Economic geography and entrepreneurial diversification in the agricultural sector

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ABSTRACT
Taking concepts from economic geography, this study decomposes locational factors as ‘first-nature’ and ‘second-nature’ geography, and argues that the second-nature geography, which is the concentration of entrepreneurial activities, helps entrepreneurs to discover entrepreneurial opportunities and gives them an incentive to integrate business with supporting activities in close proximity due to pecuniary and technological externalities. This study has taken the agricultural sector as the context of its research, and finds that the agricultural entrepreneurship literature has neglected the impact of the second-nature geography. Findings from the Netherlands show that the higher the concentration of entrepreneurial diversification in a region, the greater the likelihood that a farmer undertakes entrepreneurship on the farm.

ARTICLE HISTORY
Received 18 January 2022; Accepted 21 April 2022

KEYWORDS
entrepreneurship; agriculture; economic geography; agricultural entrepreneurship

JEL CLASSIFICATIONS
C31, D81, L25, L26; Q12, Q13; R11; R14

INTRODUCTION
A study by the Organisation for Economic Co-operation and Development (OECD) shows that economic activities within a country are concentrated in a number of regions, and that some regions contribute more to national gross domestic product than do others (OECD, 2016, p. 54). While this within-country heterogeneity is found to be highly attributable to differences of total factor productivity, economic geography in terms of availability of factors of production and knowledge diffusion explains why some regions are more advanced than others with high total factor productivity (Beugelsdijk et al., 2018). Variation in regional characteristics results in variation of entrepreneurship across space (Georgellis & Wall, 2000; Reynolds et al., 1994b). The role of location due to within-country heterogeneity in new firm formation has received adequate attention in the entrepreneurship literature (e.g., Acs & Armington, 2004; Armington & Acs, 2002; Beugelsdijk, 2007a; Fritsch & Wyrwich, 2014; Georgellis & Wall, 2000; Gohmann, 2016; Kangasharju, 2000; Konon et al., 2018; Reynolds et al., 1994a, 1994b). However, the present studies do not adequately incorporate micro-level entrepreneurial

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response to regional differences within a country. The central research questions of entrepreneurship – ‘why, when, and how’ entrepreneurship opportunities are discovered, and ‘why, when, and how’, compared with others, ‘some people’ use these opportunities (Shane & Venkataraman, 2000, p. 218; 2001; Venkataraman, 1997) – cannot be adequately explained using a macro-level conceptual framework. Moreover, most studies are based on the number of business entries in a region which does not capture an entrepreneurial decision made within an existing business. As entrepreneurship includes enterprising activity within the existing organization (Cromie, 2000; Shane & Venkataraman, 2000), the number of business entries in a region is an incomplete proxy of entrepreneurial initiatives.

This aside, context, defined as ‘circumstances, conditions, situations, or environments that are external to the respective phenomenon’, which includes industry, concentration of activities and physical location (Welter, 2011, p. 167), is an important factor in understanding how entrepreneurship opportunities are discovered and used (Welter, 2011; Welter & Lasch, 2008; Zahra, 2007). While there is a call to contextualize entrepreneurship research (Fitz-Koch et al., 2018; Welter, 2011; Welter & Lasch, 2008; Zahra, 2007), ‘sector’ as a context has received little attention in the discipline (Fitz-Koch et al., 2018). The multifunctionality concept of agriculture means that it delivers valuable positive externalities to start entrepreneurial activities, which is a distinctive feature of the sector compared with other sectors in the economy (Pretty et al., 2001). Farmers often combine agricultural activities with other income-generating activities, known as pluri-activity, which makes the agricultural sector unique (Carter, 1998a, 1999). Although the agriculture sector is one of the largest sectors in the world, mainstream entrepreneurship studies have not given adequate attention to entrepreneurship in that sector (Fitz-Koch et al., 2018). Entrepreneurship is an interdisciplinary field of research (Zahra, 2005), and there is a call to diversify that field (Welter et al., 2017). Application of agricultural sector-specific theories to understand entrepreneurship in the sector can contribute to the mainstream entrepreneurship literature (Fitz-Koch et al., 2018; Shane & Venkataraman, 2001).

Using a farm–household model, this study investigates the role of location in entrepreneurial decisions at the micro-level in the agricultural sector. The study incorporates economic geography concepts to decompose location into locational attributes and concentration of entrepreneurial activities in order to explain the locational influence in terms of agglomeration economies in agricultural entrepreneurship.

Entrepreneurship is defined ‘as a means for creating value within new or existing businesses’ (Morgan et al., 2010, p. 119). In the agriculture sector, building a new on- or off-farm business opportunity ‘beyond agricultural production’ is defined as entrepreneurship (Alsos et al., 2003; Carter, 1998b, p. 297; Fitz-Koch et al., 2018; Hassink et al., 2016). An initiative to establish a new business makes a farmer owning multiple businesses a ‘portfolio entrepreneur’ (Carter, 1998b, 1999, 2001). Thus, agricultural entrepreneurship is often synonymous with farm diversification. Diversification of non-agricultural businesses is a major entrepreneurial strategy of the agricultural sector in developed countries (Dias et al., 2019; Morris et al., 2017), and has received significant attention in agriculture business literature (Carter, 2001). Ilbery (1991, p. 209) defines farm diversification as ‘farm-centred’ activities, which excludes ‘income generated from, and labour involved in, off-farm activities’. Similarly, McElwee (2006) includes on-farm diversification and excludes off-farm employment in defining diversification. Thus, commonly found pluri-activity strategy in the agricultural sector, or farmers’ involvement in other income-generating activities, does not always warrant entrepreneurship (e.g., off-farm employment) (Carter, 1998b, 1999; Fitz-Koch et al., 2018). This study defines agricultural entrepreneurship as a new business initiative built on farm resources on a farm, that is, on-farm diversification, specifically, agro-tourism, farm sale, processing of products, care farms and daycare.

There is a variation of rules around entrepreneurship from one place to another place (Bau- mol, 1990, 1996). Entrepreneurial culture varies within a country (Beugelsdijk, 2007a), and this
makes entrepreneurship a regional characteristic (Konon et al., 2018). Although there is a call to investigate how environmental factors influence new opportunities (Busenitz et al., 2014), little attempt has been made in the agricultural entrepreneurship literature to identify locational factors adequately. The economic geography literature distinguishes location with two types of factors and it argues that the variation of economic activities across space is due to ‘first-nature geography’ and ‘second-nature geography’ (Fujita & Mori, 2005; Krugman, 1993; Redding, 2010). First-nature geography is the ‘locational fundamentals’ or location-bound resources; second-nature geography is defined as locational agents that develop concentration of production and are ‘relative to one another in geographic space’ (Redding, 2009, p. 2).

