0.052
University	-0.173***	0.059	-0.11**	0.052	0.057	0.062
British Columbia	-0.118*	0.064	0.092	0.062	0.157**	0.067
Prairies	-0.041	0.058	-0.016	0.053	-0.027	0.062
Atlantic	-0.048	0.09	0.048	0.07	-0.041	0.094
Liberal	0.21***	0.056	0.04	0.05	0.131**	0.057
Conservative	-0.058	0.059	-0.149***	0.057	0.111*	0.066
Suburban	0.038	0.058	-0.048	0.051	0.022	0.061
Concern about FAW	0.104***	0.033	-0.007	0.03	0.086	0.037
Subjective Ethics	0.415***	0.033	0.062**	0.031	-0.083**	0.039
Lived on a Farm	0.068	0.049	-0.064	0.046	0.109**	0.051
Altruism			0.263***	0.032	0.136***	0.042
Anti-Anthropocentrism					0.165***	0.046
R^2	0.65		0.48		0.68	

*, **, *** significant at 10%, 5%, 1% level.

In line with Vigors (2019), our results in Table 12 reveal that individuals who lived on a farm and claimed to have subjective farm knowledge are also more likely to purchase CH, hormone-free, and organic labeled meat. Similarly, we found that highly educated

and well-informed individuals — looking for labeling information — are more likely to purchase these labels (Aanesen et al., 2014). Moreover, our results suggest that religious consumers are more oriented towards specially labeled meat, directly and indirectly, as they are considered more altruistic (Table 12). However, individuals with higher levels of spiritualism were also found to be more anthropocentric, which negatively affect their purchase intentions towards certified meat (Tarakeshwar et al., 2003; Hwang, 2018). This provides evidence that religious Canadian consumers are more likely to have sustainable shopping decisions, since they were found to be more altruistic. Even so, they also hold a negative component driving their purchase intentions, as they are more likely to be anthropocentric, which means supporting that human's rule over nature.

The role of ethics was also investigated, and our results suggest that individuals considering themselves ethical are also more altruistic and anti-anthropocentric than their pairs (Table 13). In this sense, although ethical identity does not directly enhance the probability of purchase specially labeled meat, it can hold an indirect influence due to it is linkage with human values (Birch et al., 2018). Beyond that, this analysis also captured respondents' political orientation. We found that respondents who perceive themselves as liberal are more likely to prefer labels attesting FAW, directly and indirectly, due to altruism (Heleski et al., 2004). On the other hand, conservative individuals are more anthropocentric, which negatively affects their intentions toward CH, hormone-free, and organic meat (Table 13). Key socio-demographic variables were controlled for, with younger individuals more inclined to specially labeled meat, while women are more likely to purchase it due to higher levels of altruism and anti-anthropocentrism.

Following the literature suggests, household income was also found to directly influences consumers' behavior towards specially labeled meat (Lagerkvist & Hess, 2011). While the relationship between income and FAW concern was statistically insignificant, we found that a high level of income can positively support consumers' actual purchases of specially labeled meat. However, income still provide a minor contribution as a driver of shopping decisions towards sustainable and ethical meat when compared to other values and constructs, such as political orientation and knowledge. Table 14 summarize the pathways provided by Table 13, revealing all the indirect effects of observed variables on the purchase frequency of specially labeled meat mediated through latent constructs. These results are important since it provides a detailed analysis of the pathways driving consumers to engage in mindful shopping conducts.