A few exceptions focus on location’s role in agricultural entrepreneurial activities at a micro-level (e.g., Dawson et al., 2014; Meraner et al., 2015; Pfeifer et al., 2009; Weltin et al., 2017). However, these studies largely focus on the role of location in relation to farmland use or physical location investigating the influence of the first-nature geography without adequate focus on second-nature geography – how agglomeration economies affect entrepreneurship in this sector. Second-nature geography across space plays a significant role by providing farmers with the opportunity to enjoy agglomeration economies and gain information through interaction and spillover of knowledge. While the agricultural entrepreneurship literature has adequately considered the role of the first-nature geography, the role of agglomeration economies due to heterogeneous distribution of the second-nature geography across space has been neglected. Further, there is a lack of a conceptual framework to understand entrepreneurship in the agricultural sector, although there has been adequate attention given to investigating operations of the sector (Fitz-Koch et al., 2018). We therefore aim to contribute to agricultural entrepreneurship research by proposing a conceptual framework for how entrepreneurship decisions are explained by locational factors of agglomeration economies.

This study presents findings from the Netherlands by incorporating concepts from economic geography into a farm household model in order to explain the likelihood of agricultural entrepreneurial activities within the farm due to agglomeration externalities in close proximity, and while controlling for the effects of different factors internal and external to the farm. The Netherlands provides a suitable environment to investigate the role of the second-nature geography in agricultural entrepreneurship. Cultural and institutional differences do not create regional variation in the Netherlands and thus offer a more homogeneous institutional environment across the country (Bosma et al., 2008). Moreover, the Netherlands is a relatively flat country with low relief differences (van Lanen et al., 2015) and hence presents an ideal landscape to investigate the impact of the second-nature geography on agricultural entrepreneurship.

THEORETICAL BACKGROUND

The Marshallian concept of ‘localization economies’ provided an initial concept as to why location is important in business decisions. Alfred Marshall identified the knowledge spillover and different linkages of market forces in industrial agglomeration (Beenstock & Felsenstein, 2010; Fingleton, 2003): there are three economies external to the localized agglomeration of production – specialized and skilled labour market, and availability of specialized input – because a large number of producers in one place provides a big market for suppliers and knowledge spillover (Fingleton, 2003). Moving away from Marshall’s perfect market assumption in ‘localization economies’ (Fingleton, 2003), the concept of externalities is further developed by Scitovsky (1954) under imperfect market conditions, which is more realistic. Scitovsky (1954) categorizes Marshallian externalities into pecuniary and technological externalities: Marshallian knowledge spillover is defined as technological externalities, and the labour market and the availability of specialized inputs are categorized as pecuniary externalities (Fingleton, 2003; Fujita & Thisse, 1996). Technological externalities are knowledge spillovers found, as a result of being in a particular location,
without any effort and cost (Antonelli et al., 2011). Thus, businesses are likely to enjoy technological externalities without any market mechanisms. However, the pecuniary externalities in the location occur through market transactions among the agents located there (Fujita & Thisse, 1996). Hence, spillover of knowledge is localized as a public good (Breschi & Lissoni, 2001; Fujita & Thisse, 1996) and scholars argue that it diminishes over distance (Fujita & Thisse, 1996).

Ciccone and Hall (1996) argue that if there is a cost to transport inputs, then a business can enjoy increasing returns to scale by co-locating with the source of the input, considering that technology itself has constant returns to scale. It implies that a co-location of up- and down-stream activities creates an increasing return to scale (Fujita & Mori, 2005). Where pecuniary externalities are created by transport cost and increasing returns to scale (Redding, 2010), a proximity to the source of the inputs facilitates an access to pecuniary externalities (Antonelli et al., 2011). Hence, just as technological externalities are accessible due to proximity, pecuniary externality also suggests the importance of interactions between businesses in close proximity, and thus it generates agglomerations (Fujita & Thisse, 1996) – or, in other words, concentration of activities has both pecuniary and technological externalities.

Starrett (1978, p. 21) points out two causes of economic diversity across space: economies of scale and variations ‘of the underlying resource base’. In the absence of these two factors, Starrett argues, each point of space would have been self-sufficient. Variation of resources across space is the differences in inherent characteristics of a location. Ottaviano (2003, p. 666) also states that ‘places differ in terms of their relative abundance of natural resources’. The existence of this difference of resources across space makes location a very important factor in agricultural entrepreneurship, due to its significant impact on farm performance (Grande et al., 2011). The second reason for economic diversity is economies of scale (Starrett, 1978). Concentration of activities provides new ventures with the opportunity to reduce costs associated with unfamiliarity with complex local structures through building networks with other businesses in the location, and therefore they enjoy economies of scale in their production of services or goods. Being an agglomeration force (Krugman, 1993; López-Bazo et al., 2004; Redding, 2009), economies of scale are present in concentration of business activities, and this affects entrepreneurship by reducing costs of discovery of opportunities and building networks with buyers and suppliers.

Pluri-active farms identify opportunities by combining business activities with existing agricultural business (Alsos et al., 2003), and they use farm resources in new venture creation on the farm (Grande et al., 2011). Multifunctionality of the agricultural sector (Pretty et al., 2001), and dependence on farm and local resources, indicate an indivisibility in the production of services or goods of farm entrepreneurship. Distance becomes a determining factor in exchanges between economic agents when there is an indivisibility in the production processes (Ottaviano & Thisse, 2001). Indivisibility in farm businesses thereby makes increasing returns to scale an important factor in agricultural entrepreneurship. Thus any concentration of agricultural entrepreneurship provides increasing returns to scale to co-located farms and by this means proximity to concentration of farm business activities will positively influence farm entrepreneurship.

Agricultural entrepreneurship literature explains neoclassical explanations of locational influence or first-nature geography in detail (e.g., Dawson et al., 2014; Meraner et al., 2015; Pfeifer et al., 2009; Weltin et al., 2017). However, the mechanisms in concentrations of business activities or second–nature geography have not received adequate attention in agricultural entrepreneurship. It is not adequate if it is argued that the regions are heterogeneous just because of unequal distribution of natural resources (Ottaviano, 2011). There are differences in second-nature geography, just as there are differences in first–nature geography. Locational influence in agricultural entrepreneurship therefore warrants critical analysis due to likely heterogeneity within a country, with additional rigor for second-nature geography.

Agritourism is one farm entrepreneurship activity for diversifying farm income (Boys et al., 2017). Visitors come to a farm to learn about agricultural activities, to perform ‘self-harvest’
activity, and to enjoy on- and off-farm recreational activities (Sotomayor et al., 2014). Agritourism as an entrepreneurial activity therefore depends on the cropping pattern of the farm, and entrepreneurial activities such as ‘farm sale’ or management and marketing of ‘self-harvest’ activity. Hence vertical (e.g., management of ‘self-harvesting’) and horizontal (e.g., management of farm accommodation) activities in agricultural tourism (Wu, 2018) are the supporting businesses for farms considering tourism as an entrepreneurial activity. As supporting activities promote agricultural tourism (Torres, 2002), availability of supporting businesses in close proximity provides increasing returns to scale (Fujita & Mori, 2005) to a prospective entrepreneur. In addition, production and processing sites of agricultural foods are often transformed into tourist destinations (Everett, 2012), since visitors are often attracted by authentic local food products (Sims, 2009) and the opportunity to experience the food production process (Everett, 2012). Visiting wine production facilities to experience wine making (Byrd et al., 2016) is an example of how tourism in the agricultural sector can depend on processing of a product on the farm.

As farm entrepreneurial activities are related to each other, concentration of farm entrepreneurial activities in a region ensures the presence of supporting farm business in close proximity. As consumers’ ‘shopping itinerary’ attempts to reduce total costs (Fujita & Thisse, 1996), a concentration of diverse businesses becomes more attractive to visitors. Building on the economic geography concept of ‘circular causality’, this suggests that concentration of entrepreneurial activities is ‘self-enforcing’ by creating more supporting activities in close proximity, and therefore it continues to grow (Baldwin et al., 2003, pp. 33–36; Behrens & Robert-Nicoud, 2009; Ottaviano, 2003). Density of farm entrepreneurship creates a regional identity and common market (Marcoz et al., 2016), and therefore positively affects productivity due to increasing returns to scale, which can further help to identify entrepreneurial opportunities and to start similar or supporting business activities using the farm resources. Moreover, a knowledge ecosystem is created when members depend on each other for performance and survival, and share and use each other’s knowledge to achieve common objectives (Nambisan & Baron, 2013). The knowledge pool in the location helps others with prior knowledge of the market, which influences the discovery of entrepreneurship opportunities (Shane, 2000). Knowledge is locally bound and it does not flow over distance (Baptista & Swann, 1998; Lamin & Ramos, 2016). Studies have found that personal interaction is important for innovation (Gray et al., 2015), and it applies in both within- and cross-industry agglomerations (Lamin & Ramos, 2016). Proximity simplifies relationship building to gain access to information (Chakrabarti & Mitchell, 2016); therefore, the influence of distance has not diminished as a result of innovation in information and communication technologies, supporting the proposition that ‘collocation still matters’ (Gray et al., 2015, p. 2761). While farm business initiatives are often imitated by farmers (Alsos et al., 2003), concentration of diversification activities is a significant factor influencing such entrepreneurial decisions.

In sum, concentration or second-nature geography therefore creates both pecuniary and technological externalities for farm entrepreneurship. Pecuniary externalities in a concentration arise from increasing returns to scale for factors such as co-location of back- and forward-supporting common markets due to regional identity and prior knowledge due to interaction with other entrepreneurs. Technological externalities in a concentration arise from easy access to varieties of common regional business strategies, access to local institutional support, and imitation of other entrepreneurs’ business strategies.

**CONCEPTUAL FRAMEWORK**

In line with previous studies of farm entrepreneurship (e.g., Jongeneel et al., 2008; Pfeifer et al., 2009), we have chosen the farm household model to investigate farmers’ decisions to start a business. This model explains farmers’ economic behaviour based on household goals and
identifies the factors affecting their decisions (Ellis, 1993; Pfeifer et al., 2009). In a farm household model, a decision is made to maximize a household’s expected utility within budget and time constraints. Household income defines the budget constraint; availability of labour defines the time constraint – how much time the household can work on the farm. A farm household can derive income from agricultural and non-agricultural entrepreneurial activities. The model includes uncertainties (Ellis, 1993), and therefore, in case of any fluctuations of income level or uncertainties in relation to income level, farmers adjust their allocation of labour between agricultural and non-agricultural activities. To maximize total utility, a household’s problem is to choose the input level and allocation of labour; solving the utility maximization problem results in input demand and output supply functions, which are influenced by their prices (Jongeneel et al., 2008).

Assuming a farm has two production possibilities of agricultural and non-agricultural activities on the farm, and labour as a variable input and first-nature geography as a quasi-fixed input such as soil type (Pfeifer et al., 2009), a farm household can allocate labour from leisure either in the production of the farm or in the production of diversification products. The utility of the household declines with any fall in price of the agricultural product. Due to uncertainties of agricultural product price, diversification is a risk-management strategy (Mishra et al., 2004). A farmer starts entrepreneurial diversification activities to keep income flowing so that total utility does not fall. Any uncertainties with income from agricultural products increase opportunity costs of taking leisure, and the household then allocates labour either in agricultural or in entrepreneurial diversification activities based on the relative price of these two. If the price of agricultural products declines, the relative price for diversification activities increases. This suggests that any uncertainties with income from agriculture will motivate farms to start diversification activities on the farm.

With pecuniary and technological externalities of agglomeration, concentration of entrepreneurial activities helps a farmer to enjoy increasing returns to scale and numerous benefits of a common market. They help to reduce costs of production and to increase profits of diversification activities. Therefore, concentration of farm entrepreneurship increases the output price of diversification activities and reduces the input price of their production. With a constant price of the agricultural product, the relative price of diversification activities is comparatively higher in a location with higher concentration of farm entrepreneurship. To maximize total utility or to keep total utility constant, in the presence of uncertainties with income from agricultural products, farmers in a concentration of entrepreneurial activities will more likely allocate labour in diversification activities. Thus the study proposes the following hypothesis:

Hypothesis: The concentration of agricultural entrepreneurship in a region increases the likelihood that a farm has entrepreneurial diversification activities.

On the basis of the explanations of the farm household model, Figure 1 presents a conceptual framework that depicts the factors influencing a farmer’s decision to begin an entrepreneurial activity. Agricultural entrepreneurship literature has adequately addressed the influence of first-nature geography, which has been considered a quasi-fixed input (Pfeifer et al., 2009), and the influence of a nearby population hub as a market for the products (Mishra et al., 2004). The hypothesis of this study aims to make the analysis of the locational influence complete by adding second-nature geography in the framework.