Table 11. Statistically significant indirect effect pathways on purchase frequency of specially labeled meat

Path of indirect effects on PF	Coefficient	S. E.
Male → Altr → NEP → PF	-0.014***	0.005
Male → Altr → PF	-0.045***	0.015
Male → NEP → PF	-0.037***	0.013
Age → Altr → NEP → PF	0.001***	0
Age → Altr → PF	0.002***	0.001
Vegetarian → Altr → NEP → PF	-0.009**	0.004
Vegetarian → NEP → PF	-0.027**	0.013
Pet Owner → NEP → PF	0.041***	0.014
Religious → Altr → NEP → PF	0.007**	0.003
Religious → NEP → PF	0.023**	0.01
Religious → NEP → PF	-0.04***	0.013
University → Altr → NEP → PF	-0.008**	0.003
University → NEP → PF	-0.023**	0.011
University → NEP → PF	-0.018*	0.01
Liberal → Altr → NEP → PF	0.009**	0.004
Liberal → NEP → PF	0.028**	0.012
Conservative → NEP → PF	-0.025**	0.012
FAW Concern → Altr → NEP → PF	0.005**	0.002
FAW Concern → Altr → PF	0.014**	0.006
Ethics → Altr → NEP → PF	0.018***	0.006
Ethics → Altr → PF	0.056***	0.018
Ethics → NEP → PF	0.01*	0.006
*, **, *** significant at 10%, 5%, 1% level.		

3.6.   Research Implication and Conclusions

This study found that Canadians with an altruistic and anti-anthropocentric profile are more likely to be concerned and demand certified labeled meat. This finding is consistent with our hypothesis that human values shape public opinion about FAW. Thus, our results contribute to the literature by estimating how specific psychometric factors underline consumers' behaviors toward certified meat.

We also provide empirical information that differentiates the main drivers of a person's concerns about FAW from their behavior as a buyer. Our results indicate that consumers who read food labels and skim information are more likely to engage in conscious behavior — favouring pro-environmental and ethical attributes. In this sense, labels that provide detailed information about how the food was produced can reduce the general information asymmetry surrounding purchasing decisions. This knowledge can also support the agricultural supply chain, as food labels often do not present clean, objective,

and concise information that contributes to the customer decision-making process (Pedersen et al., 2006; Moser, 2015).

Moreover, the role of information goes beyond food labels, as social media engagement was a precursor of FAW concern. On average, well-informed individuals — seeking FAW information and engaging in social media — can adopt more conscious behaviors and be more aware of FAW. Hence, investing in sharing information on social media by providing specific details about the production process, its public benefits, and building a trustful relationship with society, can increase the number of individuals willing to pay a premium for sustainable and ethical food labels. Nevertheless, income was considered a major barrier to shopping behaviors, as it forms the main boundary separating citizens' concerns from consumers' actual purchase intentions. Another key strategy to assist the marketing process of green-labeled meat is to enhance consumers' reliance on farmers, food labels, and the entire livestock producing system (Nocella et al., 2012; Nuttavuthisit et al., 2017). According to our results, the approximation between farm production and urban environments can be a potential solution, as it improves consumers' knowledge and trust in farming operations. However, further analysis on this topic remains important, particularly to analyze what is the role of selfishness and altruism on consumers' purchase motivations, and the specific strategies that the supply chain can adopt to move specially labeled meat from a market niche to mainstream.

Chapter 4. Conclusions

This thesis analyzed why environmentally friendly and ethically labeled food products represent only a small part of market shelves. Although society is increasingly demanding moral aspects in food production, this awareness is not yet profoundly reflected in purchasing decisions. More importantly, the heterogeneity of consumers' purchasing behavior is puzzling feedback for the agri-food industry, and it has become a challenge to understand how to meet consumers' needs. Therefore, this research aims to provide the necessary knowledge to align the interests of consumers and producers. Our goal was to understand the main obstacles preventing the supply chain and consumers from behaving in favor of socially responsible agriculture.

Our initial research focused on the supply side of this market imbalance. Our motivation was to understand whether farmers are willing to support investments in SL and FAW-related practices. As a result, we concluded that SL is not yet a challenge for Canadian farmers, making it the least preferred option for industry-level investments. Indeed, public pressure was selected by farmers as the top measure to boost their intentions towards socially responsible agriculture, revealing the remaining gap between public calls and what consumers actually buy. This speaks to the fact that consumers are failing in translate their major concerns into appropriate market signals.