DATA AND METHODS

The data were collected from the Annual Agricultural Census of the Netherlands for 2009. This census includes the following information for each farm in the Netherlands: education and age
of the head of the farm household, number of male and female members working on the farm, economic and physical farm size, location of the farm, farming activities of the farm, soil type, and type of entrepreneurial activities on the farm. This dataset has geo-referenced information; therefore, it was able to give us distances from different locations and identify the municipality of each farm. This study used ArcGIS software to calculate distances of each farm from different locations such as nearby nature sites, cities and the Randstad region. Due to missing values of the dataset, the number of farms included in the analysis is reduced from the originally included 73,008 farms in the census to 57,195. In line with previous studies, the farm is chosen as the unit of analysis (Grande et al., 2011).

According to that census, there were 4651 farms in the Netherlands with entrepreneurial activities on the farm, which is only 6.37% of total farm holdings. Specifically, 3.06% of farms have agro-tourism, 3.08% have farm sales, 1.00% have processing of products, 0.97% have care farms and 0.09% have daycare activities besides their regular farming. Diversification entrepreneurial activities in provinces in the Netherlands are presented in Table 1. Table 2 summarizes key characteristics of farms with and without any diversification activities on the farm.
Measures and variables

Dependent variable
Farm entrepreneurship is the dependent variable, and is binary, depending on the farm’s diversification activity, whether or not a farm has any entrepreneurial-diversification activity on the farm. In line with prior studies (Meraner et al., 2015; Van der Ploeg & Roep, 2003; Alsos et al., 2003; Fitz-Koch et al., 2018; Hassink et al., 2016), we identified on-farm diversification activities as farm entrepreneurship. However, we did not consider ‘nature conservation’ a diversification activity because it is a government incentive programme to protect the environment and landscape (Meraner et al., 2015); support provided under this scheme does not fall under the economic diversification axis of the rural development policy of the European Union. Therefore, this study takes five diversification activities in the Netherlands as farm entrepreneurial activities. The dependent variable is 1 if a farm has any of agro-tourism, farm sale, processing of products, care farms and daycare; 0 otherwise. Daycare activity includes childcare and education, and care farming includes rehabilitation and caring for disadvantaged people (Meraner et al., 2015).

Independent variables
We have defined within-country regions using administrative boundaries (Beugelsdijk, 2007b; O’Brien & Lane, 2018) and identified farms’ location using postcodes in 441 municipalities in the Netherlands. Using the location of the farm, municipality-level concentration of different farm business activities is calculated. The percentage of farms compared with total farms with farm entrepreneurial diversification activities in the municipality is a measure of the entrepreneurial cluster and the independent variable in the study. Compared with total farms, a higher percentage of farms with farm business activities in the local municipality provides agglomeration benefits to a farm. The higher the number of farms compared with total farms with diversification activities, the greater the farmer’s opportunity to share knowledge, technology and information. For the sensitivity test of the measure, this study also includes five concentration variables: agro-tourism concentration (calculated as the percentage of farms with tourism activity in the municipality where the farm is located, except for the farm itself), farm-sale concentration (calculated as the percentage of farms with farm-sale activity in the municipality where the farm is located, except for the farm itself), processing concentration

Table 1. Percentage of total farms with entrepreneurial diversification activities in the Netherlands.

| Province          | Diversified farms | Agro-tourism | Homestead/farm Sale | Processing of products | Care farms | Agri daycare |
|-------------------|-------------------|--------------|---------------------|------------------------|------------|-------------|
| Drenthe           | 5.77              | 2.77         | 2.35                | 0.70                   | 1.25       | 0.10        |
| Flevoland         | 5.20              | 1.98         | 2.50                | 1.66                   | 0.94       | 0.26        |
| Friesland         | 5.60              | 3.11         | 1.94                | 0.83                   | 0.85       | 0.12        |
| Gelderland        | 5.82              | 2.89         | 2.84                | 0.80                   | 1.06       | 0.08        |
| Groningen         | 4.53              | 1.57         | 2.60                | 0.86                   | 0.83       | 0.09        |
| Limburg           | 9.13              | 3.38         | 5.81                | 0.94                   | 0.90       | 0.04        |
| Noord-Brabant     | 5.56              | 2.36         | 3.19                | 0.54                   | 0.82       | 0.05        |
| Noord-Holland     | 7.80              | 4.18         | 3.25                | 1.31                   | 1.58       | 0.12        |
| Overijssel        | 4.97              | 2.87         | 1.99                | 0.67                   | 0.82       | 0.07        |
| Utrecht           | 7.90              | 4.07         | 3.49                | 1.83                   | 1.22       | 0.24        |
| Zeeland           | 13.05             | 8.31         | 5.49                | 1.55                   | 0.74       | 0.06        |
| Zuid-Holland      | 6.10              | 2.23         | 3.13                | 1.98                   | 0.90       | 0.07        |
(calculated as the percentage of farms with processing activity in the municipality where the farm is located, except for the farm itself), care-farm concentration (calculated as the percentage of farms with care activity in the municipality where the farm is located, except for the farm itself), and daycare concentration (calculated as the percentage of farms with daycare activity in the municipality where the farm is located, except for the farm itself). Including concentrations of different farm businesses also provides opportunities to capture the effects of both similar business concentration and related (horizontal and vertical businesses) business concentrations on farm entrepreneurial decisions.

**Control variables**

Type of soil is important because it affects cropping pattern and aesthetic attractiveness of a farm and its location (Meraner et al., 2015; Mishra et al., 2004; Pfeifer et al., 2009). If a farm has fertile soil, the farmer will specialize in farming; otherwise the farmer will have an entrepreneurial intent to secure sustained income (Meraner et al., 2015; Mishra et al., 2004; Pfeifer et al., 2009). We included three dummy variables to control any effects of soil condition of the farm: dummy for clay (if a farm is on clay soil, then the value is 1; 0 otherwise), dummy for sand (if a farm is on sand soil, then the value is 1; 0 otherwise) and dummy for peat (if a farm is on peat soil, then the value is 1; 0 otherwise).

Clustering of natural sites (Meraner et al., 2015; Pfeifer et al., 2009), such as proximity to beaches, forests, rivers or sea, makes a location attractive for tourists to visit, and thereby provides quasi-fixed inputs for any entrepreneurial decision. Distance from the nearest national landscape region and co-location with other natural sites were included to find the effect of these location-related, quasi-fixed inputs on farmers’ decisions for farm entrepreneurial activities. To control the effects of nature cluster, we included two distance variables from the nearest landscape region and the nearest nature site by calculating distance from the border of the nearest landscape region and nature, respectively, in kilometres, using geographical information system (GIS) technology. In addition, we included four dummy variables to control the effects of farm co-location with any of the natural sites: dummy for forest (if a farm is co-located with a forest, then the value is 1; 0 otherwise), dummy for beaches (if a farm is co-located with a beach, then the value is 1; 0 otherwise), dummy for fresh water (if a farm is co-located with a fresh water location, then the value is 1; 0 otherwise), and dummy for salt water (if a farm is co-located with a salt water location, then the value is 1; 0 otherwise).

A nearby population hub provides a market for any entrepreneurial business activities (Mishra et al., 2004). Using the report of Marlet and van Woerkens (2003), we considered 50 large municipalities in the Netherlands to calculate the distance from each farm to the nearest large population hub. We included this distance from the large town variable to control any impact of the nearest population hub by calculating distance (m) from the centre of the nearest large municipality using GIS technology. In addition to large municipalities, we included the cluster of economic activities by including the distance from the Randstad region in the analysis.

### Table 2. Mean value of key farm characteristics.

|                               | Farms with diversification activities | Farms without diversification activities |
|-------------------------------|--------------------------------------|------------------------------------------|
| Male family worker            | 1.45                                 | 1.32                                     |
| Female family worker          | 0.99                                 | 0.74                                     |
| Age                           | 51.61                                | 53.58                                    |
| Area (ha)/Physical farm size  | 35.75                                | 27.66                                    |
| Nederlandse grootte-eenheid (NGE)/economic farm size | 79.35 | 103.29 |
The Randstad Metropolitan Region is a major population and economic hub in the Netherlands (Feng et al., 2013; Priemus, 2018), which includes Rotterdam, The Hague and Amsterdam. Distance from the Randstad region variable was included to control any impact of the major economic hub by calculating the distance (km) from the border of the region using GIS technology.

There are a number of demographic variables in the analysis. Education level is found to be a significant factor in influencing entrepreneurial decision of the farmer (Haugen & Vik, 2008). Therefore, the highest education level attained by the head of the farm is included to control its effect as such: 1 and 2 for primary school, 3 and 4 for trade school, 5 and 6 for vocational education, 7 and 8 for professional education, and 9 and 10 for a university degree. Family involvement and collective efforts for any business activities on the farm make these an integral part of any farm entrepreneurial initiatives (Alsos et al., 2014; Fitz-Koch et al., 2018; Hansson et al., 2013). Gender is also found to be a significant factor (Haugen & Vik, 2008) in entrepreneurial activities. Therefore, the number of male and female family members was included as two different variables to control the effects of gender and family size. Age is an important factor because of its association with the investment perception in diversification activities (Serra et al., 2004). To control the age effect, age of the head of the farm, in years was included as a variable in the analysis.

Farm size is a measure of its available resources and thus an important determinant of the entrepreneurial decisions (Meraner et al., 2015; Mishra et al., 2004). Both physical farm size in terms of area of farm (ha) and economic farm size, in terms of total Nederlandse grootte eenheid (NGE), a Dutch size unit: 1 NGE = €1420 of the farm were included as two variables to control the effects of farm available resources on entrepreneurial decisions.

A dummy variable for greenhouse farming is a proxy to control any effect of high-tech or capital-intensive farming on entrepreneurial decisions. Seasonal cropping patterns, such as arable cropping activities of the farm, influences a farm’s motivation to diversify business in the off-season (Meraner et al., 2015). Therefore, we included a number of dummy variables to control cropping patterns of the farm: dummy for arable (if a farm has income from arable farming, then the value is 1; 0 otherwise), dummy for greenhouse (if a farm has income from greenhouse farming, then the value is 1; 0 otherwise), dummy for horticulture (if a farm has income from horticulture farming, then the value is 1; 0 otherwise), dummy for cattle (if a farm has income from its cattle, then the value is 1; 0 otherwise), dummy for poultry (if a farm has income from its poultry, then the value is 1, 0 otherwise), and dummy for pigs (if a farm has income from its pigs, then the value is 1; 0 otherwise).

A list of control and independent variables is given in Table 3. Descriptive statistics and correlation matrix of the variables are presented in Table 4.

**Method**

Because of the two possible outcomes – a farm has diversification activities or not – a binary choice model is appropriate for conducting the regression. Our dependent variable has only two outcomes:

\[
Y = \begin{cases} 
1 & \text{if a farm has any of the five diversification activities} \\
0 & \text{if a farm does not have any diversification activities} 
\end{cases}
\]

The probit regression model is a binary choice model and has the following form:

\[
Pr (Y = 1) = h(\alpha + \beta X)
\]
where $Pr$ means the probability of a farm having diversification activities; $h$ is normally distributed and transforms $\alpha + \beta X$ to intervals 0 and 1. The parameters $\beta$ are estimated by maximum likelihood.

This study takes five activities as diversification activities in the Netherlands. Different activities in the same farm may be interdependent (Pfeifer et al., 2009). Interdependence
Table 4. Descriptive statistics and correlation matrix.