Accordingly, farmers do not see financial benefit in SL and FAW-related investments. Therefore, policy proposals could be put in place to create positive incentives, such as subsidies, for farmers to behave in the direction of a sustainable and humane production system. In fact, our results suggest that farmers are willing to act towards socially responsible agriculture, but with an engagement between industrial and governmental initiatives. Hence, the private and public sectors could incentivize farmers preferences for investments in SL by promoting collaborative approaches and supporting a less bureaucratic and more straightforward environment for certifying the production process. At the same time, working with social media, extension, and advertising regarding the implied benefits of public trust and support can positively influence farmers' investment behavior. Although our results suggest that innovative and efficient farmers are already willing to have investments in SL, these efforts could also help profit-oriented farmers change their perceptions and act towards public appeals.

Nevertheless, further research could contribute to this study to analyze farmers' detailed preferences for policy mechanisms, considering specific real-world investment options with different economic returns. In addition, a novel analysis could also incorporate the influence of time on investment behavior, as the factors that influence farmers' investment decisions in the short term may be different from those that influence their decisions in the long term. Given the lack of research focusing on farmers' views and perspectives, specific studies remain important to thoroughly analyze supply chain investment and policy preferences related to SL and FAW. Nevertheless, our study was one of the first to examine Canadian farmers' behavior in relation to SL industry level investments and provides important background that should be explored from other perspectives and methodologies in future studies.

Following this research objective, the second study provided a different angle by looking at the consumer's perspective. Our main interest was understanding the psychometric motivations behind consumers' awareness of FAW and the role of human values as a driver of their purchasing behavior. We employed a structural equation model to understand the direct and indirect relationships between the latent and observed variables that influence consumers' intentions towards certified meat. Consistent with our hypothesis, we find altruistic and anti-anthropocentric individuals to be more concerned about FAW. Thus, consumers holding this profile are also more likely to behave in favor of a humane food production. Moreover, our results suggest that consumers who engage in social media are more susceptible to make conscious purchases.

Nevertheless, further research is needed to understand the specific reasons that drive shopping behavior toward sustainably and ethically labeled foods. More specifically, new research could provide information to understand why individuals purchase organic, CH and hormone-free certified meat: whether it follows their FAW and environmental concerns or the goal of maintaining their health and safety. Scholars could contribute to the literature by analyzing this selfish vs. altruistic background to understand which motivation is more relevant as a driver of purchasing behavior. This knowledge could help design effective marketing strategies that are better aligned with consumers' interests.

From the results of both studies, we can conclude that the supply chain is not yet fully focused on investing in socially responsible agriculture. In addition to the scientific contribution, these results may also contribute to better marketing strategies by

developing food labels with information that most appeals to consumers. Despite collaborative approaches and positive incentives for the supply chain to behave according to public appeals, understanding consumers' perceptions and intentions toward specially labeled food can also help the agri-food industry improve its marketing strategies. In summary, this research has filled a gap in the literature by providing detailed knowledge on what motivates consumers purchase behaviors and farmers investment preferences regarding SL and FAW across Canada.

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Table 12. Structure and objectives of the survey

Sections	Descriptive Questions	Major Objectives
1. Background Questions (I)	Operational systems; Farmed area; Farm Management	To differentiate respondents, build individual profiles and analyze which factors may contribute to different behaviors and intentions
2. Farm Management and Decision-Making	Major role as a farm manager; Experience as a decision-maker; Perspectives and goals on farming and decision-making	To gain insight regarding personal norms and values; To analyze how farmers perceptions and goals influence behavior
3. Opportunities and Threats to Agriculture	Farmers concerns; Perceived challenges; Most and least preferred investment options	To capture how farmers relate concerns and challenges; To analyze how respondents make farming-related investment decisions
4. Specific Topics (SL/FAW)	Level of interest in FAW and SL; Barriers and preferred mechanism to address FAW and SL	To achieve detailed information regarding crop and livestock farmers attitudes and intentions towards SL and FAW, respectively
5. Assessment of Challenges to Canadian Agriculture	Major forces strengthening Canadian agriculture	To determine the perceived forces able to improve the resilience, competitiveness and social license of agricultural operations
6. Background Questions (II)	Associations; Information sources; Intentions after retiring; Age; Province; Gender; Education; Farm ownership	To differentiate respondents, build individual profiles and analyze which factors may contribute to different behaviors and intentions