| Variables                                      | Mean  | SD    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |
|------------------------------------------------|-------|-------|------|------|------|------|------|------|------|------|
| 1 Dummy for loam                               | 0.015 | 0.123 | 1    |      |      |      |      |      |      |      |
| 2 Dummy for clay                               | 0.355 | 0.479 | −0.09| 1    |      |      |      |      |      |      |
| 3 Dummy for sand                                | 0.561 | 0.496 | −0.14| −0.84| 1    |      |      |      |      |      |
| 4 Distance from the Randstad                   | 49.831| 38.543| 0.22 | −0.28| 0.31 | 1    |      |      |      |      |
| 5 Distance from the national landscape         | 9.406 | 9.962 | −0.09| −0.18| 0.28 | 0.3  | 1    |      |      |      |
| 6 Dummy for forest                              | 0.489 | 0.5   | 0.11 | −0.53| 0.6  | 0.24 | 0.21 | 1    |      |      |
| 7 Dummy for beaches                             | 0.052 | 0.222 | −0.03| −0.02| 0.04 | −0.03| 0.09 | −0.23| 1    |      |
| 8 Dummy for fresh water                         | 0.377 | 0.485 | −0.08| 0.44 | −0.54| −0.33| −0.3 | −0.76| −0.18| 1    |
| 9 Dummy for salt water                          | 0.041 | 0.198 | −0.03| 0.23 | −0.18| 0.07 | 0.04 | −0.2 | −0.05| −0.16| 1    |
| 10 Distance from the natural site               | 3.022 | 2.434 | 0.12 | 0.04 | −0.05| 0.17 | −0.06| 0    | −0.04| −0.01| 0.04 |
| 11 Physical farm size                           | 27.873| 53.378| −0.01| 0.06 | −0.07| 0.1  | 0.01 | −0.06| 0    | 0.02 | 0.05 |
| 12 Distance from the town                       | 16152.9| 10372.04| −0.1 | 0.03 | 0.04 | 0.34 | 0.1  | −0.03| 0.08 | −0.17| 0.34 |
| 13 Education                                    | 4.944 | 1.656 | −0.01| 0.08 | −0.05| 0.06 | 0.06 | −0.02| −0.01| 0.01 | 0.04 |
| 14 Male                                         | 1.324 | 0.684 | 0.01 | 0.03 | −0.04| 0.02 | −0.01| −0.04| 0.02 | 0.02 | 0.01 |
| 15 Female                                       | 0.756 | 0.662 | 0    | 0    | −0.01| 0.01 | 0.01 | 0    | 0    | −0.01| −0.01|
| 16 Age                                          | 54.609| 11.325| 0.03 | −0.03| 0.02 | 0.02 | −0.06| 0.01 | −0.01| 0.01 | 0    |
| 17 Economic farm size                           | 96.205| 206.742| −0.03| 0.07 | −0.06| −0.07| 0.08 | −0.05| 0.05 | 0.03 | 0    |
| 18 Dummy for arable                             | 0.416 | 0.493 | 0.07 | 0.04 | 0.03 | 0.16 | 0.15 | 0.1  | −0.03| −0.15| 0.11 |
| 19 Dummy for horticulture                       | 0.161 | 0.368 | 0.02 | 0.06 | −0.07| −0.16| 0.07 | −0.07| 0.05 | 0.06 | 0.02 |
| 20 Dummy for greenhouse                          | 0.088 | 0.283 | −0.03| 0.11 | −0.13| −0.24| 0.04 | −0.13| 0.14 | 0.11 | −0.04|
| 21 Dummy for cattle                              | 0.464 | 0.499 | −0.02| −0.12| 0.09 | 0.07 | −0.14| 0.07 | −0.08| −0.01| −0.08|
| 22 Dummy for pigs                               | 0.103 | 0.304 | −0.03| −0.15| 0.18 | 0.01 | 0.04 | 0.18 | −0.05| −0.14| −0.06|
| 23 Dummy for poultry                             | 0.034 | 0.182 | −0.01| −0.06| 0.07 | 0.02 | 0.04 | 0.07 | −0.02| −0.07| −0.01|
| 24 Concentration of farm entrepreneurship activities| 6.346 | 4.57  | 0.31 | 0.09 | −0.16| 0.02 | −0.09| −0.06| 0.1  | −0.02| 0.15 |
### Table 4. Continued

|   | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 0.01 | 1 |     |    |    |    |    |    |    |    |    |    |    |    |    |
| 2 | 0.11 | 0.09 | 1 |    |    |    |    |    |    |    |    |    |    |    |    |
| 3 | 0.02 | 0.12 | 0.07 | 1 |    |    |    |    |    |    |    |    |    |    |    |
| 4 | 0.02 | 0.14 | 0.01 | 0.03 | 1 |    |    |    |    |    |    |    |    |    |    |
| 5 | 0.01 | 0.07 | -0.01 | 0.04 | 0.23 | 1 |    |    |    |    |    |    |    |    |    |
| 6 | 0 | -0.09 | 0 | -0.29 | -0.01 | -0.08 | 1 |    |    |    |    |    |    |    |    |
| 7 | -0.02 | 0.16 | -0.06 | 0.09 | 0.1 | 0.02 | -0.17 | 1 |    |    |    |    |    |    |    |
| 8 | 0.01 | 0.12 | 0.18 | 0.08 | 0 | -0.02 | 0.02 | -0.05 | 1 |    |    |    |    |    |    |
| 9 | -0.03 | -0.06 | -0.07 | 0.04 | 0.05 | 0.05 | -0.08 | 0.1 | 0 | 1 |    |    |    |    |    |
| 10 | -0.06 | -0.13 | -0.18 | 0.02 | 0.02 | 0.02 | -0.1 | 0.3 | -0.19 | 0.2 | 1 |    |    |    |    |
| 11 | 0.03 | 0.15 | 0 | -0.05 | 0.11 | 0.08 | -0.01 | -0.08 | -0.18 | -0.3 | -0.28 | 1 |    |    |    |
| 12 | -0.01 | -0.05 | -0.04 | 0 | 0 | 0.04 | -0.08 | 0.02 | 0.11 | -0.06 | -0.1 | -0.05 | 1 |    |    |
| 13 | 0 | -0.02 | 0 | 0.01 | 0.01 | 0.04 | -0.05 | 0.02 | 0.03 | -0.03 | -0.05 | -0.06 | 0.01 | 1 |
| 14 | -0.04 | 0.04 | 0.24 | 0.01 | 0 | -0.01 | 0.04 | -0.08 | 0.12 | 0 | -0.12 | -0.02 | -0.06 | -0.02 | 1 |
| Category                          | Variables                      | Coefficient estimates |
|----------------------------------|--------------------------------|-----------------------|
| Individual attributes            | Education                      | 0.0542725***          |
|                                  |                                | (0.0056754)           |
|                                  | Age                            | −0.0088639***         |
|                                  |                                | (0.0008697)           |
| Inputs and resources             | Male                           | 0.0707639***          |
|                                  |                                | (0.0123792)           |
|                                  | Female                         | 0.2365045***          |
|                                  |                                | (0.0125704)           |
|                                  | Physical farm size             | 0.0007604***          |
|                                  |                                | (0.0001159)           |
|                                  | Economic farm size             | −0.001071***          |
|                                  |                                | (0.0001024)           |
| Market                           | Distance from the Randstad     | 0.0003481             |
|                                  |                                | (0.0002952)           |
|                                  | Distance from the town         | −2.23e−07             |
|                                  |                                | (9.66e−07)            |
| Cropping pattern/supply of farm products | Dummy for arable              | 0.2247628***          |
|                                  |                                | (0.0190169)           |
|                                  | Dummy for greenhouse           | −0.0921036**          |
|                                  |                                | (0.0396086)           |
|                                  | Dummy for horticulture         | 0.5078169***          |
|                                  |                                | (0.0234965)           |
|                                  | Dummy for cattle               | 0.1553765***          |
|                                  |                                | (0.0201488)           |
|                                  | Dummy for poultry              | 0.5024832***          |
|                                  |                                | (0.0397689)           |
| Quasi-fixed inputs/‘first-nature geography’ | Dummy for pigs                | −0.0399476            |
|                                  |                                | (0.0311706)           |
|                                  | Dummy for clay                 | −0.0944229***         |
|                                  |                                | (0.0366324)           |
|                                  | Dummy for sand                 | −0.0863059**          |
|                                  |                                | (0.0404975)           |
|                                  | Dummy for loam                 | −0.1707749**          |
|                                  |                                | (0.0770754)           |
|                                  | Distance from the national landscape | −0.004472***         |
|                                  |                                | (0.0009759)           |
|                                  | Distance from the nature site  | −0.0169306***         |
|                                  |                                | (0.0037625)           |
|                                  | Dummy for forest               | 0.0675628             |
|                                  |                                | (0.0507537)           |
|                                  | Dummy for beaches              | 0.0099567             |
|                                  |                                | (0.063637)            |
|                                  | Dummy for fresh water          | 0.084999*             |
|                                  |                                | (0.0504484)           |
|                                  | Dummy for salt water           | 0.0684205             |
|                                  |                                | (0.0631648)           |
| ‘Second-nature geography’        | Concentration of farm entrepreneurship activities | 0.0508451*** |
|                                  |                                | (0.0017463)           |