Table 13. Description of TPB constructs applied to measure investment behaviors

Indicator	Question Text	Response Format	Variable
	Attitudes		
Goals	Please rank the following farm management goals: Improve Soil Quality[1] Increase Sustainability[1] Improve Biodiversity[1] Improve Water Quality[1] Increase FAW[1] Reduce Greenhouse Gas Emissions[1] Expected Return of Investment[2] Reduce Costs[2] Increase Revenue[2] Increase Productivity[2] Reduce Risk Increase Efficiency	1 (= Least Important) to 10 (=Most Important)	Non-financial goals: Average of non-financial goals ([1]) Financial goals: Average of financial goals ([2]) Reduce risk goal Increase efficiency goal
Concerns	How concerned are you about the following issues? Public trust in agriculture FAW	1=Not at all concerned 2=Not very concerned 3=Somewhat concerned 4=Very concerned 5=Extremely concerned	SL concern: Average of concerns in public trust and FAW
Challenges	Social license	1 (= Least Important) to 10 (=Most Important)	SL challenge
	Personal Norms		
Perspectives on Farming	Select the response that best indicates if you agree or disagree: Dollar and cents are what farming is all about I view my farm first and foremost as a business enterprise I mainly focus on how profitable future activities will be	1=Strongly Disagree 2=Disagree 3=Indifferent 4=Agree 5=Strongly agree	Belief that farming is about money
Perspectives on Farm Decision-Making	"To me, good farm decision-making..." Means investigating new production or farming methods	1=Strongly Disagree 2=Disagree 3=Indifferent	Belief that farming is about innovation

		4=Agree 5=Strongly agree	
Perspectives in FAW/SL	Select the response that best indicates if you agree or disagree: My specific sector recently took steps to increase SL or FAW	1=Strongly Disagree 2=Disagree 3=Indifferent 4=Agree 5=Strongly agree	Belief that sector is improving towards SL
Subjective Norms			
Information	Which of the following sources do you get information from? Family[1] Social Media[2] Veterinarian[3] Agronomist[4] County Agricultural Groups[5] National or International Agricultural Groups[5] County/Municipal Government[6] Provincial Government[6] Federal Government[6] Universities or Colleges in Alberta[7] Universities or Research Groups outside of Alberta[7] Local/Regional Newspapers/Magazines[8] National/International Newspapers/Magazines[8]	Choose all that apply: 1=Yes 0=No	Inf. Family Inf. Social media Inf. Veterinarian Inf. Agronomist Inf. Agricultural Groups: Sum of ([5]) Inf. Government: Sum of ([6]) Inf. University: Sum of ([7]) Inf. Magazines: Sum of ([8])
Self-Identity			
Age	In what year were you born?	Whole number	Age
Gender	Please indicate your gender: Female Male	1 0	Gender
Education	Please indicate the highest level of education you have obtained: High School Trade or Technical School Professional Degree College Degree University or Bachelor's Degree Graduate Degree	1 2 3 4 5 6	Education
Farmed Area	How many acres of land do you own?	Whole number	Farmed area
PBC			
Decision-Making	What is your role on the farm? Sole decision-maker	1=Yes 0=No	Decision-maker

Table 14. Coefficients of the TPB constructs driving producer willingness for industry-level investments in Social License