(Continued)
between each of these diversification activities should be taken into account when estimating the probability of starting a specific activity. Therefore, to ensure robustness, in addition to a binary probit we used a multivariate probit regression model to estimate five probits simultaneously while considering their interdependence:

$$Y_m = \begin{cases} 1 & \text{if a farm has a specific diversification activity} \\ 0 & \text{if a farm does not have the specific activity} \end{cases}$$

where \( m = 5 \) (agro-tourism, farm sale, processing of products, care farm, daycare).

As a result, there will be a five-equation multivariate probit model:

$$Y_{i5} = \beta_{5}X_{i5} + \epsilon_{i5}$$

$$Y_{i5} = 1 \text{ if } Y_{i5}^* > 0 \text{ and } 0 \text{ otherwise}$$

where the error terms \( \epsilon \) are multivariate normally distributed with 0 means and 5 \( \times \) 5 covariance matrix with 1 on the diagonal axis and off-diagonal elements are correlations of two activities (Cappellari & Jenkins, 2003).

**RESULTS**

Table 5 shows findings of the probit regression. The statistical significance of the coefficients is reported based on a Wald chi-square test. The hypothesis of the study states that concentration of entrepreneurial diversification in a region (i.e., municipality) increases the likelihood that a farm will have agricultural entrepreneurial activity on the farm. Findings of the probit regression show that a 1% increase in the concentration of entrepreneurial diversification activities in a municipality increases the probability that a farm has agricultural entrepreneurship by 5%. After controlling the effects of individual attributes of the head of the farm, cropping pattern, farm inputs, farm resources, and first-nature geography, which most agricultural entrepreneurship studies have addressed, second-nature geography is found statistically significant (\( p < 0.01 \)) for explaining entrepreneurial diversification on the farm.

Considering that farm entrepreneurial activities could be interdependent, we ran a multivariate probit regression for the robustness check of the findings from the probit regression model. Multivariate probit regression enables us to take into account the relationships between different diversification activities and provides a better estimation. Results of the multivariate probit are given in Table 6. To check the sensitivity of the independent variable, we have included five concentration variables, one for every entrepreneurial diversification activity in this analysis of multivariate regression. The results show that farm entrepreneurship is not only explained by concentration of similar activity but also by concentrations of other
Table 6. Multivariate Probit regression model

| Category                        | Variables                  | Agro-tourism | Farm sale | Processing | Care farm | Daycare |
|---------------------------------|----------------------------|--------------|-----------|------------|-----------|---------|
| Individual attributes           | Education                  | 0.0567743*** | 0.0302978*** | 0.0518525*** | 0.0861267*** | 0.0164962 |
|                                 | Age                        | -0.00507***  | -0.0086246*** | -0.0078513*** | -0.0140681*** | -0.0146258*** |
| Inputs and resources            | Male family worker         | 0.0224342    | 0.1105204*** | 0.0942629*** | -0.0276818    | -0.0350525 |
|                                 | Female                     | 0.2384361*** | 0.1868552*** | 0.1866883*** | 0.156543***   | 0.1559493*** |
|                                 | Physical farm size         | 0.0005615*** | 0.0008376*** | 0.0005748*** | 0.0006016***  | -0.0002042  |
| Market                          | Economic farm size         | -0.0008572***| -0.0012873***| -0.0000429  | -0.0013959*** | -0.0003389  |
|                                 | Distance from the Randstad | -0.0003396   | 0.0012277*** | -0.0006206  | -0.000203    | 0.0003958   |
|                                 | Distance from the town     | 3.64e-07     | -0.000015*** | -8.75e-06*  | -2.36e-06    | -0.0000226* |
|                                 | Distance from the town squared | 1.08e-10*  | 2.39e-10***  | 1.92e-10**  | 4.10e-11     | 5.28e-10**  |
| Cropping pattern/               | Dummy for arable           | 0.0716757*** | 0.3892504*** | 0.2535554*** | 0.0846001**  | 0.210839**  |
| supply of farm products         | Dummy for greenhouse       | -0.5009124***| 0.1222937*** | -0.2537607***| 0.097711     | -0.3699104  |
|                                 | Dummy for horticulture     | 0.1161624*** | 0.8030402*** | 0.4879521*** | 0.3338738***  | -0.0169334  |
|                                 | Dummy for cattle           | 0.0588233**  | 0.1615152*** | 0.2951396*** | 0.41626***    | 0.2162283**  |
|                                 | Dummy for poultry          | 0.1077633*   | 0.7355586*** | 0.3414076*** | 0.5698064***  | 0.3506029**  |
|                                 | Dummy for pigs             | -0.1194902***| -0.0383211  | 0.0672984   | 0.2543067***  | 0.0851159   |
|                                 | Dummy for clay             | -0.1356414***| 0.0896481*  | -0.1161734* | -0.097275    | -0.1311513  |
|                                 | Dummy for sand             | -0.1146335** | 0.0106639   | -0.2924813***| -0.0818819   | -0.271453   |
|                                 | Dummy for loam             | 0.0567985*   | 0.1985795** | 0.0320871   | -0.1154101   | -3.421782   |
|                                 | Distance from landscape    | -0.0049412***| -0.0028073* | -0.0047743**| -0.0041068*  | 0.0013083   |
|                                 | regions                    |               |            |            |            |          |
|                                 | Distance from the natural  | -0.0319715***| -0.0130518***| -0.017223***| 0.0011316    | -0.0270584  |
|                                 | site                       |               |            |            |            |          |
|                                 | Dummy for forest           | 0.1226695*   | 0.0742284   | 0.1562002   | 0.0498233    | -0.0996966  |
|                                 | Dummy for beaches          | 0.0995553    | 0.0370142   | 0.0755476   | 0.125337     | -3.410307   |
|                                 | Dummy for fresh water      | 0.036383     | 0.1550608** | 0.1353715   | 0.1074018    | -0.1367889  |
|                                 | Dummy for salt water       | -0.0028037   | 0.1644037***| 0.2314079*  | 0.0344633    | -0.5145732  |
| ‘Second-nature geography’ | Concentration of farms have tourism activity in municipality | 0.0448757*** | 0.0116236*** | 0.0097037* | 0.0003887* | 0.0116119 |
|--------------------------|-------------------------------------------------------------|---------------|---------------|-------------|-------------|-------------|
|                          | Concentration of farms have farm sale in municipality       | 0.0007394     | 0.0302612***  | −0.009423   | 0.0010117   | −0.0225476 |
|                          | Concentration of farms have processing in municipality      | 0.0297937***  | 0.0089479     | 0.075716*** | 0.0093051   | 0.0365948  |
|                          | Concentration of farms have care farm in municipality       | −0.023575*    | 0.0222116**   | 0.0297137** | 0.0543809***| 0.0598522**|
|                          | Concentration of farms have daycare activity in municipality| 0.0243899     | 0.067959      | 0.1396031** | 0.0907666   | −0.0928692 |
| Constant                 |                                                             | −2.198693***  | −2.497651***  | −2.808776***| −2.503044***| −2.254944***|
| Observations             |                                                             | 57,195        |                |             |             |             |
| Pseudo-R²                |                                                             | 0.3038        |                |             |             |             |