	Model 1	Model 2	Model 3	Model 4
Attitudes				
Non-financial goals	-0.0321 (0.0819)	-0.115 (0.0837)	-0.147 (0.0913)	-0.239** (0.0996)
Financial goals	-0.690*** (0.125)	-0.636*** (0.133)	-0.432*** (0.139)	-0.619*** (0.151)
Willingness to reduce risk	0.133 (0.102)	0.208* (0.107)	0.0732 (0.116)	0.214* (0.121)
Willingness to increase efficiency	0.411*** (0.0911)	0.313*** (0.0835)	0.397*** (0.0902)	0.387*** (0.0931)
SL concern	-0.349*** (0.135)	-0.413*** (0.135)	-0.422*** (0.141)	-0.596*** (0.157)
SL challenge	0.741*** (0.0715)	0.659*** (0.0674)	0.866*** (0.0797)	0.913*** (0.0869)
Self-Identity				

	(1)	(2)	(3)	(4)
Age	-0.0201**			-0.0185*
	(0.00921)			(0.0105)
Gender	1.300***			1.582***
	(0.314)			(0.378)
Education	0.185***			0.156**
	(0.0542)			(0.0684)
Farmed area	2.84e-05*			-2.16e-06
	(1.70e-05)			(2.01e-05)
Personal Norms				
Belief that farming is about money		-0.208**		-0.122
		(0.104)		(0.123)
Belief that farming is about innovation		0.525***		0.969***
		(0.180)		(0.221)
Belief that the sector is improving towards SL		0.346***		0.568***
		(0.112)		(0.133)
Subjective Norms				
Social media information			-0.858***	-1.379***
			(0.224)	(0.261)
University information			-0.901***	-1.130***
			(0.251)	(0.277)
Government information			0.984***	0.924***
			(0.230)	(0.273)
Magazine's information			0.150	0.122
			(0.133)	(0.140)
Family information			0.802***	0.840***
			(0.212)	(0.231)
Veterinarian information			-0.0201	-0.0988
			(0.223)	(0.250)
Agronomist information			-0.382*	-0.350
			(0.223)	(0.241)
Agricultural groups information			-0.713***	-1.001***
			(0.255)	(0.278)
PBC				
Sole Decision-Maker				0.208
				(0.238)
Observations	3,200	3,200	3,200	3,200
Prob>chi2	0.000	0.00	0.00	0.00
LR chi2(18)	224.28	204.16	250.60	327.94
Pseudo R²	0.2087	0.1917	0.2331	0.308
Log likelihood	-425.28144	-430.34701	-412.12316	-368.45462

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 15. Structure and objectives of the survey

Sections	Descriptive Questions	Major Objectives
1.Food Consumption	Role in food shopping; Vegetarianism; Label's examination; Purchase behavior; Household information	To differentiate respondents' food shopping behaviors and the influence of their household structure on the decision-making process
2.Farm Animal Welfare (FAW)	Level of trust on food labels and the entire agricultural system; Concerns and engagement in FAW; Perceptions and reasons for buying specially labeled food	To capture how individuals' perceptions and relationship with information drive intentions towards FAW and specially labeled meat
3.Farm Experience	Level of farm experience, agricultural knowledge and grown-up area	To acquire information about how different levels of farm experience drive distinctive norms and behavioral intentions
4.Attitudes and Profile	Personal norms, human values, political orientation, religion and the role of social media	To differentiate respondents, build individual profiles and understand the role of norms and information on individuals' behaviors
6.Demographics	Income; Age; Gender; Education; Province; Employment status	To capture a wide range of control variables and to analyze their impacts as drivers of food shopping behaviors

Table 16. Description of the data

Variables	Survey Question	Data Description	
Purchase frequency	How often do you purchase meat with any of the claims listed below?	1	Never
		2	Rarely
		3	Regularly
Vegetarian	Would you describe yourself as a vegetarian?	1	Yes
		2	No
# Household vegetarian	In total, how many members of your household identify as a vegetarian?	Whole number	
Household income	Please indicate your annual household income before taxes	Whole number	
Examine labels frequency	When shopping for meat products, how frequently do you examine food labels?	1	Never
		2	Rarely
		3	Sometimes
		4	Often
		5	Always
		0	if not
Altruistic reasons drive food choices	Concerns about farm animal welfare affect my food purchase decisions	1	Strongly disagree
		2	Disagree
		3	Neutral
		4	Agree
		5	Strongly agree
Egoistic reasons drive food choices (Interaction variable between 2 survey questions)	Meat from animals raised with higher welfare standards is healthier for me	1	Strongly disagree
		2	Disagree
		3	Neutral
		4	Agree

		5	Strongly agree
	Meat from animals raised with higher welfare standards tastes better	1	Strongly disagree
		2	Disagree
		3	Neutral
		4	Agree
		5	Strongly agree
Trust on farmers	How much do you trust farmers regarding the certification of FAW?	1	Mistrust strongly
		2	Mistrust
		3	Neutral
		4	Trust
		5	Trust strongly
FAW concern	How concerned are you about farm animal welfare?	1	Not at all concerned
		2	Not very concerned
		3	Neutral
		4	Somewhat concerned
		5	Very concerned
Ethics	Do you consider yourself more ethical than most people you know?	1	Strongly disagree
		2	Disagree
		3	Neutral
		4	Agree
		5	Strongly agree
Political orientation	Would you describe your political views to be..?	1	Primarily conservative
		2	Somewhat conservative
		3	Neutral
		4	Somewhat liberal
		5	Primarily liberal
Religion	Religion/Spirituality plays an important role in my life and guides my decisions		Strongly disagree
			Disagree
			Neutral
			Agree
			Strongly agree
Education	What is the highest level of education you completed?	1	Grade school
		2	High school
		3	Technical school
		4	College
		5	University undergraduate
		6	University graduate
Farm experience (interaction variable between 2 survey questions)	Which describes most accurately where you grew up?	1	Downtown area
		2	Suburban area
		3	Rural area

		4	Farm
	How would you describe the environment you live in?	1	Urban area
		2	Suburban area
		3	Rural area
Seek FAW information	Have you ever actively sought information about farm animal welfare?	1	Yes
		0	No
Social media engagement	Do you get information from or engage in social media?	1	Yes
		0	No
Pet Owner	Are you a pet owner?	1	Yes
		0	No
Subjective knowledge	Compared to your friends and family, how would you rate your knowledge about modern agriculture?	1	I know nothing
		2	Much less
		3	About the same
		4	A bit more
		5	A lot more
Human Values (Schwartz scale)	Think about how important each statement is as a guiding principle in your life: - A world at peace, free of war - Equal opportunities for humans - Leading an exciting life - Being influential - Social justice - Honouring parents and elders - Having wealth and material possessions	1	Not at all important
		2	Not very important
		3	Neutral
		4	Somewhat important
		5	Very important

Table 17. Parameter estimation of the FAW concern ordered logit model

	Coefficients
Socio-Demographics	
Gender	0.871***
	(0.112)
Age	0.0124***
	(0.00397)
# Children	0.227*
	(0.116)
Income	-8.96e-07
	(1.22e-06)
Vegetarian	0.316*
	(0.179)
Knowledge and Experience	
Trust in farmers	-0.00245
	(0.0630)
Education	-0.0457
	(0.0334)
Seek FAW information	1.471***
	(0.142)
Engage in social media	0.269**
	(0.112)
Norms and Human Values	

Ethical	0.415***
	(0.0671)
Religious	0.102**
	(0.0433)
Liberal	0.157***
	(0.0466)
Belief that human's rule over nature	-0.337***
	(0.0526)
Being influential is important	0.0720
	(0.0643)
Justice is important	0.290***
	(0.0741)
Respect for elders is important	0.0943
	(0.0755)
Having an exciting life is important	0.182***
	(0.0677)
Being wealth is important	-0.0472
	(0.0593)
Observations	1,329
Prob>chi2	0.000
LR chi2(18)	480.20
Pseudo R²	0.1376
Log likelihood	-1505.1533

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.