Note: Statistical significance: *p < 0.1; **p < 0.05; ***p < 0.01.
entrepreneurial activities. We checked the variance inflation factor (VIF) for possible multicollinearity: VIFs are found to be less than 10 and this suggests no multicollinearity in our model.

After the sensitivity and robustness check, the finding in relation to the hypothesis of the study has been consistent, and it shows that concentration of entrepreneurial activities significantly explains farm entrepreneurship. Farmers enjoy agglomeration benefits such as pecuniary and technological externalities from the concentration.

**DISCUSSION AND CONCLUSIONS**

The economic geography literature examines how ‘macro-heterogeneity’ of locations influences micro-level decisions of economic agents (Ottaviano, 2011). In previous studies, it is found that new entrepreneurial activities are high in regions with high concentration of such activities (Reynolds et al., 1994a) or high intensity of the relevant industrial activities (Armington & Acs, 2002). However, agricultural entrepreneurship literature did not pay adequate attention to the effects of a concentration on entrepreneurship. Taking the agricultural sector as a context, this study has sought to address this gap in the agricultural entrepreneurship literature to explain the role of concentration of entrepreneurship at municipality-level in entrepreneurial diversification on the farm. Thus it investigates the impact of ‘macro-heterogeneity’ of the second-nature geography on micro-level farm entrepreneurship. In particular, in the agricultural entrepreneurship literature, most studies have focused on the first-nature geography in their investigation of the locational influence on agricultural entrepreneurship at micro-level. However, a lack of attention is paid to how the ‘macro-heterogeneity’ of second-nature geography influences entrepreneurial decisions at micro-level. Therefore, this study has made a number of contributions in agricultural entrepreneurship theory and practice.

The concept of economic geography, to decompose location into ‘first nature’ and ‘second nature’, has important implications for entrepreneurship. The factors considered to define location remain incomplete in the entrepreneurship literature because adequate attention to second-nature geography is not paid, which has left location a neglected factor. By integrating knowledge from economic geography literature, this study has decomposed locational factors and empirically examined the influence of second-nature geography, while controlling the influence of the other. Second-nature geography provides an opportunity to acquire information from different sources, and with its pecuniary and technological externalities this provides advantages and incentives for entrepreneurial ventures. Thus, second-nature geography explains the central questions of entrepreneurship, ‘why, when, and how’ entrepreneurship opportunities are discovered, and ‘why, when, and how’, compared with others, ‘some people’ use these opportunities (Shane & Venkataraman, 2000, p. 218; 2001; Venkataraman, 1997).

Agricultural entrepreneurship is highly dependent on first-nature geography because farmers often combine agricultural activities with farm entrepreneurship (Carter, 1998a, 1999). This pluri-activity makes location a very important factor in farm entrepreneurship, because farms’ agricultural activity depends on natural conditions where the farm is located. However, the importance of first-nature geography does not reduce the importance of second-nature geography. This study argues that the availability of relevant businesses in close proximity can make a location attractive by providing the opportunity to integrate business with supporting businesses vertically and horizontally (Wu, 2018). The opportunity to integrate businesses with supporting activities in close proximity provides increasing returns to scale and thus reduces the costs of or increases the incentives for starting farm entrepreneurship. Therefore, without undermining the role of first-nature geography, this study argues that second-nature geography merits similar importance in the agricultural entrepreneurship literature. Based on the farm household model, this study has made a theoretical contribution to how economic geography can influence
the decision of the farm household to start entrepreneurial diversification on the farm. It thus ensures an economic geography literature focus by integrating the ‘macro-heterogeneity’ of locations into a microeconomic decision-making model.

However, this study is not free from limitations. Access to farm data is a major challenge that this study encountered. Future studies can conduct a longitudinal analysis instead of a cross-sectional analysis to estimate the influence of locational factors more precisely. Further, agricultural entrepreneurship includes both on- and off-farm diversification (Fitz-Koch et al., 2018). However, this study could not include off-farm diversification activities due to unavailability of data. Future research can conduct a comparative study on the impact of second-nature geography between on- and off-farm diversification. The Netherlands is relatively a small and ‘flat’ country, and therefore it is more homogeneous than heterogeneous. Although the statistically significant findings of the role of location in a relatively homogeneous country are very promising, future research can make a comparative analysis between heterogeneous and homogenous countries. Future research can also focus on performance implications of agricultural entrepreneurship in a concentration of similar or relevant activities. After a certain level, agglomeration effects on performance might become negative (Antonelli et al., 2011). Therefore, future studies can investigate whether agglomeration effects on performance of farm entrepreneurship become negative after a certain level, making the relationship an inverse-‘U’ shape. Despite these limitations, this study makes significant theoretical contributions in the field of entrepreneurship.

ACKNOWLEDGEMENTS

The authors thank the editor, Dr Adelheid Holl, and two anonymous reviewers for their constructive suggestions that strengthened the quality of the paper.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

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